

Institiúid Teicneolaíochta Cheatharlach



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TECHNOLOGY

CARLOW

At the heart of South Leinster

Software Development 4th Year Project

Fitness Application and Website

Project Report

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Introduction

As part of my fourth year in IT Carlow, I was required to create a fitness application and website that would allow a user to enter the phone application and by providing a few details be able to generate a workout plans or meals suitable to the details they had entered. The goal was to provide the user with a quick and easy plan suitable to their needs. In this Project Report I will provide a description of my project, a description on the conformance to the specification and design, a document I completed prior to the first iteration. Additionally I will give a description of what I have learned during the duration of the project, both technically and personally, before giving an overall personal review on my project and how I felt about the events that transpired during the extent of the project. Finally I will acknowledge any help and guidance I received which helped me while working on this project.

Section 1

Description of Project

For my final year project I requested to do a fitness application as I have a keen interest in fitness and keeping active and also have a relatively strong knowledge in the subject. I was pleased to have my project idea accepted and was eager to get started with it. The idea I put forward was a fitness application that allowed users to generate a fitness program or meal by entering details into a form. A plan was then generated from the details provided and the user could view this plan on their phone application. One of the main benefits of getting to do a project of my choosing, as opposed to being assigned one, is that it gave me free reign to do what I wanted with the project, given that it was my idea. If I had done a project that had been assigned to me I would have had to follow the guidelines of that project, which would have lessened the amount of individual ideas I could have implemented. Another advantage of doing my own project idea was that because of my interest in the subject I was much more enthusiastic about doing the project and putting time and effort into it. I feel I would've had a more difficult time doing this if the project was on something I had very little interest in.

Section 1.1

Documents

Before beginning the building of my phone and web application I had to complete three documents. These documents were the Research document, Design Specification document and the Functional Specification document. For the Research document I researched apps that I thought would be similar to the app I wished to create. By doing this I was able to pick out any positives from apps that I could consider when creating my own app. I could also pick out the negatives of these applications. By doing this I could avoid implementing these negative elements into my app. I also researched different technologies I could use for the building of my project. The Research document proved to be very beneficial as I used some of these technologies and would not have known about them if I had not done any research. The research document also convinced me to purchase a MacBook to carry out my project. This proved to be a fantastic decision as it made everything so much simpler to carry out tasks. After the Research document I felt much more comfortable moving forward with the project.

Next I would move onto the Design Specification document. Here I designed screens for the project and briefly described what happened on each screen. This document provided me with a good idea on how I would design the applications once I got to the building of the phone and web application in Iteration 1, 2 and 3. However, the current screens do look different to the ones I designed in the Design Specification. Some features in the document have been taken away, while other features have been added that were not in this document. The document provided a sufficient guideline to follow for the duration of the project but It was always going to be difficult to follow it precisely.

Finally, before moving onto the creation of my application I wrote up the Functional Specification of my project. Here I discussed the objectives of the project, along with the functionality of the project and any risks or issues I saw forthcoming. I also provided a projected timeline for the individual tasks involved in the project. Doing this provided me with helpful concept of what was to come and how I could prepare myself to be able to deal with any potential problems and also to understand better what I wanted to do with the application.

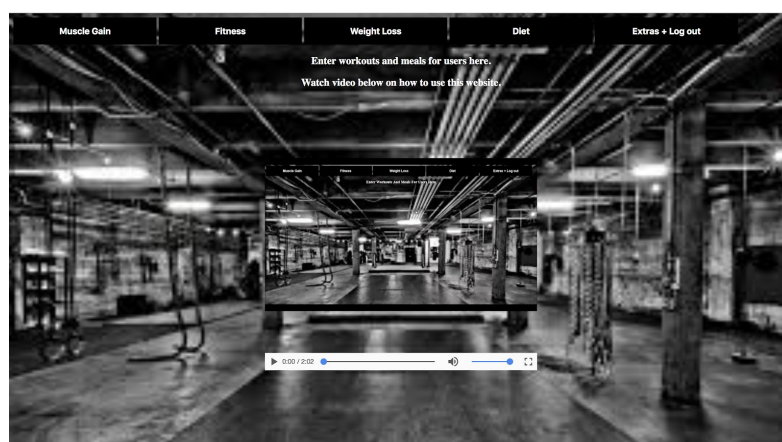
Section 1.2

Iterations

After finishing off the documents it was time to move onto the building of my applications. The building of the project was separated into three iterations spread out over 3-4 weeks with a presentation at the end of the first two iterations and a demonstration at the third.

