



NCI Hub

TECHINICAL REPORT

Eamon Coleman

x10364935 | EAMON.COLEMAN@STUDENT.NCIRL.IE

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- prohibiting a student from sitting any examination or assessment.,
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Executive Summary

NCI Hub is an extremely user friendly system that allows to user to easily access information about the college's services, facilities, staff as well as provide local transport information.

The system is based around the idea of making students and staff life easier by offering 24/7 on demand information concerning their course, timetables, room availability and facilities using a Facebook Chat bot with artificial intelligence.

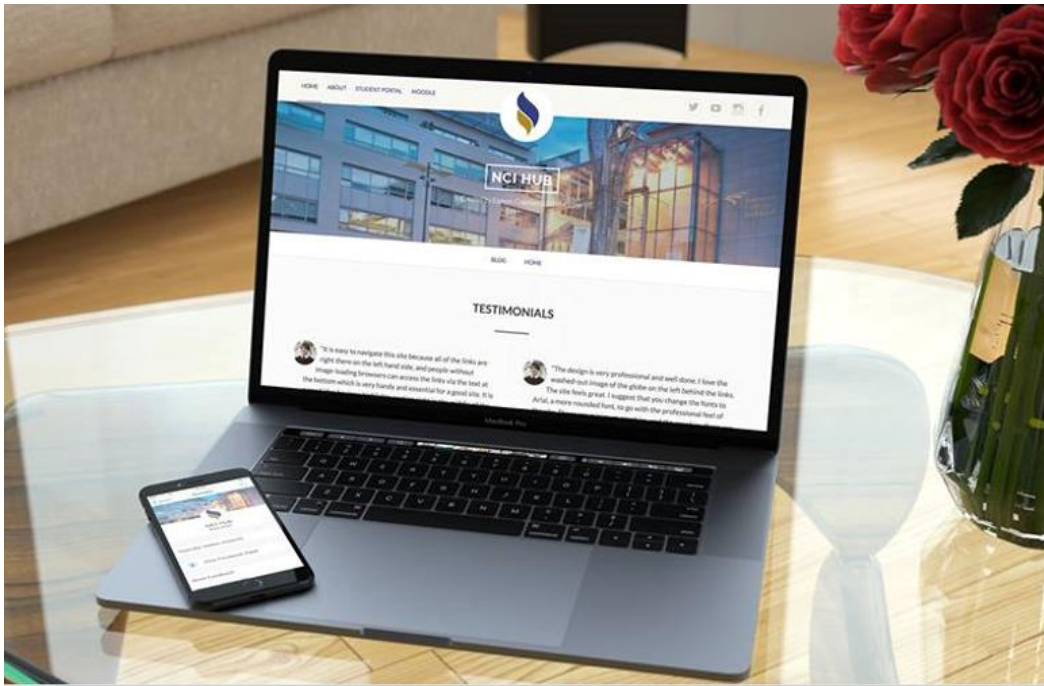


Figure 1: NCI Hub across the platforms

The Problem

As it stands right now, if a student as a general question or query about rooms and timetables they must go to the college website and search of the required information there.

This process usually involves the student signing into the college portal or using the main NCI website. Most of the time students are using their mobiles to access the information on the go but NCI's college page among others unfortunately don't scale very well across mobile platforms a student has a choice of working through this issue or waiting to use a desktop.

In addition, it requires the user to navigate through several pages and logins to access the information.

This process has frustrated both myself and every other student at some point or another as it takes time and energy that could be more usefully spent on academic pursuits. Another area that the college can improve on is an interactive campus map that could more accurately represent the college's layout and facilities.

How it's being addressed

NCI Hub's chat bot feature allows students to access this information on the go as well as offering an easy, more interesting, and responsive method in doing so.

Offering this portable and highly accessible service would drastically cut down the time students spend on navigating through difficult we

NCI Hub will also provide a new interactive campus map for the college available on both desktop and mobile platforms.

Why makes NCI Hub unique

No system like these currently exists for this college or any other college. I've made a point of bringing up my chat bot idea in conversation to any student I can and have always received a positive and enthusiastic responses and interest towards the idea in particular the room status feature.

The project will be based on both mobile and desktop. I believe that primarily users will use the chat bot to gain access to most of the features and the website will come secondary is a medium to better show case the features.

I believe that this application could become a regular part of a student's college experience proving with an extremely useful and effective time saving tool.

What NCI Hub offers

This projects individuality and innovation is found in the method the information is displayed as well as the features being offered.

Chat Bot

- Incorporates Artificial Intelligence.
- Room Status.
- Lecturer Directory.
- Timetables.
- Basic Conversation Features.
- Real Time Transport Information.
- FAQs.
- Links to Campus Maps.
- Advertise College and College Services.
- (Possibly) Reminder Function.
- Natural Language Processing
- Email Feedback
- Record User Information via a database
- Return Rich Messages to The User
- Utilize Facebook Chat Features I.e. Quick Messages and Cards.

Facebook Page

- Hosts Chat Bot.
- Displays College News and Updates.
- Links to Campus Map.

Campus Map

- Interactive Map.
- Displays Rooms Location and Information i.e. Number or Lecturer.
- Available on Desktop and Mobile Platform.

Real Time Bus Information

- Due Times for Common bus routes used by students.
- Integrated into chat bot.

Website

- Information about NCI Hub.
- Links to Facebook Page (Chat Bot).
- Links to Campus Maps.
- Links to social networks.

A Database (Postgres)

- Connected directly to the chat bot.
- Containing User Information .

1 Introduction

1.1 BACKGROUND

I've been a student for the last 4 years. In that time, I believe that myself and other students have had the problem with small queries that have resulted in either having to look them up which has proven to be time consuming and in some cases difficult or just guess my answer and hope for the best.

For example.

- What time does the library shut?
- What's that lecturers room number?
- Is there a class on in SCR3?
- When is the next Bus?
- What is number for student services?
- Where is the SU?

I thought to myself could an easily accessible system be in place where all these general queries could be answered in one place.

During my research, I came across the "Facebook Chat Bot" which is a relatively new feature on the market that is quickly establishing itself as a new and exciting method of user interaction.

I'm quite confident that the implementation of a Facebook Chat bot in a college environment would be extremely well received among students as using Facebook as an information resource method is both new, unique, and extremely accessible.

One area that the chat bot could come in very useful is the real-time room status feature that I came up with since it seems to be an issue for a lot of students with NCI students being very much effected by it.

It was being in NCI that gave me the idea of creating a system that'd tell me the status of a room due to the inconvenience myself and peers experience daily of trying to find a free room.

For example, myself and my friends and I spend an average of 10 - 15 minutes every day in total looking for a free room to use the computers for group and independent study. Taken we're in college five days a week which makes an hour. So that's roughly 4 hours a month of lost time for students.

I think that this system could be used to all colleges with NCI in particular, as the college is relatively small with a limited library capacity which is usually hard to get a seat in at peak times during the semester let alone during exam periods.

One of my lecturers Ron Elliott even mentioned that the college is vastly growing with talks of purchasing another cite to expand the college due to this space issue.

I think that having this tool at every student's disposal could drastically increase the productivity of each student by and minimising the amount of time lost searching for a room given that this service applies to all the students in the college no matter field of student or year.

1.2 AIMS

The aim of project is to produce an effect time saving tool that'll be used by college students daily.

- Reinvent the how students access General Campus Information and ask FAQs
- Introduce a real-time method to check college facilities and availability.
- Introduce new features currently unavailable in this college.
- Offer an interactive map for college.

I came up with NCI Hub to address these problems while providing even more features.

1.3 TECHNOLOGIES

- **Facebook Developer**
This is used in the backend of my project to customize my chat bot.
- **JavaScript**
The file that the chat bot's logic is found is completely written in JavaScript
- **Heroku**
Heroku is a server application that I'm using as a place where my message can be pushed from Facebook to the server where my java script file resides to determine the responses that my chat bot outputs.
- **API.ai**
This makes my chatbot more intelligent and enabling it to pick out keys words in a sentence to give accurate and correct responses.
- **WordPress**
NCI Hubs website was made with a website content management system named WordPress.
- **ImageMapster**
I'm using google sketch up to create my campus maps. I first get the college's floor plan then build a 3D model of the college around that plan.
- **Database (PostGres)**
Postgres was linked to my chatbot using a Heroku.
- **Dublin Bus API**
The real-time information what is using in the chatbot was provided by The Dublin Bus real-time API made available by Data gov.
- **Photoshop**
All the graphics used throughout the project were created by myself of Photoshop.

2 System

2.1 REQUIREMENTS

2.1.1 Functional requirement

- **Check Room Status.**

Description: The main feature in my project is to check the status of the room in question using the time. The project will be connected to a database that'll refer to what is going on in a room at that given time.

Use Case

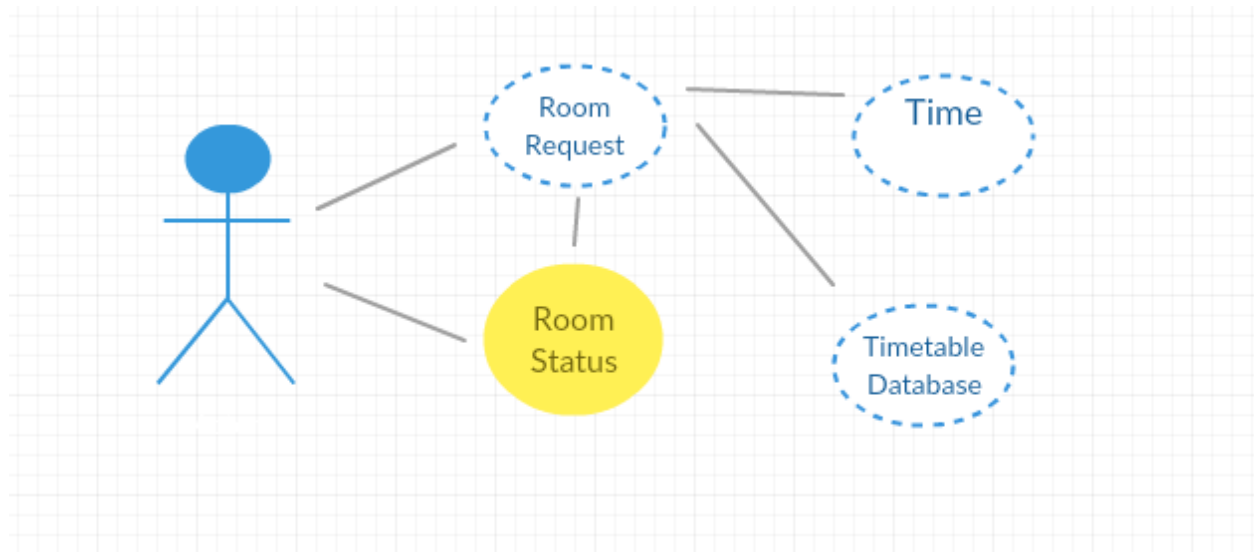


Figure 2: Room Status Use Case

- **Display the campus via interactive map.**

Description: An interactive map will be made for the college that'll display information about the rooms and facilities.

Use Case

Activation: The activation this requirement is when the user goes to a page where the map is hosted.

Main Flow: The

Alternate Flow: This process would have an alternate outcome if for example the user didn't have a WIFI connection which would result in no output being given and the action failing.

Termination: This process is completely terminated when the user shuts off their Facebook app.

Postcondition: The user must have a Facebook account, WIFI and been given access to the NCI Hub page.

- **Search Lecturer Directory.**

Description: My intention is to create a database of all the lecturers in the college which information will be requested by the user and pulled back in. This information will include Name, Telephone number, Department, Room Number and Role.

Use Case

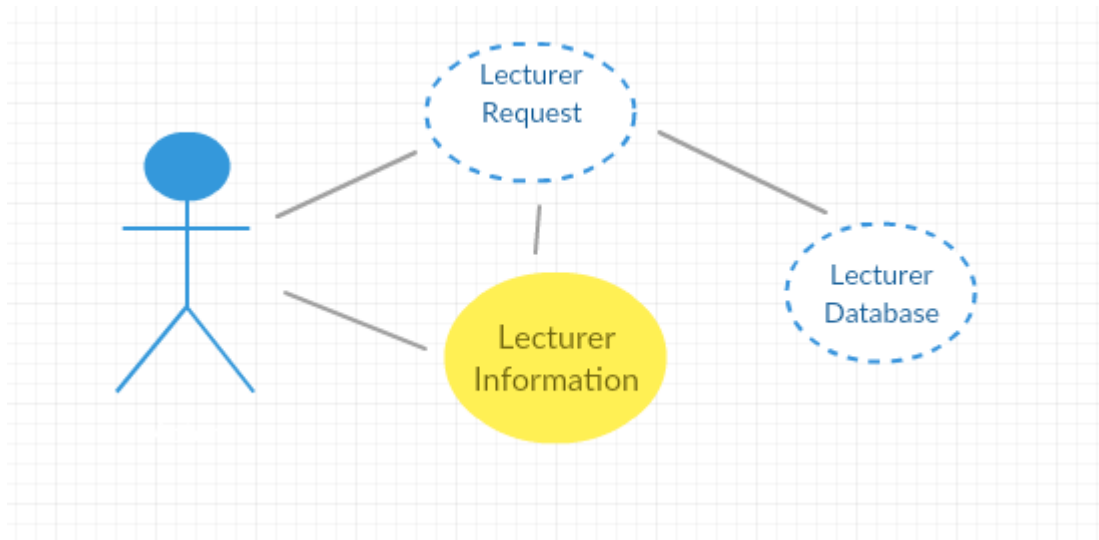


Figure 3: Search Lecturer Use Case

Precondition: The user must have a Facebook account, WIFI and been given access to the NCI Hub page. The user must know a small amount of information about the lecturer e.g Name, Room Number or Telephone Number.

Activation: This process starts when the user enters a lecturers name.

Main Flow: The user enters information about a lecturer. The code the searches this information from the database and returns all the information about the given lecturer.

For Example,

Paul Hayes
Department: IT
Number: (01) 4498612
Email: Paul.Hayes@ncirl.ie

Alternate Flow: This process would have an alternate outcome if for example the user didn't have a WIFI connection which would result in no output being given and the action failing.

Termination: This process is completely terminated when the user shuts off their Facebook app.

- **Answer FAQs**

Description: A list of FAQs about the college will also be created in which the user asks a frequently asked question for example. What time does the library shut? This information will pick out the key words in the sentence a then give back the relevant information.

