



Final Deliverable

Oughterard Golf Club



MS812 – Major Project
Group 5
Final Deliverable



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Oughterard Golf Club

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List of Acronyms

OGC	Oughterard Golf Club
App	Mobile Application
GDPR	General Data Protection Regulation
SEO	Search Engine Optimisation
CMS	Content Management System
QR Code	Quick Response Code

Section One: Project Summary

Acknowledgements

Firstly, the team would like to thank our client, Oughterard Golf Club for accepting the project, and taking part in the various group meetings and providing regular guidance and feedback. We would particularly like to thank our client representative Barbara Buckley, for her enthusiasm, support and motivation from start to finish during this project.

We would also like to thank our Project Supervisor Henry Edison, Business Information Systems department at NUI Galway for his continued advice throughout.

Introduction

Project Overview

As a requirement of the M.Sc. in Information Systems Management Programme at the J.E. Cairnes School of Business & Economics, NUI Galway, students are required to complete a major project that involves the development of a new/ enhancement of an existing information system for a business or organisation. The aim of this project was to bring together the skills and knowledge gained throughout the course and utilise learning in a real-world scenario. This project involved working with Oughterard Golf Club, located in Oughterard, Co. Galway.

The main elements of our project with Oughterard Golf Club included the development of an online membership portal, a mobile application, the creation of QR codes which would hold detailed hole overviews, alongside optimising the OGC website's SEO and social media presence.

As a group, we followed an agile project methodology to carry this project from start to finish. With an agile project methodology, a project team has to be prepared for requirements to be changed, altered or removed at any stage of the development process. We as a group faced this challenge. In early February when we received a phone call from our client representative informing us of a change in requirements. Our client representative emailed us (see Appendix 4.1) informing us that a committee meeting was held at the golf club, at which it was decided to not proceed at present with a major element of our project. The committee had decided that they did not want to allow members to view or update their account balance through the member's portal. This was a major piece of functionality that we had agreed upon with the client and had spent many months researching and preparing. Our project team decided to continue to develop the member's portal and instead develop other functionalities which were identified by the client and by our team through requirement gathering techniques. This major change so late into the project really tested our abilities as a team and our ability to work in an agile manner. We believe we handled this successfully and professionally with a positive response from our client.

Selection of Project Client

After forming our project group, we discussed our skill sets, previous work experiences and educational background. We then began the process of selecting a client that would best suit us all as an all-round team this consisted of reviewing the client list provided by our project coordinator. As a group, we understood the importance of selecting the correct client that would not only fulfil the project outline given to us, but one that would also challenge us and develop key skills that would benefit us in the future.

We initially identified two clients that we believed met the criteria which we had laid out-Oughterard Golf club and CKI (Community Knowledge Initiative). The team composed emails which explained the project and our team, which were sent to the clients, receiving positive responses from both. We organised meetings with both clients so we could get a better understanding of the requirements outlined and also to gain a deeper insight into the organisations themselves. After weighing up the positives and negatives from both projects the group voted for Oughterard Golf Club. An email was sent to Barbara Buckley the representative for Oughterard Golf Club to inform her of our commitment to undertake the project.

Project Motivation

As a team, we developed a list of criteria that would help us choosing a client. Oughterard Golf Club fulfilled this criterion and more. The main motivations behind this project was the exciting opportunity to build fully functioning Information Systems that would be used by the golf club. Everyone was on board with this project and as a team we believed it would challenge us and keep us on our toes, developing our skillsets throughout the year.

Large businesses often focus on the bigger picture and lose sight of their stakeholders. We ensured that the main focus was the client and their members as we developed a fully functioning application, boosted their SEO, developed their website and created an Instagram page. The main motivation for this project was that the requirements gave every team member the opportunity to stray into areas they have never worked or experienced before. For example, throughout the course of the project, the team zeroed in on areas of Human Resources, Marketing, UX design, project management and web design which were unfamiliar to them. This broad range of skills is something that only a project/ project team can provide an individual with.

Client Background

The Oughterard Golf Club is located twenty-six kilometres outside of Galway city. Oughterard Golf Club was founded in 1969 after five founding members raised the capital needed to purchase the land where the course would be developed.

Since its founding, the club has grown substantially in size and popularity. They currently have over six hundred and fifty members, a full-time restaurant and bar, and eight full time staff comprising of green keepers, administrative staff and restaurant staff. In a highly competitive market, Oughterard Golf Club has proven itself to be one of the best golf courses in Galway. However, in the current economic

environment which has been quite difficult for recreational clubs, Oughterard Golf club like many other golf clubs, has seen a downturn in their membership numbers.

In recent years, Oughterard Golf Club had membership numbers reaching up to 1200 people, but these numbers have nearly halved. The club has persevered through the hard times and has still managed to maintain its full-time staff members and continue the development of the course.

Client Relationship

Throughout the completion of this project, we worked with Barbara Buckley who was the representative of Oughterard Golf Club. From the outset, Barbara was clear on what requirements the club would like to obtain and explained the resources available to us in the club.

Due to Oughterard being over thirty minutes away, the main collaborative tools we used to keep in contact was email and phone. These collaboration tools were enough to ensure that we kept in steady contact with our client, providing feedback on our progress throughout the year. Occasionally we met up with Barbara to maintain a strong client relationship and to explain the process in person, to give her a full understanding of certain aspects of the project.

Our client was very hands on and understood the dynamic nature of this project. During semester two, the client had called us regarding concerns with the member's portal, a number of committee members expressed hesitation with one of the features and the golf club decided not to pursue this element of the portal for the time being.

With this major change in our requirements, we had tried to find alternative ways to add to the requirements and to satisfy our clients expectations. Therefore, we decided to change the member's portal to provide simpler features that would be used by both members and visitors at the golf club.

The client was thrilled with how we had adjusted the requirements and was very pleased with the end results we had provided.

Requirements

Below you will find the requirements definition statement we outlined and agreed upon with our client Oughterard Golf Club during the early stages of this project. As mentioned previously, these requirements needed to be adapted and changed at the request of our client. The updated and revised requirements definition statement which accurately reflects the work completed during this project can also be seen below.

Original Functional Requirements

No.	System/ Feature	System	<i>Requirement Description</i>
1	Web-based membership portal	System	<p>The portal should have</p> <ul style="list-style-type: none"> • A membership authentication system • Different access levels for Admin, Staff, and User • an option for users to fetch account details from the GMS database • A page with the GDPR compliance details and an option(checkbox) to collect users' consent • Integration with a payment gateway to process card payments online • PCI compliant pages for collecting card details • Easy navigation across the pages of the portal • minimum load time (4-6 seconds)
		User	<p>Members should be able to</p> <ul style="list-style-type: none"> • Signup/Login to their portal account • view their handicap information • view their club card balance • top-up their club card via online payment option • provide or withdraw GDPR consent • pay membership dues via online payment option(<i>optional requirement</i>)
		Staff	<p>The staff members should be able to</p> <ul style="list-style-type: none"> • View all member's information • Edit member's information • Create membership account • Update payment for a member paying offline

		Admin	The admin should be able to <ul style="list-style-type: none"> • View all member's information • Edit member's information • Export member's information • Create membership account • Cancel membership account • Update payment for a member paying offline
2	Golf Course details app using QR Code scanner (Android)	System	The app should have <ul style="list-style-type: none"> • An option to scan a QR code • Buttons to go back and scan again • Store information linked to the scanned QR code • Fetch information linked to the scanned QR code • Minimum load time after QR code is scanned • Feedback page with user input option
		User	Members should be able to <ul style="list-style-type: none"> • download the mobile app from Google Play Store • Scan a QR code near the hole to view details on the app • Provide feedback about the app
		Staff/ Admin	<ul style="list-style-type: none"> • View/modify the app content
3	SEO Improvement		The website should <ul style="list-style-type: none"> • Rank better on search engines and must appear on the first page • Target potential customers • Improve SEO score by <ul style="list-style-type: none"> - Creating page titles - Creating meta tags - Placing strategic search phrases on pages • Include links to social media pages

Non-Functional Requirements

- The system should be compatible with different browsers (Safari, Chrome, Firefox, Internet Explorer)
- Should be compatible with different Operating Systems (Windows, iOS, Android)
- Should be responsive to different devices (desktop, mobile, tablet)

- User and their payment details should be secure (PCI compliance)
- The Request and Response time for the system should be optimal
- User interface should be easy to use, understand and remember for the target audience
- A development document and user manual should be created to facilitate further enhancement of the system in the future.

Optional Requirements

Social Media Optimisation

At the request of the client we were tasked with improving the social media presence of the golf club by creating and maintaining an Instagram account for OGC. Training for staff and admin may also be required.

Updated Functional Requirements

No.	System/ Feature	System	Requirement Description
1	Web-based membership portal	System	<p>The portal should have</p> <ul style="list-style-type: none"> • A registration system • Different access levels for Admin, Staff, and User • A booking system for golf lessons • Pages to display hole by hole information • Page to display competition results • A page with the GDPR compliance details and an option(checkbox) to collect users' consent • Easy navigation across the pages of the portal
		User	<p>Members should be able to</p> <ul style="list-style-type: none"> • Signup/Login to their portal account • View recent competition results • view upcoming events • book a golf lesson with the club pro • provide or withdraw GDPR consent • view course information
		Staff	<p>The staff members should be able to</p> <ul style="list-style-type: none"> • View all member's information • Edit member's information • Create membership account • Confirm or cancel lesson bookings

			<ul style="list-style-type: none"> • Update events in events calendar • Update competition results
		Admin	<p>The admin should be able to</p> <ul style="list-style-type: none"> • View all member's information • Edit member's information • Export member's information • Confirm or cancel lesson bookings • Update events in events calendar • Update competition results
2	<i>Golf Course details app</i>	System	<p>The app should have</p> <ul style="list-style-type: none"> • an interactive scorecard for both men and women the scorecard should display both gross and net score • a page displaying the golf club's facilities • a page which links the user to the BRS booking system • images of each hole containing course information
		User	<p>Members should be able to</p> <ul style="list-style-type: none"> • download the mobile app from Google Play Store • book a tee time through the link provided • view all hole overview images • view golf club facilities • document score per hole using interactive scorecard and receive both gross and net score
		Staff/ Admin	<p>The admin should be able to</p> <ul style="list-style-type: none"> • View/modify the app content
3	QR Codes	System	<p>The QR codes should</p> <ul style="list-style-type: none"> • contain a detailed image of each hole on the golf course • be able to be scanned by any QR code scanner • be able to be stored on any device
		User	<p>Users should</p> <ul style="list-style-type: none"> • be able to scan the QR codes using any QR code scanner on their device • be able to easily view the images contained in the QR codes

4	<i>SEO Improvement</i>		<p>The website should</p> <ul style="list-style-type: none"> • Rank better on search engines and must appear on the first page • Target potential customers • Improve SEO score by <ul style="list-style-type: none"> - Creating page titles - Creating meta tags - creating meta descriptions • Include links to social media pages
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Updated Non-Functional Requirements

- The Member's Portal should be compatible with different browsers (Safari, Chrome, Firefox, Internet Explorer)
- The Member's Portal should be compatible with different Operating Systems (Windows, iOS, Android)
- The Member's Portal should be responsive to different devices (desktop, mobile, tablet)
- User and their payment details should be secure (PCI compliance)
- The Request and Response time for the system should be optimal
- User interface should be easy to use, understand and remember for the target audience
- A development document and user manual should be created to facilitate further enhancement of the system in the future.

Updated Optional Requirements

Social Media Optimisation

At the request of the client we were tasked with improving the social media presence of the golf club by creating and maintaining an Oughterard Golf club Instagram account. Training for staff and admin may also be required. This requirement did not change.

Methodology Overview

For this project our team firstly began using Scrum methodology. After some time implementing this methodology during the requirements gathering phase of our project, we realised that it was not the best match for our team's needs and schedules. The team researched other methodologies and felt that combining Scrum with the use of a Kanban board would suit our team better as we moved to the implementation phase of the project. The team implemented a Scrumban methodology for the remainder of the project. We will discuss this change further in Appendix one. Scrumban methodology combines the structure of Scrum with the flow-based methods of Kanban (Patil and Neve, 2018).

Scrum is one of the most widely used Agile frameworks which works on the process of dividing tasks (product backlog) into time-based intervals(sprints). The framework helps release a product in iterative steps thus allowing developers and clients to refine requirements with improved communication between the teams. Kanban, on the other hand, works on a pull-based approach where the tasks are not time-boxed, but it is ensured that there is a continuous flow of tasks without burdening the development teams.

Though Scrum is ideal for development, it requires us to define and work on 2-week sprints, conduct sprint reviews and retrospective meetings which was challenging to implement due to our study and assignment schedules. Hence we combined Scrum with Kanban and utilized the structure of Scrum while enjoying the flexibility offered by Kanban.

With the Scrumban methodology, we performed requirements gathering, planning and prioritization combined with reviews and retrospective meetings. We created user stories and added them to our product backlog and assigned priorities based on our client's requirements. Next, we created a Kanban Board using Trello to help visualize the tasks, assign it to members, set reminders and track the progress. This also helped us set a WIP (work in progress) limit.

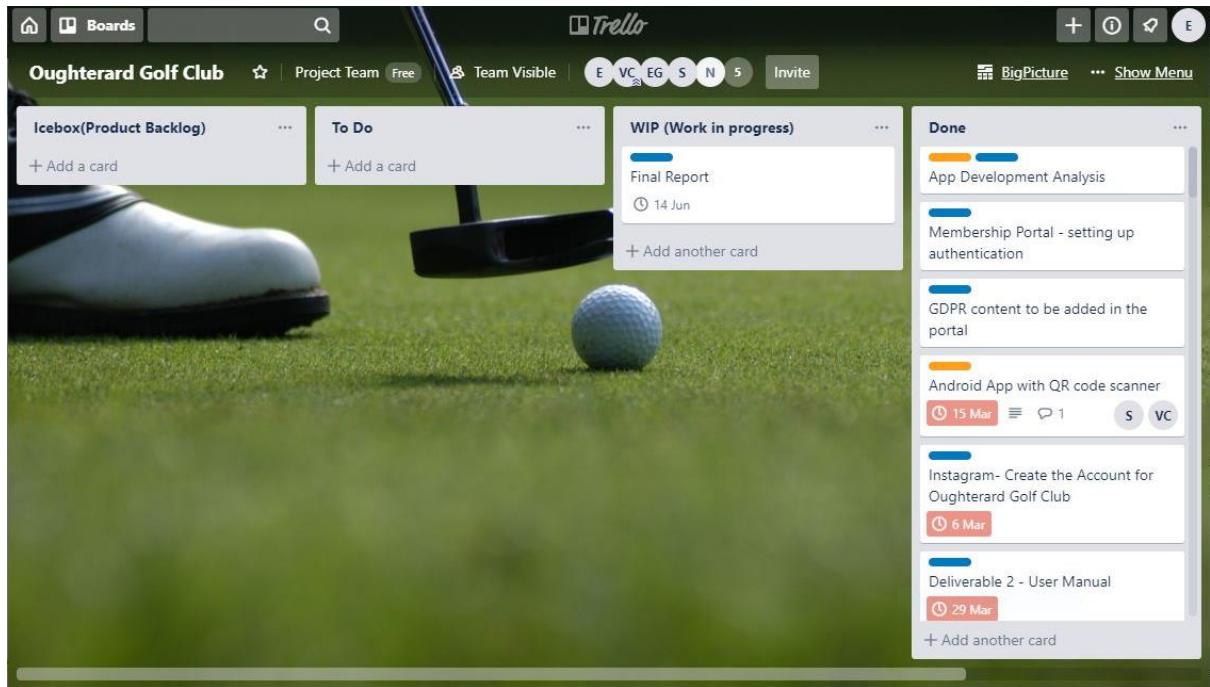


Figure 1 - Team's Trello Board

Benefits of 'Scrumban'

Our team found several benefits to implementing a Scrumban methodology for this project:

1. Quality - With the ability to limit the work in progress, defects are minimized and we can produce a better quality product/features in a shorter duration.
2. Just-in-time - Scrumban allows us to make decisions and gather facts when they are needed.
3. Kaizen (continuous improvement) - This is one of the core principles of Agile and with Scrumban there is greater flexibility in terms of improving the product through continuous reviews and retrospects.
4. Minimizing waste - Scrumban ensures that no unnecessary user stories and issues are tracked. Requirements through comprehensive are precise and exclude everything that is not adding value to the customer (Patil and Neve, 2018).

Target Audience

Identifying your target audience can be done by examining your current customer base, investigating your competitors, creating personas for your customers.

In order to identify the target audience for Oughterard Golf Club, we spoke to Barbara and other members of staff and discussed the current customers they have at the golf club and the potential customers they would like to target. We researched the competitors in the surrounding area to

identify how they market to their target audience. We also created personas and user stories to assist in developing the target audience.

The key target audience we have identified for Oughterard Golf Club can be broken down into the following categories:

Current Members:

A key area for Oughterard Golf Club to focus their attention is on their current members. While recruiting new members is important, it is crucial to not neglect the current members and to ensure they will remain with the golf club and renew their membership each year. By including a membership portal on the golf club's website, the golf club will be providing an additional service that will benefit all members. It is our intention that all members avail of this system and in doing so increase their satisfaction with the club.

Visitors/Non Members:

Visitors to Oughterard Golf Club will be the primary users of the QR codes placed on each individual hole. Visitors or non-members of the golf club will be unfamiliar with the hole layouts and lack course knowledge. This lack of knowledge is why visitors make up the core of the target audience for the use of QR codes. The use of QR codes will enable any visitor to better enjoy his/her round by providing course information that can only be gathered from playing the course numerous times.

Achievements

Team Achievements

During the completion of this project, our team has grown in many ways – from individual learnings, collaborating as a team, dealing with minor conflict as well as deciding on project direction and approaches. Often, problems arise in teams due to certain disagreements, lack of leadership and lack of participation, however, our team exceeded expectations and worked together to complete this project for the client without any contingency plan necessary. Members were able to divide the work fairly and complete the tasks assigned to them in a timely manner ensuring that the end goal- the client's expectations- were met. The team also handled the considerable change in requirements made by the client in a professional and effective manner.

Project Achievements

Our team has handed over to the client a fully functioning application that sports features such as an interactive scorecard, a booking system, hole details, and facility descriptions. SEO has been

increased greatly and Oughterard Golf Club now boasts fifth position on the first page of search results as opposed to the bottom of the third page when we began the project. The QR code scanner has already proven popular with visitors to the club and has received an excellent response. The member's portal adds great value to the members of Oughterard golf club by providing functionalities such as booking lessons, view upcoming events and competition results as well as an overview of each hole on the golf course.

Meeting Stakeholder Requirements

From the beginning of this project it was extremely important to the success of this project and also extremely important to all team members that the client was satisfied with the final product. As a team, we managed to deliver a final product that met all the requirements we had set out and agreed upon with our client. We have also been informed by our client of their satisfaction with what we have delivered and they have received many positive responses from members and visitors to the golf club.

Client and Project Team Relationships

Maintaining a strong client relationship was key factor in the success of our project. From the outset of this project we ensured that a strong client relationship was formed. We accomplished this in several ways. Firstly, we were always willing to meet with our client at their request. We also organised regular meetings with the client to provide updates on our progress. Secondly, we provided the client representative with our private numbers and ensure her that we could be contacted at any time on any day. This constant communication between ourselves and the client was hugely beneficial to the progress of our project as we could get direct feedback from them. Working with our client has been a hugely enjoyable experience for all team members. As a group, this experience is something that will benefit us greatly in the future. We are hugely grateful to Barbara Buckley for her enthusiasm and support throughout the duration of this project.

Lessons Learned

Time Management

One of the greatest lessons we as group gained from completing this project is the importance of time management. Together as a team we knew the huge time commitment required to complete this project. However, each team member had commitments outside of the major project such as lecture attendance, tutorials, study and other projects. We knew how important it was to balance our time between this project and other commitments. Holding weekly team meetings was a huge benefit in ensuring that we kept on track and managed our time effectively.

Communication

Strong communication skills and utilising different forms of communication we learned was vital to the success of our project. Face to face meetings was a major foundation for this project, however we soon realised, this form of communication was not always possible. Utilising other forms was required to maintain communication between group members when meetings were not possible. This included, video conferencing especially at the weekend, WhatsApp messenger and email updates. Each group member worked hard to ensure that communication between the group would be a priority.

Conflict Management

Another lesson we feel we learned was the effective management of conflict if they arise. Our team is made up five members, each of whom come different backgrounds, with different personalities and at times different opinions. In a major project such as this with immense pressure placed on every member, conflict was sure to arise. Any conflicts that did [present itself was dealt with in a professional and a mature manner by ensuring open communication and allowing opinions to be heard.

Recommendations for Future Project Enhancement

Social Media Optimisation

Facebook

With regards the Facebook page, the Call to Action button is set to “Book now” with the link leading to nowhere in particular. Our recommendations would be to change the button to a “Call Now” and provide the number of Oughterard Golf Club.