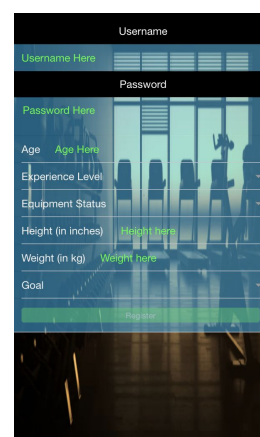
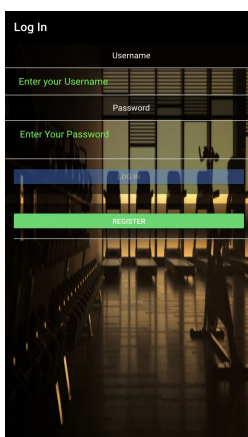
Iteration 1

During Iteration one I decided to build the web application, which would allow a personal trainer to enter workouts or meals into a database. I build the website using HTML, PHP and CSS and hosted on a localhost using XAMPP which contained an Apache Web Server and a Phpmyadmin Database. I decided to build it this way as I had used XAMPP before during my third year project to great success and was comfortable using it. I was able to complete the web application before iteration 1 was finished and presented my web application at the end of the iteration. I then set out what I was going to do for Iteration 2, which was to build the phone app.



Iteration 2

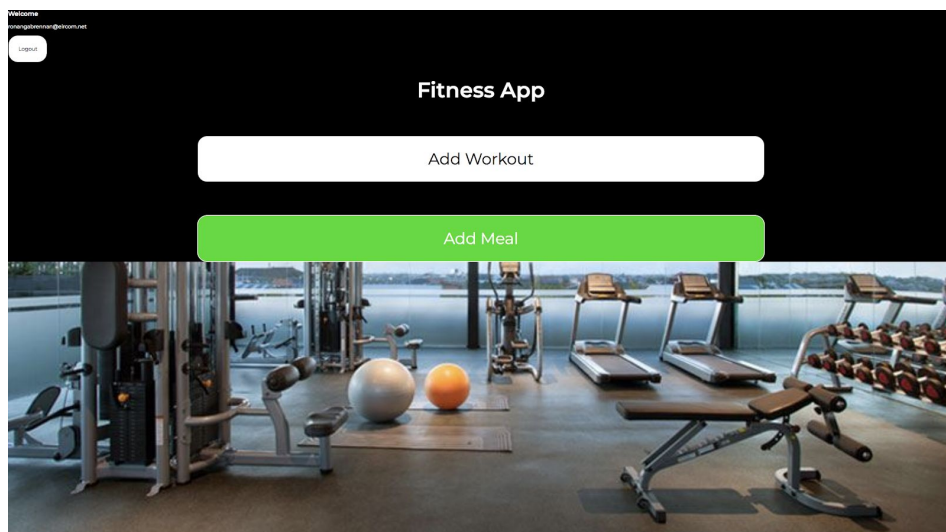
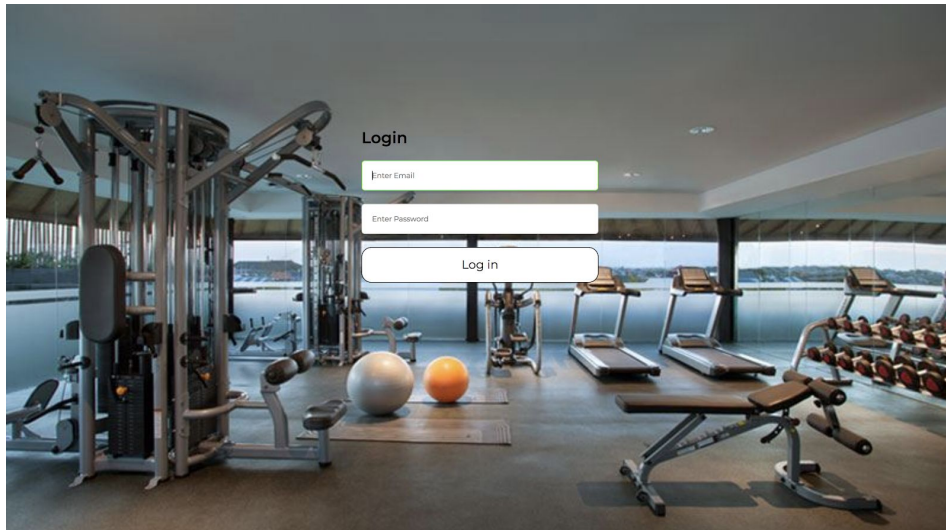
For Iteration 2, as previously mentioned I was going to build my phone application. Here the user would enter details into a form to generate a workout plans or meals for them to use. Initially I decided to build the application using Android Studio, as I had also used that before when creating my application for my 3rd year project I was again comfortable using the software. However, it quickly became apparent that it would not work efficiently with what I wanted to do and decided to pursue a different technology. I consulted my Research document and decided that I would take a look at Apache Cordova and the Ionic Framework. The learning curve proved to be steep initially but I quickly gained a good understanding of the technology and how to make it work the way I wanted it to. I also needed to find a text editor to use, as Android studio did not need a text editor and I had just purchased my MacBook and the text editor I would usually use, Notepad++, was not available on Mac OS. Again I consulted my Research document and decided to use Sublime Text. Using these technologies I was quickly able to build the screens for the phone app. Next I would encounter another problem, the biggest one I would encounter during the entire project. I was having a very difficult time connecting the phone application to the database, where I had all the data stored from the web application. Without this functionality, the main functionality, the whole project would fall apart. This was reiterated to me during my presentation for Iteration 2. I knew I would have a lot of work to do for the third iteration. Luckily it occurred over Easter break, giving me a great deal of time to fix the issue.