Use Case

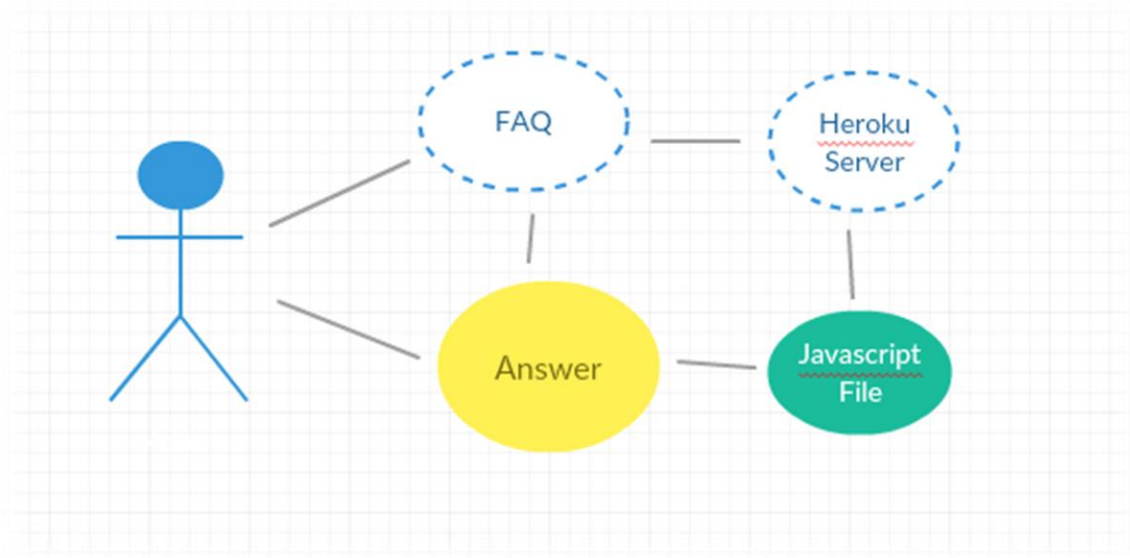


Figure 4: Answer FAQs Use Case

Precondition: The user must have a Facebook account, WIFI and been given access to the NCI Hub page.

Main Flow: The user enters a Frequently Asked question to the chat bot like “What time does the library close?” The code then retrieves the information from the database and returns it back to the user.

Alternate Flow: This process would have an alternate outcome if for example the user didn’t have a WIFI connection which would result in no output being given and the action failing.

Termination: This process is completely terminated when the user shuts off their Facebook app.

- **Book Rooms (Maybe)**

Description: I’m considering including a feature that’ll allow students to book rooms via the app.

Description: I am considering putting in a system that allows students to book certain rooms for student. This will involve them entering a specific time and room number that’ll then save in the database and become available information to the other users.

Precondition: The user must have a Facebook account, WIFI and been given access to the NCI Hub page.

Alternate Flow: This process would have an alternate outcome if for example the user didn’t have a WIFI connection which would result in no output being given and the action failing.

- **Display Real Time Transport Info**

Description: Dublin Transport has an API in which it can check public transport real time. I'm planning to include this in the chat bot so that students can

Use Case

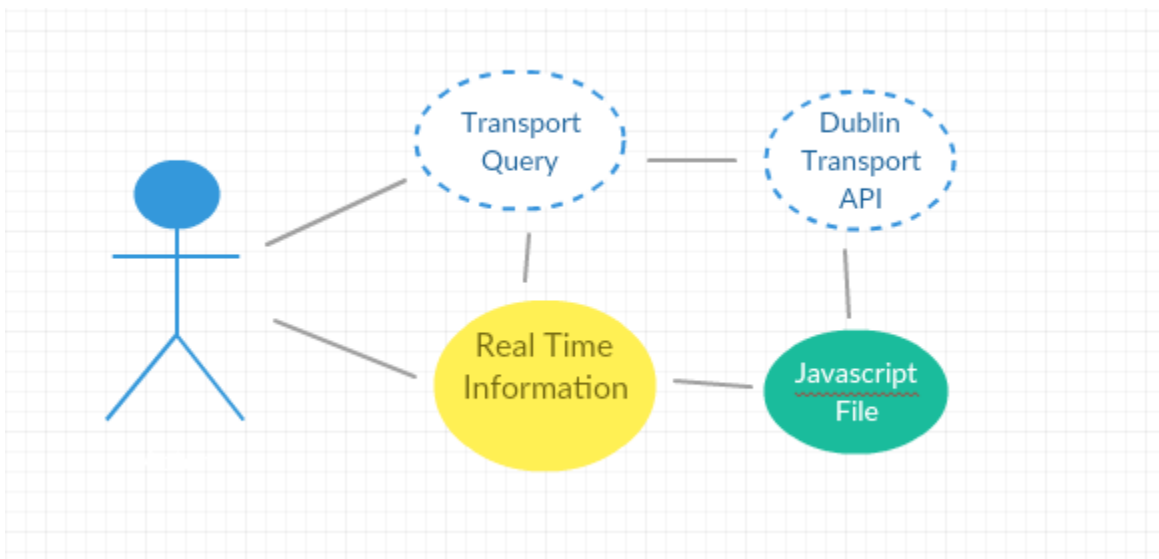


Figure 5: Real Time Transport Use Case

Precondition: The user must have a Facebook account, WIFI and been given access to the NCI Hub page. They must also know the information for the stop or station for example the Bus Stop

Activation: When the user submits and real-time transport query.

Main Flow: The user enters in information about a train station or Luas stop when the Dublin Bus API returns the real-time transport information for on those specifications and gives back the relevant information when the next form of transport is due.

Alternate Flow: This process would have an alternate outcome if for example the user didn't have a WIFI connection which would result in no output being given and the action failing.

Termination: This process is completely terminated when the user shuts off their Facebook app.

- **Advertise NCI**

Description: A feature that'll be included advertising for the colleges page and events. When a user links on an external link from the chat bot. A brief advertisement will appear for a couple of seconds in order to advertise that feature and direct more traffic back to the main NCI page.

Precondition: The user must have a Facebook account, WIFI and been given access to the NCI Hub page. Then then user must link on one of the external links given by the chat bot where there will be a 1/10 chance of this pop up being presented.

Activation: The process happens when the user clicks a link and retrieves the one in ten chance possible which triggers the pop over.

Main Flow: When the user enters a link given by the chat bot a short message will appear on a pop up for a small amount of time that'll display some sort of advertisement for the college or its services.

Alternate Flow: This process would have an alternate outcome if for example the user didn't have a WIFI connection which would result in no output being given and the action failing.

Termination: This process is completely terminated when the user shuts off their Facebook app.

2.1.2 Data requirements

The chat bot will require the following information to complete its purpose.

- **Facebook Information**
The chat bot must take in and be able to manipulate and store the users Facebook credentials i.e. they're Name, Gender, and Location.
- **Lecturers Information**
Every lecturer in the colleges general information i.e. Contact Number, Department, Room Number etc.
- **Room Information.**
The Room's status
- **Timetables**
A picture of all the course timetables.
- **FAQs**
General frequently asked questions by students. For example, "When does semester two start?"
- **Basic Conversation Features**
The chat bot must be intelligent enough to give information that would answer questions like "What time is it?" or "What's my name?"
- **Bus Times**
The time in minutes of when commonly used buses are due.
- **A Physical Representation of the College Layout (Campus Map)**
A map was need of the college to be used as a basis for my interactive ma
- **Room Equipment (Campus Map)**
How many computers and in a room and how many students the room can facilitate.
- **Lecturers Information and Offices (Campus Map)**
Information about lecturers and where they're offices are located.

2.1.3 User requirements

Facebook Page/Chat Bot

If this page became used how its intended the communications department of the college would manage the page and be completely in charge of who is given access to the Facebook page and all its features.

Campus Map

The campus map should be made for the public as it shouldn't contain anything that a non-student shouldn't see.

Website

I decided against putting any security on the NCI Hub website. In my opinion there is no sensitive data listed on the website and should be able to viewed by anyone.

2.1.4 Usability requirements

Performance

The performance of this project should be fast a reliable across the board was there is minimal pressure being up across the system

Responsiveness

NCI Hub will be fully responsive if all of the requirements are met like WIFI and a reliable device used by the user

2.2 DESIGN AND ARCHITECTURE

Chat Bot: The Chat Bots design and Architecture is built around Facebook's Messenger Framework.

Campus Map: The campus map was designed by myself using google sketch up

Website: The website's framework will be React JS.

2.2.1 Typical Chat Bot Architecture

Simple Chatbot Architecture

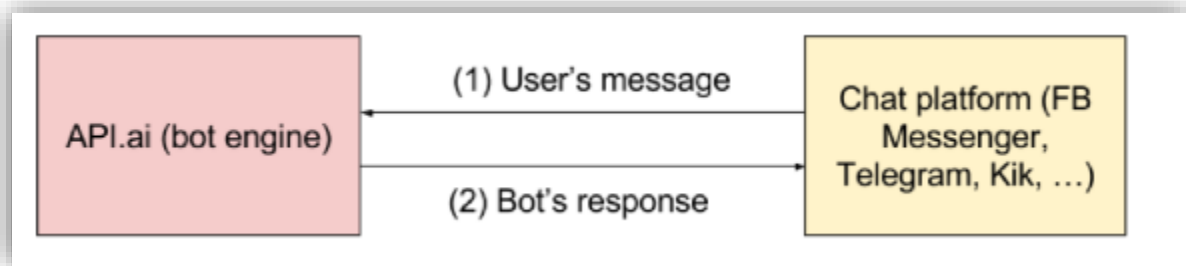


Figure 6: Simple Chat Bot Architecture

This use case illustrates a simple chat bot that is only connected to a natural language interface in this case API.ai. This process is linked together using a combination of Facebook web hooks and tokens as well as API.ai URLs.

Advanced Chatbot Architecture

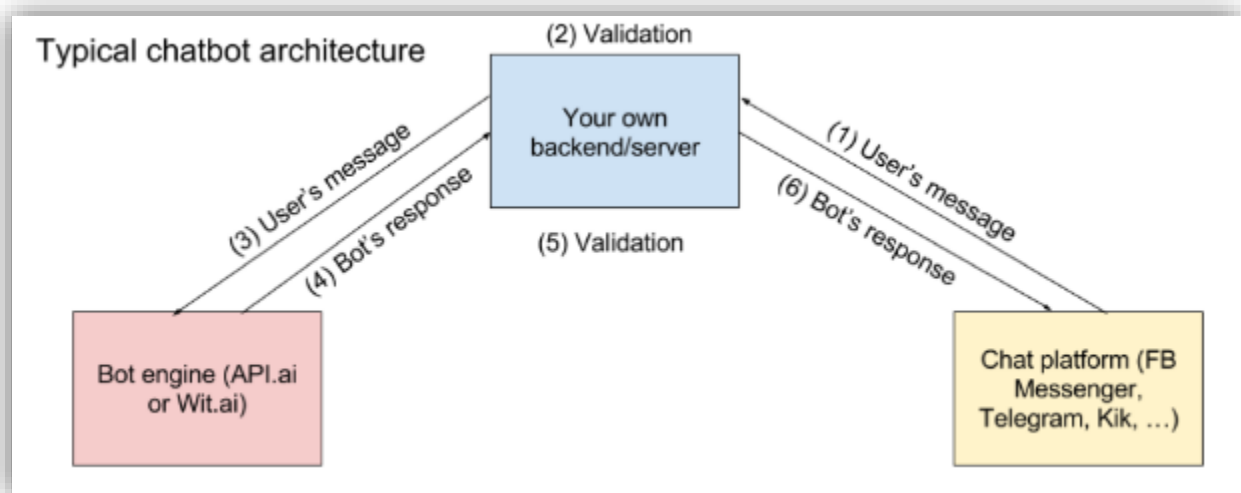


Figure 7: Advanced Chatbot Architecture

This layout is a little more complicated and was the design architecture that was followed for my project. The addition backend server is used to house additional features i.e. the Dublin bus real time transport information.

2.2.2 Use Case Sequence Diagram

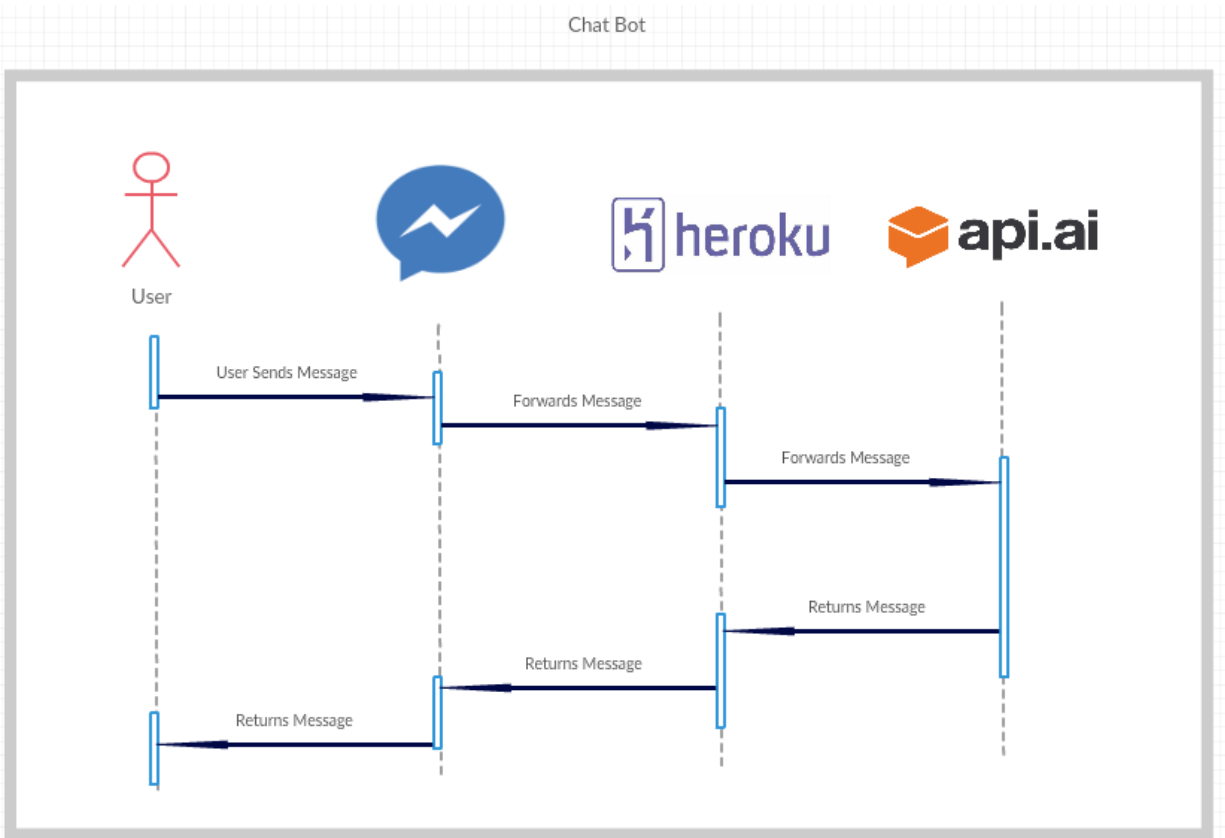


Figure 8: First Sequence Diagram

The process is initiated when the user sends a message via Facebook messenger. Using web hooks, it links to a JavaScript file that is hosted on a Heroku server.