Currently, there are no ads running. Perhaps running a brand awareness advert to boost followers who are interested in golfing would be an avenue the golf club could explore. We would also recommend installing a Facebook Pixel onto the website to improve ad performance. You can also easily retarget visitors to your website with social media adverts in your Facebook Ad Manager platform.

Email Marketing

Mailchimp is a marketing automation platform and an email marketing service. A low-cost option for Oughterard Golf Club to consider is Mailchimp. It would help in boosting online sales if you do decide to set up an online shop. It would also help with golf club member retention, updating your subscribers of upcoming events, recent news etc. This could be a new and exciting way for Oughterard to reach their members and the younger generation.

Search Engine Optimisation

Google AdWords

Google AdWords is an online advertising platform developed by Google. The aim is for advertisers to pay to display brief advertisements, service offerings for a fee- thus increasing your search presence. By implementing this platform, Oughterard Golf Club can get in front of potential customers and direct them towards the club. See Appendix 6 for instruction on how to implement Google AdWords.

Application Launch

Our application which we have developed for both Android and iOS has many features for both visitors and members such as hole details, interactive score cards, facility descriptions, and access to an online booking facility.

As a team we decided to pay for the launch of the android app on the Android play store. Therefore, our group would advise that the golf club review the launch of the application on the Apple AppStore at their next budget meeting as something to launch in the future as Apple are one of the most widely used brands worldwide. This would ensure that all members and visitors are given the opportunity to use this application.

QR Code

The current set up for the QR code scanner is that each of the eighteen holes on the golf course is provided with a medium sized QR code which has been laminated and secured to each hole details board. To further the development of the QR codes, the golf club could look at adding more details regarding a more accurate size of the greens and pin positions.

We would also recommend that the golf club consider having a larger QR code pinned to stakes in the ground with a description of their purpose underneath. Currently, the golf club has no budget available to complete this, but for visitors – they may not understand their purpose and decide not to avail of this super feature to their golfing game. Pictured below (Figure 2) are members of Oughterard Golf Club using the new QR codes during their round of golf.



Figure 2 - QR Codes being used on course

Conclusion

In conclusion, we believe that our team achieved several goals that we had laid out at the beginning of the project. Our team provided our client with a membership login portal for their website and improves the site's SEO. Our team also provided our client with a new app and QR codes for the golf course, and improved their social media presence. We believe this will help Oughterard Golf Club develop and expand their business further.

Throughout the course of the project, the team gained experience and new skills as we worked with our client. The team encountered challenges along the way, for example changing requirements and technical knowledge limitations, but ultimately, we overcame these challenges by working together as a team and learnt from them.

The opportunity to work with a client and follow project methodology enabled our team to gain vital experience that will be beneficial to all members in the future in a workplace environment. The development of our teamwork and project managements skills, in addition to the hours spent by the team researching and using different technologies will be of great advantage to each team member in the future.

While the entire process was not without its difficulties and challenges, we as a group feel that being able to handle and overcome the challenges that presented to us reflect the reality of the workplace and appreciate the experience it has given us.

While the main outcome of our project was to satisfy the needs of our client, it also benefitted us by allowing us the opportunity to put our learning and knowledge gained throughout our modules in semester one and two into practice.

Section Two: User Manual

Oughterard Golf Club App – User Manual

App Overview

This application has been developed for Oughterard Golf Club and designed for both iOS and Android platforms. The application has been designed with its potential users in mind, both existing members and visitors to the golf club. The app will allow users to view information about the club, its facilities and course information as well as the option to use an interactive scorecard to record their scores. The app also allows users to view detailed information about each hole on the golf course. Users will also be given the option to book lessons with the golf club through the app.

App Features

The app we have designed for Oughterard Golf Club has the following features:

- Hole-by-Hole course information details
- Interactive Scorecard to record user's score
- Facilities Gallery and descriptions
- Option to Book Tee Times and Lessons
- Results page for golf club competitions

Mobile Compatibility

The app has been designed with its users in mind, primarily to be used while out on the golf course and therefore likely to be used on a mobile device. The app has been developed for both iOS and Android users.

Getting Started

The first step for users to be able to interact with the Oughterard Golf Club app will be to download and install on the users chosen device. The app can be found on the Apple App Store and Google Play Store. There is no charge for users to download the app.



Figure 3 - Apple App Store and Google Play Store

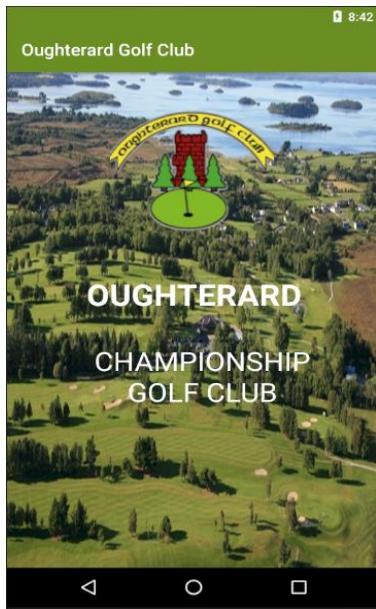


Figure 4- Oughterard Golf Club
Android App Home Screen

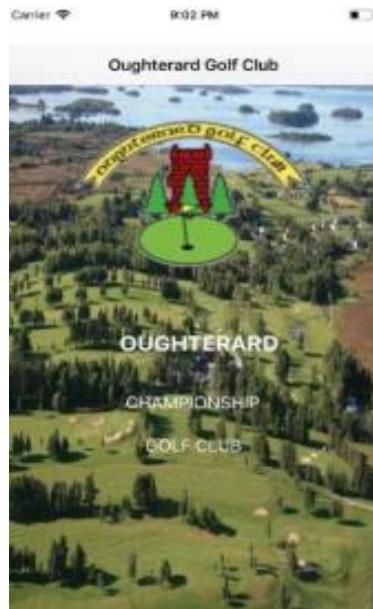


Figure 5 -Oughterard Golf Club iOS
App Home Screen

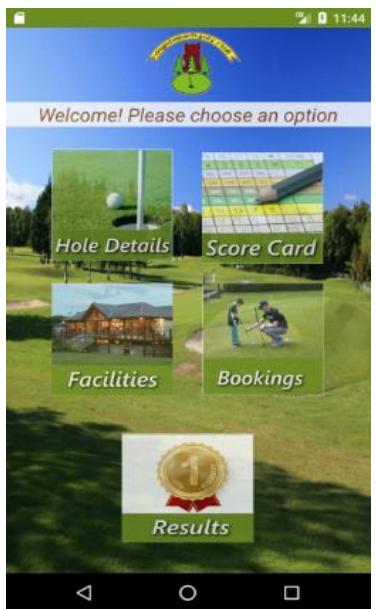


Figure 6- Oughterard Golf Club
Android Features



Figure 7 - Oughterard Golf Club Features
iOS App

Once the application has been fully installed on a user's device, they will be able to access the app's home screen and choose from a number of features.

Users can choose from the following features from the app home screen:

- Hole-by-Hole Details
- Scorecard
- Facilities
- Bookings
- Results

Hole-by-Hole Details



Figure 8 - Android App Hole Details

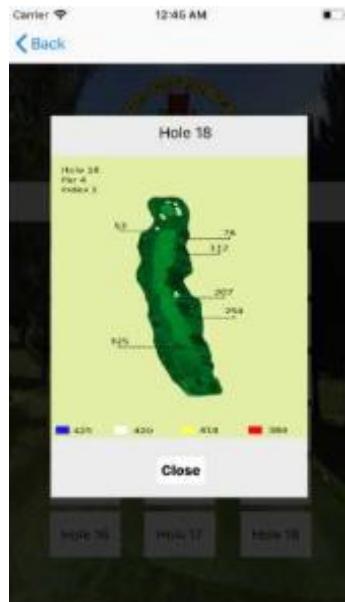


Figure 9- Hole Description iOS

Users can then select to view the next hole or choose the exit button, located on top right corner, to return to overview of all 18 golf holes.

Scorecard



Figure 10 - Women's Scorecard Android

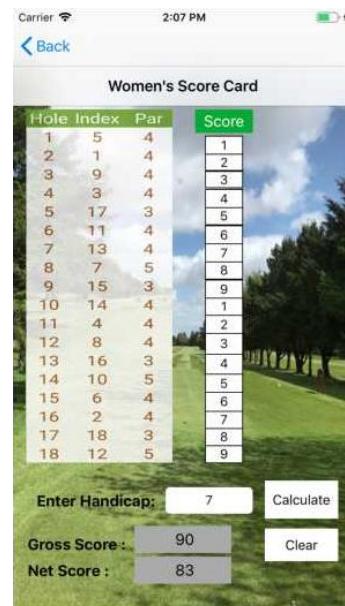


Figure 11- Women's Scorecard iOS

Users can select Hole-by-Hole Details on the apps home page. This feature enables users to view information for the eighteen holes on the golf course, including yardages and a visual overview of the chosen hole.

Users select the hole number they wish to view details of. Hole information for the chosen hole will be displayed to the user.

User selects the scorecard feature from the app home screen.

Users can choose from the options if they want to use the men's or women's scorecard.

Users can enter their handicap and score for each hole and the app will calculate and update their gross score and net score. Users can also view the index and par for each hole.

To interact with the scorecard, users can input their score in text field for each hole, the app will then save that score until the next hole's score is entered.

Facilities Gallery

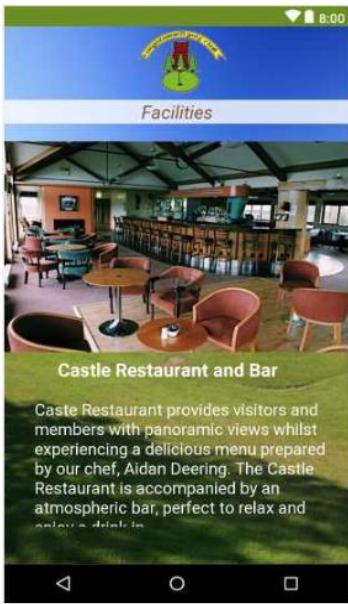


Figure 12- Facilities Description
Android



Figure 13- Facility Description iOS

Book Tee Times and Lessons



Figure 14- Book Tee Time Page

Results

This feature of the app presents users with a link. By clicking this link, users are directed to the Oughterard Golf Clubs Member's Portal where they can review results from competitions. The results page will present options for Men's, Women's, Senior's and Junior's results.

Users can browse the facilities gallery exploring what is available for members at Oughterard Golf Club. By clicking on the image on screen, users can view images of facilities and the description of that facility in the club.

Member's Portal Administration Manual

This section of the manual will outline all information required by the administrator to manage, edit and update the Member's Portal.

Member's Portal Login

To begin, open your web browser of choice, e.g. Google Chrome, Internet Explorer, Mozilla Firefox or Safari and enter the following URL: <https://oughterardgolfclub.com/wp-login.php>

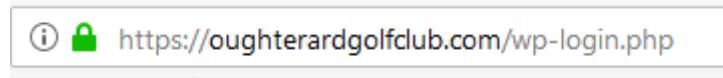
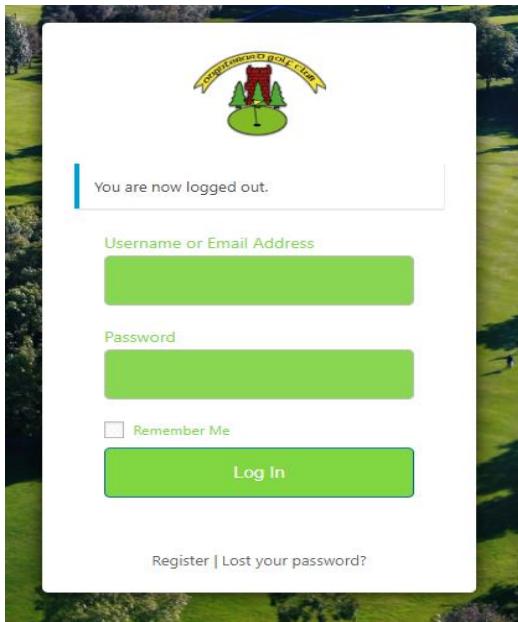


Figure 15 - WordPress Login URL

WordPress Login Screen



The following page will then appear.

Enter admin username or e-mail address and password in the text boxes and click the log in button. It is important to note the function of the 'remember me' check box. By checking this box, your computer will remember your login details for future reference. This will enable anybody with access to your computer to be able to login as administrator. Only check this feature if you are using a secure computer that no one else has access to it.

Figure 16 - WordPress Login

Forgot Log-In Password

Should the situation present in which your login password is forgotten, the password can easily be reset.

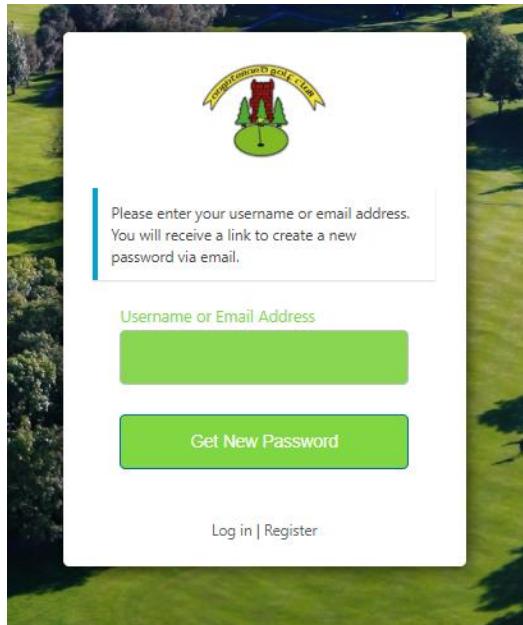


Figure 17- Lost Password

- 1) Click on ‘Lost Your Password?’. Once clicked, the following page will appear.
- 2) Enter your username or email address in the textbox and check the ‘I’m a human’ checkbox.
- 3) Click the ‘Get New Password’ button.
- 4) An email will then be sent to your email address. Once you receive the email, simply follow its instructions to reset your password

WordPress Dashboard Overview

Once the user has successfully logged in, they will be directed to the site’s WordPress dashboard. This dashboard enables the user to manage all details of the site.

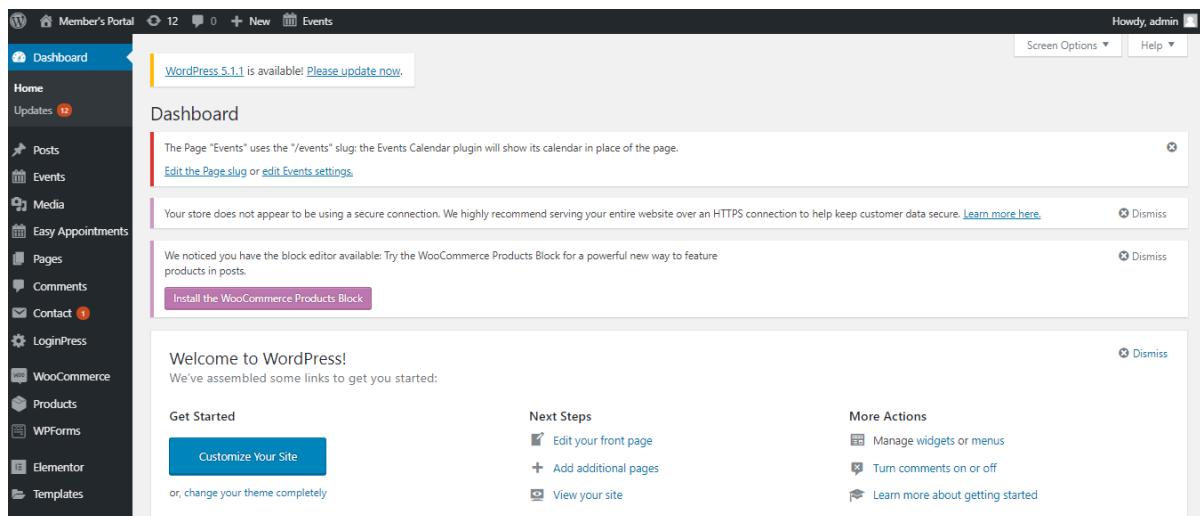


Figure 18 - WordPress Dashboard

Dashboard Widgets

A WordPress Widget is a small block that performs a specific function. We will now explain the features and functions of the widgets located on the site dashboard.

Welcome Widget

The welcome widget displays links to the commonly used tasks when designing a site, such as adding new pages, viewing your site and changing site theme.

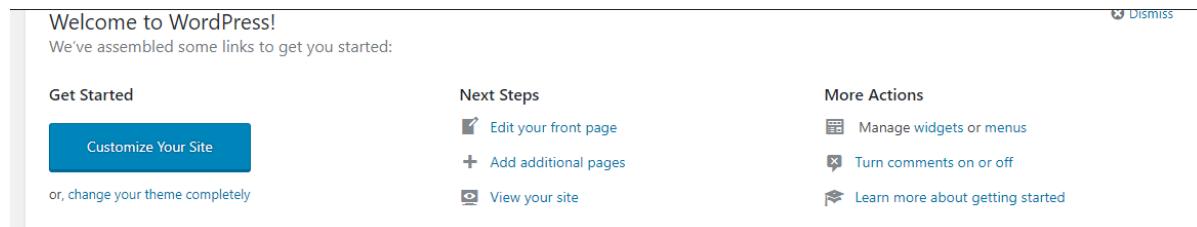


Figure 19 - Welcome Widget

At a Glance Widget

The At a Glance widget offers the user an overview of the number of posts, pages and comments on the site. These can be further accessed and managed by clicking the relevant link for each specific area.

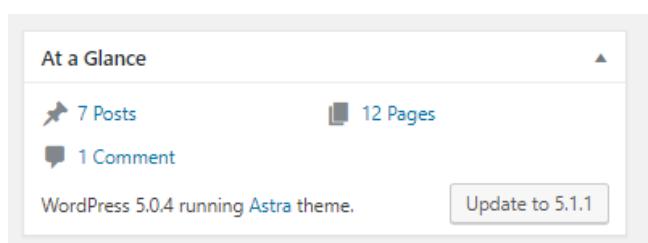


Figure 20 - At a Glance Widget

Quick Draft Widget

This widget allows the user to quickly create a new draft for the site. To create a new draft using this widget, the user must enter a post title, enter the post content and click the save draft button.

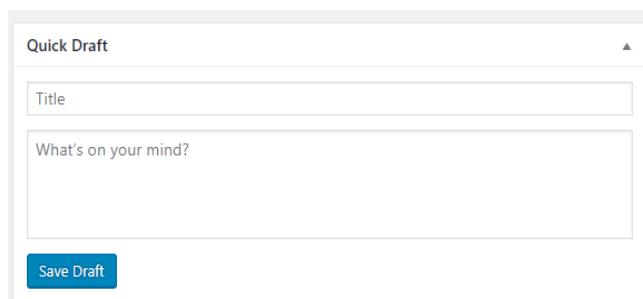


Figure 21 - Quick Draft Widget

WordPress News

The News widget displays the latest news from the official WordPress blog. This widget allows users to keep up with current WordPress news and information. Details of software development and updates will be displayed to the user here.

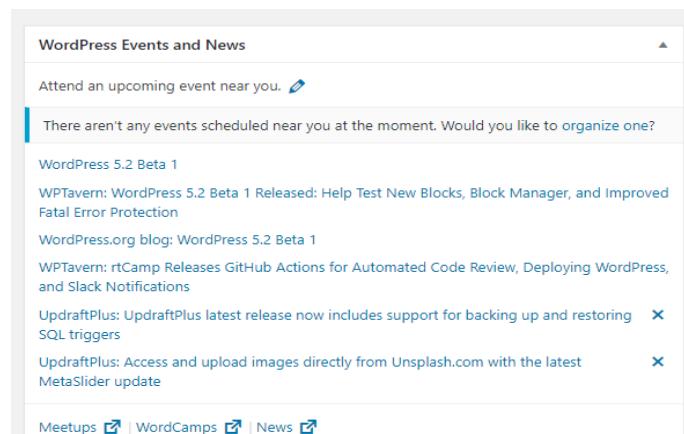


Figure 22 - WordPress News Widget

Toolbar

The Toolbar can be found on the header of the dashboard page. The Toolbar allows the users convenient access to monitoring notifications, appointments and updates regarding the site.

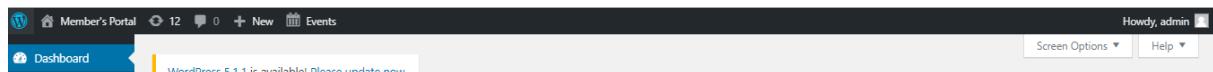


Figure 23 - WordPress Toolbar

Navigation Bar

The Navigation Bar can be found on the left side of the dashboard page. The Navigation Bar allows the admin to complete various tasks and to make changes to the site. The admin can access such functions as, add pages to the site, change the sites appearance and view plugin information.