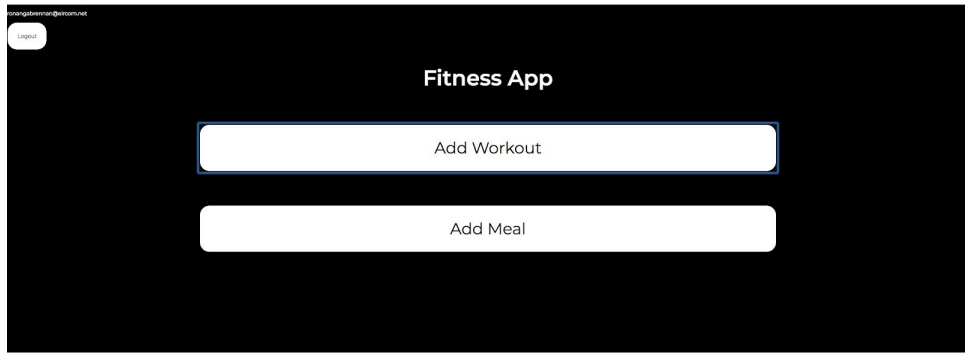


Iteration 3

For the start of Iteration 3, I knew that the database I was currently using, Phpyadmin, would continue to cause me problems, therefore I decided to take the risk and change to a different database provider. Again the trustworthy Research document was consulted and I decided to have a look into Google's Firebase. After a few hours of research, I knew that Firebase would be able to help me fix my situation, using its Authentication functionality, its Realtime Database and its Firestore Database, which is still in Beta at the time of writing this document, and its hosting functionality. However in switching to Firebase changes had to be made to my phone and web applications and there was plenty of them to be made. Unlike last time I decided to create my phone application first and ensure that it was working and connecting to the database correctly and getting and displaying data from the database. Next I made the changes to the web application. I decided to incorporate JavaScript instead of PHP and was surprised as to how easy the language is to use as it seems to have somewhat of a bad reputation in the coding community. Using Javascript I was able to improve my web page dramatically. I say web page because by using Javascript I was able to provide all the functionality of the web app on one page. I then equipped the web page with its functionality, to allow the personal trainer (user) to add workouts or meals to the database. I then tested getting this added data on my phone application. Satisfied with the functionality I then let my creative side out and added style to the screens using SCSS for the phone and CSS for the web page. Happy with the outcome I started on my Project Report and Technical manual, as well as building the compulsory website to display my documents and preparing the documents to be handed up for the deadline. I will then prepare myself for the upcoming demonstration.

Final Web Application Screenshots





Add Workout

Trainer Name.

Workout Name

Add Workout

Trainer Name.

Workout Name

Primary Area Worked

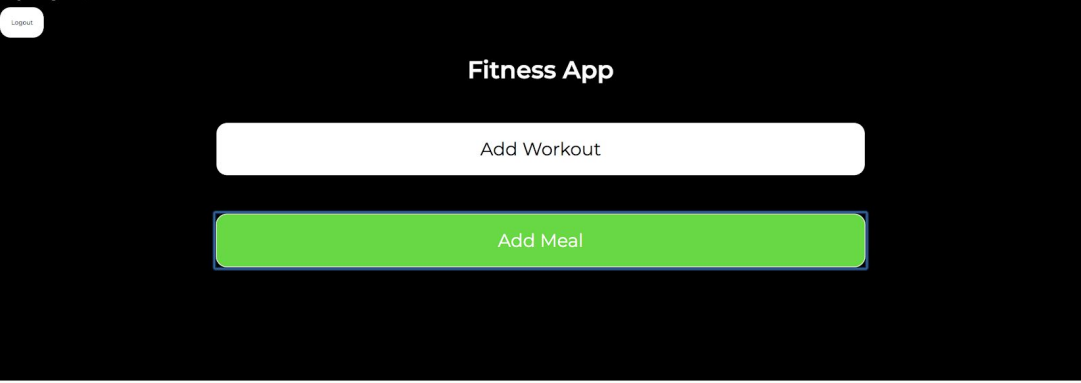
Experience

Equipment Needed

Reps

Sets

Goal



Add Diet

Trainer Name.