That file is then connected to API.ai which can densifier that message and figure out an intent for that message e.g. if the user wanted to find out where is good to eat on campus. It either returns a response based on an intent or a confused response like "Can you rephrases that?".

This is then passed back to the Heroku server which returns the responses to Facebook messenger and read by the user.

Updated Sequence Diagram

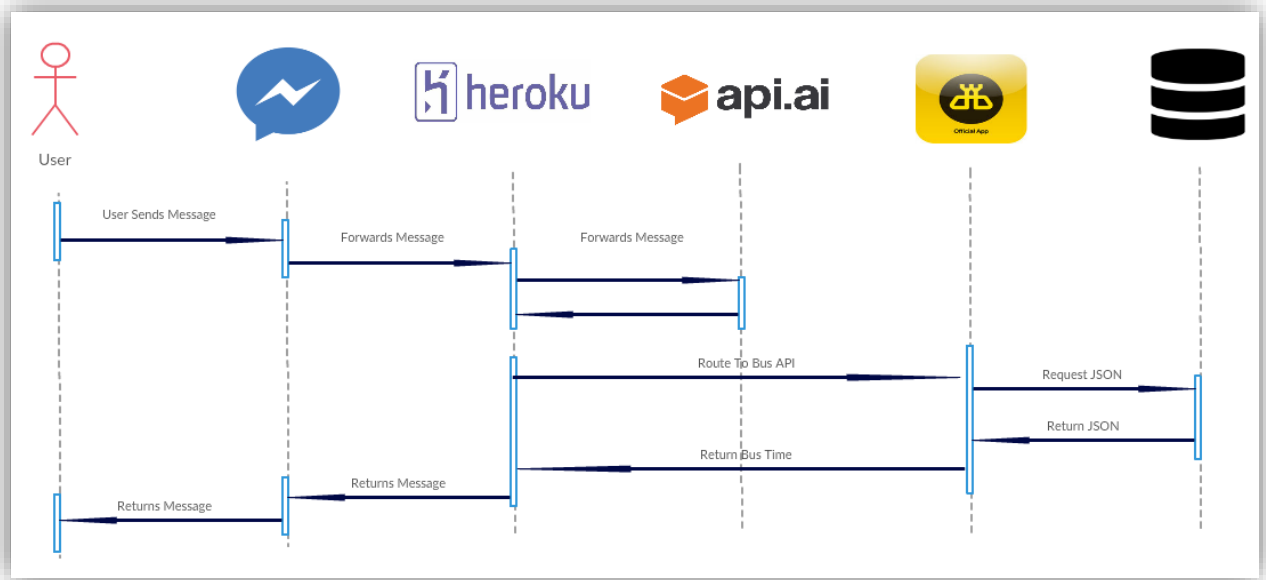


Figure 9: Final Sequence Diagram

This use case most accurately represents my chat bot. It illustrates the start to end process of who a message is sent, received, and transformed throughout my system.

This is an updated version of the sequence diagram after the implementation of both the Dublin Bus API and then database.

In addition to the previous steps then ins an another to process that can possibly take place.

The first begin a request being made to an additional Heroku server that hosts the Dublin Bus Real time API that returns the due times for buses.

The last is a database that is hosted on Heroku that records information that is beginning submitted by the user that is stored and could be further analyzed.

2.3 IMPLEMENTATION

In this section I will talk about the main algorithms/classes/functions that were used in my project and outline how they were executed via text and screen shots.

2.3.1 Chat Bot Set Up

Config.js file

```
1 module.exports = {
2   FB_PAGE_TOKEN: 'EAAJ2aBX63yMBADtHAL16LFQZAw5cR6IpwThigahOYx8m2DqEkdHns
3   FB_VERIFY_TOKEN: 'testbot_verify_token',
4   API_AI_CLIENT_ACCESS_TOKEN: '6c88a0aa9da740fca6199eac4f21f061',
5   FB_APP_SECRET: '40db0f0c6967118338c94cb89288925e',
6   SERVER_URL: "https://fathomless-atoll-13950.herokuapp.com/",
7 };
8
```

Figure 10: Access Tokens and Links

- **Facebook Page Token**
This is a unique token of my Facebook page “NCI Hub” This is
- **Facebook Verify Token**
This is a verification string what I created I used a simple easy to remember string 2testbot_verity_token”.
- **API AI Client Access Token**
This is a code that is linked to my API account where the natural language process takes place.
- **Facebook App Secret**
This is used for a method of security where it is linked to my Facebook developer account.
- **Server URL**
This is the URL of the Heroku server app’s webpage. When you put that page into the browser it’ll tell you that it is the landing page for NCI Hub chat bot.

App.js

The app.js file where the main activities take place. It's where all the logic is written for the chat bot and is the single most important file in what makes the app run.

This file contains how each input is dealt with. For simple queries that only require one response it redirects that query to API.ai where it is process.

While other more complicated queries are dealt with using the JavaScript contained in the file.

```

281 function handleMessage(message, sender) {
282   switch (message.type) {
283     case 0: //text
284       sendTextMessage(sender, message.speech);
285       break;
286     case 2: //quick replies
287       let replies = [];
288       for (var b = 0; b < message.replies.length; b++) {
289         let reply =
290           {
291             "content_type": "text",
292             "title": message.replies[b],
293             "payload": message.replies[b]
294           }
295         replies.push(reply);
296       }
297       sendQuickReply(sender, message.title, replies);
298       break;
299     case 3: //Image
300       sendImageMessage(sender, message.imageUrl);
301       break;
302     case 4:
303       // custom payload
304       var messageData = {
305         recipient: {
306           id: sender
307         },
308         message: message.payload.facebook
309       };
310     };
311

```

Figure 11: Code Snippet from App.js

Method Example

Here is a method that acts a

The case "Find a Course" is a feature where the user can look up in a specific course. In this case the course are separated into categories being Business, Computing and Management.

When the user enters something that triggers the intent of Find a course it prompts these three quick replies to appear.

Content type: The content type is the format of that da

Title: This is the what appears on the quick reply.

Payload: This is the outcome of what happens when that quick reply is returned.

```

27 function handleAPIAction(sender, action, responseText, contexts, parameters) {
28   switch (action) {
29     case "Find-A-Course":
30       let replies = [
31         {
32           "content_type": "text",
33           "title": "Business",
34           "payload": "Business"
35         },
36         {
37           "content_type": "text",
38           "title": "computing",
39           "payload": "computing"
40         },
41         {
42           "content_type": "text",
43           "title": "Finance",
44           "payload": "Finance"
45         }
46       ];
47       sendQuickReply(sender, responseText, replies);
48       break;
49     default:
50       //unhandled action, just send back the text
51       sendTextMessage(sender, responseText);
52   }
53 }

```

Figure 12: Quick Replies Method

Package.json

The package.json file is where all of the necessary packages are download and referenced for our project to use.

A lot of this code was directly supplied by the Facebook Developer platform but some additions had to be added such as updated version that were compatible with my chat bot as well as API.ai.

```
{
  "name": "hero",
  "version": "1.0.0",
  "description": "",
  "main": "app.js",
  "scripts": {
    "test": "echo \\\"Error: no test specified\\\" && exit 1"
  },
  "repository": {
    "type": "git",
    "url": ""
  },
  "author": "",
  "license": "ISC",
  "dependencies": {
    "apiai": "^2.0.5",
    "body-parser": "^1.15.1",
    "express": "^4.13.4",
    "request": "^2.72.0",
    "uuid": "^2.0.3"
  }
}
```

Figure 13: Package Imports

2.3.2 Chat Bot Features

Persistent Menu

With natural conversations being so unpredictable I decided to introduce a persistent menu to act as aid in the conversation always being there for quick navigation to a website or even just list NCI Hubs features if the user is lost.

This menu is constantly present on the chat window to provide quick navigate to useful sources. In this case, I've added a link to the student portal and Moodle.

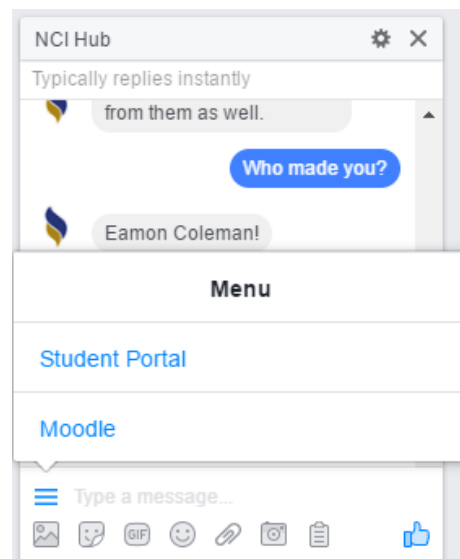


Figure 14: Persistent Menu

Below I've listed a code snippet that acted as a starting point in my creation of my persistent menu in NCI Hub.

This code is a curl request that is made to the server. This makes requests to the Heroku server using different protocols.

Since this code will be input directly into our command prompt and won't be included into our app.js file it requires us to include our unique Facebook Page Access token to commit the menu to our messenger.

```
curl -X POST -H "Content-Type: application/json" -d '{
  "setting_type" : "call_to_actions",
  "thread_state" : "existing_thread",
  "call_to_actions": [
    {
      "type": "postback",
      "title": "Help",
      "payload": "DEVELOPER_DEFINED_PAYLOAD_FOR_HELP"
    },
    {
      "type": "postback",
      "title": "Start a New Order",
      "payload": "DEVELOPER_DEFINED_PAYLOAD_FOR_START_ORDER"
    },
    {
      "type": "web_url",
      "title": "Checkout",
      "url": "https://petersapparel.parseapp.com/checkout",
      "webview_height_ratio": "full",
      "messenger_extensions": true
    },
    {
      "type": "web_url",
      "title": "View Website",
      "url": "https://petersapparel.parseapp.com/"
    }
  ]
}' "https://graph.facebook.com/v2.6/me/thread_settings?access_token=PAGE_ACC
```

Figure 15: Code For Payload

The array "Call To Actions" lists all of the items will be present in our menu. . Frist, it defines a "type" which could be a link, post back, or checkout. For my menu, I've listed a post back when returns the features to the user and two links which go to college websites. I made this choice after talking with some students and asking them what features they'd be likely to need most.

The title simply refers to what that menu item will say.

Then finally, the payload must be written in the code and trigger a response e.g. List all feature of menus of the chatbot or return to main menu. Below is a code snippet of a payload to list all the features.

```
755 var payload = event.postback.payload;
756
757 switch (payload) {
758
759   case 'LIST_FEATURES'
760     // List Features of the Chat bot
761     sendToApiAi(senderID, "Features");
762     break;
```

Figure 16: Code for Payload

Course Enquiry

With the chatbot being back of a college's information system I wanted to create a way that the user's could enter into a back and forth conversation with the end goal being given information about that user's desired course.

I first created an intent by the name "Course-Enquiry" that I'd use to initiated the conversation and gain information about what course that user wanted to learn about.

I used three areas of study for the chatbot to keep things simple. Business, Computing and Finance. With the aid of API.ai I created an entity for each of them that would enable me to create message paths that the conversation could go depending on their answer.

In did this by creating context to the conversation and connected all of the contexts together In order for the system to enquire and ask for information in order to return the correct information about the users desired course.

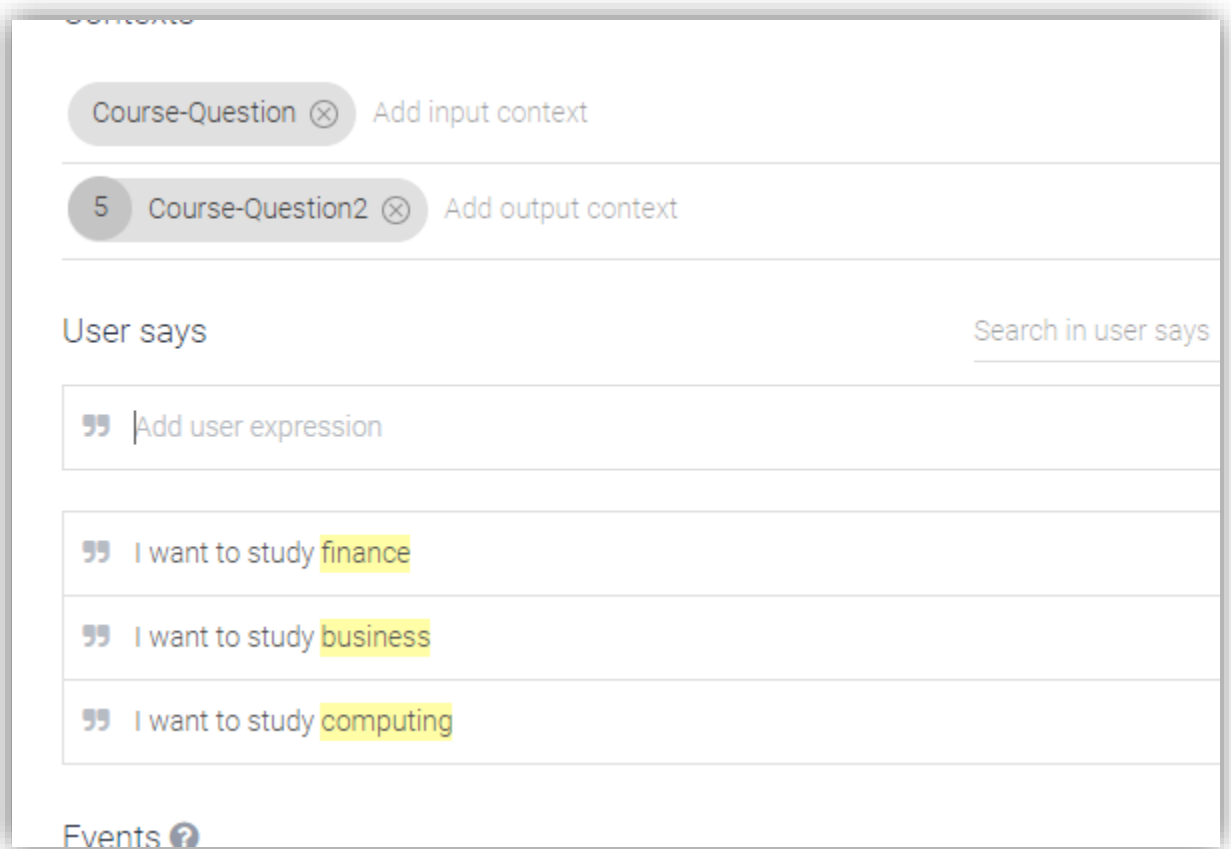


Figure 17: API.ai Dashboard

These entities can be picked up by what the user inputs to define context in what course the user wants to study.