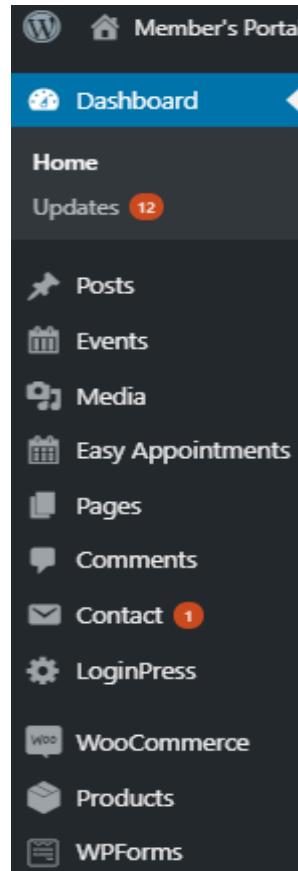
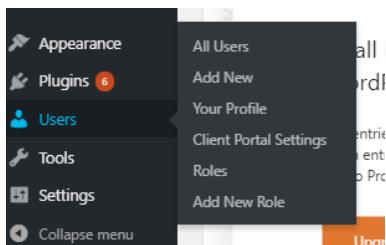


Figure 24 - WordPress Navigation Bar

Users



The admin can access information and update user information using the ‘User’ item located on the navigation bar. Once ‘Users’ is selected, the user can view existing users, add new users and update their own profile.

Figure 25 - Users

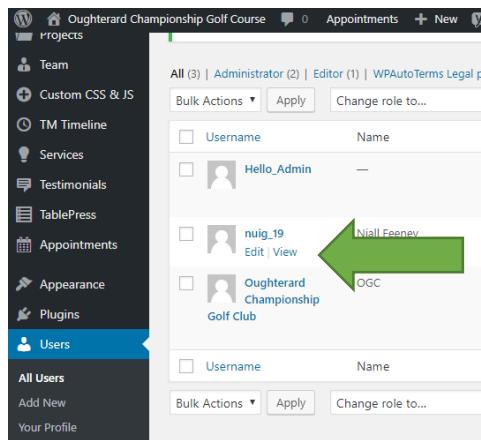
View Existing Users

Click on ‘All Users’ to view information on existing users. The next screen that will appear as a result will display names, email, role and posts for each user.

Users Add New			
The Page "Events" uses the "/events" slug: the Events Calendar plugin will show its calendar in place of the page.			
Edit the Page slug or edit Events settings.			
All (5) Administrator (2) Editor (2) Subscriber (1)			
Bulk Actions	Apply	Add role...	Add Remove role... Remove
<input type="checkbox"/> Username	Name	Email	
<input type="checkbox"/>  admin	—	n.feeney7@nuigalway.ie	
<input type="checkbox"/>  Barbara	Barbara	info@oughterardgolfclub.com	
<input type="checkbox"/>  Golffpro	Golffpro	feeneyniall8@gmail.com	
<input type="checkbox"/>  Niall	—	niallf8@hotmail.com	
<input type="checkbox"/>  Oughterardadmin	—	barbaraannebuckley@gmail.com	

Figure 26 - All Users View

Edit Existing Users

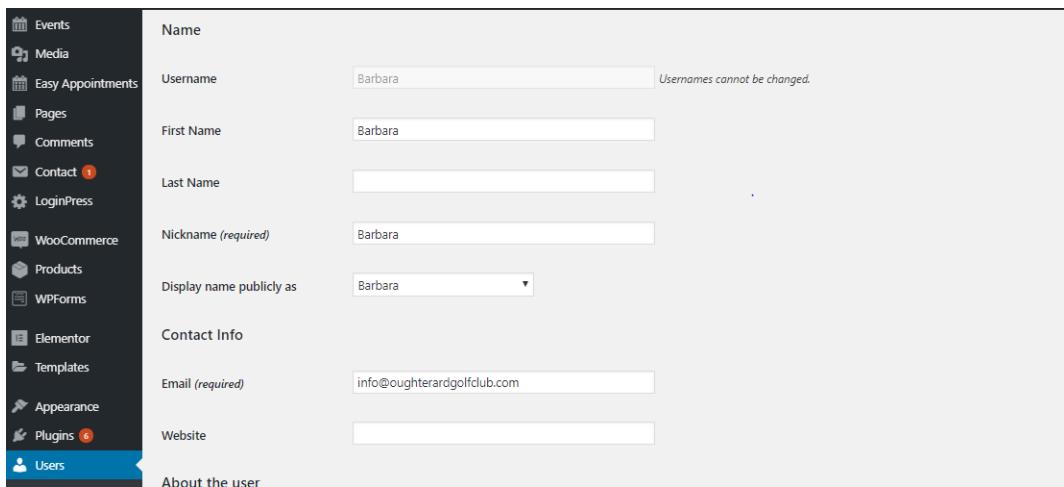


The screenshot shows the WordPress dashboard with the 'Users' menu item selected. The main content area displays a list of users with their usernames and names. A green arrow points to the user 'Hello_Admin'.

Username	Name
Hello_Admin	—
nuig_19	Edit View
Oughterard Championship Golf Club	OGC

Figure 27 - Edit User View

If you wish to edit information for an existing user, click the username of chosen user. You will then be able to add or edit the information for that user. You will also be able to generate a new password for that user.



The screenshot shows the 'Edit User' details page for the user 'Barbara'. The form fields include:

- Name
- Username: Barbara (disabled, indicated by a note: "Usernames cannot be changed.")
- First Name: Barbara
- Last Name: (empty)
- Nickname (required): Barbara
- Display name publicly as: Barbara
- Contact Info
- Email (required): info@oughterardgolfclub.com
- Website: (empty)
- About the user: (empty)

Figure 28 - Edit User Details

Add New Users

The 'Add New User' page in the WordPress admin. The left sidebar shows the navigation menu with 'Users' selected. The main area has fields for Username (required), Email (required), First Name, Last Name, Website, Password (with a 'Show password' button), and a checkbox for 'Send User Notification'. A note at the top says 'WordPress 5.1.1 is available! Please update now.' and another note below it says 'The Page "Events" uses the "/events" slug: the Events Calendar plugin will show its calendar in place of the page. Edit the Page slug or edit Events settings.'

Figure 29 - Add User

If you wish to add a new user, click on “Add New” under the Users item on the navigation menu. You can then edit the details for the new user on the following page. Fill out the form and click the “Add New User” button located at the bottom of the page.

Pages

View all Pages

To view all pages on the website, hover your mouse over the ‘Pages’ and select ‘All Pages’ from the dropdown menu that will appear.

The 'All Pages' list in the WordPress admin. The left sidebar shows the navigation menu with 'Pages' selected. The main area shows a table of pages with columns for Title, Author, and Date. The table includes rows for 'Title', 'Competition', 'Contact — Elementor', 'edit profileppb-login', 'Events', 'GDPR', 'Golf Lessons — Elementor', and 'Hole 1 – 6 — Elementor'. All pages are authored by 'admin' and published between March 2018 and March 2019.

	Title	Author	Date
<input type="checkbox"/>	Competition	admin	— Published 2019/03/27
<input type="checkbox"/>	Contact — Elementor	admin	— Published 2018/11/27
<input type="checkbox"/>	edit profileppb-login	admin	— Published 2019/02/20
<input type="checkbox"/>	Events	admin	— Published 2019/03/23
<input type="checkbox"/>	GDPR	admin	— Published 2019/03/20
<input type="checkbox"/>	Golf Lessons — Elementor	admin	— Published 2019/03/18
<input type="checkbox"/>	Hole 1 – 6 — Elementor	admin	— Published 2019/03/23

Figure 30 - All Pages

Add New Pages

To add a new page, repeat the above step and hover over ‘Pages’ and select ‘Add New’.

The following page will then be displayed. To add a title for the new page, enter your chosen title in the ‘Enter title here’ text box. You can then enter text for the new page in the large text box below, and add media using the buttons located above the text box.

You can then choose to save the page, preview it and publish, from the option located on right side of page.

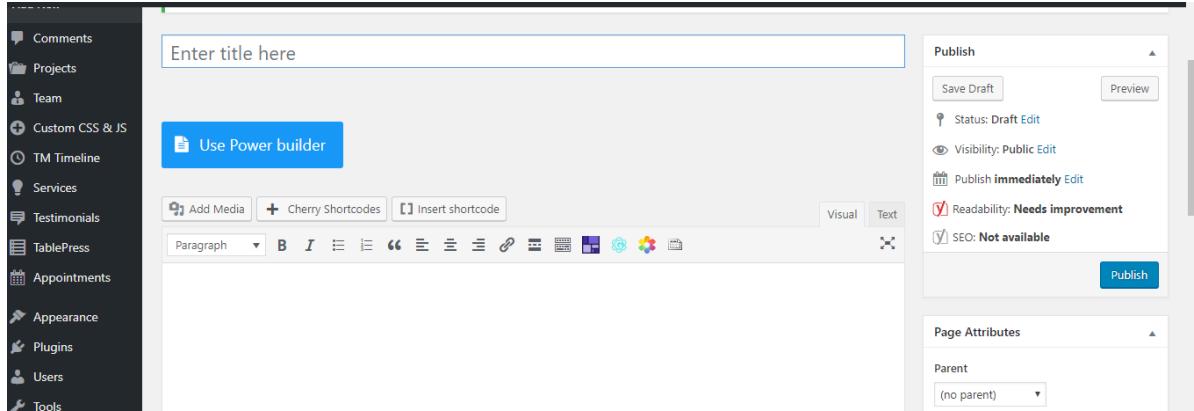


Figure 31 - Add New Page

Edit Pages

To edit existing pages on your site. Repeat the steps to ‘View all Pages’. On the following pages, select the page you wish to edit and click ‘Edit’ located under the page title.

Once you have made the desired changes, click the blue ‘Update’ button on the bottom right side of page to save your changes.

If you wish to add a new page with the same design and layout as a current page, click the ‘Clone’ function under the page title. This will create an exact copy of the existing page which you can now edit and add new information to. This will save you time as you will not have to design a new page from scratch.

Click ‘Edit’ to make changes to this cloned page. Click ‘Publish’ when you are happy with new changes to save the new page.

Member's Portal		
All Pages		
Media	12	0
Easy Appointments	New	Events
Pages	12-items	
All Pages		
Add New		
Comments		
Contact 1		
LoginPress		
WooCommerce		
Products		
WPForms		
Elementor		
Templates		

All (12) Published (12) Trash (17)		
Bulk Actions	Apply	Date
<input type="checkbox"/> Title		
<input type="checkbox"/> Competition	admin	— Published 2019/03/27
<input type="checkbox"/> Contact — Elementor	admin	— Published 2018/11/27
<input type="checkbox"/> edit profileppb-login	admin	— Published 2019/02/20
<input type="checkbox"/> Events	admin	— Published 2019/03/23
<input type="checkbox"/> GDPR	admin	— Published 2019/03/20
<input type="checkbox"/> Golf Lessons — Elementor	admin	— Published 2019/03/18

Figure 32 - Edit Page

Delete Pages

The screenshot shows the WordPress admin dashboard with the 'Pages' section selected. The 'Bulk Actions' dropdown is open, and a green arrow points to the 'Trash' option. The page title is 'Delete Pages'.

Figure 33 - Delete Page

The screenshot shows the WordPress admin dashboard with the 'Pages' section selected. Multiple pages are checked, and the 'Bulk Actions' dropdown is open. A green arrow points to the 'Move to Trash' option. The page title is 'Delete Page'.

Figure 34 - Bulk Action Delete

The screenshot shows the WordPress admin dashboard with the 'Pages' section selected. A message at the top indicates '1 page moved to the Trash. Undo'. The 'Bulk Actions' dropdown is open. A green arrow points to the 'Undo' link. The page title is 'Delete Page'.

Figure 35 - Undo Page Delete

Media

Adding New Media

The screenshot shows the WordPress admin dashboard with the 'Media' section highlighted by a green box. A green arrow points from the 'Media' icon on the navigation bar to the 'Media' section. The page title is 'Adding New Media'.

Figure 36 - Media

To delete a page from the site, hover over ‘Pages’ again and select ‘All Pages’ from the drop down menu.

The following page will display all the pages currently on the site. Under the title of the page you wish to delete, click ‘Trash’.

If you wish to delete more than one page. Check the check box beside the pages you wish to delete, hover over ‘Bulk Actions’ and select ‘Move to Trash’. This will delete all pages you have checked.

If you accidentally delete a page that you did not intend to delete, you can simply click ‘Undo’ located at the top of the page.

If you wish to add media (pictures, video, etc.) to your site, hover over ‘Media’ on the navigation bar. Select ‘Add New’ from the drop down menu that will appear.

On the following screen you can drag and drop files or select a file from your computer, by clicking ‘Select Files’.

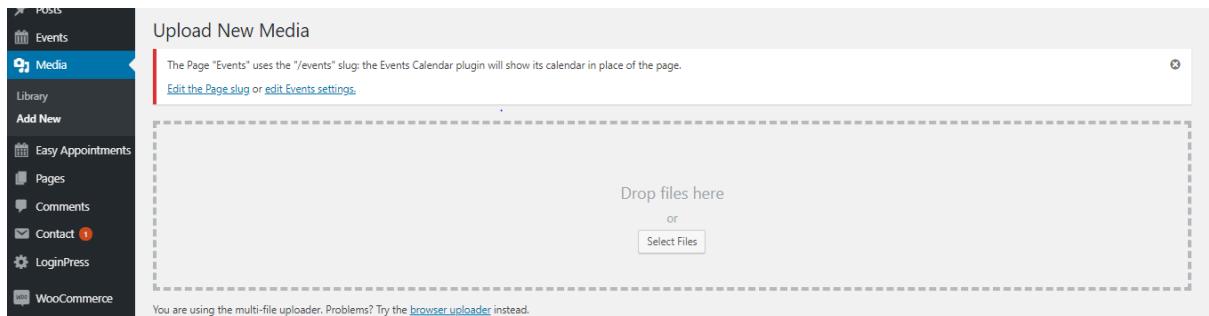


Figure 37 - Add Media

Media Library

To view the media you have stored in your media library, hover over ‘Media’ and select ‘Library’. The following page will display all the media that has been previously uploaded.

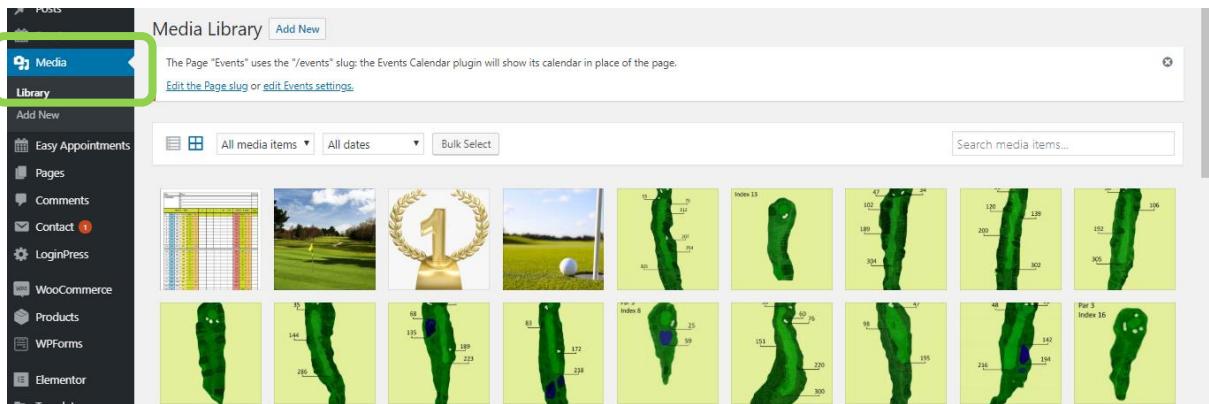


Figure 38 - Media Library

In order to efficiently find the media you are looking for, you can apply filters to narrow down your search. To filter by media type, click on the ‘All Media Items’ drop down menu and choose the media type (Images, Audio, Video) you are looking for.

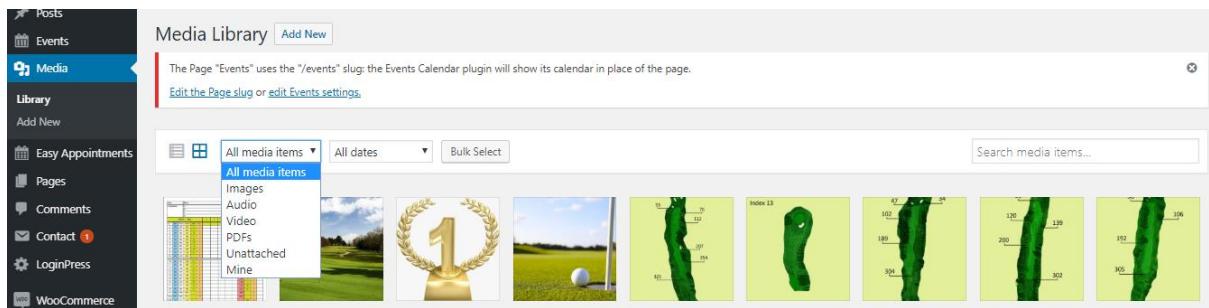


Figure 39 - Refine Media Search – Media Type

To filter by date, click the ‘All Dates’ drop down menu and choose the upload date relevant to your search.

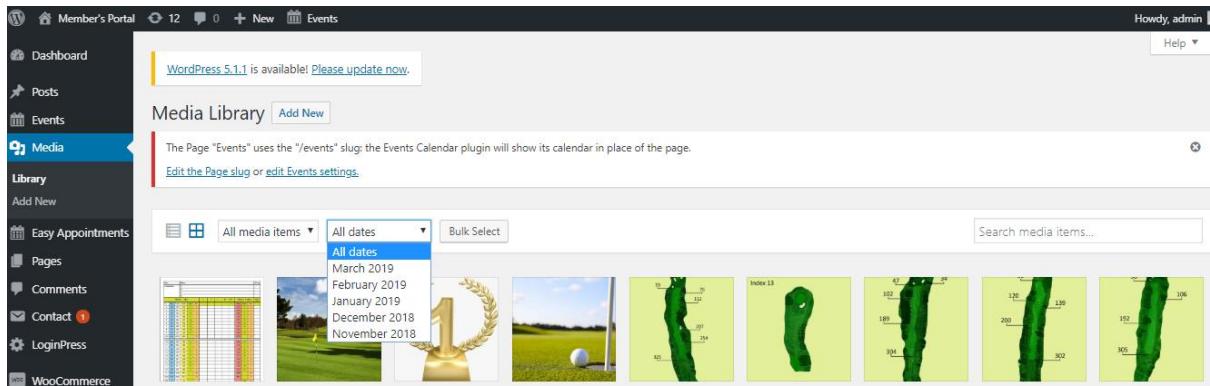


Figure 40 - Refine Media Search - Date

If you know the name of the media you are searching for, you can use the ‘Search media items’ search bar.

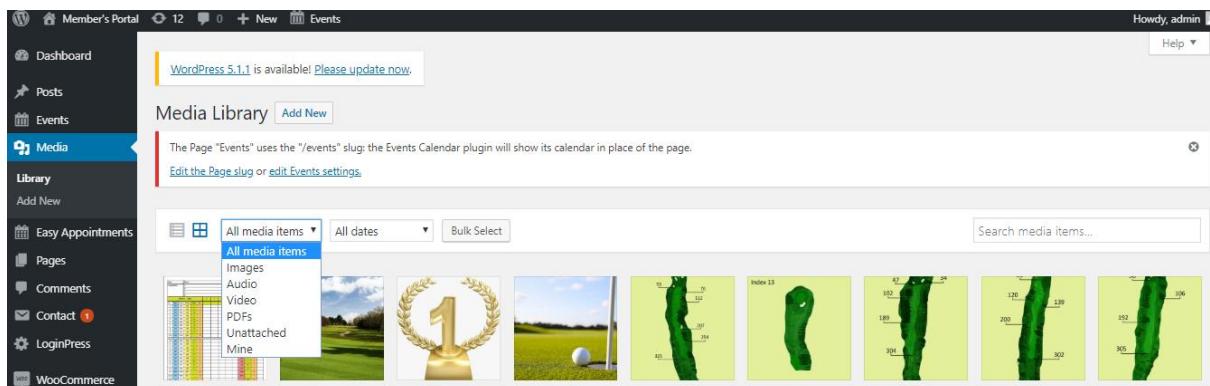


Figure 41 - Media Search Bar

Editing Media

After clicking a media item, you can change its title by clicking the ‘Title’ text box. You can also use the additional text boxes to add a caption and description to the item.

