

# Final Report



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CARLOW

Institiúid Teicneolaíochta Cheatharlach

## Interactive Map of IT Carlow

Name: Daniel Polak

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Supervisor: Hisain Elshaafi

# Abstract

The purpose of this project is to develop a mobile app for Android that will allow users to find the way to their classroom on campus of IT Carlow. This app will help guests, students and professors to find a room on campus. The user is able to choose between points on the map as the starting point or use the GPS function of their device. The app will have a function to calculate the path from the starting point to the end point. Users can create a profile. This allows them to create a schedule. This feature will push notifications to the device 5 minutes before the event(i.e. lecture) and when the user clicks on the notification it will calculate the path to the classroom and display it to the user.

# Table of Contents

Abstract	1
Table of Contents	2
Introduction	3
1. Project Description	5
2. Conforming to Design/Functional Specification	6
3. Learning Outcomes	8
3.1. Personal	8
3.2. Technical	9
React Native	9
Google Firebase	9
Git	10
Expo/NPM	10
4. Project Review	11
4.1. What went as planned?	11
4.2. Difficulties faced?	11
4.3. What was changed and why?	12
4.4. What would I do differently?	12
5. Conclusion	13
6. Acknowledgement	13

# Table of Figure

Fig. 1	6
Fig. 2	10

# Introduction

The following content describes the final report for the Interactive Map of IT Carlow. This report covers elements that make up the final submission of this project as well as reflection and retrospective look upon the project. For better understanding of the project, please read page 1 of this document.

The first part of the document is a deep dive into the final submission, outlining the project description in case this project was to be published. This section is broken to 2 parts. First part is a description of the project and second part is a look at how the project conforms to design specification outlined in the Design Document.

The second part of the document covers the learning outcomes for this project. This is broken into 2 parts. First is a personal, which goes into what I have learned during the project aside from technologies that were used. Second part outlines what I have learned in terms of technologies used during the project.

The third and the last part covers project overview and reflection on the project as a whole.

# 1. Project Description

Interactive Map of IT Carlow is an app that was designed to help people get around IT Carlow in an easy and quick manner. Many people want to know the location of their next lecture and don't have time to look through different maps on the IT Carlow website. Google maps, while providing users with indoors maps at certain locations, does not provide indoor maps of IT Carlow. The idea of the map was to give people an easy way of finding the rooms and/or buildings at IT Carlow. The main purpose of the app was to save time for people so they don't have to spend too much time walking around the campus and can spend a little more time with friends.

To do this, the app needed to work on a device that people always carry with them. This ruled out everything except mobile phones/tablets. The app needed to work on as many devices as possible and was therefore developed with React Native as it allows for development on multiple platforms with one codebase. The app needed to provide the path from one point to another while also switching maps so that users would not get lost and could follow the path easily. It also needed search functionality so that users could select rooms.

## 2. Conforming to Design/Functional Specification

This project was worked on over a course of the entire 4th year(October 2020 to April 2021). This time frame includes the time spent on documentation for this project. Due to the fact that the project was going on for so long, it meant that design specification was changed from the original draft. This is especially true for UI and UX which has been improved drastically from the original design by listening to the feedback from other people.

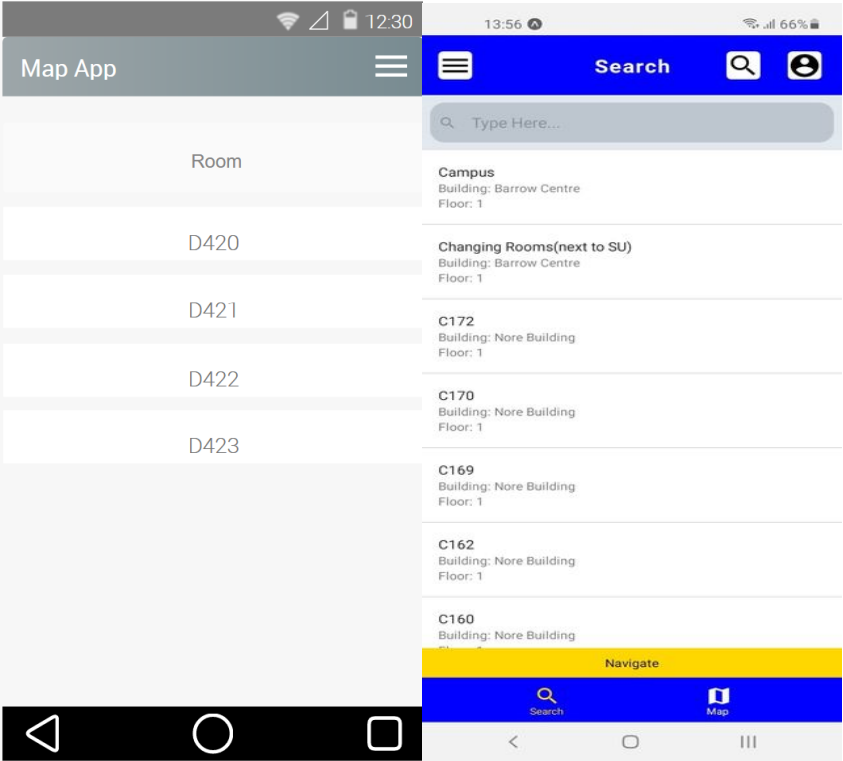


Fig. 1: Original Design(left) vs Current Design(right) of Search.