Allowing the User to Submit Feedback

Get user feedback is an import part of any system and something I really wanted to include in my project. I decided to include a method of user feedback that can be submitted directly into the Facebook messenger. The headings I wanted to use where (Name, Contact Number, School, and finally a feedback section where the user could enter in their thoughts on the bot. I wanted this information to be stored and retrievable and found a couple of methods to do so. One that I found particularly interesting was the email being submitted directly to an account. With deciding to use this method I set up a Gmail account user the name NCIHubFeedback@gmail.com that would be used to collect the information.

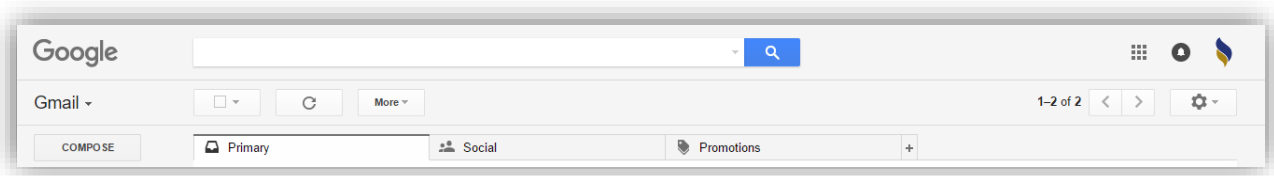


Figure 18: NCI Hub Feedback Account

2.3.3 Natural Language Processing

Api.ai was a natural language processing system what was integrated into the project to facilitate a much more natural conversation. The system also for errors in spelling and grammar in find out what that a user’s intent is. From example let’s say the student’s intent was to find out what food facilities are on campus. They could type anything like “Where is there to eat on Campus.” Using Api.ai it can take anything along those lines to figure out the intent and return the right answer.

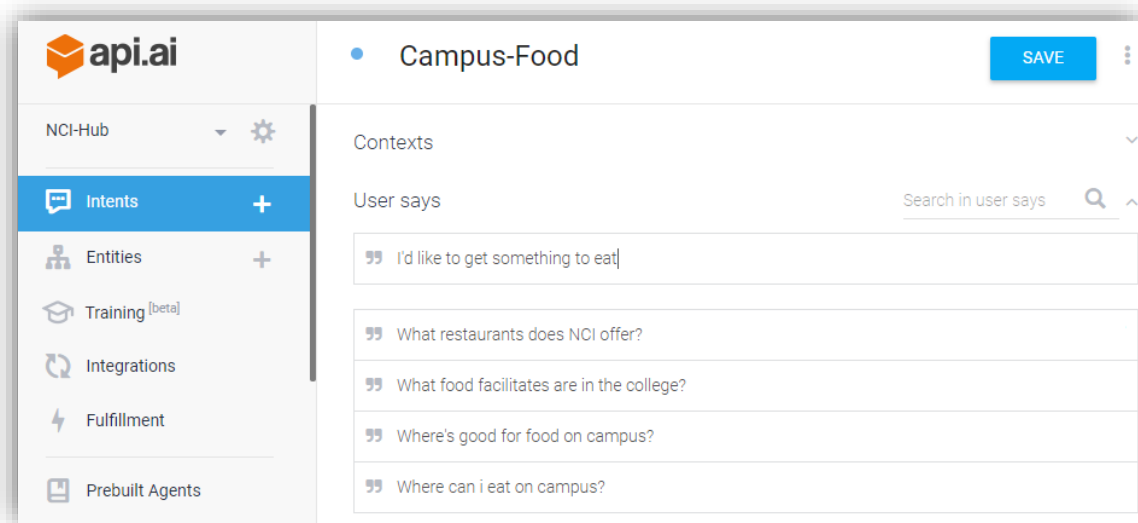


Figure 19: Intent Example

2.3.4 Setting Up a Database

I decided to create a database for this project as I thought it would be a great addition to be able to store things said by the user. I could also act as a great tool of the project by being able to store things what we're queried by the students for example and increases in questions about the course or something simple coming up often like where is the library. Having access to this information would drastically improve how effect this NCI is in providing the best possible college experience possible.

I researched several possible database types including mongo, fire base and sql lite. I eventually found that Heroku offer some great simple database services that are easily integrated into a chat bout environment. I eventually decided on the Prostgresql service with the free package called Hebby-Dev.

```
User1@User MINGW64 ~/testbot (master)
$ heroku addons:create heroku-postgresql:hobby-dev
Creating heroku-postgresql:hobby-dev on fathomless-atoll-13950... free
Database has been created and is available
! This database is empty. If upgrading, you can transfer
! data from another database with pg:copy
Created postgresql-trapezoidal-35492 as DATABASE_URL
Use heroku addons:docs heroku-postgresql to view documentation
User1@User MINGW64 ~/testbot (master)
```

Figure 20: Command Terminal in Creating a database

I first checked if the database had somehow been previously defined which it wasn't. I then entered in a command that created the database (Heroku addons:create Heroku-postgresql:hobby-dev)

Then I went over to the Heroku dashboard of the app server and seen that the database had been created.

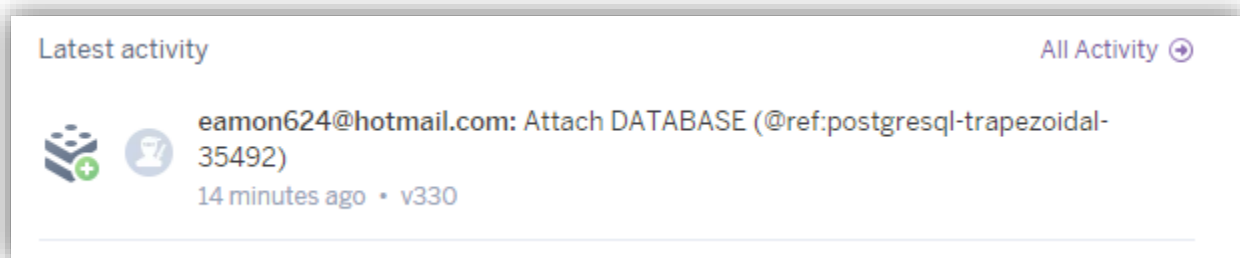


Figure 21: Database Creation on Heroku

[Add postgres module to nodejs.](#)

I then went back to the terminal and started the process to add my database to node.js. I first committed the following code that would install the necessary files need.

```
User1@User MINGW64 ~/testbot (master)
$ npm install --save --save-exact pg
npm WARN package.json hero@1.0.0 No description
npm WARN package.json hero@1.0.0 No README data
pg@6.1.5 node_modules\pg
├── packet-reader@0.2.0
├── pg-connection-string@0.1.3
├── buffer-writer@1.0.1
├── semver@4.3.2
├── pg-types@1.11.0 (postgres-array@1.0.2, postgres-bytea@1.0.3, ap@0.2.0, postgres-interval@1.0.2)
├── pg-pool@1.7.1 (object-assign@4.1.0, generic-pool@2.4.3)
└── pgpass@1.0.1 (split@1.0.0)
```

Figure 22: Install Files

Download and Install postgras client.



Figure 23: PostgreSQL

After that I needed to download the default client for the Postgres server which was PGAdmin

My Database: d7ssfbjlfh7j1

Once everything is set up and linked from Heroku to pgAdmin we can begin to make a table.

I thought that a good idea was to record the information about the users that message the bot. I've previously got information from the user in the GET_STARTED payload but didn't do anything with that information other than return it in the messenger.

Using pgAdmin I'm going to create a table that records and displays all the information of people how interacted with the bot.

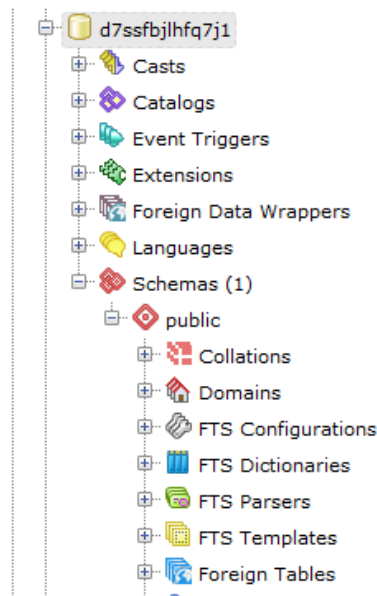


Figure 24: My Database

Using the Facebook graph developer tool where automatically able to pick up several information entities about the user (Name, Gender, Profile Picture, Time Zone, General Location, and Time zone).

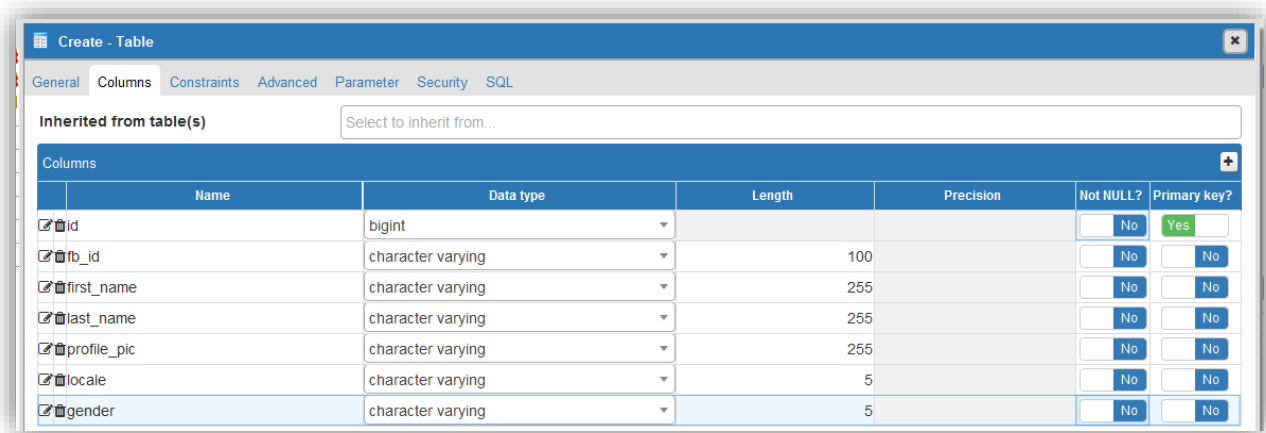


Figure 25: Database Entities

Using these information, types I made a table that could track this information.

After all the fields were saved I need to introduce an auto increment method for the database. I did this by creating a sequence.

With this completed the database was set up. I then had change the code in the app.js file.

```

pg.connect(process.env.DATABASE_URL, function (err, client) {
  if (err) throw err;
  console.log('connect to postgres. Searching for a user...');
  let rows = [];
  client
    .query('SELECT id FROM users WHERE fb_id = '${userId}' LIMIT 1')
    .on('row', function (row) {
      rows.push(row);
    })
    .on('end', () => {
      if (rows.length === 0) {
        let sql = 'INSERT INTO users (fb_id, first_name, last_name, profile_pic, ' +
          'locale, timezone, gender)' +
          'VALUES ($1, $2, $3, $4, $5, $6, $7)';

        client.query(sql, [
          userId,
          user.first_name,
          user.last_name,
          user.profile_pic,
          user.locale,
          user.timezone,
          user.gender
        ])
      }
    })
})

```

Figure 26: How Database Collects Information

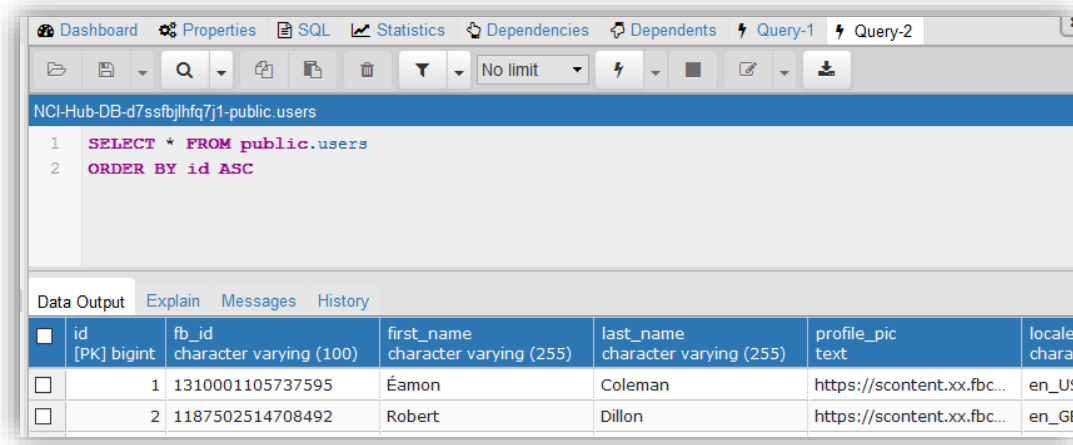


Figure 27: Database

Here is the final database of all the people that have currently signed into the chatbot.

2.4 GRAPHICAL USER INTERFACE (GUI) LAYOUT

Chat Bot

The graphic user interface for the chatbot is completely based around the Facebook platform so can be used on a desktop or a mobile platform.

In addition to simply text input's my chat bot uses a lot of Facebooks built in functionality like quick replies that appear at the bottom

I also introduced a persistent menu that is permanently present in the left-hand corner of the chat screen.

The three heads are

- Get Stated
- Student Portal
- Moodle.

Cards are also present throughout my chat both that produce both a picture as well as buttons to increase the overall usability and f



Figure 28: Chatbot GUI

NCI Hub

Campus Map

The Campus map is a 2D floor plan of the college that becomes interactive when the user hovers over either the legend for one of the rooms. This triggers a light up feature that highlights that area on the map as well as triggers a pop over that displays information about that room.