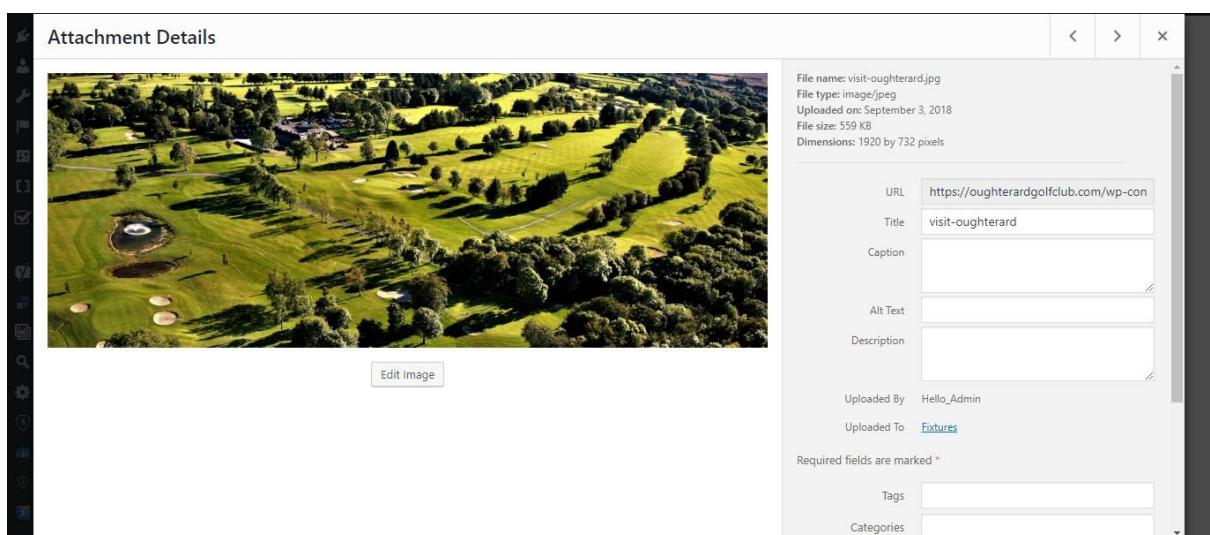


Figure 42 - Edit Media

Click on ‘Edit Image’ button underneath the media item to change the size if the selected image. You can change the dimensions, scale and crop the image. Once you are happy with the changes, click the ‘Save’ button.

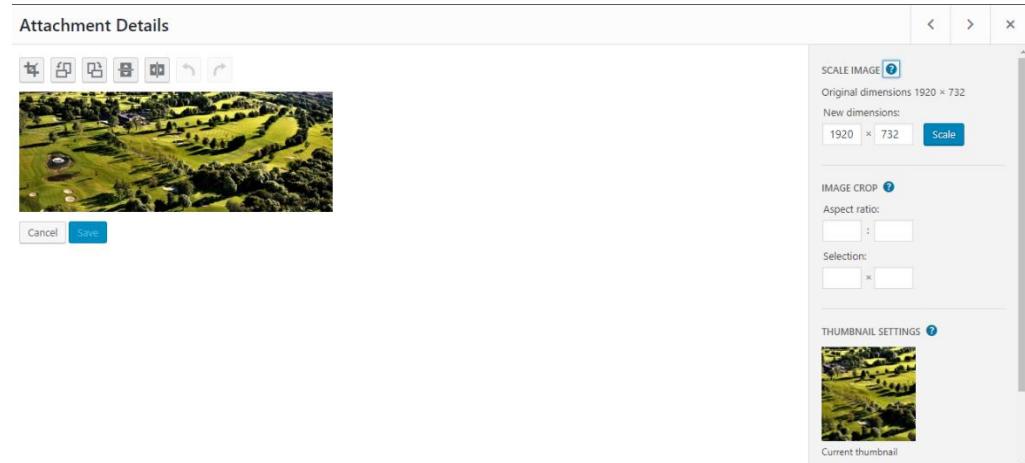


Figure 43 - Edit Media

Deleting Media

 A screenshot of the 'Edit Media' page for a file titled 'download'. The page shows fields for Title, Caption, Alt Text, Description, Uploaded By (Niall Feeney), Tags, Categories, and Slide link. At the bottom, there are buttons for 'View attachment page', 'Edit more details', and 'Delete Permanently'. The 'Delete Permanently' button is highlighted with a green box.

Figure 44 - Delete Media

If you wish to delete a media item for the media library, first identify the item you wish to delete. Then click the ‘Delete Permanently’ option.

A screenshot of the 'Media Library' page. On the left, a sidebar shows navigation links like Member's Portal, Posts, Events, Media (selected), Library, Add New, Easy Appointments, Pages, Comments, Contact, LoginPress, and WooCommerce. The main area shows a grid of media items with blue checkmarks in their top right corners, indicating they are selected for bulk deletion. Buttons at the bottom include 'Cancel Selection' and 'Delete Selected'.

Figure 45 - Bulk Delete Media

If you wish to delete more than one item at a time, click ‘Bulk Select’ button on the ‘Library’ page. You will then be able to select the items you wish to delete. Once an item is selected a blue tick will be displayed on the top right corner of the item. Once you are satisfied with the selection, click ‘Delete Selected’ to delete all chosen items.

Plugins

A Plugin allows you to easily modify, customise and enhance your WordPress site. A Plugin allows you to add features and services to your WordPress site. WordPress offers many different plugins, both free and paid options. Plugins offers a wide range of different features, such as search engine optimisation, client portals, payment gateways and many more.

Plugins Used

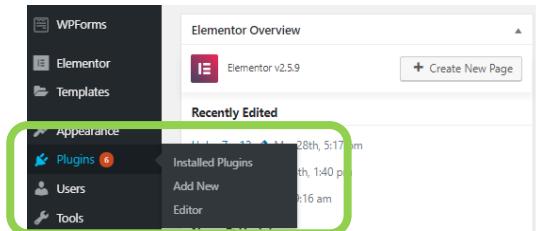


Figure 46 - Plugins

The following screen will appear showing all plugins used.

A screenshot of the 'Installed Plugins' page. The left sidebar shows a navigation menu with 'Member's Portal', 'Media', 'Easy Appointments', 'Pages', 'Comments', 'Contact', 'LoginPress', 'WooCommerce', 'Products', 'WPForms', 'Elementor', 'Templates', 'Appearance', 'Plugins' (selected and highlighted in blue), and 'Installed Plugins'. The main content area lists 17 items. It includes 'Astra Starter Sites – Elementor, Beaver Builder & Gutenberg Templates' (active), 'Check Email' (inactive), 'Client Portal' (inactive), 'Contact Form 7' (inactive), and 'Easy Appointments' (inactive). Each plugin entry has a checkbox for 'Plugin', a 'Description' section, and a note about updates. A 'Bulk Actions' dropdown is at the top left.

Figure 47 - All Plugins

Update Plugins

A screenshot of the 'Installed Plugins' page, similar to Figure 47 but with a different focus. The 'Plugins' menu item is highlighted with a green oval. In the main content area, there's a message: 'We noticed you have the block editor available: Try the WooCommerce Products Block for products in posts.' Below this, a button labeled 'Install the WooCommerce Products Block' is visible. The list of plugins includes 'Astra Starter Sites – Elementor, Beaver Builder & Gutenberg Templates' (inactive), 'Elementor' (inactive), and 'Profile Builder' (inactive). At the top of the list, there's a 'Bulk Actions' dropdown with a 'Update Available (6)' option highlighted with a green rectangle.

Figure 48 - Update Plugins

New updates for plugins will often be available for installed plugins. To view which updates are available, click on 'Update Available'. This will result in a list of all plugin updates available to install being displayed. To update a plugin, click 'Update now' for a specific plugin. To install all available updates at one time, click the 'Bulk Actions' drop down menu. Select 'Update', then click on 'Apply'. This will result in all plugins being updated.

Deactivate Plugin

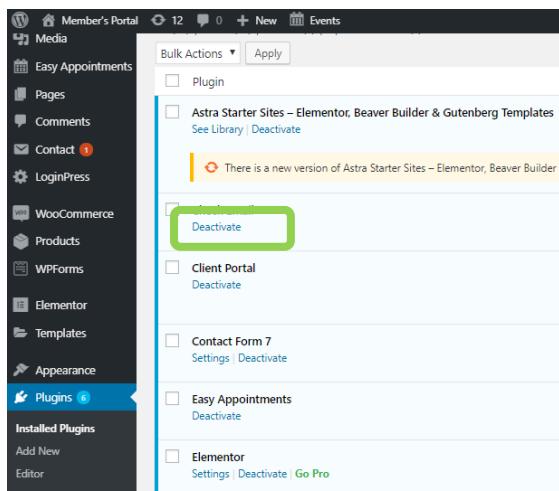


Figure 49 - Deactivate Plugin

Reactivate Plugin

To activate a plugin that has previously been deactivated, choose ‘inactive’ from the ‘Plugin’ page. This will display a page with all inactive plugins. Click ‘Activate’ under the title of the Plugin to reactivate the plugin.

Add New Plugin

To add a new Plugin, click ‘Add New’ from the ‘Plugins’ menu item. The following page will be displayed containing various plugins available to be installed. You can narrow your search for new Plugins by selecting options from the menu bar. You can view featured plugins, popular plugins and recommended plugins. You can also search for a specific plugin using a keyword, author or tag, in the search bar.

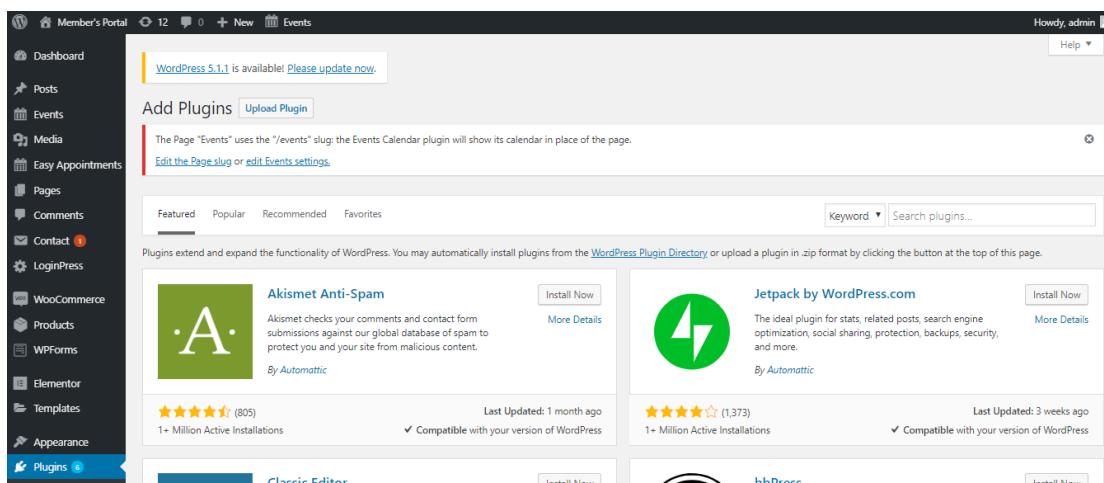


Figure 50 - Add New Plugin

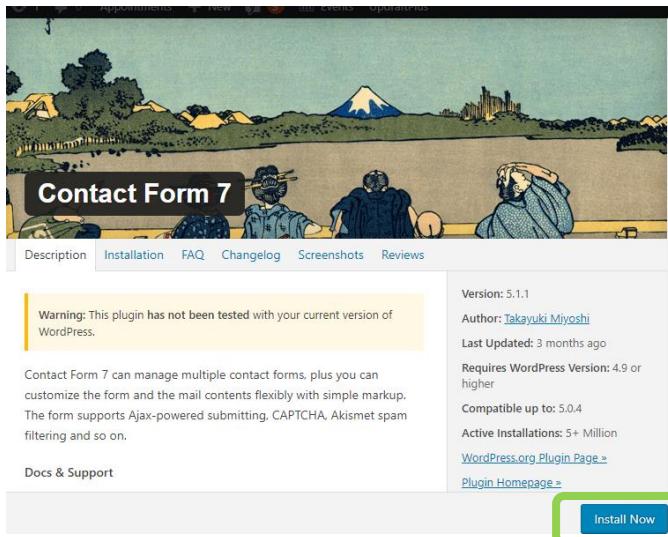


Figure 51 - Install New Plugin

GDPR

From the Member's portal Oughterard golf club management have the ability to publish their privacy policy. Members then have the option to provide or not provide their consent to golf club's storage of their information under the new GDPR guidelines.

Admin can edit and publish their policy details by first clicking on WP Forms located on the navigation bar on the Dashboard.

The admin must then select GDPR form and select edit.

They will then be taken to the following page.

Once you have identified the Plugin you wish to install, click the 'Install Now' button located beside the Plugin.

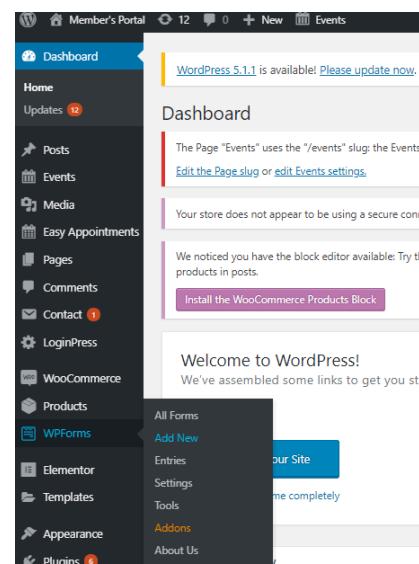


Figure 52 - WP Forms Navigation

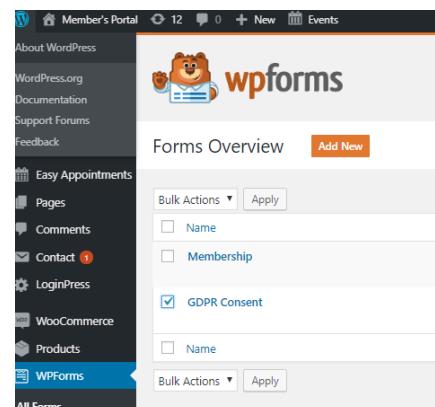


Figure 53 - WP Forms

From here, the admin can easily add or edit their privacy details while also adding more required fields from the end user if they deem it necessary.

The screenshot shows the 'Fields' section of a software interface. On the left is a sidebar with icons for Setup, Fields (highlighted in orange), Settings, Marketing, and Payments. The main area is titled 'Now editing GDPR Consent'. It shows a 'Fields' section with a 'GDPR Consent' form. The form includes fields for 'Name' (First and Last), 'Email', and a 'GDPR Agreement' checkbox with the text 'I consent to having this website and Oughterard Golf c'.

Figure 54 -GDPR Form Edit

Once the admin is happy with the content, they can select “save” located in the top right-hand corner of the page. Once completed the GDPR page will be updated automatically.

The screenshot shows a list of entries under 'New Entry: GDPR Consent'. There is one visible entry with the name 'Niall Feeney' and email 'niall8@hotmail.com'. The entry includes a 'GDPR Agreement' section with the same text as the form.

When a member/end user submits their details and consents to the GDPR agreement, the golf club will receive an email of the update.

Figure 55- GDPR Consent Email

Search Engine Optimisation

Search Engine Optimisation (SEO) is the process of trying to rank a website highly in a search engine with specific keywords. Typically, users of a search engine will only use the first few results that appear. Therefore, it is important for the web site developers to improve the site's SEO in order to increase traffic to the website, especially in today's competitive business environment. Search engine optimisation is typically done by making use of strong keywords that will result in the website being highly ranking on the search engine (Yalçın and Köse, 2010).

Yoast SEO

In order to improve the site's ranking, we installed a plugin called 'Yoast SEO'. Yoast SEO is rated as the number one WordPress SEO Plugin. The Yoast Plugin provides a variety of features that can improve your site's search engine ranking.

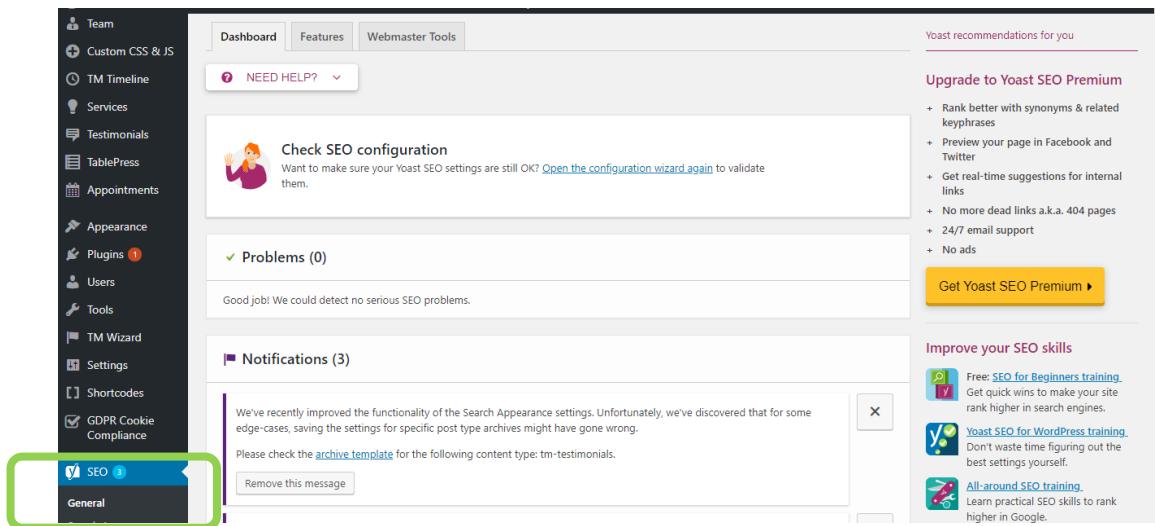


Figure 56 – SEO

In order for a keyword to enhance search engine optimisation on a specific page of the website, go to the navigation bar and hover your cursor over 'Pages', then click 'All Pages'.

All pages in the website will then be displayed. Click on the title of the page you wish to add a keyword to.

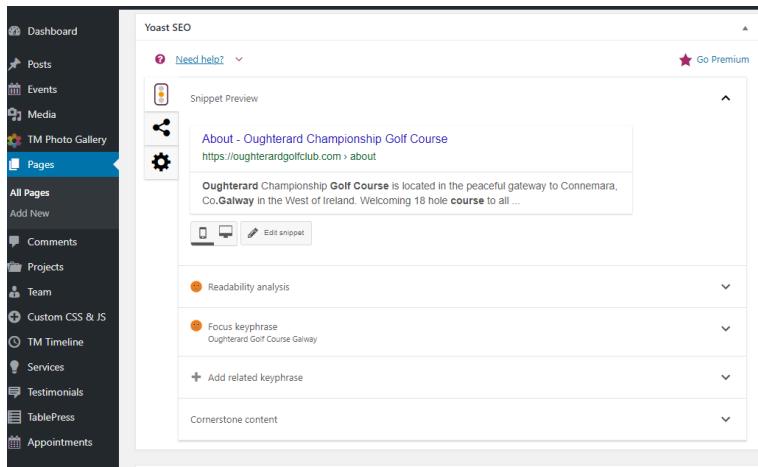


Figure 57 - SEO Keyword

You can also edit the snippet. The snippet is the short ‘summary’ Google and other search engines show of your page in the search results. Figure 56 shows the snippet of Oughterard Golf Club’s website on Google.

Home - Oughterard Championship Golf Course

<https://oughterardgolfclub.com/> ▾

A magnificent 18 hole championship course situated at the gateway to scenic ... Welcome to Oughterard Championship Golf Club on the shores of the idyllic ...

Figure 58 - Google Snippet

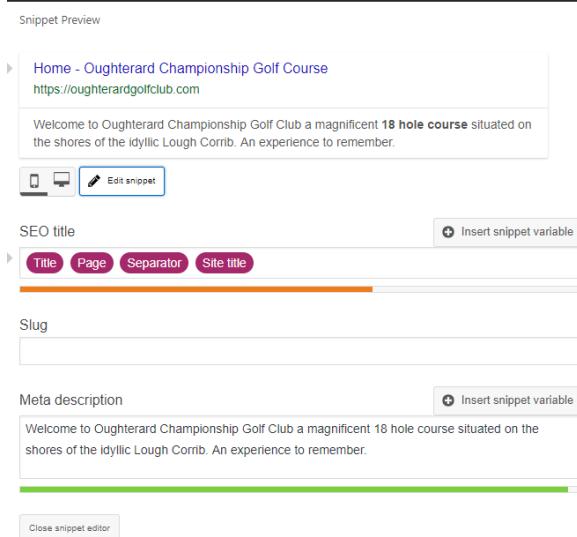


Figure 59 - Edit Snippet

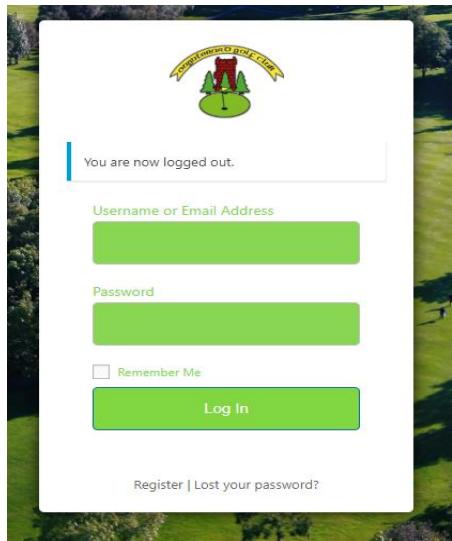
The Snippet contains three fields which you can edit-

- **SEO Title** – The title of the post displayed on the search engine.
- **Slug** – The slug is the part of the URL that identifies the particular page on the website in easy to read form.
- **Meta Description** – The meta description is a short description of your webpage that you add to your page. This description will tell readers what the page is about.