Meal Name

Ingredients

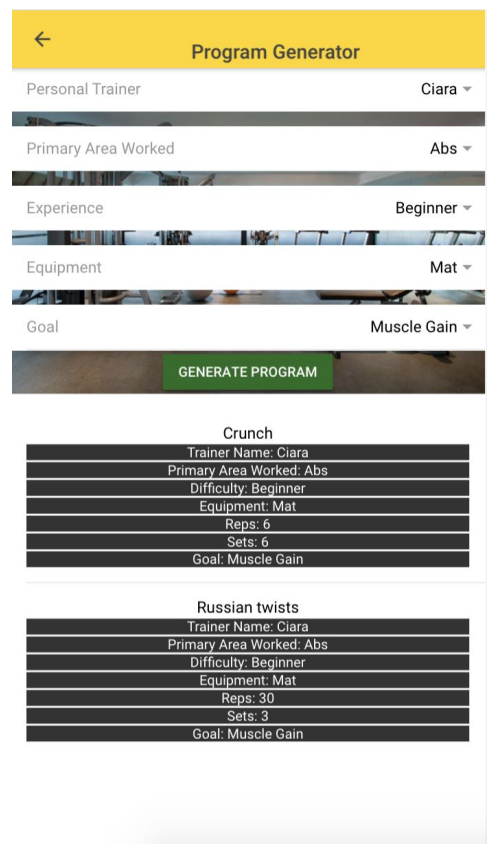
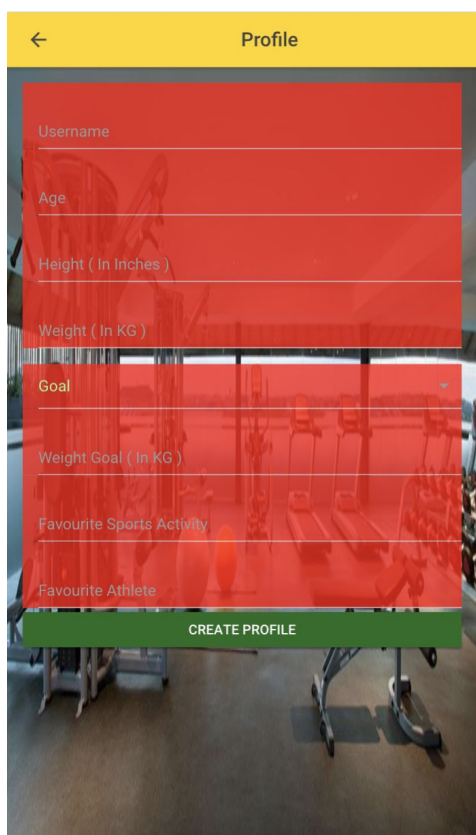
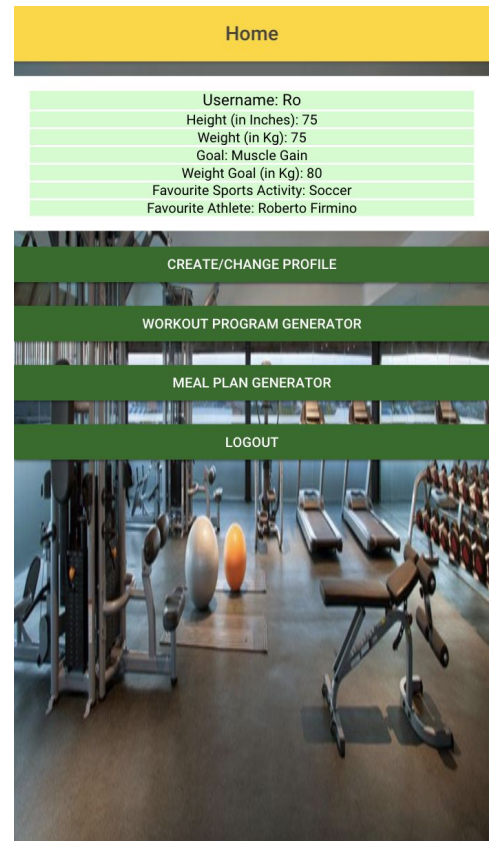
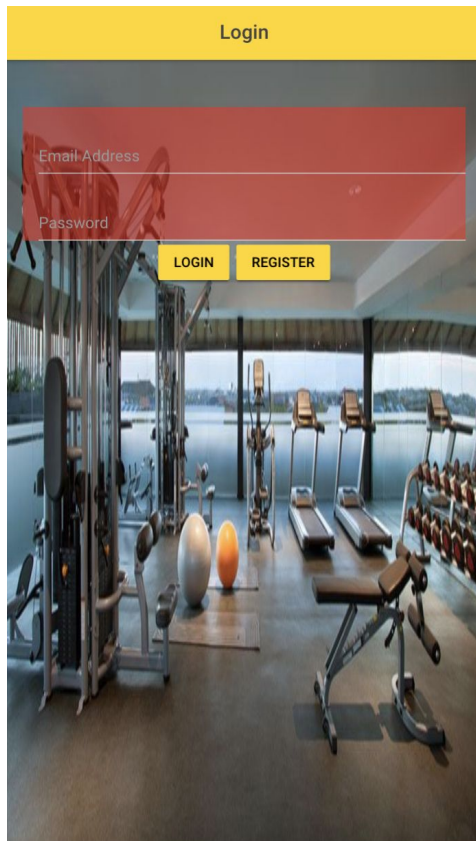
Meal Time

Prep Time (in Minutes)

Primary Nutriton

Allergens

Final Phone Application Screenshots



← Meal Generator

Personal Trainer: Jim ▾

Meal Time: Dinner ▾

Prep Time (in minutes): 40 ▾

Primary Nutrition: Protein ▾

GENERATE PROGRAM

Curry

Trainer Name: Jim

Ingredients: Curry Powder, Chicken, Onion, Mushrooms, Peppers, Nuts ...