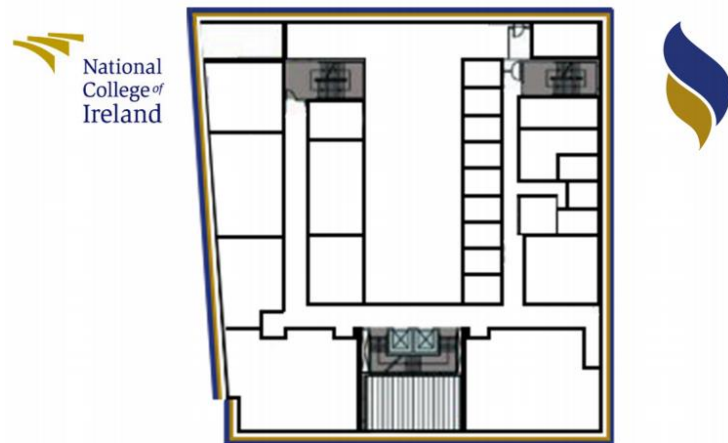


Figure 29: Campus Map GUI

Website

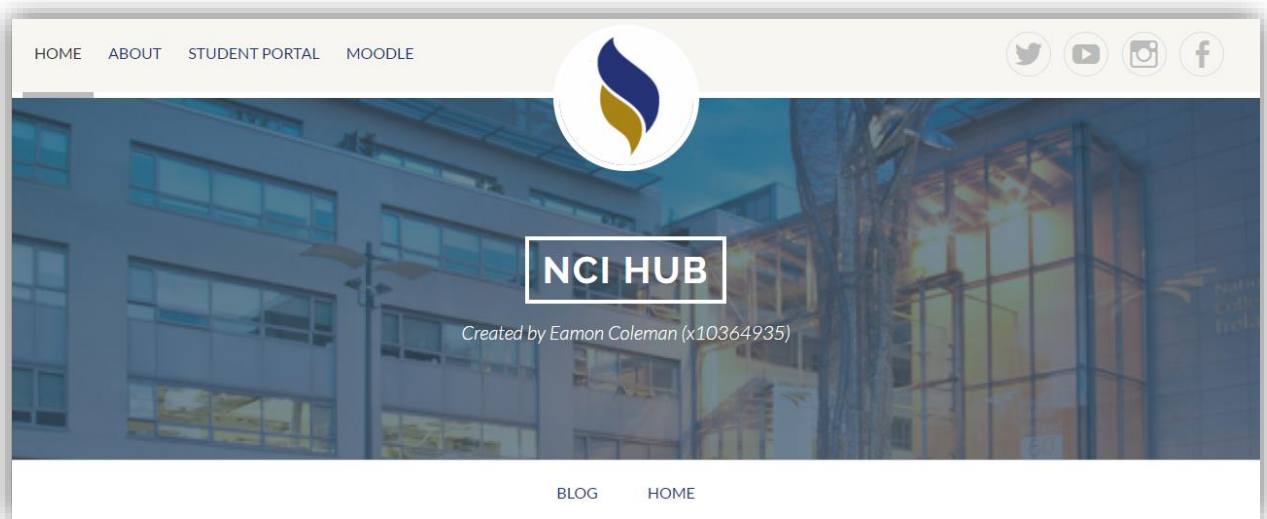
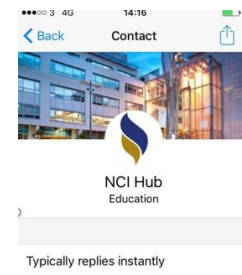


Figure 30: Website GUI

Here is the final finished website for NCI Hub. I used a pretty modern design for the layout. The site was modeled after NCI Hubs Facebook messenger layout seen in the picture to the right.

The websites main navigation is found in the bar that spans across the top of the website that is constantly present. It also links all of NCI's social media accounts to the right of the navigation bar to increase traffics across NCI's platforms.



2.5 TESTING

2.5.1 Usability Testing

Usability testing was implemented to examine the way the end user interacts with the chatbot.

Additionally, this form of testing was incorporated to determine and quantify the chatbots ease of use and the overall experience of the user while interacting with the application.

As above mentioned this task was achieved by adding a select number of users as testers to the platform where the chatbot is housed. In addition, the users were observed interacting with the chatbot in an informal setting, thus making them more at ease and comfortable to suggest change.

Changes were made to the chatbot in terms of conversational flow. A more button driven approach was taken due to the response of the testers.

Below I've documented the testing process between 4 separate users all of which were NCI students.

<p style="text-align: center;"><u>Tester 1</u></p> <p>Name: Robert Dillion</p> <p>Gender: Male</p> <p>Age: 21</p> <p>Area: of Study: Computing</p>	<p style="text-align: center;"><u>Tester 2</u></p> <p>Name: Graham Rogers</p> <p>Gender: Male</p> <p>Age: 20</p> <p>Area: of Study: Science</p>
<p style="text-align: center;"><u>Tester 3</u></p> <p>Name: Darragh Ward</p> <p>Gender: Male</p> <p>Age: 22</p> <p>Area: of Study: Business</p>	<p style="text-align: center;"><u>Tester 4</u></p> <p>Name: Sarah Maher</p> <p>Gender: Female</p> <p>Age: 19</p> <p>Area: of Study: Marketing</p>

2.5.1.1 Five Second Test Results

I conducted a quick five second test with my user group to get NCI Hubs impression from a quick glance. I chose to ask a couple of very simple questions to get an understanding of how NCI Hub appears without deep investigation and examination.

Tester	What does NCI Hub do?	What do you like most about the service?	Is there anything you dislike?
1	Student Help Service	The chat bot is great	Sometimes the chat bot didn't understand
2	Give Info about NCI	It's extremely easy to use	Nothing, I think it's great
3	Helps new students	I haven't seen anything like this before	Would be cool if it had your college info.
4	Assists students in getting around NCI	The Map is cool	Map is much easier to use on desktop
5	Tool for students	The constant style across all the platforms	It'd be great if it had an app

I was very pleased with the result of the five second test. All the users seemed to understand the concept of the system immediately and were very enthusiastic about the concept. With all my students being from NCI they were also able to see the need for the concept as they also experience the same problems that I had.

2.5.1.2 Trunk Test

I thought a trunk test might also be useful to gain further insight into what information that the test users gained from their experience using NCI Hub.

Using the previous four testers, I gave them access to the NCI Hub system and came up with a couple of tasks for them to do and timing them doing so.

I used this task in the past and found it to be a great help in finding out about of usable the website is to a new user.

I found that this test was a great success. I gave them a couple of easy takes to complete and found that pretty much all the users easily completed these tasks in a very small amount of time.

<u>Tester 1</u>	<u>Tester 2</u>
<p>Q1. (Chatbot) Find out what time the library closes at.</p> <p>Result: Search Library Times</p> <p>Correct: Yes</p> <p>Time Taken: 6 Seconds</p>	<p>Q1. (Chatbot) Find out what time the library closes at.</p> <p>Result: Enter Library Times</p> <p>Correct: Yes</p> <p>Time Taken: 9 Seconds</p>
<p>Q2. (Chatbot) Find a link to Moodle.</p> <p>Result: Entered Go to Moodle</p> <p>Correct: Yes</p> <p>Time Taken: 12 Seconds</p>	<p>Q2. (Chatbot) Find a link to Moodle.</p> <p>Result: Entered Moodle</p> <p>Correct: Yes</p> <p>Time Taken: 15 Seconds</p>
<p>Q3. (Chatbot) Find Information about the lecturer "Paul Hayes"</p> <p>Result: Search Paul Hayes</p> <p>Correct: Yes</p> <p>Time Taken: 16 Seconds</p>	<p>Q3. (Chatbot) Find Information about the lecturer "Paul Hayes"</p> <p>Result: Search Lecturers</p> <p>Correct: No</p> <p>Time Taken: 9 Seconds</p>
<p>Q4. (Campus Map) Find information about SCR2</p> <p>Result:</p> <p>Correct: Yes</p> <p>Time Taken: 10 Seconds</p>	<p>Q4. (Campus Map) Find information about SCR2</p> <p>Result:</p> <p>Correct: Yes</p> <p>Time Taken: 8 Seconds</p>
<p>Q5. (Campus Map) Where are the lifts?</p> <p>Result: Found the Lifts</p> <p>Correct: Yes</p> <p>Time Taken: 8 Seconds</p>	<p>Q5. (Campus Map) Where are the lifts?</p> <p>Result: Found the Lifts</p> <p>Correct: Yes</p> <p>Time Taken: 5 Seconds</p>

<u>Tester 3</u>	<u>Tester 4</u>
<p>Q1. (Chatbot) Find out what time the library closes at.</p> <p>Result: Enter library</p> <p>Correct: No</p> <p>Time Taken: 6 Seconds</p>	<p>Q1. (Chatbot) Find out what time the library closes at.</p> <p>Result: Searched Library Times</p> <p>Correct: Yes</p> <p>Time Taken: 10 Seconds</p>
<p>Q2. (Chatbot) Find a link to Moodle.</p> <p>Result: Searched Moodle</p> <p>Correct: Yes</p> <p>Time Taken: 11 Seconds</p>	<p>Q2. (Chatbot) Find a link to Moodle.</p> <p>Result: Found in Persistent Menu</p> <p>Correct: Yes</p> <p>Time Taken: 10 Seconds</p>
<p>Q3. (Chatbot) Find Information about the lecturer "Paul Hayes"</p> <p>Result: Search Paul Hayes</p> <p>Correct: Yes</p> <p>Time Taken: 8 Seconds</p>	<p>Q3. (Chatbot) Find Information about the lecturer "Paul Hayes"</p> <p>Result: Entered Paul Hayes</p> <p>Correct: Yes</p> <p>Time Taken: 9 Seconds</p>
<p>Q4. (Campus Map) Find information about SCR2</p> <p>Result: Found it on the legend</p> <p>Correct: Yes</p> <p>Time Taken: 10 Seconds</p>	<p>Q4. (Campus Map) Find information about SCR2</p> <p>Result: Knew where it was and hovered over it</p> <p>Correct: Yes</p> <p>Time Taken: 8 Seconds</p>
<p>Q5. (Campus Map) Where are the lifts?</p> <p>Result: Found the Lifts</p> <p>Correct: Yes</p> <p>Time Taken: 6 Seconds</p>	<p>Q5. (Campus Map) Where are the lifts?</p> <p>Result: Thought the Stairs were the lifts</p> <p>Correct: No</p> <p>Time Taken: 5 Seconds</p>

2.5.1.3 Screen Test

I conducted a screen test of one of the users talking to the chat bot to gain a better understanding of how the user interacts with the artificial intelligence. I've included the screen recording in the final file submission. In addition, to make my chat bot published I needed to provide a screen test to Facebook to prove that the chat bot is fit to be published and doesn't have any malicious intent.

2.6 HEURISTIC EVALUATION

The heuristic evaluation is a form of usability validation that I've used it in the past in order to assess usability. I've found great success in this as I've found that it can show the systems strengths as well as areas that could be improved on in the future.

The following headings are different principles of usability that I'll discuss whether NCI Hub satisfies that principle.

Visibility of system status

I believe the system satisfies this requirement. With most of the system being present on Facebook Messenger the visibility of the system would mostly be naturally facilitated by the platform as well as features in my artificial intelligence that would also make the user know what is going on or what has gone wrong.

Match between system and real world

The system meets this requirement. The main aspect of NCI Hub is accurately displaying information that could be easily understood and taken in by the user. I believe that the chatbot does a great job of doing this through the use of easy-to-understand language as well as plenty of imagery.

User control and freedom

I hope this requirement is satisfied. I do realise that sometimes the freedom could be limited using the system trying to get the right questions asked to give back the right information. User control and freedom are however very much present across its other features like the Website and Campus Map.

Consistency and standards

I believe that with the correct introduction in API.ai could meet this requirement as making the artificial intelligence as smart as possible using training and smart phrases could make the conversations as smooth as possible with very little ambiguity.

NCI Hub

Error prevention

I think that there is a good amount of error prevention across NCI Hub as the system is designed to be extremely user friendly and a lot of the time the system isn't looking for anything too complex on the users part.

Recognition rather than recall

I think that this principle is a core part of what makes NCI Hub a great system in terms of usability. The well designed artificial intelligence makes it easier the more the user interacts with it. In addition, The training feature is constantly active that I can updated at any point in order to increase its usability.

Flexibility and Efficiency of use

This site satisfies this requirement. Users have the search options and menu available to them at all times on the sidebar and in the header and the logo links you back to the homepage.

Aesthetic and minimalistic design

The sites design is perhaps my favourite of the system. I designed all aspects myself and believe that the system looks very modern as well as maintaining a great level of consistency across all of its features. I think that NCI Hubs look quite comfortable meets this principle.

Help users recognize, diagnose, and recover from errors

With most of NCI Hub's functions being quite simple theoretically it is often rare when the user is in a status of an un usable system. Due to this reason, maybe there could've been more time spent of meeting this principle.

Help and Documentation

The website was kept in mind while completing this requirement. MyNCIhub.com was made for the user of describing how the system works as well as further advertising the college and all of its features.

3 Conclusions

Advantages

- **Innovative interaction Platform**
Facebook chat bots are new of the scene and are unseen by most consumers today. This method of user interface is fun, new and is based on the most popular website in the world.
- **Responsive**
This method of interaction is completely responsive actively given you feedback and answer your questions as you ask them.
- **Innovative**
Through my research, I have found that this is a completely new concept that hasn't yet been done by any other college and could potentially be revolution in how college information is
- **Time Effective**
NCI Hub gives instant feedback to the given query that drastically decreases the amount of time that the user would spend of getting the information for an external source e.g.. College Website or Transport App.
- **Access to room Status.**
No system is currently in place that allows students to check whether a room is in use.
- **Lecturer Search Directory**
Students can search for their lecturer's information by simply entering their name into the Facebook messenger instead of finding it on the website which would take a lot longer.
- **Access Transport Information through NCI Hub rather than the Website**
No system is currently in place that students are access public transport info from the website. This feature will make a student's commute easier everyday with easy access to information about their Bus/Trains.

Disadvantages

- **Decreased traffic on college page**
The implementation of this app would mean less students using the college website to get information.
- **Relying on a third-party tool**
NCI Hub's main feature is its chat bot which relies on Facebooks Developer platform. If these tools was taken offline for whatever reason the entire chat bot would be unusable.

- **Facebook account is necessary**

A Facebook account is necessary for the user to gain access to the chat bot. Without an account this isn't possible

- **Older Students May Not Like it**

There are many mature students in NCI and I fear one aspect that may limit the service is older users not being as Tec savvy as younger students and not using the service.

Opportunities

- **Setting the Standard**

Set the standard for the service for colleges as it hasn't yet been seen or introduced to a college platform.

- **Potential of a dramatic increase of users to the service**

A great service could entice increasingly more users.

- **Advertisements within the messenger**

The system could incorporate adds directly into the chat bot offer students discounts on services

Limits

- **Facebook Dependant**

The chatbot is completely dependent on the Facebook platform so if for some reason the site was down the chatbot would be completely inactive.

- **Must have Facebook Messenger**

Many people have issues with downloading the Facebook Messenger app due to privacy concerns. This could result in a limit of users willing to be eligible to use our service.

4 Further development or research

Facebook chat bots are a new concept which technology was only released this year.

I think that they are a wide number of features and tools that could all be incorporated into my project and will only increase as Facebook Bot's grow and expand.

I researched several interesting APIs that could be implemented into the project and my planning on continuing developing the app perhaps outside of the college environment however I will keep NCI Hub active and live.

My ideal goal would be for the user to have an individual experience with the bot. I played around with the idea of having the bot remember many things specific to the student i.e. My Upcoming Exams and Assessments/Grades. I realised soon after I started development on this system that I would need several additional APIs that as of this date are not available.

Having said this, I do however believe that the technology would have great application in NCI as well as several different businesses. In the future, I'm looking forward to expanding the current features and further developing the concept and my skill set in Chat Bot engineering.