Editor Role (Golf pro)

The golf instructor at Oughterard Golf club will be given a pre-registered editor role. He will be given log in credentials in order to access the Dashboard. The instructor's primary activity is to manage golf lesson bookings made by members through the golf lessons page. This process will be explained below.

Login



He/she will log in through log in page shown below (Fig. 62).

Once logged in he/she will be taken to the Dashboard, but Editor restrictions will be applied.

Figure 60 - Editor Portal Login

Figure 61 - Dashboard

How to add/edit/delete bookings?

New Reservation 3 [Inbox X](#)

feeneyniall8@gmail.com
to me =

Id	3
Status	Pending
Location	Golf Club
Service	Golf Lesson
Worker	Golf Pro
Date	March 30, 2019
Start	9:00 am
End	10:00 am
Created	2019-03-28 16:06:14
Price	50.00
IP	::1
EMail	niallf8@hotmail.com
Name	Niall Feeney
Phone	+0873661515
Description	Lesson short game

- [Confirm appointment](#)
- [Cancel appointment](#)

When a booking is made by a member through the golf lessons page contained in the member's portal, the instructor will receive an email (Figure ??).

The instructor has the option to confirm or cancel the appointment through the email. If the instructor wishes to view and edit the booking, he/she can access the Easy appointments page on the Dashboard.

Figure 62 – Lesson Booking Pending Email

Easy Appointments

From the Easy appointments page contained in the Dashboard, he/she can view/add/edit bookings made by members. All bookings made by members will be stored here. Bookings made by members are set to pending until confirmed by the golf instructor. All the details required by the instructor can be found here.

Appointments					
Location : <input type="text" value="Golf Club"/>		Service : <input type="text" value="Golf Lesson"/>		Worker : <input type="text" value="Golf Pro"/>	
Status : <input type="text" value="-"/>		From : <input type="text" value="25/03/2019"/>		To : <input type="text" value="31/03/2019"/> Quick time filter: <input type="button" value="Select period"/>	
Id / Location / Service / Worker	Customer	Description	Date & time	Status / Price / Created	Action
#2 Golf Club Golf Lesson Golf Pro	niallf8@hotmail.com Niall Feeney +0873661515	Lesson short game	March 28, 2019 - 17:00 March 28, 2019 - 18:00	confirmed 50.00 March 24, 2019 23:57	<input type="button" value="Edit"/> <input type="button" value="Delete"/> <input type="button" value="Clone"/>
#1 Golf Club Golf Lesson Golf Pro	niallf8@hotmail.com Niall Feeney +0873661515	Lesson short game	March 29, 2019 - 13:00 March 29, 2019 - 14:00	confirmed 50.00 March 24, 2019 23:16	<input type="button" value="Edit"/> <input type="button" value="Delete"/> <input type="button" value="Clone"/>

Figure 63 - Easy Appointments

When he/she clicks on the status of the booking a drop-down menu will appear which will allow him/her to change the booking from pending to confirmed. Once this is completed both the instructor and the member who made the booking will receive an email confirmation.

The instructor can also manually create an appointment by clicking on “Add New Appointment” and entering the relevant details, as shown in figures 66 and 67.

The screenshot shows a web-based application interface for adding a new appointment. At the top left is a blue button labeled '+ Add New Appointment'. To its right is a 'Refresh' button. Below these are several input fields and dropdown menus. On the left, there's a dropdown for 'Id / Location / Service / Worker' with options 'Golf Club', 'Golf Lesson', and 'Golf Pro'. Next to it are fields for 'Customer': 'Email' (with placeholder 'Email'), 'Name' (placeholder 'Name'), and 'Phone' (placeholder 'Phone'). To the right of these are 'Description' fields: 'Date:' set to '28/03/2019', 'Time:' set to 'pending', and a 'Status / Price / Created' section showing 'Status: pending' and 'Price: 50.00'. At the bottom left is a checked checkbox for 'Send email notification'. On the far right are 'Save' and 'Cancel' buttons.

Figure 64 - Add New Appointment

The instructor also has the ability to view reports which will allow him/her to view which slots are taken and which are free. This can be done through the reports section contained in the Easy Appointments page. A booking slot that is taken will appear in red (Fig. 70).

25	26	27	28	29	30	31
08:00 - x 1						
09:00 - x 1						
10:00 - x 1						
11:00 - x 1						
12:00 - x 1						
13:00 - x 1	13:00 - x 0	13:00 - x 1	13:00 - x 1			
14:00 - x 1						
15:00 - x 1						
16:00 - x 1						
17:00 - x 1	17:00 - x 1	17:00 - x 1	17:00 - x 0	17:00 - x 1	17:00 - x 1	17:00 - x 1

Figure 65 - Booked Time Slots

Editor

The Editor’s primary role is to edit and add content to the Member’s portal. A user assigned as an editor has been created and will be given to the Golf club management team.

The three primary functions performed by the editor will be to:

- Add events and competitions to the Events page
- Update competition results contained in the Competitions page
- Update Rules contained in the Rules page

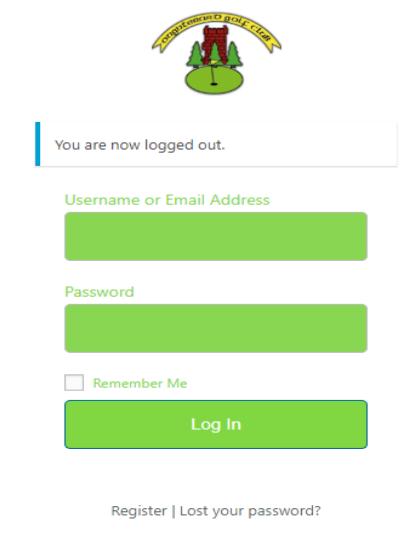


Figure 66 – Member's Portal Login

A screenshot of the WordPress dashboard titled 'Member's Portal'. The left sidebar shows menu items like 'Dashboard', 'Posts', 'Events', 'Media', 'Easy Appointments', 'Pages', 'Comments', 'Templates', 'Contact' (with 1 notification), 'Profile', 'Tools', and 'Collapse menu'. The main area shows a notice about WordPress 5.1.1, the 'Elementor Overview' (Elementor v2.5.9), and a 'Recently Edited' section listing 'Hole 1 – 6', 'Holes 7 – 12', and 'Home'. On the right, there is a 'Quick Draft' section with a title field and a 'Save Draft' button.

Figure 67 - Dashboard

Update Events Calendar

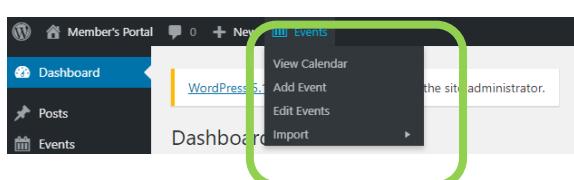


Figure 68 - Update Events

To update the Events calendar contained on the Events page the user must click on the 'Events' button on the top of the screen and then select 'Add Events'.

Once selected the user will be taken to the following page.

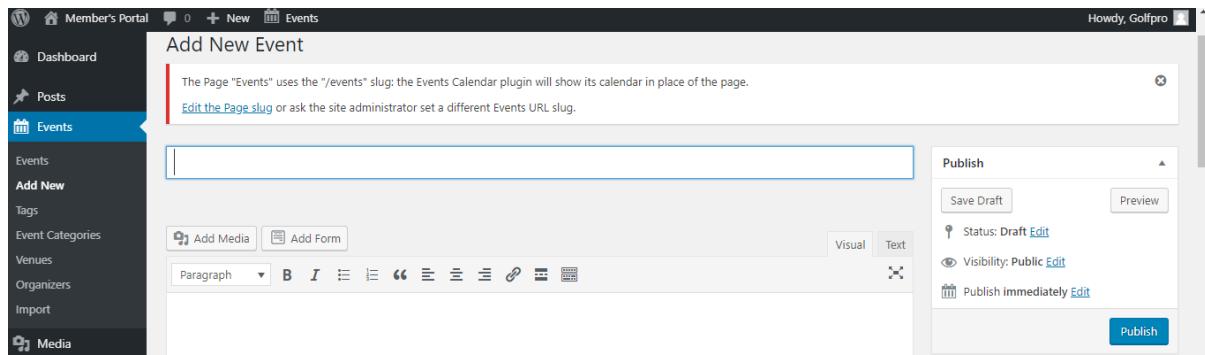


Figure 69 - Add New Event

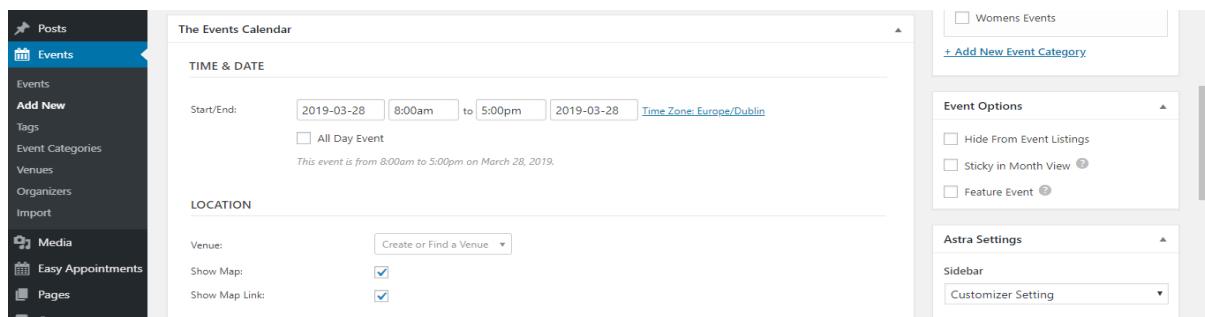


Figure 70 - Event Details

The Editor can now enter all relevant details for the new event/competition. Once the editor is happy with the content they can select “Publish” which will then add that event to the ‘Events Calendar’.

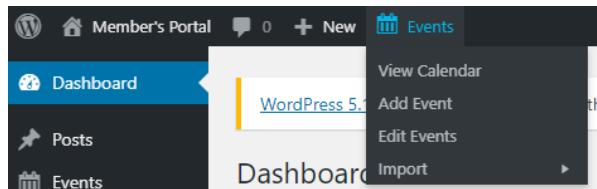


Figure 71 - Event Calendar

The Editor can view all events/competitions by selecting “View Calendar” from the events drop down menu.

Once selected the Editor will be taken to the Events calendar which contains all upcoming events.

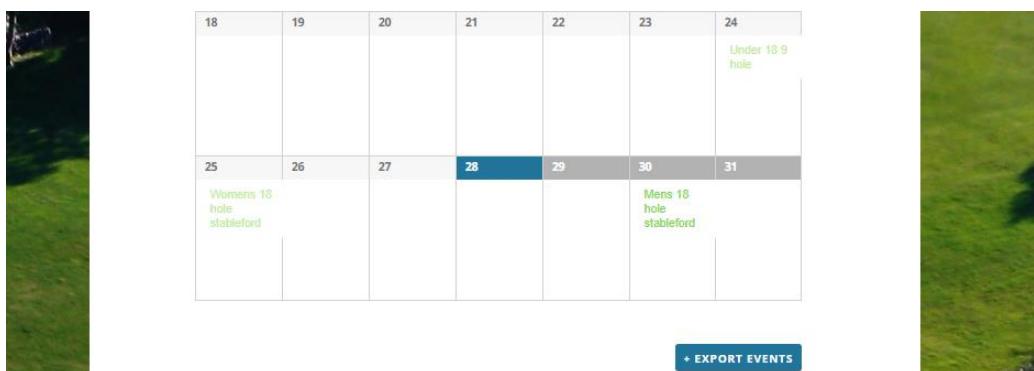


Figure 72 - Events Calendar

Update Competition's page

To update the competition results contained on the Competition page the Editor must first select “All Pages” which is contained in the “Pages” drop down menu which is located on the left-hand side of the Dashboard. Once completed they will be taken to the following page.

The screenshot shows the WordPress dashboard under the 'Pages' section. The sidebar on the left has 'Pages' selected. The main area displays a list of pages with columns for Title, Author, and Date. One page, 'Competition', is highlighted with a blue selection box. The list includes:

Title	Author	Date
Competition	admin	Published 2019/03/27
Contact — Elementor	admin	Published 2018/11/27
edit profilewppb-login	admin	Published 2018/11/27

Figure 73 - Competition Page

This page lists all the pages created. To edit the Competition page, user must select the page and click edit.

The screenshot shows the WordPress dashboard under the 'Pages' section. The sidebar on the left has 'Pages' selected. The main area displays a list of pages with columns for Title, Author, and Date. The 'Competition' page is selected and highlighted with a blue selection box. The list includes:

Title	Author	Date
Competition	admin	Published 2019/03/27

Figure 74 - Edit Competition Page

The Competition page is built with a PDF embedder which makes it easy and quick to upload new PDF's directly to the Competition's page.

The screenshot shows the Competition page in the WordPress editor. The sidebar on the left has 'Pages' selected. The main area shows the page content with the title 'Competition'. In the center, there is a box containing the text 'Please see below results of our recent competitions:' followed by a PDF link: 'PDF: http://localhost/wordpress/wp-content/uploads/2019/03/Competition-sample-wordpress.pdf'. On the right, there is a sidebar with various settings: Status & Visibility (Visibility: Public, Publish: Mar 27, 2019 2:33 pm, Author: admin), 5 Revisions, Permalink, Featured Image, Discussion, and Page Attributes.

Figure 75 - Competition PDF

To upload a new PDF containing new results the editor must select the link in the centre of the page. This will then take them to the media library.



Figure 76 - Upload PDF

The Editor has a choice to choose a file already contained in the media library or upload a file directly from their computer or storage device. Once an image or PDF is selected the content will be embedded on the page. To finish the Editor must select “Update” in the top right-hand corner of the page.



Figure 77 - Publish PDF

Update Rules page

If the Editor wishes to update the Rules page, they can follow the same steps which were completed to update the competition page.

End User

Registration/ Log In

The end user will be denied access to the Member's Portal until they have registered and logged in. Once they have selected to enter the Member's Portal they will automatically be taken to the log in page. Once on the log in page they can select "Register" which will take them to the registration form.

Once the user has entered the required details they can select "Register" they will be sent a confirmation email. The user will then be taken to the log in page where they can enter their username or email address and password. They will gain access to the website.

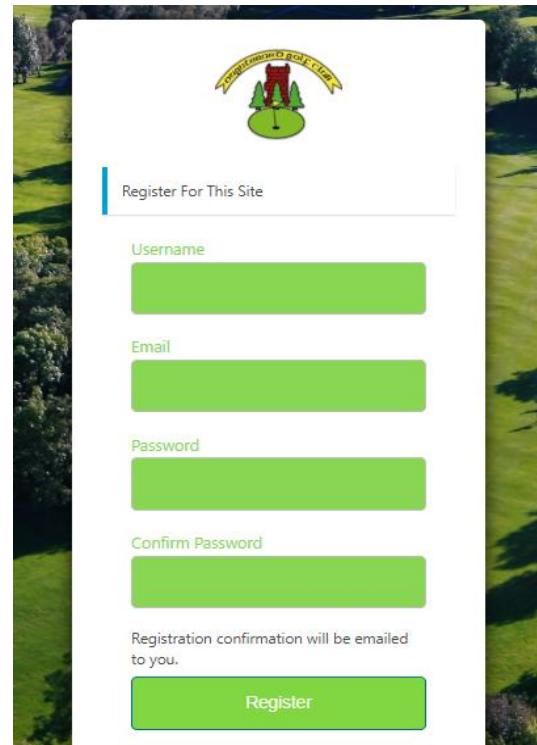

 A screenshot of a mobile device displaying the member's portal registration form. The background shows a scenic golf course. The form itself has a white header with the Oughterard Golf Club logo and the text 'Register For This Site'. Below this are four green input fields labeled 'Username', 'Email', 'Password', and 'Confirm Password'. To the right of these fields is a note: 'Registration confirmation will be emailed to you.' At the bottom is a large green 'Register' button.

Figure 78 -Member's Portal registration form

Once registered and securely logged in they will be taken directly to the Member's Portal homepage. From the homepage, the user is provided with two forms of navigation. The primary menu is contained in the header of the page while they also have three navigation options for three of the most popular pages located on the lower half of the page.

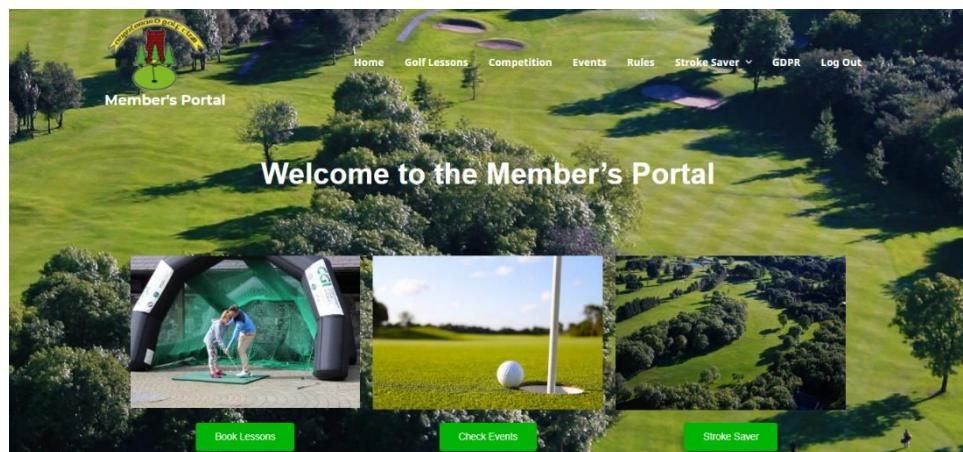


Figure 79 -Member's Portal Home Page

Book Lessons

To book a lesson the user can access the page through the primary menu or quick access button located on the homepage. Once selected they will arrive to the following page.

Golf Lessons

Are you struggling with parts of your game? Not performing as well as you would like in competitions?

Then why not book a lesson with our experienced professional?

He has five years coaching experience and works with all levels of golfer.

Prices are as follows:



Figure 80 - Golf Lessons

March 2019						
Mo	Tu	We	Th	Fr	Sa	Su
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

08:00	09:00	10:00	11:00
12:00	13:00	14:00	15:00
16:00	17:00		

Personal information

Fields with * are required

Email * :

Name * :

Phone * :

Description :

Booking overview

Figure 81 -Golf Lessons Page

Once the user has selected their preferred date and time, they must then enter their personal details including name, phone number and email address. They must also enter a brief description of what they hope to focus on during the lesson. The brief description allows the instructor to better prepare for the lesson. Once they are happy with their booking they can select “Submit”.

 feeneyniall8@gmail.com
 Thu 28/03/2019 19:18
 You ↴
 You have booked **Golf Lesson**
 For the amount of time **60**
 at a cost of **50.00**
 with the following person: **Golf Pro**
 You can contact him at **feeneyniall8@gmail.com , 0873661515**
You will receive an email when the reservation is confirmed.
 Thank you.

Figure 82- Golf Lesson Reservation Pending Email

 feeneyniall8@gmail.com
 Thu 28/03/2019 19:21
 You ↴
 Your booking is now confirmed. Please see details below.
 You have booked **Golf Lesson**
 For the amount of time **60 minutes**
 at a cost of **50.00**
 with the following person: **Golf Pro**
 You can contact him at **feeneyniall8@gmail.com , 0873661515**
 Thank you.

Once the instructor has confirmed the booking the user will receive the following email explaining that the booking is confirmed.

Figure 83 -Golf Lesson Reservation Confirmation Email

Check Events

If the user wishes to view upcoming events or competitions, then can do so by viewing the Events page. This page can be accessed through the primary menu or the quick access button contained on the homepage. Once on the page the user will be presented with a calendar with upcoming events and competitions. If the user wishes to receive more about any event/competition they can hover over that date and additional information will be displayed as shown below.



Figure 84 -Events Page Calendar

The user can also change the view from calendar format to list format by selecting the drop-down menu and selecting “List”. The following view will be displayed.

The screenshot shows a web-based events calendar interface. At the top, there is a dropdown menu labeled "VIEW AS" with "List" selected. Below this, a link "« Previous Events" is visible. The main content area displays two sections: "March 2019" and "April 2019".