Meal Time: Dinner

Prep Time: 40

Nutrition: Protein

Allergies: Nuts

Section 2

Description of Conformance to Specification and Design

Section 2.1

Conformance to Functional Specification

In my functional specification, I discussed the objectives, functionality and potential risks and issues involved with the upcoming creation of my software. Even though I encountered problems in iteration 2 I was able to quite accurately match my software to the projected functionality description and the user interface design. These headings were able to give me an idea of the process to take in order to create the functionality and design of my applications. It was especially useful when I had to change my technological approach at the end of iteration 2/beginning of iteration 3. By consulting the functionality description and user interface description I was able to remain on track with the development of my project. The risk assessment was also surprisingly accurate as I did encounter problems with time management and in incorporating the database with my phone application. As I had prepared for these difficulties I was effectively able to overcome them. There are a few inaccuracies in my project timeline as some of the deadlines changed during the course of the project. Some aspects of the the user interface description did not match that of the final design but that is not surprising as a lot can change when implementing a system as opposed to talking about implementing a system. Overall there was not much of a difference between my finished product and what I discussed in my Functional Specification.

Section 2.1

Conformance to Design

From doing the Design document I quickly realised that not everything you envisage is possible to implement. There are a number of changes from the screens I designed in this document to the final screens. Not so much in the web application, they were quite accurate, but it is more evident when it comes to the phone application screens. This occurred for a few reasons, most notably, due to the technology changes during the establishment of my software. When I designed these screens I

was going to make them using Android Studio and XAMMP. As it became clear that using Android Studio would not be a sufficient way of creating the phone application, the changing of software would mean the changing of the screen design for the phone. In hindsight, I am pleased things turned out the way they did as the phone screens I had designed in the Design document were a bit too complicated looking and not very user friendly. The current design is much more user friendly in my opinion. The complicated design is most obvious in the user flow diagrams. On some pages there are too many options for the user to choose from, potentially overwhelming the user. The current design removes all complications and provides the user with an easy to follow design. Both the Functional and Design specification were very beneficial in the development of my software and provided an ample template for my application.

Section 3

Description of Learning

Section 3.1

Technical Learning

Initially I was going to use Android Studio and XAMMP to develop my software as I had used them to develop software before. In hindsight, this may not have been a great idea as I would not have learned about other technologies that may have been more beneficial. In a way I am thankful that the Android Studio XAMMP combination did not work well this time round as it meant I would have to use different technologies to carry out my development. These technologies that I learned were Apache cordova and Ionic Framework and Firebase. I am very grateful to have been able to use these technologies for the development of my project and learned so much when using them.

Apache Cordova/Ionic Framework

I first came across Apache Cordova while I was researching technologies for my Research document. I liked the idea of it but because I had never used it before I decided not to use it. Thankfully it was imposed on me when Android Studio would not suffice and combined with Ionic Framework it was the perfect technology for the job. I am delighted that I had the opportunity to learn it and apply it to my project. Initially the learning curve was quite steep, but with the realisation that it was fairly similar to HTML CSS and JS, it became much easier to learn, it uses an ionic adaption to HTML as well as Typescript (TS), similar to Javascript, and SCSS, very similar to CSS. These languages were much easier to learn and use than that of Android Studio. Apache and Ionic made great use of the command line to create pages and to display the app you had created. Everything about the process was so smooth that I will definitely be using these technologies again if I ever have to create another phone application.