5 References

5.1 CHATBOT RESOURCES

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Messenger Platform - Documentation - Facebook for Developers. [online] Available at: <https://developers.facebook.com/docs/messenger-platform> [Accessed 6 March 2017].
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- **CONQUERING THE COMMAND LINE**
(Softcover.io, 2017)
Conquering the Command Line. [online] Available at: <http://conqueringthecommandline.com/book/curl> [Accessed 6 March 2017].

5.2 REAL TIME BUS RESOURCES

- **DATA.GOV.IE — IRELAND'S OPEN DATA PORTAL**
Data.gov.ie, 2017) *Ireland's open data portal*. [online] Available at: <https://data.gov.ie/dataset/real-time-passenger-information-rtpi-for-dublin-bus-bus-eireann-luas-and-irish-rail> [Accessed 28 March 2017].
- **WORKING WITH JSON DATA**
In-text: (Mozilla Developer Network, 2017)
Your Bibliography: Mozilla Developer Network. (2017). *Working with JSON data*. [online] Available at: <https://developer.mozilla.org/en-US/docs/Learn/JavaScript/Objects/JSON> [Accessed 20 April 2017].

5.3 CAMPUS MAP RESOURCES

- **IMAGEMAPSTER**
In-text: (Outsharked.com, 2017)
Your Bibliography: Outsharked.com. (2017). *ImageMapster*. [online] Available at: <http://www.outsharked.com/imagemapster/> [Accessed 1 May 2017].

APPENDIX

5.4 PROJECT PROPOSAL

OBJECTIVES

The objective is provide a new interactive environment that students can survey the college campus as well as introduce new innovative features that they can utilize in the form of a Campus Map.

My objectives are to integrate all of these features into my Campus Map.

Innovative Display

A 3D model will be made of the campus using google sketch up that will give the user a very clear and enticing representation of the college rather than a simple overhead plan.

Extremely User friendly Interface

This project will be available across desktop and mobile devices and will contain many user-friendly features such as a hover display method that promptly and clear displays information and content.

Check Room Availability

I plan to include a feature in the project that allows the user to see whether a room is being occupied or not. This is a feature that I would find very useful as a student myself as I'm constantly looking for free rooms in the college to uses the machines and currently the college offers no system for this.

Book Rooms

In addition to checking the rooms availability I plan to allow the student to book rooms on the system for independent and group study.

See Real Time Local Transport

This feature will allow the user to see relevant real time transport information. For example when a bus or luas is due. It would also increase user traffic to the page as it is a very useful feature relevant to most students.

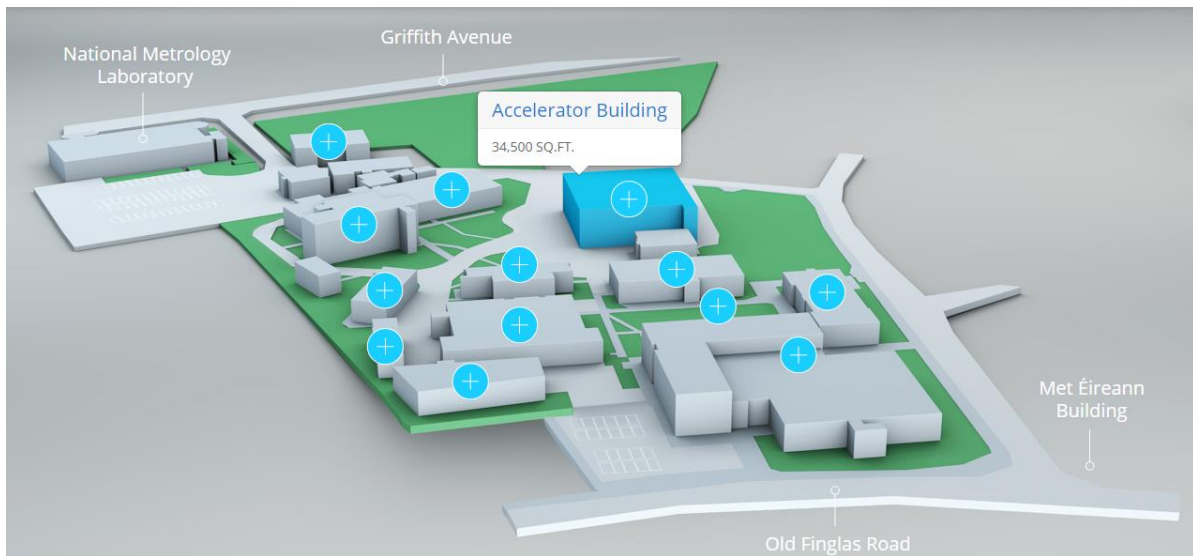
Import Timetable Feature

I plan to have system in place where each students account is unique to them where they can see their timetable and tell them what class is currently scheduled and where.

BACKGROUND

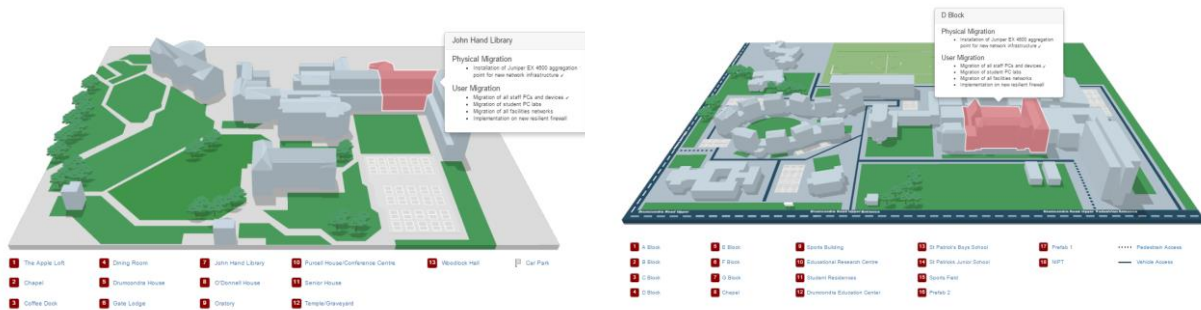
I spent the second semester of my 3rd year of college in a work placement provided by Dublin city university.

During my time there I was asked to create an interactive campus map that was modelled after another one of DCU's campuses. I looked at the given functionality for DCU Alphas campus map and replicated my own version of it.



I completed this project for three of DCUs campuses. Glasnevin, St.Pats and All Hallows.



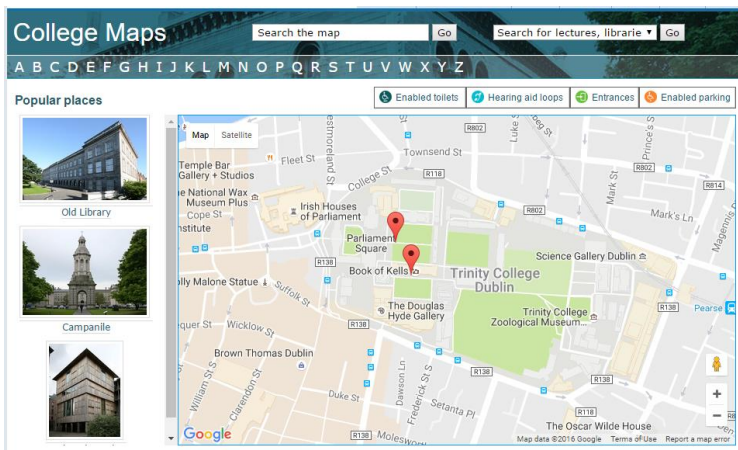


The goal of my final year project is to expand on the technology I've used to create the maps. I hope to make this an extremely effective tool in which students can refer to for information about campuses as well as a number of additional useful features.

TECHNICAL APPROACH

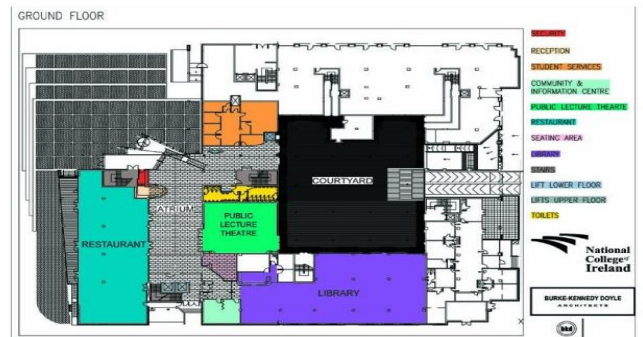
Research

From my research, I've found that no colleges currently offer this feature. The first image here is Trinity college's current campus which is a Google earth snippet with a couple notable buildings placed on it. The second is NCI's current campus map which is the plan of the building from an overhead view. Neither of these maps offer much functionality and aren't very interactive for the user. I plan to improve on the idea making it an essential tool for both new and existing students



College Layout

Ground Floor



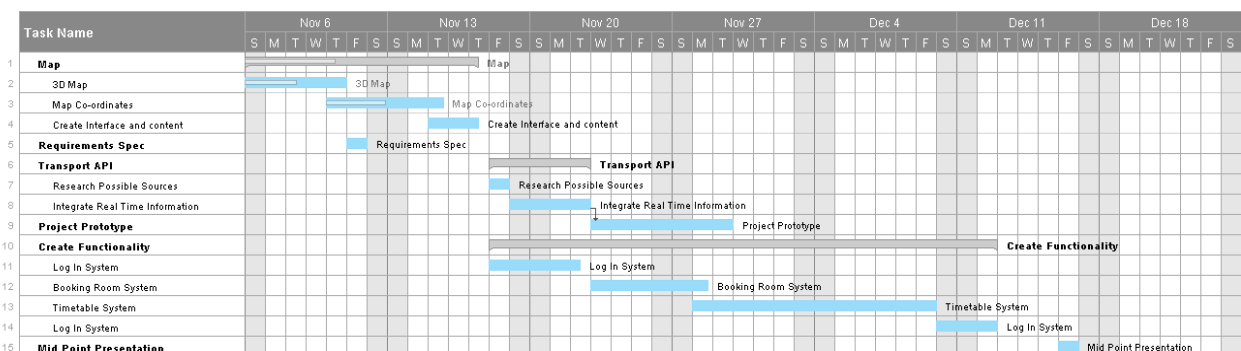
SPECIAL RESOURCES REQUIRED

[Google Sketch Up](#)



This program is where I'm going to make the physical representation of the campus. Using the overhead map of the college already provided I then map out the entire site making it a 3D representation that I can use in my project.

PROJECT PLAN



TECHNICAL DETAILS

CSS

Cascading Style Sheets are used in most parts of my project for presentation and layout.

JavaScript

Image Mapster is a javascript file that I have implemented in my previous maps. It is a feature that lights up a selected area defined by the programming, In this case I map around the selected regions of the page and set the code to trigger the feature as well a popover.

Transport API

The Transport API will be used in the app to help students commute to college. Depending on which college for facility I'm doing I will include the local public transport APL accordingly.

Java

Java will be used to program my timetable system as well as programming my project to take in students timetables. I'm also considering a log in system for the project that will entirely made with java.

Bootstrap

Bootstrap will be used extensive in the way my content will be displayed.

Apache

I plan on hosting my project on an Apache web server.

EVALUATION

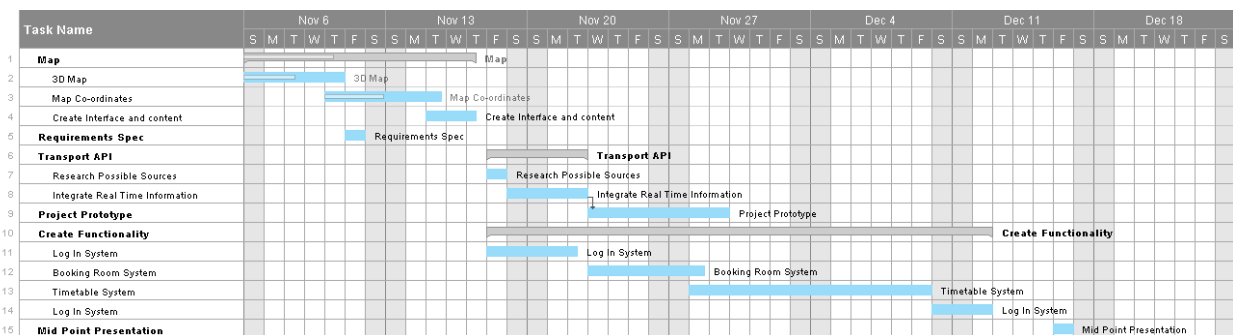
Regression Testing

Iterative testing is great for making sure a new feature all features are working correctly.

End User Tests

When my project is fully completed and functional I plan on testing it with my peers as well as other students for their thoughts and feedback.

5.5 PROJECT PLAN



5.6 MONTHLY JOURNALS

MONTH 1

INTRODUCTION

My name is Eamon Coleman I am 23 years of age and I live in Skerries Co. Dublin. I am in part time employment as a sales advisor in Skechers based on henry street Dublin 1.

I will be starting the final year of a Bachelor of Science Degree in Business Information Systems at The National College of Ireland in September this year (2016).

This project will be the most important assessment of the year and maybe even the course as it is my intention to use this a selling point for potential employer's post college. I hope to showcase all the skills I've learned during the four years of my studying in one project which in itself is going to be a tricky task but I'm quite confident that I'll succeed.

I wanted to enter my final year with something that would be a support document for my final year project, tracking my thoughts as I progressed through the year and allow me to get on paper or record the journey that I go through in the final year.

My intention of this reflective journal is to accurately map my progressing and thought process through my final year project with the ultimate goal being an impressive well documented project that gets me a good grade.

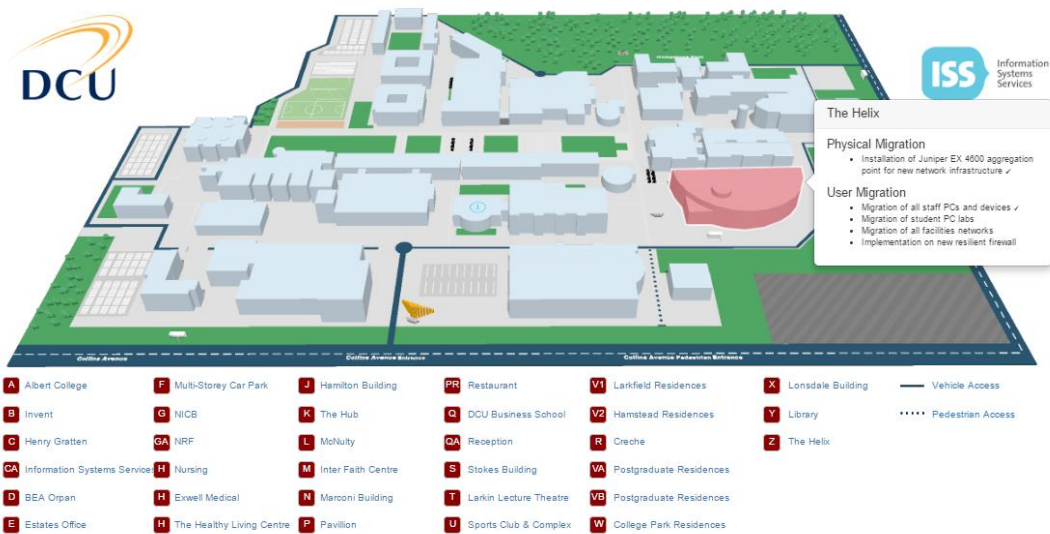
CURRENT PROJECT IDEA

My 3rd year placement was spent in DCU working as a web developer which I thoroughly enjoyed. I spent most of my time creating web pages for the college website as well as external parties such as past students.