- March 2019:** Contains an event titled "Mens 18 hole stableford" with the date "March 30 @ 7:00 am - 4:00 pm", location "Golf Club", and price "€7". A description states "18 hole stableford. Oughterard." and a link "Find out more »" is provided.
- April 2019:** Contains an event titled "18 Hole Stableford" with the date "April 1".

Figure 85- Events Calendar List View

View Competition Results

If the user wishes to view competition results, they can access the Competition page from the primary menu. Once selected, they will be taken to the Competition page. From here the user can view all results uploaded by the Golf club.

The screenshot shows the "Competition" page of the golf club website. At the top, there is a logo for "Oughterard Golf Club" and a navigation bar with links for "Home", "Golf Lessons", "Competition", "Events", "Rules", "Stroke Saver", "GDPR", and "Log Out". Below the navigation bar, a section titled "Member's Portal" is visible. A message says "Please see below results of our recent competitions:". A large image of a golf course is displayed. Below the image, a table lists the competition results:

Competition Results	
1 John Doe	46 Points
2. Jane Doe	45 Points

Figure 86 -Competition Page

View Stroke Saver

The end user also has the ability to view 18 detailed hole by hole images and the club's scorecard. These images are divided into four pages located in the drop-down menu on the main menu.

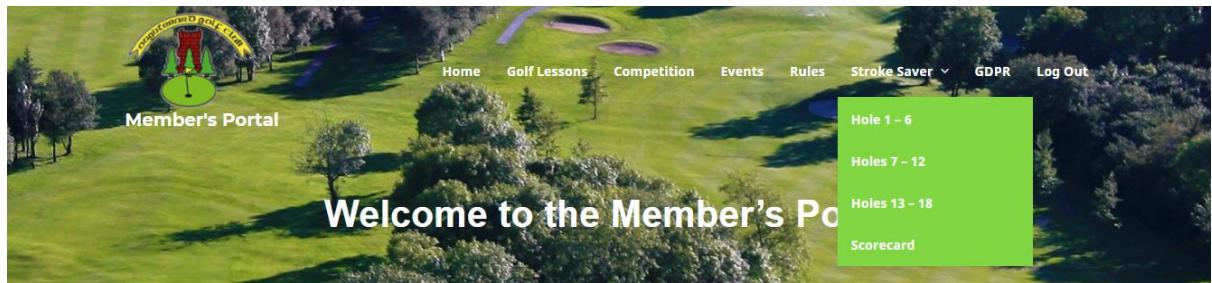


Figure 87 -Stroke Saver Drop Down Menu

Once the user has selected a hole to view, he/she will be taken to a page like below.

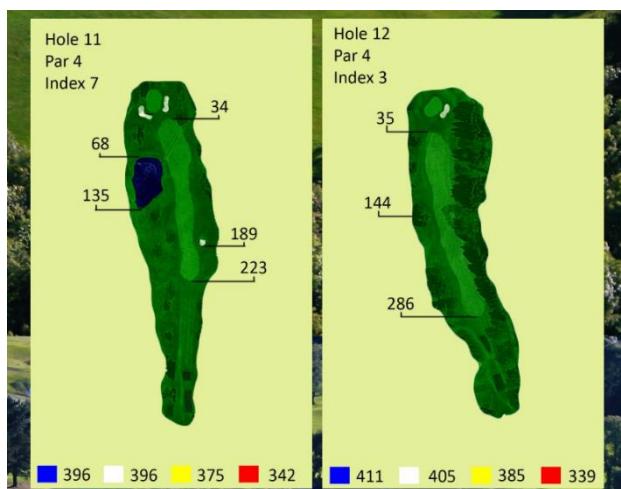


Figure 88- Stroke Saver Sample Images

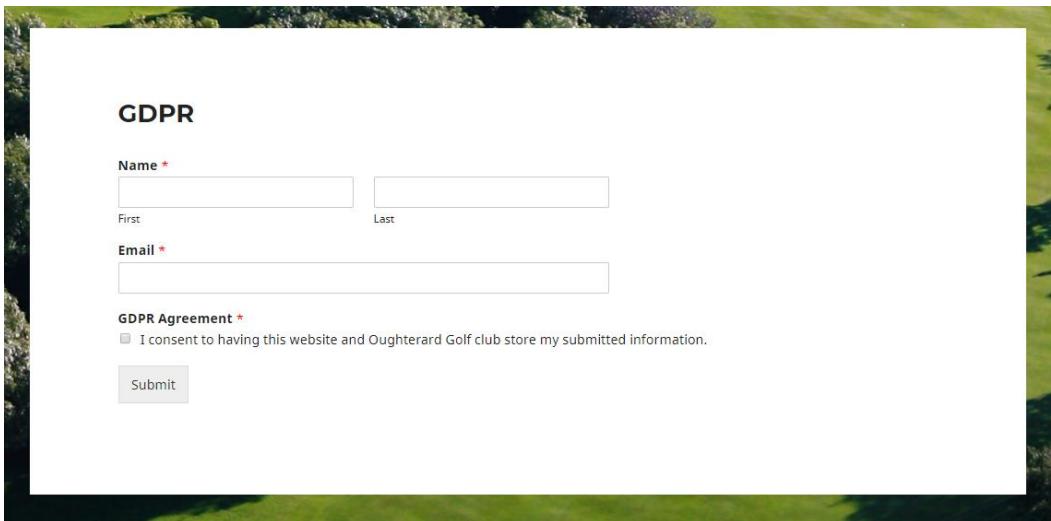
GDPR

On the Member's Portal there is also a page labelled GDPR. The user can access this page through the main navigation menu.



Figure 89 -Primary Menu GDPR

Once selected the user will be taken to the following page.



The image shows a screenshot of a GDPR consent form. The form is titled "GDPR" and contains fields for "Name *", "Email *", and a "GDPR Agreement *". The "Name" field is split into "First" and "Last" parts. The "Email" field is a single input box. Below these fields is a checkbox labeled "I consent to having this website and Oughterard Golf club store my submitted information." A "Submit" button is located at the bottom left of the form area.

Figure 90- GDPR Consent Form

From here, the user can view Oughterard golf club's GDPR compliance which will be updated by the golf club management. The user, once having read the golf club's GDPR has regulations has the option to provide his/her details and provide GDPR consent by ticking the GDPR agreement box.

Log Out

If the user wishes to log out, they can do so with one click. The 'log' out button is located in the top right corner of the page.



Figure 91- Primary Menu Log Out Location

Once 'log out' is selected they will be taken directly to the log in page where a message will alert the user that they have logged out.

QR Codes

A QR Code or a Quick Response Code is a type of barcode consisting of small black and white squares, in a square pattern, that encode data. First developed in 1994 by the Japanese Corporation, Denso Wave, in order to track parts during the assembly process. They are now widely used, especially in advertising, to encode the URL of a website that gives further information about a product (Gregerson, 2012).

To interact with a QR Code, simply use your mobile device to scan the code using your camera or scanner app. The QR code will scan and you will be redirected to a webpage or image.

The QR Codes will be printed and displayed on the golf course. This will allow people, in particular new visitors to the club, to interact with them and learn about each hole on the course. Users can scan the QR code displayed at each hole with their mobile phone and view information about the hole layout and yardages.

We have included one sample QR Code for Hole 18 (Fig. 99). Try it out on your own device to see the hole information.



Figure 92 - Resulting page after QR Code scanned

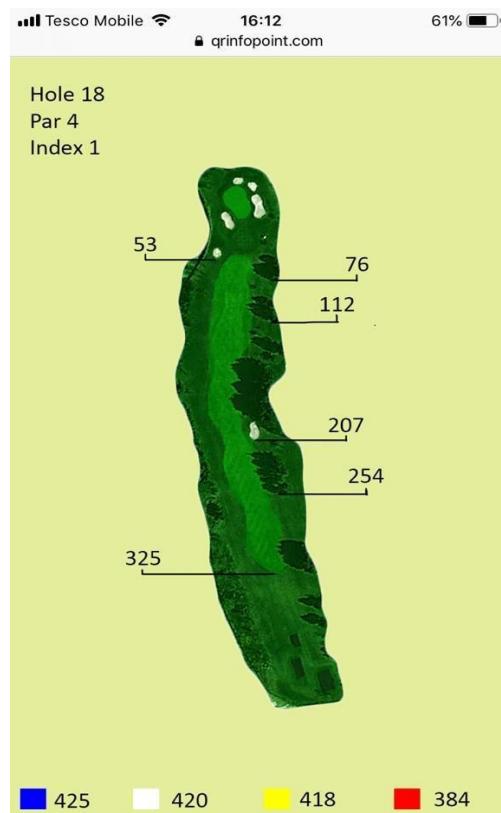


Figure 93 - Sample QR Code

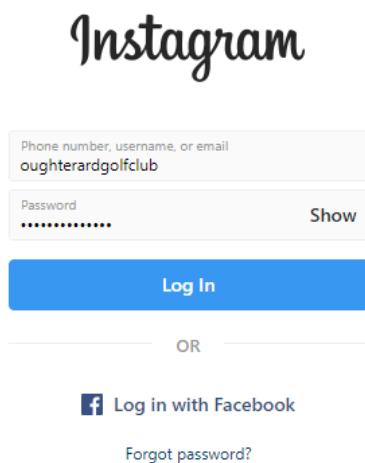
Social Media

As part of our project, we aimed to optimise the online presence of Oughterard Golf Club. In order to achieve this requirement, we have created an Instagram page for the club, which is also linked to the website.

Instagram is a social media platform owned by Facebook, Inc. It allows users to share photo and video content with other users.

Instagram User Guide

We will now describe in detail how staff at Oughterard Golf Club can interact and maintain the new Instagram account.



Logging in

On your IOS or Android device, Instagram is free to download. To log in, enter your username and password and then press “Log in”.

Figure 94 - Instagram Log In

Homepage

Your homepage on Instagram will display all the posts from pages/people/clubs and hashtags that you follow. Posts may include photos and videos. Each photo and video can be labelled with a unique caption, explaining what is happening in the photo, followed by some hashtags that are relevant to the photo. Hashtags are words or phrases that are used on posts that identify a keyword or topic of interest in that photo or video. For example, you would hashtag #golf #golfing #oughterard



Figure 95 - Instagram Home Page



Figure 96 - Instagram Explore Page

The explore feature

By clicking on the magnifying glass at the bottom of the page, you will be given the opportunity to find different pages/ people/ hashtags that may interest you on Instagram. You can search for different golf club pages and follow them to keep up to date on their posts. You can also follow your club members. This feature will also display photos and videos that may interest you.

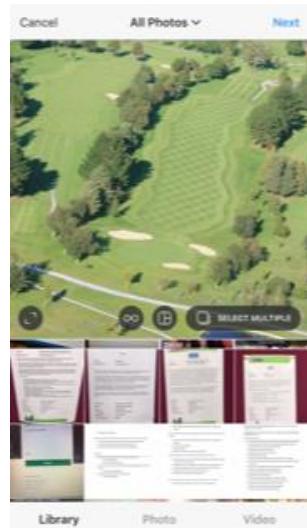


Figure 97 - Uploading Content

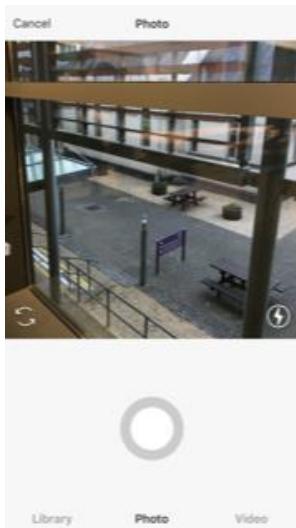


Figure 98 - Instagram Camera Feature

Camera:

If you want to upload an image in real time for your page you click “Photo” at the bottom of your screen. This will allow you to capture the photo, thus preceding with your next step- filtering the photo.

Video:

The video feature allows you to record video footage, that you can upload to your Instagram page. You are also given the option to filter the video if desired.

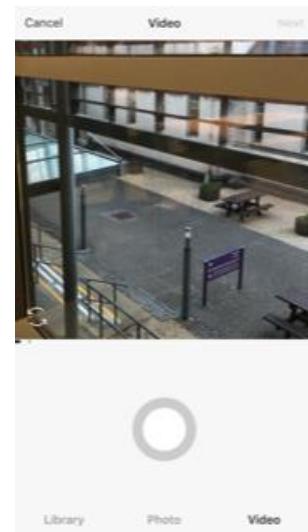
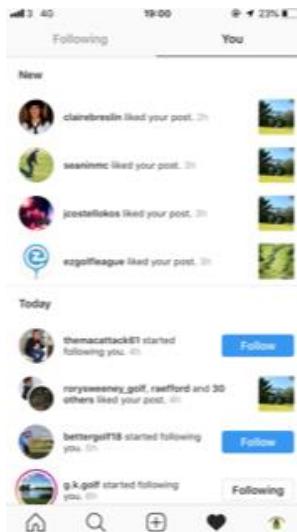
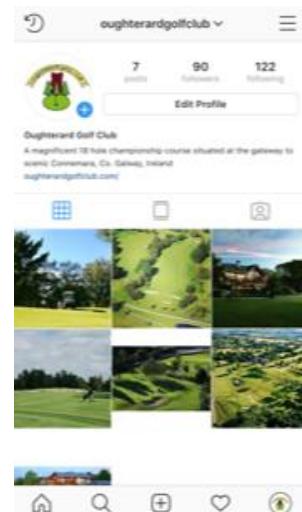


Figure 99 - Instagram Video Feature



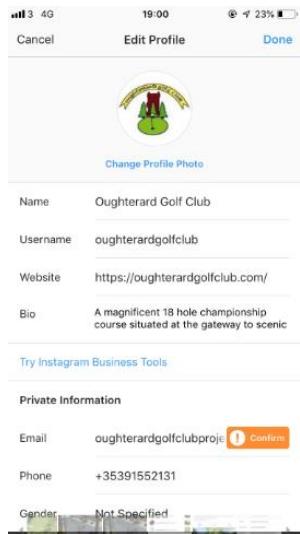
Likes/Comments

The “You” feature on Instagram allows you to view your comments, likes and new followers. The following feature displays your follower’s activity- who they are following. Posts they have liked.



Homepage

This page displays your personal content as well as giving you the option to change your settings. You display this section by pressing the person logo at the bottom of the screen.



Edit Profile

To edit your profile, click the “Edit Profile” page. This enables you to change your username or contact details, or if so desired- access some business tools.

Figure 101 - Edit Profile

Settings:

To display settings, you must slide the screen across to the left, this will bring up a few options. You can also view your own activity; see how much time you are spending on the application or who is viewing your page.

Log Out:

To log out, simply click the log out button at the end of the settings page. This will sign Oughterard Golf Club out.

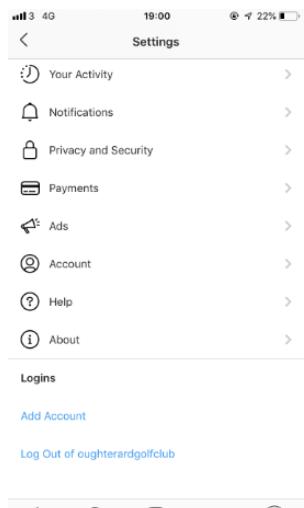


Figure 102 - Instagram Settings

Section 3: Developer Manual

System Modelling

"System modelling is the process of developing abstract models of a system, with each model presenting a different view or perspective of that system" (Gyires.inf.unideb.hu, 2019). System modelling was an important and beneficial activity for us to undertake. These models allowed us to visualize the system from different perspectives.

Context Level Diagram

A context level diagram is a diagram that shows the boundaries between a system and the environment. It is a diagram that shows the entities which interact with the system. It gives a high level view of a system. A context level diagram is also referred to as level 0 data flow diagram. There are many benefits to creating a diagram such as this including showing the scope and boundaries of a system.

Member's Portal

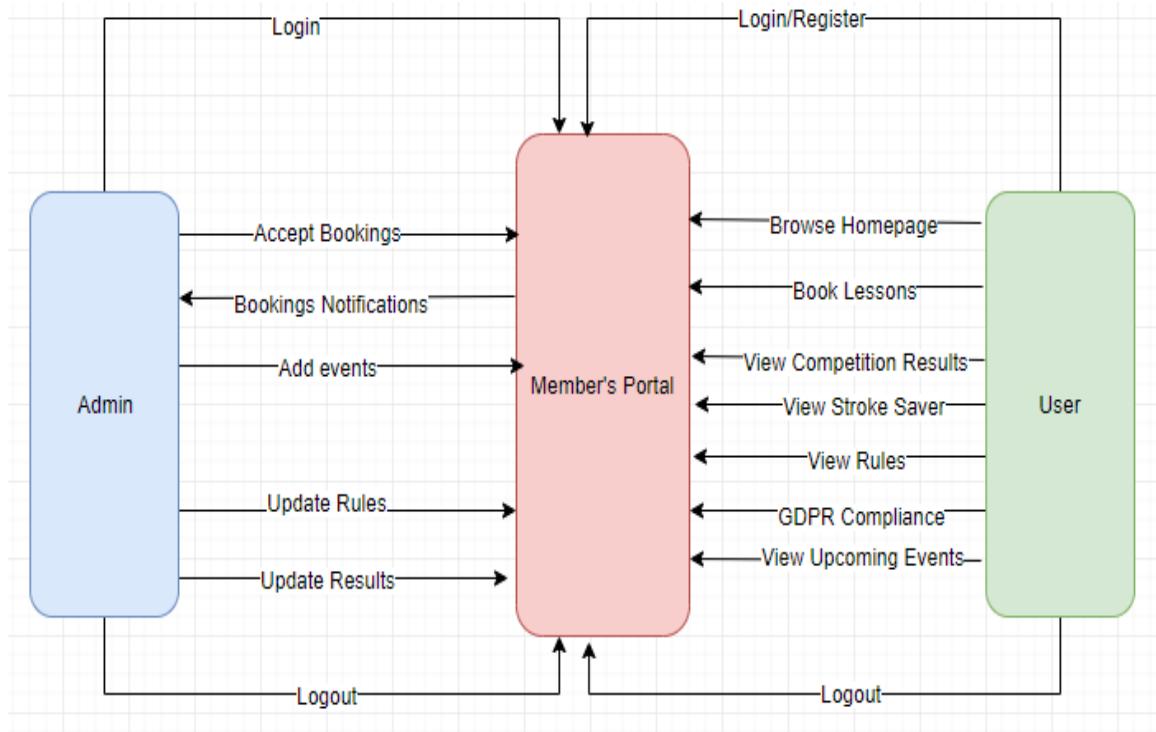


Figure 103 - Member's Portal Context Level Diagram

Android/iOS Application

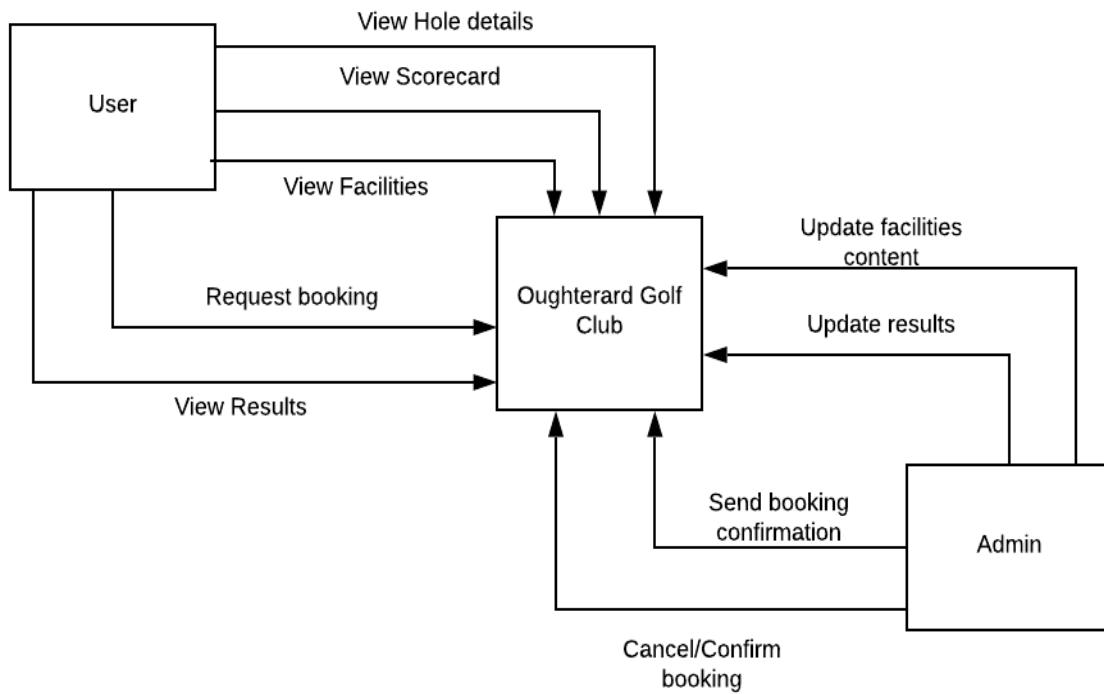


Figure 104 - Android/iOS Context Level Diagram

Functional Decomposition Diagram (FDD)