Firebase

Similar to the Apache Cordova/Ionic situation I was originally going to use a technology I had used before for the database and hosting of my website. Again I am glad that this did not come to fruition, if it had I would not have come across Firebase, which was the solution to all my problems. Firebase has everything you need to host a website. It has its own authentication setup that was easy to implement in both the website and the phone app. Firebase and Ionic worked very well together which was a huge advantage. The Realtime Database was very easy to save data to and get data from. The hosting was also well laid out and deploying your web page/s to the live server was simple. Additionally once you deployed your web page/s you were given a URL that others could access to see the web page/s. The most significant aspect was the release of the Firestore database, released on October 3rd 2017. This database which is still in Beta was very useful to learn and I feel that it will be very beneficial to have this knowledge in the future. Finally Firebase has a docs dedicated to teaching the user how to use its features and implement them into their software, which greatly lessened the learning curve.

Section 3.1

Personal Learning

This project has had many positive effects on me throughout its duration. There are many things I am better at now because of this project but if I was to narrow it down to the three biggest things I learned about myself they would be, my time management and organisation skills, my confidence in my programming ability and my researching skills.

Time Management/Organisation

Going into this project I knew about the importance of meeting deadlines and being organised in order to meet said deadlines. Therefore I knew I had to work on my time management skills as they are not my strongest attribute. I decided that in order to help with this I would use sticky notes to remind myself of when I needed to complete a task to meet the deadline. I also set personal deadlines on sections of the task in order to ease the workload and not leave too much to the last minute. This proved to be a very good move as when I encountered problems I had plenty of time to fix them. I also became much more organised because of this project

knowing how important it was in order to succeed. I am thankful that the project has enabled me to improve on these skills as I am sure they will be beneficial to me in future endeavours. By challenging myself to become more organised and time conscious, the rewards of doing so have encouraged me to improve further on these skills and that would not be the case if it was not for this project.

Confidence in my Ability

Going into this task I did not believe that I was a strong programmer. I felt that I would have great difficulty in producing the software for the project because of this. When I encountered the problems with the database during iteration 2 I felt I did not have the ability to overcome this hurdle. With the project and my year resting in the balance I knew I had to eliminate this problem and with determination I was able to do so. This was very pleasing to me as I thought this problem would be the end of my project. I am glad in a way that I encountered this problem as it pushed me to come up with a solution and in doing so improved my coding ability and with that confidence in my ability. This new found confidences should prove to be very helpful in the future.

Researching Skills

Prior to this project I had not done much in the way of research. So to start with a research document was a rather difficult task, I was not feeling too enthusiastic about doing it as I thought it would be a boring monotonous procedure. Yet in the end it turned out to be a very rewarding one. Without it the project would have failed miserably as during this stage is when I found out about the two technologies I would end up using, Apache Cordova with Ionic Framework and Firebase. This was pleasing as without my research skills I probably would not have come across these technologies and the project would have greatly suffered because of this. Improving these skills will be a great aid to me in the future as new technologies are always appearing and it is essential to have these skills to be able to do good research on them as they could prove to be critical.

Section 4

Project Review

When undertaking this project I knew that I would have a difficult task ahead of me that would involve countless hours of work but because I got to do a project on a subject I had an interest in this made it so much easier to put in those hours of effort. There were many ups and downs during the duration of the project but I am very satisfied with what I have done in the end. I have managed to create a phone and web application that achieves my initial goal going into the project. That was to create a phone application that would allow a user to register and login with their credentials. Once the correct credentials are entered the user is brought to the main page where they can choose to generate a workout plans or a meals depending on the button they click on said main page. They then enter a few details into a form, hit the generate button and a plan or meal is generated for them. As for where these plans and meals come from, they are added to the database via a form that is filled out by a personal trainer on a webpage that I created. This makes the process so much simpler than having to join a gym and communicate with a personal trainer at said gym in order to get a personal plan. It also trumps other applications in that it provides personal plans for the user. I could not find an application that did that during my research phase of this project. I really believe that this is the future of interactions between personal trainers and their clients. I am also very pleased with how the screen designs turned out. I think the user interfaces are very slick looking and very user friendly. I would like to test the app out on some people to see if they share this opinion and would be greatly interested in the feedback they would have to offer. Nonetheless, like most things in life, not everything was perfect along the way as I encountered one or two issues on that journey.