One of my key projects was to create an interactive campus map for DCU, St.Patricks and All Hallows.

I wish to expand of this idea by drastically increasing the maps functionally and adding much more features and usability.

Here is one of the maps that I've created. In this case it is the Dublin City University Campus in Glasnevin.



Features already present

- 3D Representation of Campus
- Popover boxes displaying information displaying information on buildings
- Hover feature that lights up selected buildings

Features I plan to introduce

- Real time transport information.
- Check rooms timetables.
- System in place that checks your timetable and access where you should be.
- The ability to book rooms in buildings.

But with all projects I plan to further develop

SEPTEMBER WEEK 3

My first week back in college was quite productive. I knew that the software project was coming so had a lot of time to mentally prepare my idea.

Although the first part of the week was stressful because had to make sure that my stream change went ahead.

I had originally chosen the gaming and multimedia stream. Really because I thought that my campus map idea almost fell in the multimedia category more than the software development. But after examining the course content on both sides I decided that the software development stream was the one for me. I then I emailed the college and was giving go advice on how to change stream.

In addition, software development field is one that I have great interest as well as the one with the most prospects coming out of college with software developer being one of the most sought after skills in the industry.

SEPTEMBER WEEK 4

Week 2 was one of the more of the uneventful ones. We had a couple group assignments to complete which weren't too much. For the software project I asked my class mates what projects they were doing to compare them to mine. I've found that their projects are a lot more technical than mine which made me a little worried that I would have to really expand my projects functionality.

OCTOBER WEEK 1

This week is when it starts getting serious. I had my meeting for my project proposal and I was preparing as much as I could but I was still quite nervous. Luckily my meeting was at twenty to three which gave me time to come into college early to prepare for it.

My overall thoughts on the meeting was okay. I had a slight amount of trouble properly conveying my idea to the panel. One of the panel members had the idea too of implementing google maps into the project which would make all the work I've done previously obsolete which was a bit of a knock. But ultimately if my projects benefit's from it I'll happily do it.

After talking to another class mate who had trouble with coming up with an idea he told me that he was seriously considering taking one of the projects given by the lecturers. He told me that this year there is a lot to choose from and the lecturer Dominic Carr recommended it to that student. This for me was a little tempting since although I am pretty certain on the idea my project I'd lying if I said I was 100% confident. Plus having everything I needed to do all laid out would definitely make things easier. .

My panel didn't say whether the idea was passed or not at that panel. After I get their insight my choice may be made a lot easier.

MY ACHIEVEMENTS

This month I think my idea took more shape and progressed further. After talking to my lecturers and classmates about the idea I could get honest feedback and tips which was very helpful This month I'm quite certain that I've established my projects topic and goals although I greatly want to expand them.

My contributions where mostly further research into the project most notable the possibility of including google maps to the project.

MY REFLECTION

Overall I felt good about this month. Establishing an idea was good and I took steps for completing them. Im really looking forward to next month where the work can begin 😊

MONTH 2

WEEK 1 (11/10/16)

Today was an important day for the future of my project. I was talking to the previous student I mentioned in the report who was doing one of the recommended ideas given by the lecturers and he won't be there was one listed by Lisa Murphy which had a lot of similarities to mine. After doing my own research I've found this to be true.

PROJECT 10

Areas of Interest: Teaching and Learning, Gamed based learning and Design and mobile game development

Proposer: Lisa Murphy

Title: Transition from Second to Third Level Mobile App

Proposal: Create a mobile application that allows 1st year students to check relevant information needed for 1st year. Examples include: Maps/Floor plans, Video tutorials, Staff roles and contact details, programme structure and timetables and an area for student feedback. This student feedback should be feedback to Marketing.

My plan is to email Lisa requesting a meeting to further discuss this option.

WEEK 1 (13/10/16)

Today unfortunately was a disaster. I emailed Lisa yesterday and she got back to me today informing me that the project had been taking but a student which was a knock.

The project proposal is due next week and at the moment I'm having a tough time even nailing down what I want to do.

NCI Hub

I wasn't in this week's software project class where Eamon had the list of accepted projects. Since I thought I'd do Lisa's idea I hadn't checked whether for not my project has been accepted. I just sent him an email now so hopefully he gets back to me soon and I can decide what I want to do.

I was staying back late to prepare for an upcoming CA and Eamon got back to me telling me that my project had been approved which was great news. So I'm going to keep my idea and add more features as I go.

WEEK 2

This week was stressful I had multiple assignments and assessments due so wasn't able to give my project as much attention as I wanted. On Friday, I completed my entire project proposal which I was very happy with. I was good to have everything all there on paper rather than just an idea in my head. One feature which that was very useful was the rough Gant chart which outlined my plan and timescale as most of this time spent so far was sorting out my idea as well sorting out my supervisor.

I had thought that I may have gotten Lisa Murphy because I wanted to accept her project but that fell through which is totally fine.

We are being assigned our supervisors next Monday which I'm looking forward to.

SUPERVISOR

I was assigned Frances Sheridan as my supervisor through the automatic assignment process done by Eamon which I was very happy about. I had Frances for a module previously and found her to be very helpful and approachable so I considered myself lucky to have her as my supervisor. She immediately scheduled a group meeting for this week to talk about our ideas.

GROUP MEETING (25/10/16)

Frances scheduled a group meeting for Tuesday the 25th.

It was a group meeting with all the students that were assigned to Frances. She first asked us to explain our ideas briefly. After I explained my idea and she seemed to of like it. She said that it was a very board idea since I was in software development which I liked as my idea I still taking shape and I know that I'll increase the functionality in time which maybe Frances can help me with.

Frances seemed enthusiastic about all the ideas which made everyone feel at ease. One thing she mentioned too which stuck me was the credit allocation for the modules with the project having much more. It was then I realised that I'll have to out more time aside for the project than any other of modules.

She then talked about all the project guidelines and gave us advice on getting started and as well as tips for getting the most marks possible. She scheduled a group meeting once every two weeks on Monday at 1pm in SCR3 for a check in and to see how we're getting on. At the end of the meeting I felt great going forward.

NEW FUNCTIONALITY (FACEBOOK CHAT BOT)

I came across this idea during the third week of the month. I thought it would be an amazing and previously unseen feature for the project as its only been out for 6 months and is a relatively new concept.

Facebook Chat Bot

What is it?

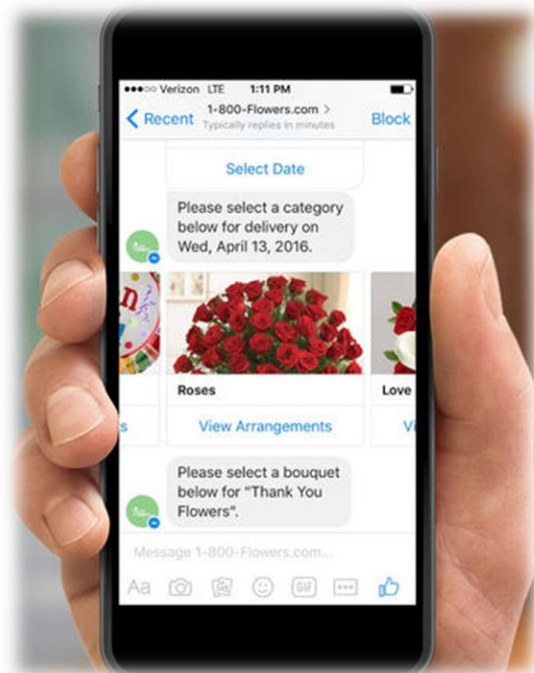
A chat interface that allows the user to have a conversation with a system using artificial intelligence.

What does it do?

Using instant messenger the user can write to the page and it'll respond instantly using a.i to determine what it'll say back.

How is used?

The user likes a Facebook page. In this case a NCI Student page. The user than opens an instant messaging conversation with the page.



It's part in my project.

I'm planning to make this into a tool used by the college where students can ask college FAQ's as well as get information on their course/timetables and assignments.

OCTOBER WEEK 4

This week was my reading week. I was working a lot in my part time job but still found time for my project. I researched the chat bot and found some good online resources including tutorials and blogs on how to set it up. By the end of this week I'm to have my Facebook page and the foundations of my Chat Bot already started for Monday.

MY ACHEIVEMENTS

This month's achievements include

- Introducing the Facebook Chat Bot
- Being assigned a Supervisor
- Completed Project Proposal
- Assessed my timescale and plan via Gant Chart

MY REFLECTION

I feel very optimistic after this month. I'm very happy with my supervisor and after coming across that Chat Bot idea and can't wait to get started on it. I've started work on the Chat Bot which is going very well and plan to map out the Campus Map by maybe

GOING FOWARD

I've already research in detail the chat bot idea and am certain that I'm going to include it in my project. I plan to make an echo first that will echo back to the user what they input. I hope to have this done by next weekend.

My plan for the month is to first make my campus map for the college then start mapping the coordinates for my functionality.

I believe I have our first regular meeting which Frances this coming Monday where I will inform her about the chat bot idea and tell her in detail my plan for the month

MONTH 3

FACEBOOK BOT

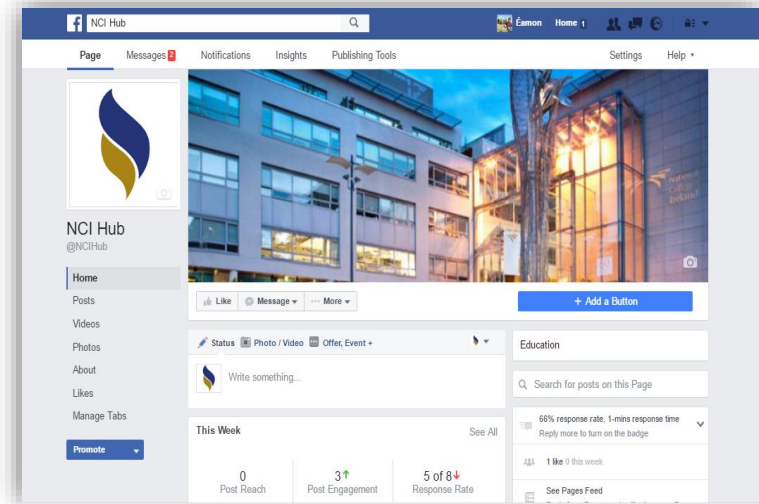
Most of my time this month was spent looking at the chat bot feature of the project. Below I will list all the steps taken to get my Chat bot up and running.

Create a Git Repository.

Created a Git Repository to accurately save my progress so it can be easily recovered if a problem presents itself.

Create a Facebook Page.

I needed to create a Facebook page in which the Chat bot will be housed. The Facebook page can also act as an additional web presence by providing links to additional features I plan to created for NCI Hub.



Create a Facebook App.

This is used for setting up your Facebook Application, registering call-backs and submitting for approval.

Generate Page Access Token and Setup a Web hook.

Webhook is a call back interface from Facebook to your server that allows us to receive messages sent via Messenger to our Page, as well as metadata and lifecycle events.

Set Up a Server.

I used Heroku to set up a server that would act as an additional level of the project. Where the users message is sent to the server processed and then returned back using JavaScript to determine what responses



Echo Function.

This was the first Responses I had where very simply the JavaScript file takes the message inputted by the user and returns it back to the user like an echo.

Basic Responses.

At the moment, my Chat bot has limited responses. The user writes a message to the bot and if the message matches inputs that I've hard coded in the bot rights

Buttons.

These can use used to prompt a multiple-choice question to the user rather than inputting a message. I currently have no buttons but will be implementing them soon when I return to developing the chat bot.

Basic Chat Bot.

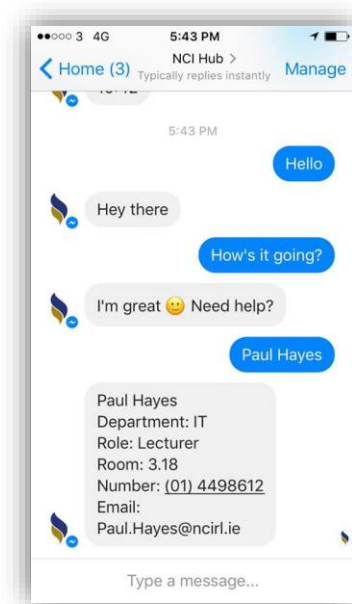
This method uses functions which I know are simple.

I've complete a basic chat bot with responses that is currently live on the NCI Hub Facebook Page.

Although the chat feature is limited to admins as it needs to be approved by Facebook to be available to the public.

I feel great having my chat bot started end in a state that I can show my progress.

My plan is to expand this significantly by integrating an AI technology (WIT AI).



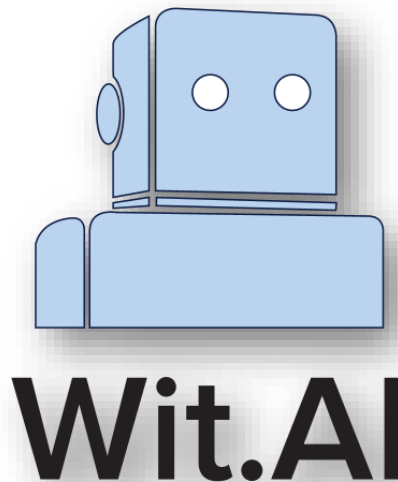
WIT AI

Description.

“**Wit.ai** makes it easy for developers to build applications and devices that you can talk or text to. Our vision is to empower developers with an open and extensible natural language platform. **Wit.ai** learns human language from every interaction, and leverages the community: what's learned is shared across developers. “

It's place in NCI my project

I'm planning on using Wit.AI in my chat bot making it more sophisticated and better equipped to answer the users queries.