“A functional decomposition diagram can be defined as a top down representation of a process or function” (Chegg.com, 2019). It is a high level view of the main functions of the member’s portal. This FDD was drawn up after our requirements were revised at the request of the client. The main functions of the member’s portal are as follows:

1. Book Lessons
2. Competition
3. Events
4. GDPR

Member's Portal

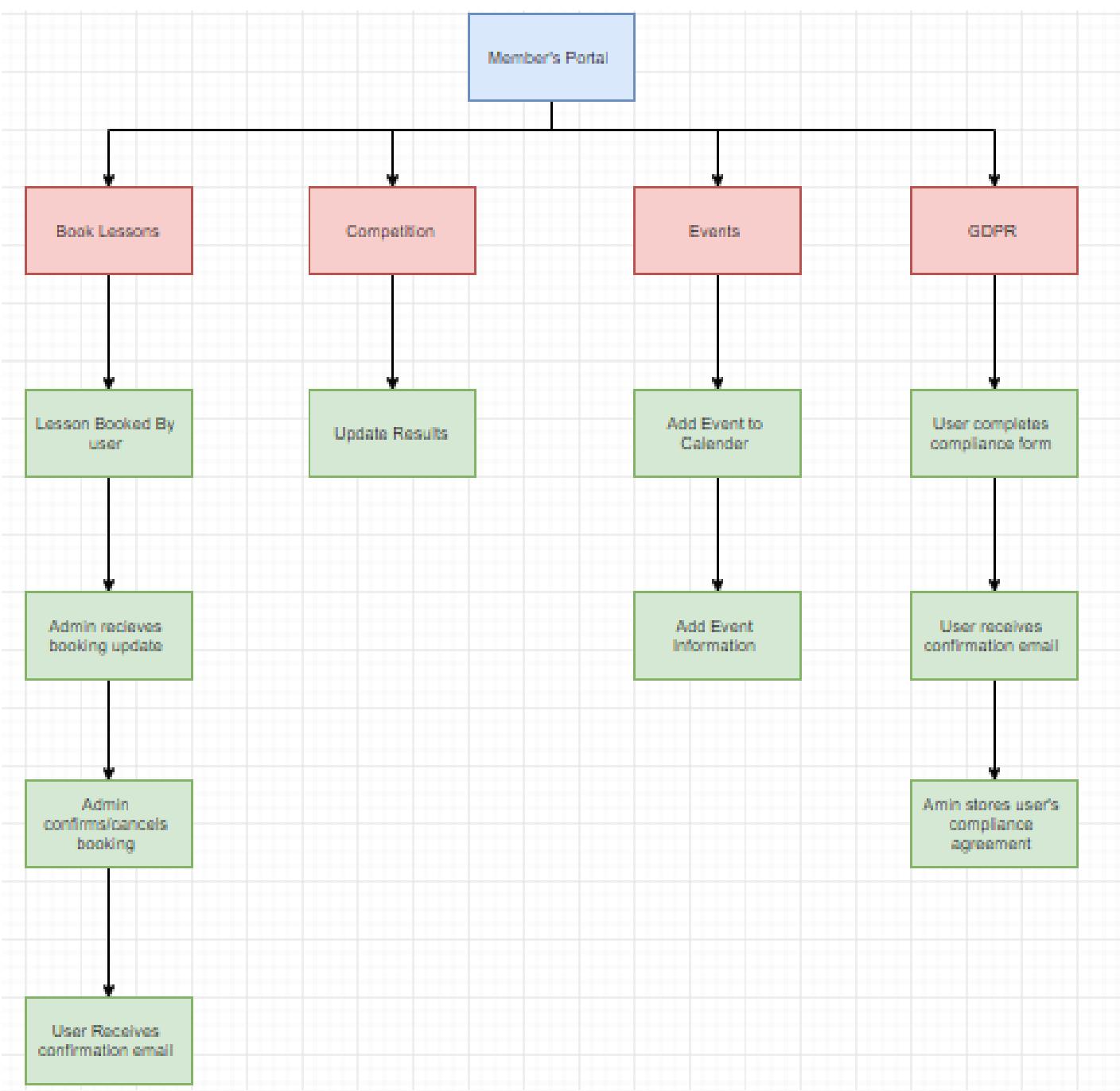


Figure 105 - Member's Portal FDD

Use Case

“A use case is a methodology used in system analysis to identify, clarify, and organize system requirements” (SearchSoftwareQuality, 2019). Use cases model possible interactions between users and the system. A use case has a number of characteristics including organising functional requirements and models the goals of a system actor such as a user or administrator. Below you will see two use cases, the first models the interaction between a user and admin and the system to complete a lesson booking. The second is the interaction of a user and admin with the system to collect GDPR compliance.

Member's Portal

Use case 1 – Booking a Lesson

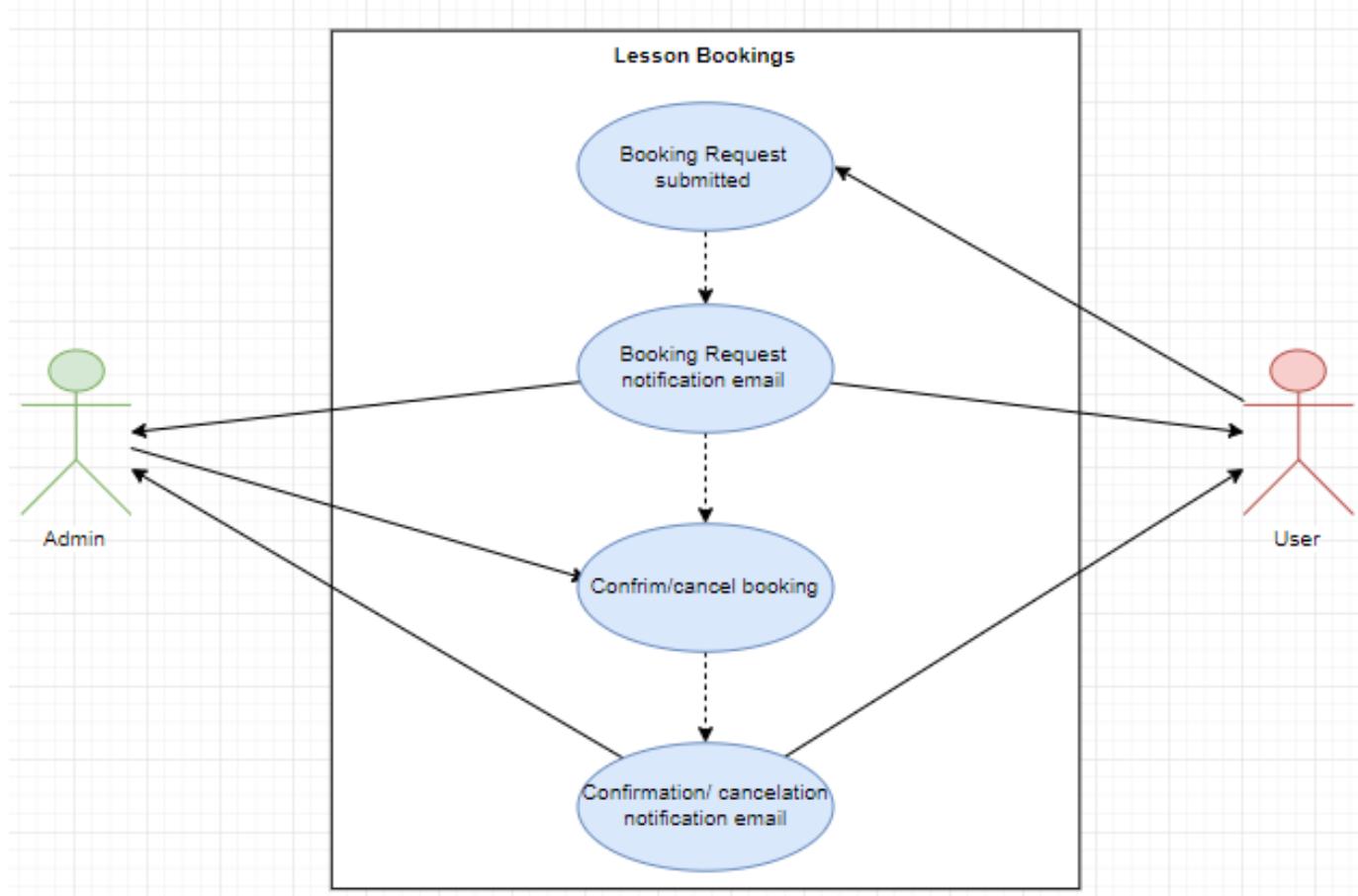


Figure 106 - Member's Portal Use Case 1

Use case 2 – GDPR Compliance

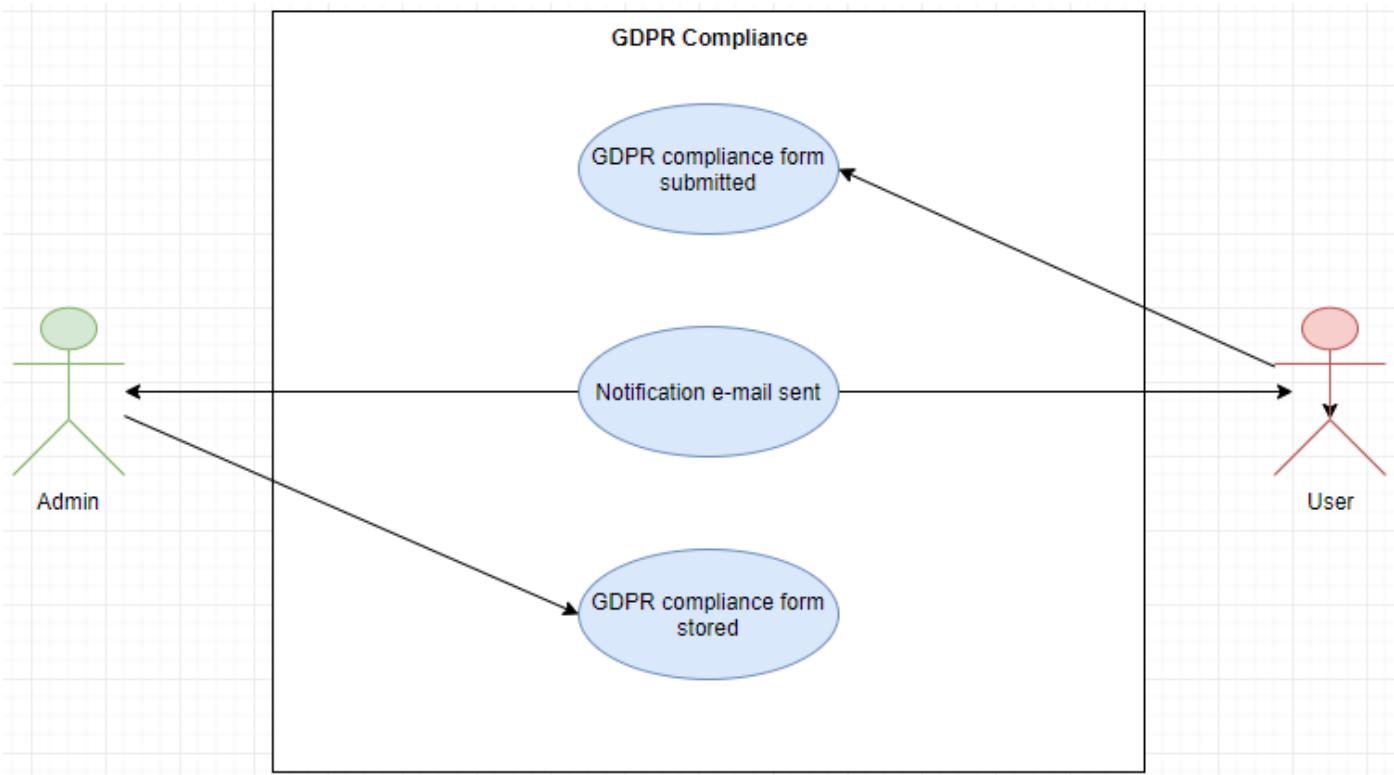


Figure 107 - Member's Portal Use Case 2

Android/iOS Application

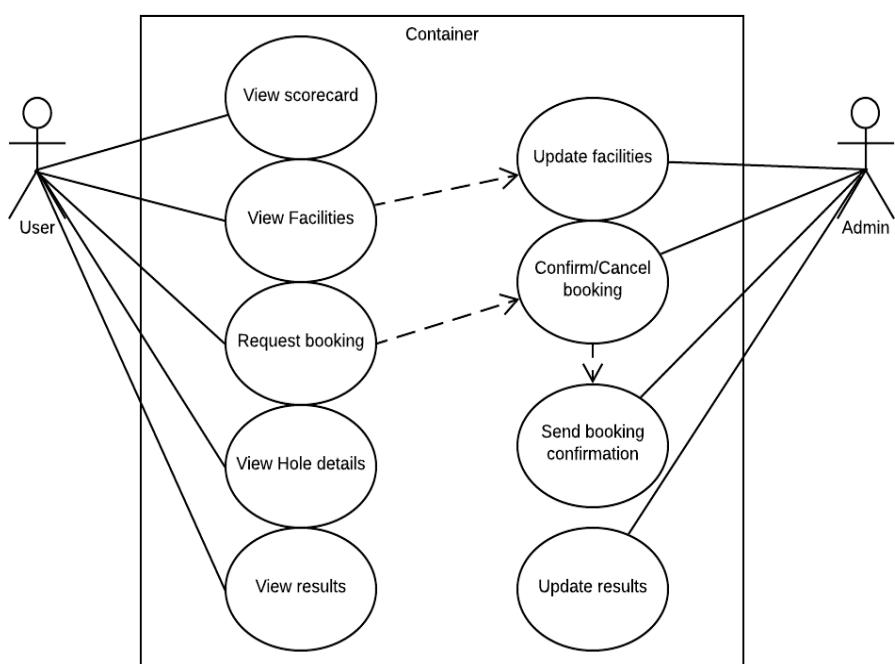


Figure 108 - Androis/iOS Use Case

Activity Diagram

"An activity diagram visually presents a series of actions or flow of control in a system similar to a flowchart or a data flow diagram" (Smartdraw.com, 2019). The activity diagram below shows the steps that need to be completed by the user, the website and the administrator for a lesson to be successfully or unsuccessfully booked.

Member's Portal

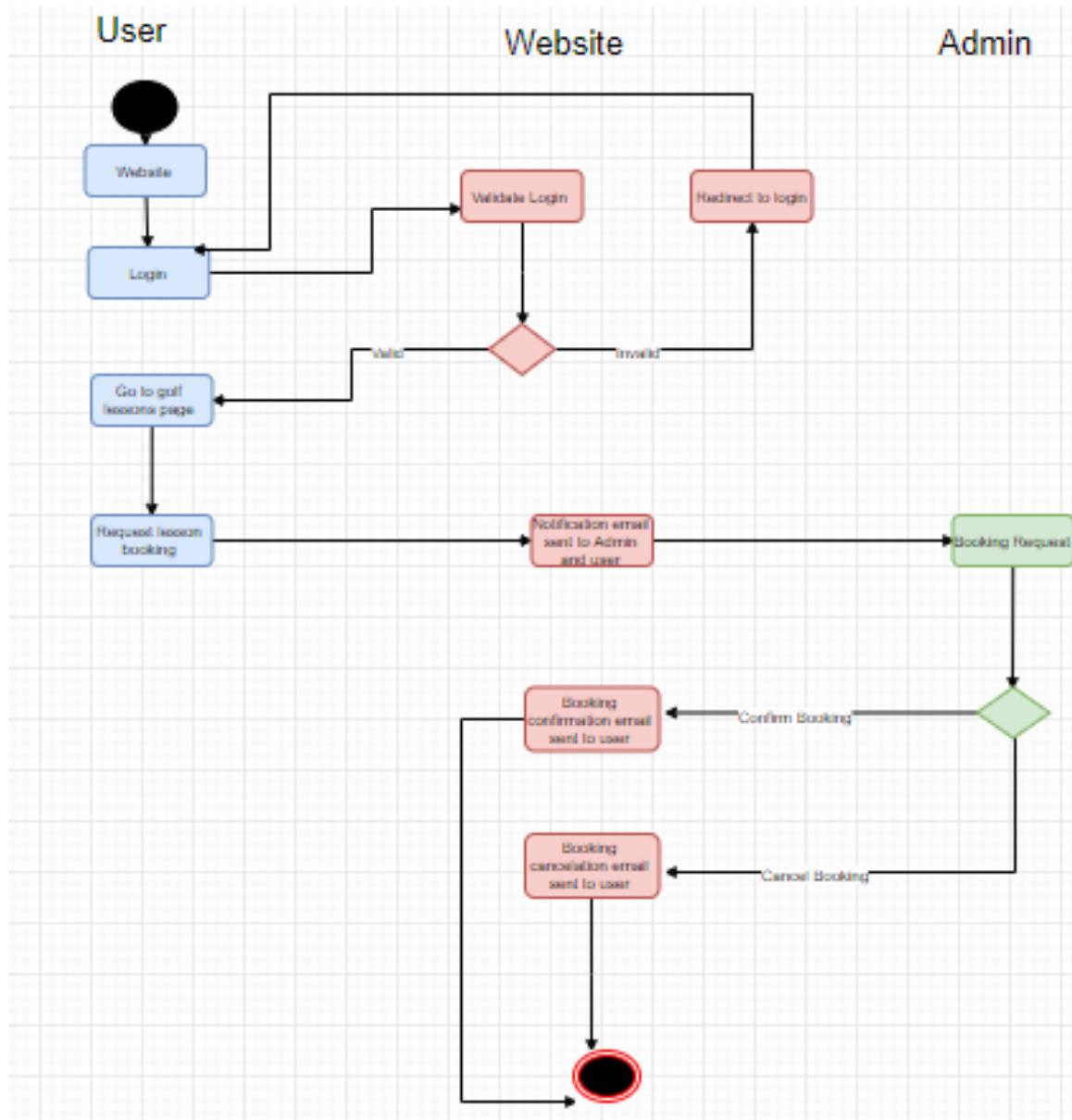


Figure 109 - Member's Portal Activity Diagram

Android/iOS Application

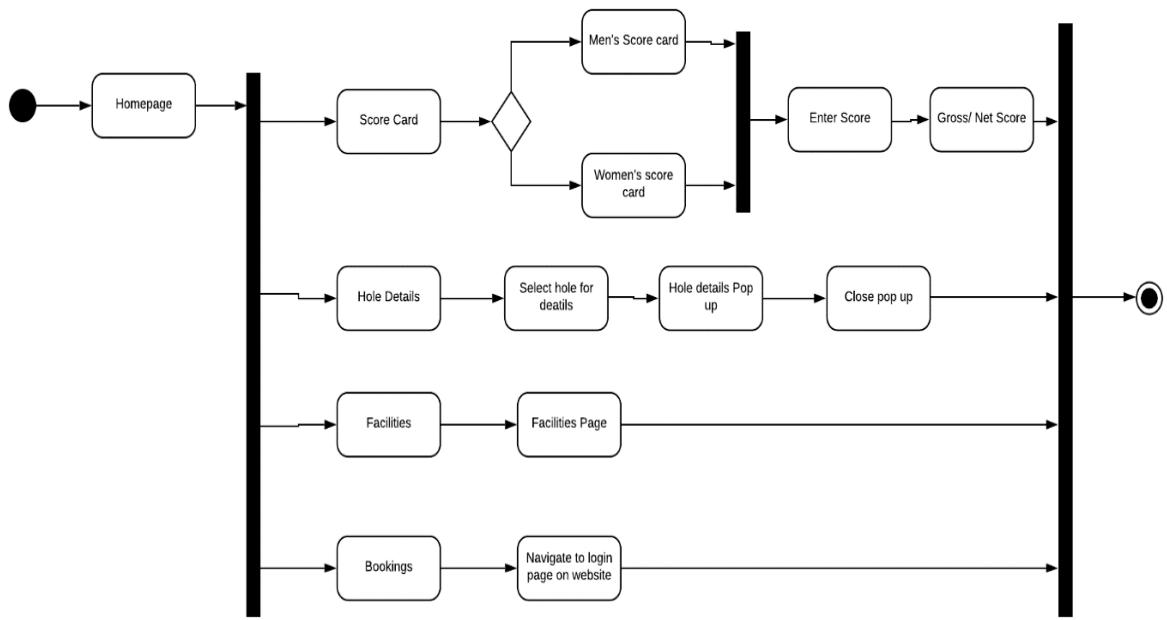


Figure 110 - Android/iOS Activity Diagram

System Architecture

Member's Portal

Setting up WordPress

Oughterard Golf Club's current website was developed on WordPress. In order for us to develop the member's portal and cause the least amount of disruption to the current website it was decided that the member's portal should be developed locally using WordPress. This decision was made during a meeting held with our client representative Barbara Buckley and the golf clubs web developer Damien Duggan. It was decided by Barbara and Damien that we should develop the website locally and once completed Damien would take the final product and incorporate it into the existing website. As the website was being developed locally and would be incorporated into the existing website we did not need to consider domain name registration or web hosting.