The app follows functional specifications closely in most cases.

Functionality	Success/Fail
The user must be able to view the map	Success
The user must be able to use search	Success
The user must be able to find a room	Success
The user must be able to login/register	Fail
The user must be able to create/edit/delete schedule	Fail

The user must be able to remove their profile	Fail
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<b>Performance</b>	<b>Expected</b>	<b>Actual</b>
Calculate Path	15 seconds	~7 seconds
Navigate to different page	2 seconds	~2 seconds
View map	10 seconds	~6 seconds
Search	10 seconds	~12 seconds
Features Found	5 seconds	~4 seconds



## 3. Learning Outcomes

### 3.1. Personal

I have learned a lot during the project which will be extremely valuable once I start working and some aspects will also be beneficial in day-to-day life.

I think the most valuable thing I learned during this project was a real life experience in problem solving. While this may not be visible in the project itself as it is not finished, I would like to think that the way I approach problems changed drastically during the course of the project. I have found new ways on how to approach problems. During the project many of the solutions I have come up with did not work as I intended or could not be done the way I intended due to technical restraints, however there were many solutions that did work, even if only until the next revision. The project came with a lot of difficulties such as learning new languages and frameworks which also introduced their own problems to be solved. By the end of the project, I learned how to approach problems in different ways and devise a plan on how to solve those problems when they got too difficult to handle at once.

Another valuable thing I learned during this project was better time management skills. This was a skill that was tested throughout the project. All from meeting deadlines for documents to be submitted at the start of the year to my own schedule that I had to stick to while managing all the college work that was given out to be completed throughout the year. With this however also came another aspect of time management, which was allowing myself to take a break during the project and knowing when I could afford to do so. This was especially important this year as all courses were done from home which meant that working on a project did not feel as if it was done for college, it felt more like working on a personal project. This, to me, made it very hard to stop at a reasonable time, especially at the start of it. Many times during the project, I would spend hours trying to reach a solution to a problem only to realise that it was simple and did not need that much time spent on it. This has been my problem for a very long time, and I feel that I have made great progress mainly by switching to a different task. By the end of the project, I have learned when to step back from the project to give myself some breathing room, even if only for a little bit, and then come back to it when I was rested and/or had a clear mind.

## 3.2. Technical

During the duration of the project I was exposed to a number of new technologies and also technologies that were familiar to me from previous years. These technologies were:

- React Native
- Google Firebase
- Git
- Expo
- Visual Studio Code
- CSS
- NPM

### React Native

During the research, I have found that using React Native might be the best option for the app due how easy it is to build for multiple mobile operating systems. React Native, while very similar to Javascript in many aspects, is quite different from it. To learn how to work with it efficiently, I had spent a lot of time just reading documentation provided to understand concepts that were unfamiliar to me. One of these concepts was how navigation between screens worked as it was quite different from anything I had experience with up to that point. Another new thing was how to pass parameters between multiple screens. While these were not necessarily hard, they were tricky to use at some points in time especially in terms of classes and functions both of which had different implementations of navigation.

Over the course of the project I have developed 7 different screens which consisted of JSX and functionality. Most of the functionality can be found on the map screen as it does all the computations to draw path and finding the point on the map.

### Google Firebase

Using Firebase was a great experience with a real time database. Previously I have used AWS and relational databases. Real time database proved to be a great way to store the data and once I got over the learning curve in the beginning, it became quite easy to use. This cannot be said about working with the data which took considerably longer time as I have never worked with objects/json formatted data. Overall, I gained a lot of insight into how real time databases works and how data is stored in and extracted from database as well as how to work with that data.

## Git

Previously, I have used git to store my projects as well as showcase my work to other people, however I have never truly used it as intended as many times I would push my code only after the whole project was done. During this project, I have learned how to utilise Git better as I have made more commits than on any other project that I have done. This was partly due to me not wanting to lose progress or revert changes when I made a mistake. I have also started to use some functionality of GitHub on this project. Mainly progress board which contained all of my to do's, in progress and done parts of the project.

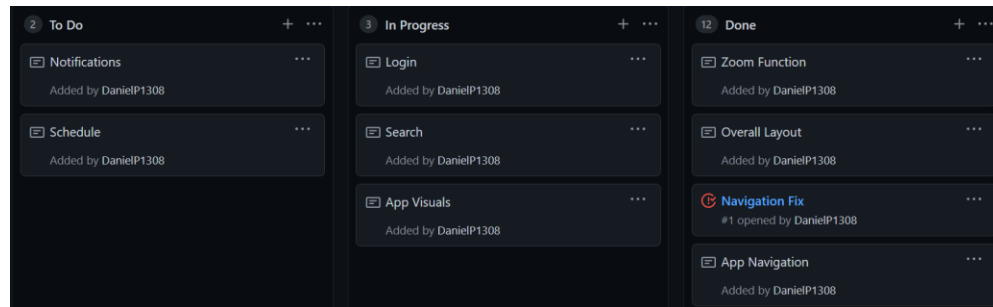


Fig. 2: Project Board

Overall, I have learned a lot about how to use git and use some of the features that it might come with. I still forget to commit changes that I have made everytime that I make them, however I have gotten better at doing it compared to before the project.