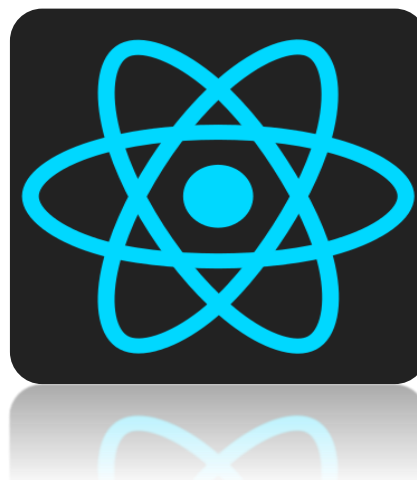


REACT JS

One of the next steps I want to take is getting a web page for NCI Hub. After talking to my friend in class he recommended looking into Reach JS.

It's place in my project.

I'm planning on designing a website for NCI using React as the front end frame work and using it's components better display my pages content.



CAMPUS MAP

Started work on campus maps taking a floor plan for an example I plan to show case for the mid-point presentation to see the technology I've used and then expand this to all the different floors and implement my technologies into the map as soon as possible.

SUPERVISOR MEETING (02/12/16)

On Friday the 2nd of Decemeber I meet with Frances for a check in and to discuss some concerns I had.

The meeting went quite well I just told her how I was getting on and got some info about the mid-point presentation.

One thing I took from the meeting that was that Frances said that external companies and parties use the rooms in the college where my timetabling and room table features may also be used.

MY ACHEIVEMENTS

This month's achievements include

- Completed a basic Facebook Chat Bot.
- The creation of a brand Name "NCI Hub" and logo.
- Secured an online Domian. (MyNCIHub.com)
- Successfully researched new features including React.JS and Wit.AI
- Completed Technical Report

MY REFLECTION

This month's progression was quite reasonable in my opinion I think I got a ot done however with the mid-point presentation due this month I will need to really give a big push to get everything ready to present.

MID POINT PRESENTATION

Deliverables

- Facebook Page
- Chat Bot
- Wit AI
- Floor Plan Image
- Floor Plan Interactive
- Plans for Wit AI
- Plans for Dublin Transport API
- Plans for Timetables
- Plans for booking rooms

GOING FOWARD

My plan for next month is to fully complete the map features and get a start on the AI and Transport API. Then take a look at the time tables system.

MONTH 4

MID POINT PRESENTATION

The midpoint presentation went great in my opinion. Although I struggled a little to find my feet talking at the beginning which is frustrating because I usually have no problem at all public speaking but it must have just been nerves because I've worked very hard on this and want to present it as well as possible.

Lisa said that she thought my presentation was good which is great coming from her since she has a background in logo design/marketing.

Both Lisa and Frances said it was great idea and were impressed that I had a prototype working as many other students hadn't had one yet.

One point that Frances said which I've since assessed is to take the chat feature out of Facebook and for it to be placed on a normal website. I've since found this to be possible and I'm looking into methods of doing so.

At the end of the presentation I was relieved that it was over and was quick optimistic going forward.

MY ACHEIVEMENTS

This month I accomplished

- Completed the Technical Report.
- Completed my Midpoint Presentation.
- Included Buttons in my messenger bot.
- Integrated Transport API on simple bus routes
- Received a good overall result

I've recently implemented Transport API and have gotten it working for a few bus stops. My plan is to implement buttons that provide easy access to local transport stops. I'm going to gather the most used stops by students including the luas and trains.

I spent a lot of time this month trying to get a copy of the floor maps to the college which has proven to be a lot more difficult than I thought with nobody seeming to have access to them. I've talked to reception, Student Services, and the IT department and none of them have it. I've since gotten the name of someone who might so I'm going to follow this up after I finish my exams. After I get the floor plans I can start work on the maps which won't take too long.

MY REFLECTION

This month was quite successful in my opinion. I was very happy with how the midpoint presentation went as well as the overall mark I received in my project however I really think that I can do better. After receiving the feedback from Frances and Lisa I realized the potential my project. In particular, Frances even mentioned bringing it to the communications team in the college as they may be interested in certain aspects like my campus map.

However unfortunately, this month I've haven't spent as much time on this project as I would have hoped. With the exams approaching project deadlines most of my focus has been on studying and getting everything in on time.

GOING FOWARD

Going forward I know that this is where the real work begins. This semester was easily the most stressful that I've ever experienced in my academic career with multiple projects and assessments throughout with directly affected how much time I could spend on this project which was frustrating but with the next semester having fewer modules, I'm planning on directing my full attention on this and reaching the projects full potential.

I've made good progressing into deciding what exactly my project is going to do and how and I quite confident that given the time I can completed all my goals.

In addition, I've had a part time job throughout this semester which has my working all weekends and noticed that this has affected how much time I can spend on it and going to make the change of just working the one day or maybe not at all as I do need the money but think that this is more important.

MONTH 5

TRANSPORT API

I had some time off work after the exam and decided to focus on the integrating the transport API into my project.

Using the JSON information that was provided online I was able to create a method that took in this information and returned it via the messenger.



This information is on the public domain that was provided by

After researching the most commonly used transport routes I found the following to be practically important to include.

I put a post on the courses Facebook page in order to get all the most commonly used transport routes

Dublin Bus Route in JSO format

```

<realtimeinformation xmlns="http://schemas.datacontract.org/2004/07/ie.dcc.rtpi2.services.publicservices.contracts.RealTimeBusInformation"
instance">
  <errorCode>0</errorCode>
  <errorMessage/>
  <numberofresults>6</numberofresults>
  <stopid>184</stopid>
  <timestamp>19/02/2017 14:43:30</timestamp>
  <results>
    <result>
      <arrivaldatetime>19/02/2017 14:53:46</arrivaldatetime>
      <duetime>10</duetime>
      <departuredatetime>19/02/2017 14:53:46</departuredatetime>
      <departureduetime>10</departureduetime>
      <scheduledarrivaldatetime>19/02/2017 14:49:00</scheduledarrivaldatetime>
      <scheduleddeparturedatetime>19/02/2017 14:49:00</scheduleddeparturedatetime>
      <destination>Limekiln Avenue</destination>
      <destinationlocalized>Ascl. na Tinileach</destinationlocalized>
      <origin>Charlestown Rd</origin>
      <originlocalized>Charlestown Rd</originlocalized>
      <direction>Outbound</direction>
      <operator>bac</operator>
      <additionalinformation/>
      <lowfloorstatus>no</lowfloorstatus>
      <route>9</route>
      <sourcetimestamp>19/02/2017 14:42:01</sourcetimestamp>
      <monitored>true</monitored>
    </result>
    <result>
      <arrivaldatetime>19/02/2017 15:16:42</arrivaldatetime>
  
```

REALTIME LAYOUT

Using some of the features available by the Facebook developer platform I constructed a layout in which the user can navigate through to find their desired information.

The user enters in the street in which there bus departs from and it then lists all the routes that depart from that street.

The user enters the route and then the due time is sent.

```
function LowerAbbeyStreetQuery(id){
var LowerAbbeyStreetMenu = {
  "attachment": {
    "type": "template",
    "payload": {
      "template_type": "generic",
      "elements": [
        {
          "title": "Please select your bus route.",
          "image_url": "https://i.imgur.com/8745f7df93.png",
        }
      ]
    }
  },
  "quick_replies": [
    {
      "content_type": "text",
      "title": "33 to Balbriggan",
      "payload": "DEVELOPER_DEFINED_PAYLOAD_FOR_PICKING_GREEN"
    },
    {
      "content_type": "text",
      "title": "41 to Swords Manor",
      "payload": "DEVELOPER_DEFINED_PAYLOAD_FOR_PICKING_GREEN"
    },
    {
      "content_type": "text",
      "title": "41b to Rolestown",
      "payload": "DEVELOPER_DEFINED_PAYLOAD_FOR_PICKING_GREEN"
    },
    {
      "content_type": "text",
      "title": "41c to Swords Manor",
      "payload": "DEVELOPER_DEFINED_PAYLOAD_FOR_PICKING_GREEN"
    }
  ]
}
```

When the user enters in there street using google street view a picture is sent back of their street.

Then using the button features all of the routes are presented and are entered in and sent when the user selects one.

Then using bullet points and spaces the information is displayed more clearly and readable to the user.



SAY BACK NAME

```
var event = events[i];

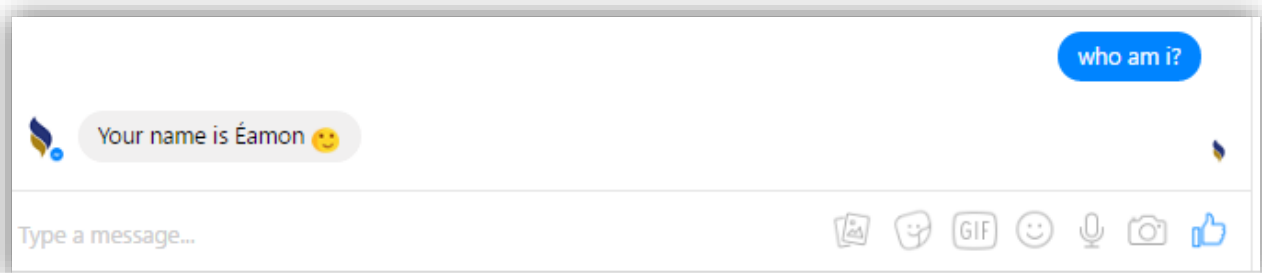
var requestUrl = 'https://graph.facebook.com/v2.6/' + event.sender.id +
'?fields=first_name&access_token=' + PAGE_ACCESS_TOKEN;

request(requestUrl, function(err, res, body){
  if(err){
    console.log(err)
  }else{
    //Parse body to a json object as the body isn't true json
    var jsonObject = JSON.parse(body);
    usersName = jsonObject.first_name;
  }
});
```

I took some time to work on a method of that returns the users first name from their facebook profile.

Again using tools given by the facebook developer service.

I will use this to increase the overall user experience making the chat more personal to the user.



MAPS

I spent a lot of time over the course of the project trying to get my hands on the maps for the college and this month I actually got them.

After talking with Frances she was able to get a hold of the blue prints to the college which were helpful however I wasn't able to get the ones used for the fire escapes which was the one that I originally wanted.

My plan going forward is to create my own maps using illustrator based on a photograph of the plans used for the fire escapes.

I've already prepped the code that'll be used to create the maps so this will be the next stage of the project getting the interactive map done and dusted.



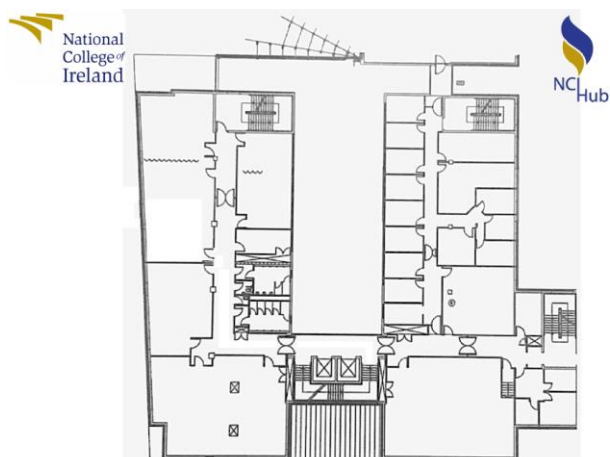
MONTH 6

MAPS

With the chat bot making good progress I started to put some time into making my campus maps.

Using the images that I got of the campus maps I created an image with logos for branding.

This is my image so far but I've still to correct the colouring before making my map.



MAP PREP

I've been writing the code for the map and have almost completed it for all the floors.

Its broken up between different areas, room co-ordinates and then the legend all written in CSS.

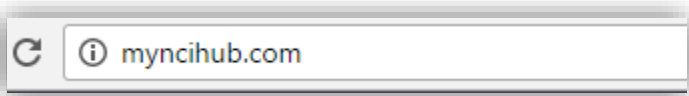
The code uses HTML, CSS and is then linked to a Javascript file that lights up section of the map on hover.

```

163     strokeWidth: 5,
164
165     isSelectable: true,
166     singleSelect: true,
167     mapkey: 'name',
168
169   });
170 });
171
172
173
174 </script>
175
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```

DOMAIN



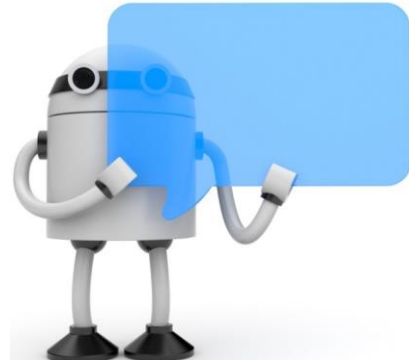
I bought a domain name in which I plan to host my website. The big plan this month is to design and created the website that'll host all my content as well as connecting all of NCI's social networks using APIs.

I've spent time researching all the aspects in creating this website and will confident that by next month I'll have it completed if not close.

EXTERNAL CHAT BOT

Ideally, I'd like to host my chat bot on the site independent to the Facebook messenger to further the target audience as well as increase my projects usability.

One fear that I had, was that some users wouldn't have a Facebook account which would be a problem and this would completely fix that.



UNIT TESTING

From my module in usability design I've been learning about effective methods of testing my applications usability. I have my final usability assignment coming up and hoping to use these forms of testing on my project.

GOING FORWARD

I feel as if I haven't made as much progress as I wanted to this month and decided that I'm going to need a big push for the next while in order to have this fully completed and in a state that I'm happy with for the end of the term. I think that I've had good gross so far but just need to put a bit more work in.

MONTH 7

CHAT BOT

Over the past month there was a change of mind that I had and switched from using Wit.ai to Api.ai. After working with wit.ai for a couple of weeks I found that it was pretty difficult to use that as well as my bus stop information.



I've had great success with api.ai and now have a much better conversation pattern in place that drastically increases the functionality and usability to the user.

CAMPUS MAPS

I revisited my old work place for some help on the campus maps. I asked Niall Spollen (The communications officer) for DCU's website for help on them which worked out very well.

At the moment, I'm just wrapping up my maps and have most of the work done.

WEBSITE



I've finished the website that will do a great job of displaying my entire project at the presentation as well as the show case. The website will host the campus maps and link to the Facebook chat both as well as provide access to college websites (Student Portal and Moodle).

UPDATE DOCUMENTATION

From talking with Frances, she told me that there was further working to be done on the documentation which must be given attention before the final due date. This includes the usability testing which I've learned much more about since the start of the report thanks to my module in Usability Design.

SHOWCASE

I'm feeling quite confident about the showcase. I'm sure that will get my project done and in a presentable state between now and then.

At the moment, the Facebook page is private because it's still in testing but I'm going to leave it public for the day and ask people to log on and try it for themselves.

My plan for the poster is to display all the information about the project and then give directions of how people start using the start bot for themselves.

MONTHLY JOURNALS (FINAL THOUGHTS)

I'm quite happy about how the project has ended up. I was very busy last semester and have just completed all my other modules so I have about 2 weeks to work on the project full time which I'm really looking forward to and I'm looking forward to having it completed and presented