As mentioned before the issue with the database connection to my phone app using Android Studio and XAMMP could have spelled disaster for the entire project. Fixing the issue consumed a large chunk of time, when I could have been adding more functionality to the applications, which I will address later. On the other hand without this problem I would not have come across the two technologies that I ended up using to develop the app and that were hugely beneficial to learn and made my project better than I ever could have imagined. Apart from that one big problem not much else went wrong throughout the project which was lucky as that one problem had already caused enough havoc.

Like I said above because of the issue I had with the database I was not able to add some functionality to the phone and web applications that would have improved them even more. This was not a major disappointment as the main, most important functionality has been implemented. However if I was to get more time to work on the project I would like to have incorporated a social aspect to both the web and phone app. In the web app I would like to have added a discussion board where personal trainers could bounce ideas off one another to improve the way they make plans. Also on the phone app I would've liked to have had a setup to allow users to compare their interests with others and that way perhaps find someone to workout with. I would also have liked to add a delete function to the web app so that personal trainers could delete certain workouts or meals that they added to the database, which would not be too difficult to implement. Finally I would have liked to have added links under each meal and workout which would take the user to tutorials on how to do that workout or make that meal. After adding those functionalities I believe my application would triumph over the competition.

If I was to go back to the very start of this project with the knowledge I have now I would be more open to learning and using other technologies. This proved to be beneficial to me during this project but I would have liked to have had this viewpoint much sooner in the project. I would also have more confidence in myself and my ability as I believe that was the main cause of the problems I encountered during this project. This is the advice I would give someone if they were to start on this project as it made a huge difference to me whenever I adapted these approaches. I would also advise someone who is beginning their project to try and do it on a subject they are interested in. I know from personal experience and conversations with others that when you are doing a project on something you personally enjoy then it makes the journey and outcome of the project much more rewarding. It also keeps you interested in your project as it is your own idea, encouraging you to try and make it succeed as much as possible. Also to enjoy the experience and to take the positives with the negatives, very seldom does a project like this go exactly as you want it to and it is important to embrace these difficulties, overcome them and learn from them.

When it came down to the technologies I made a poor choice to stick with what I know, which caused complications down the line. It was also a negative approach that at the time I was not willing to learn new technologies. Thankfully when these technologies would not work, I was able to find ones that would and in learning these technologies feel much more confident with my ability. If I was to do this again I would use Apache Cordova/Ionic and Firebase from the start or even learn and use other technologies.

To conclude, this project has been a very rewarding experience and I look forward to taking my new found skills and experiences into the future.

Section 5

Acknowledgments

I would like to thank a few people who helped me along the way with this project.

Firstly, I would like to thank my supervisor, Paul Barry, whose knowledge, experience and insights were very beneficial to the success of this project. I would like to thank him for his time and patience with me. Also his willingness to help, stating that I could email him anytime and when I did he would respond very quickly. Paul was a massive influence on me and kept me motivated for the duration of the project even when I encountered difficult obstacles.

I would also like to thank my friend, Eoghan Coffey, who through his experience with fitness was able to help me with the details that I would ask users for their workout and meal plans. His knowledge was very important to this project.

Finally I would like to thank my family for their help and support throughout the project. My mother, Mary Brennan, for proof reading my documents and also motivating me to complete them. Without her help the project would have suffered. My Dad, Jim Brennan, for giving his opinions on the screen designs of my web and phone app and for helping me test that they were working properly. His feedback was very valuable to the project. Finally my sister, Ciara Brennan for her guidance on writing documents. Her knowledge really improved my ability to compile the various documents.