## Expo/NPM

I have used Expo CLI to build and run my app on. I have learned a lot by using it and it helped me greatly during the project. Main feature that I used a lot of the time was running the app in production mode to see how it would behave if released. This was made very easy by using Expo as it had a built in feature that allowed this with one click and restart of the server.

I used NPM to install and manage modules that were used during the project. This was another aspect of the project that taught me a lot about management of modules and how modules that were not in use could impact the performance of the app.

## 4. Project Review

### 4.1. What went as planned?

I do not think many aspects of the project went as I planned or anticipated. While

I had developed some features that I planned at the beginning many of them are still not finished or are not up to my standard. I do think that in terms of visuals, the app is at the stage where I would be happy to release it. This cannot be said about the functionality of it.

In terms of functionality, nothing went according to my plan I set out at the start. Many features are not finished and while some are in a state where I could use them as intended, they do not work 100% of the time.

### 4.2. Difficulties faced?

I have faced many difficulties during the development. Some of the difficulties came with the technologies I was using, and some came from me overthinking a simple task to a point where I had a tunnel vision when it came to it.

First difficulty I encountered when developing the project was how to navigate between different screens. It took a lot of time to make it work as many guides and even the documentation were not clear. It did not help that many guides or helpful answers were outdated as navigation module had been updated to a new version a year prior to me starting the project.

I have faced some difficulties where I spent a lot of time trying to find bugs in my code only to learn that the bug was not my fault but a known new issue when modules were getting updated with bug fixes. It felt like I wasted time on something that did not need fixing.

There were also difficulties that I brought upon myself as I was too narrow minded in certain instances where I would try to fix a problem that might not have a fix instead of trying some new method of doing that particular function of the app. This is especially true when it comes to my implementation of the map function. I would say I stuck to my solution which I do not think would work for many people that would be using my app instead of trying something new or merging two ideas instead of just choosing one.

Another difficulty was to make the app look the same on different screen sizes. I spent a lot of time developing the app on just one device and only later checked how the app would look on different sized screens. This was an easy fix but there are still elements that look a bit out of place on certain screens.

I also faced a difficulty in developing the app for iOS as I do not have any device with it. I tried different emulators but some only worked on MacOS or were pay to use. When I found one that could be used, it did not allow me to Register to use the Apple store to download Expo Go app which was used to run the project on the mobile phone or it did not run on my CPU as it only supported Intel CPUs. At the end I decided to abandon the development for iOS as I could not find emulator that worked for me.

### 4.3. What was changed and why?

Not much has changed from the initial plan that I had. Some things have been expanded such as the way maps work. The most substantial change was the look of the app which has gone through several changes during the development of the project

The most obvious change between the plan and finished product was that the finished product is not actually finished. While some functionalities work to an extent they do not work all the time or with all the use cases. This change stemmed from different difficulties during the project as well as not having enough time to finish those features. This meant that features such as schedule, login and register are not completed or were cut out entirely.

### 4.4. What would I do differently?

The main difference I would make is to make the whole project in Unity or Unreal Engine. This way I could make maps not be images but either 2D or 3D objects. This would make it easier to navigate through it and be more visible.

If I would not change the technologies used in the project, then I would try to plan out a better approach in doing this project. Mainly in how I approached the development of the map functionality as I would try to tackle bigger tasks during that part of the development as I feel I lost a lot of time trying to tackle tasks that were small and never really were part of the bigger picture.

## 5. Conclusion

The project was a great challenge to learn and improve my skills. It forced me out of my comfort zone as I had to use different technologies that were new to me. The biggest challenge was learning and using React Native as it had some quirks that were hard to get used to.

Overall, I would consider this project a failure as it does not provide the functionality that was outlined in the plan nor does it feel complete at this point. While it was a failure I still enjoyed my time working on it and even if it is not complete, I still find that I have learned a lot.

## 6. Acknowledgement

Firstly I would like to thank Hisain for his guidance and support during the duration of the project. I appreciate all the advice given to me. Thank you.

I would also like to thank my friends and family who put up with me during this year and helped me greatly. Even though the project is a failure, it would not have been possible to achieve without their support. Thank you.

## 7. Declaration



### Declaration

- I declare that all materials in this submission e.g. thesis/essay/project/assignment is entirely my/our own work except where duly acknowledged.
- I have cited the sources of all quotations, paraphrases, summaries of information, tables, diagrams and other material; including software and other electronic media in which intellectual property rights may reside.
- I have provided all bibliography of works and sources used in the preparation of this submission.
- I understand that failure to comply with Institute's regulations governing plagiarism constitutes a serious offense.

**Name:** Daniel Polak  
**Student ID:** C00228290  
**Signature:**



**Date:** 30/04/2021