Running WordPress Locally

In order to develop the member's portal on WordPress and for it to be run locally on one of our computers we first needed to download a software called 'Bitnami WordPress'. This software allowed us to run WordPress on our computer. Once downloaded the software needed to be installed on one of our computers. Once installed an administrative account needed to be created. This is a very important step as the details entered here would be the login credentials used to access to WordPress dashboard. Once completed the we could begin constructing the member's portal. In order to access the website and the dashboard, 'localhost' must be entered into the search bar of any search engine installed on the computer.

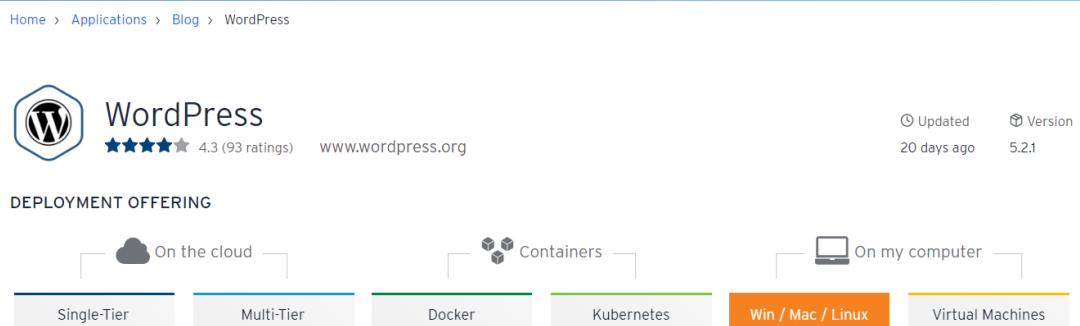


Figure 111 - WordPress Bitnami

Theme

WordPress offers themes which are free and some which must be paid for. As the golf club was unable to provide any budget towards completion of this project it was essential that we utilised the free elements that WordPress had to offer. As the member's portal would eventually be incorporated into the original website we needed to ensure that there was a continuity and flow between the two. After much research of the available free themes we decided to use the 'Astra' theme. The Astra theme had a number of excellent benefits to the development of the WordPress site. Firstly, it was made for speed and it is the most lightweight theme in the market which would allow for quick load times. It was also extremely customisable which allowed us to create a theme which was similar to the original website.

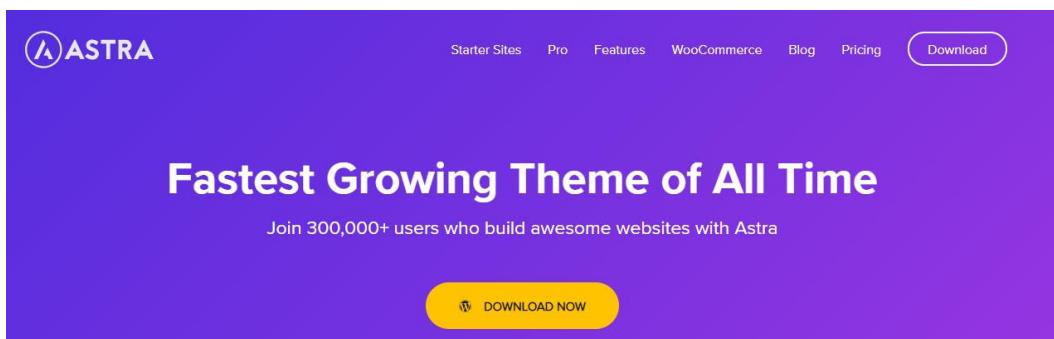


Figure 112 - WordPress Astra Theme

Responsiveness

It was very important for us to ensure that the member's portal would be fully responsive when used on a range of different devices. In order to ensure its responsiveness, we first used the Astra theme which we knew from our research was a fully responsive theme. Secondly we used a page builder called Elementor. Elementor is an intuitive page builder which allows complete control over the design and creation of web pages. It offers unique features including the ability to view your site from the view of different devices which allowed us to check its responsiveness. We utilised the free version of Elementor which limited some of our capabilities but was an excellent tool in the creation of the member's portal.



Figure 113 - WordPress Elementor

Navigation

From our many meetings with Barbara Buckley (Oughterard golf club representative) it was clearly stated that the average age of the members of Oughterard golf club is in the late sixties. As stated by Barbara in our very first meeting, any system designed by us must be easy to use and follow. This we took into great consideration when designing and creating the member's portal. Navigation was one of our key focuses when designing the portal. Our aim was to make it as simple as possible for users to navigate between the pages of the member's portal. We as group decided to use two types of navigation. The primary menu which is located in the header of the page. This menu is simple and lays out all pages located on the website.



Figure 114 - WordPress Main Menu

The second form of navigation is located on the centre of the Homepage. This is a multimedia menu with links to the pages we believe will receive the most views.

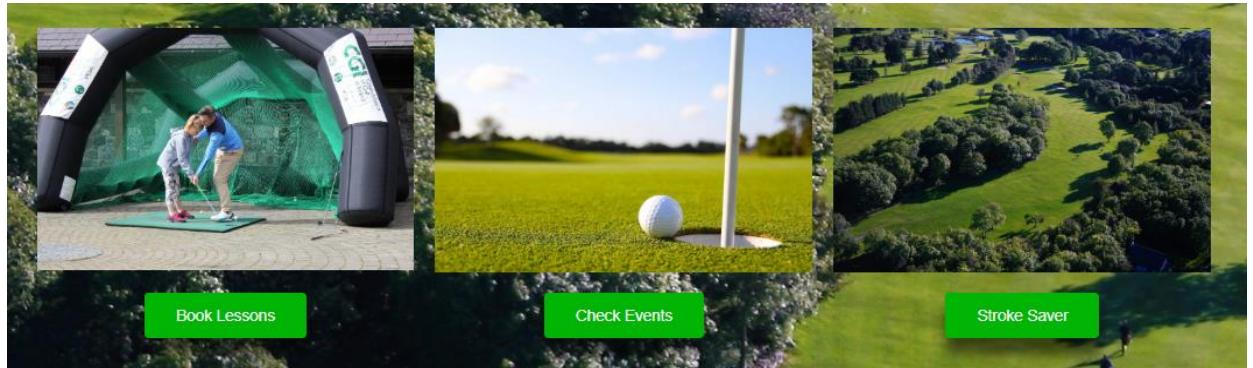


Figure 115 - WordPress Sub Menu

Plugins

"A plugin is a piece of software containing a group of functions that can be added to a WordPress website. They can extend functionality or add new features to your WordPress websites" (Wpbeginner.com, 2019). We used many plugins to complete the development of the member's portal all of which were freely available. Below is a list of all plugins used and what they were used for:

Plugins	Purpose
Admin Bar Disabler	Removes admin bar for visitors of the website
Astra Starter sites	Theme used for website
Check email	Used to test the functionality of the email delivery service
Client Portal	Turns the website into a membership site
Client form 7	Used to create the bookings form for booking a golf lesson
Easy appointments	Used to manage and organise the lesson bookings
Elementor	Page builder
Login/logout menu	Adds registration to login page
LoginPress	Allows customisation of login and logout pages
Members	Allows the management of users and their roles
PDF embedder	Allows embedding of PDF's directly into webpages
Sucuri Security	Activity Auditing, site check remote malware scanning, effective security hardening, and post hack features
The Events Calendar	Allows you to easily share and update events
WP Mail SMTP	Reconfigures mail setup
WPForms Lite	Used to create GDPR compliance form

Site Map

A site map is a list of all the pages contained on a website. We used this site map during the planning phase of the development of the member's portal to help us design and layout our website.

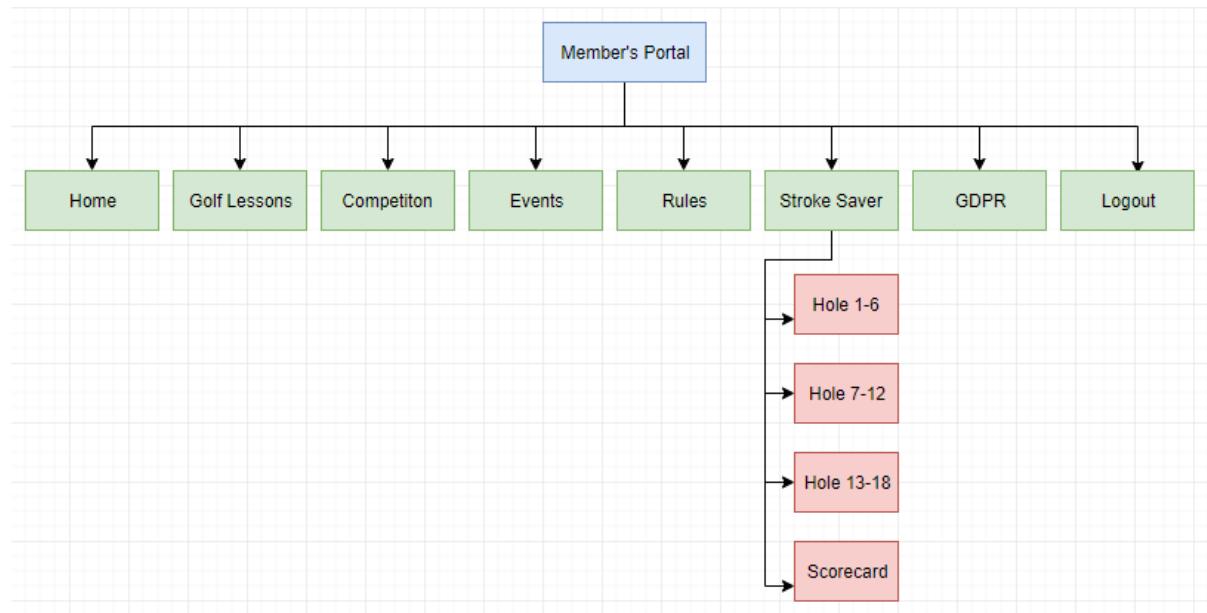


Figure 116 - Member's Portal Site Map

QR Codes

In order to create our quick response codes which would be displayed on each hole of the Oughterard golf course, we first needed to create the image that would be contained in the QR codes. These images would also be contained in the app and in the member's portal. Originally we were informed by the golf club that we would be supplied with drone footage of the golf course which we could utilise to create overviews of each hole. However, due to payment issues and ownership rights over the drone footage we were unable to use this footage to create the images of each hole. We then turned to Google Earth to get an over view of the golf course. From this overview we were able to take images of each hole one by one. The major issue we faced with using Google Earth was the quality of the images. Below is an example of a hole overview taken from Google Earth:



Figure 117 - Original Golf Course Image

Due to the poor quality of the images we needed to do extensive work using Photoshop to transform the original images into images the client was happy with and that we felt offered enough information to benefit the user on the course. Below on the left is an example of a finished over view of hole eight. All adjustments and changes made to the original image on Photoshop can be seen on the right. Yardages were added to each image. Each yardage shows a distance from a certain marker on the hole to the centre of the green. Located on the bottom of each hole image is the total distance from each tee box to the centre of the green.

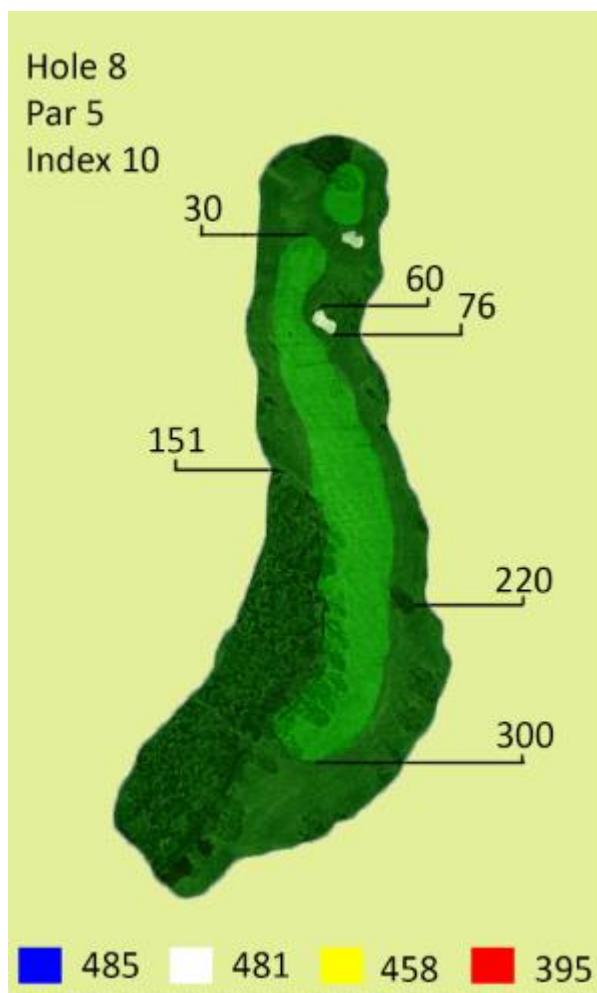


Figure 118 - Final Golf Hole Image

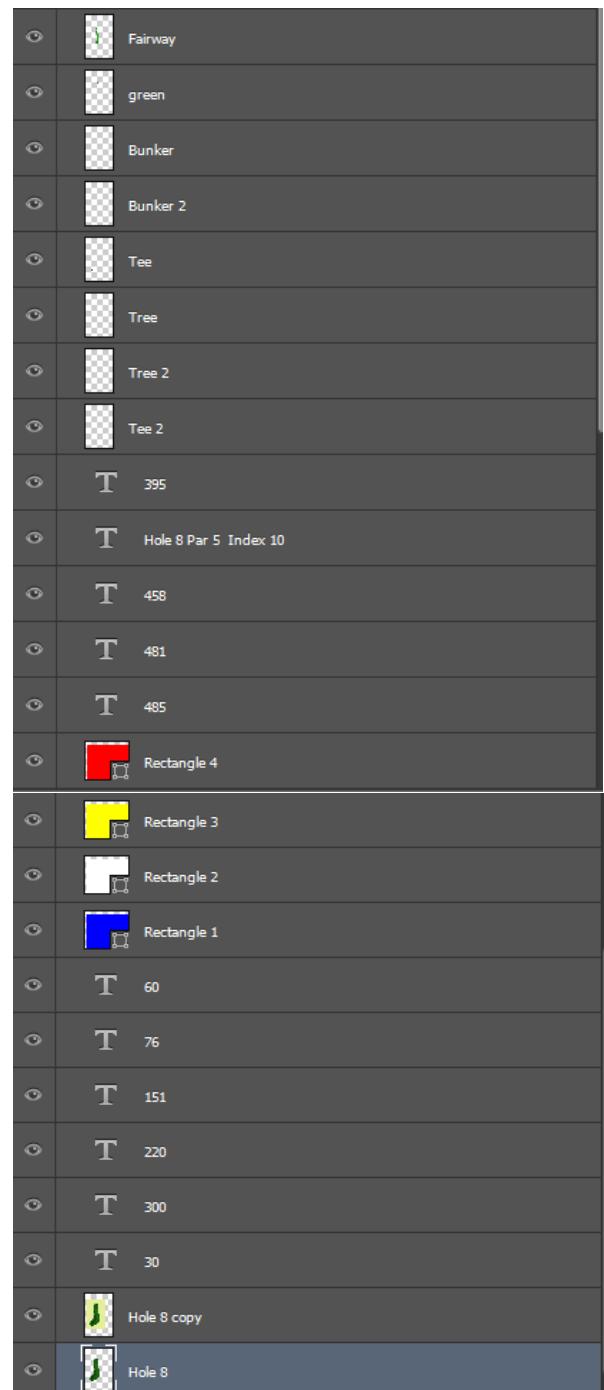


Figure 119 - Photoshop Layers

Once each image was customized and distances added it was time to transform each image into a QR code. To complete this, we used a website called ‘App.qr-code-generator’. This website was free but did require registration. Once registration was completed, we uploaded each image to the website. We were given the opportunity to customize each QR code, however we decided to keep it simple and add no customization.

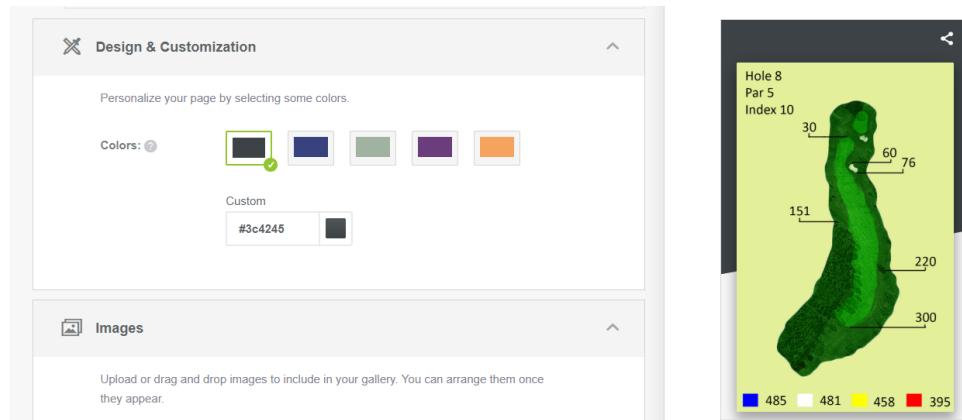


Figure 120 - QR Code Generation Step 1

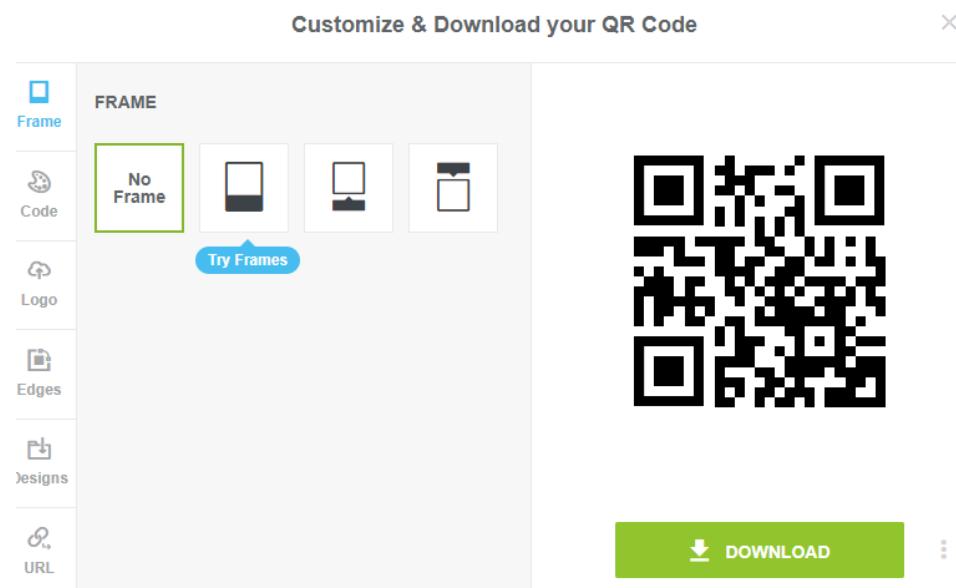


Figure 121 - QR Code Generation Step 2

Each QR code was finally downloaded, printed, laminated and added to every male and female tee box located on the course.



Figure 122 - Barbara Buckley presented with QR Codes

Android / iOS Application

We have developed an android and iOS mobile application so that more users can use the application. Android Studio was used for developing the android application and Xcode was used for developing the iOS application as these are the official IDE for the application development.

Technologies Used:

Android Studio:



Android Studio is an integrated development environment for Google's Android operating system. It is available for Windows, MacOS and Linux operating system. It is a freeware, available free of cost. It is an easy to use IDE for developing Android Applications.

Important features of Android studio are:

1. Gradle-based build support
2. Refactoring and quick fixes

3. Build-in support for Google cloud platform
4. Rich layout editor

Android studio is easy to use and understand. The editor is equipped with Intelligent interface which makes code writing faster and accurate. It is easy to test the application on your own smartphone by connecting the phone to PC. The user interface of Android Studio is friendly and allows us to connect to social media like Facebook, Twitter for latest trends and frameworks.

It uses Java as programming language for the backend of the application. For the UI/UX visual part, XML file is used for the frontend. By using plugins, it can support other programming languages.

Xcode:



Xcode is an integrated development environment (IDE) for macOS containing a suite of software development tools developed by Apple for developing software. It is an official IDE for developing iOS applications.

It supports various programming languages like C, C++, Objective-C, Objective-C++, Java, AppleScript, Python, Ruby, ResEdit (Rez), Swift and C#. It is also a freeware, freely available on App Store. It is only available for macOS.

Features of Xcode:

1. Auto-Completion – uses intellisense for auto completion.
2. Instant bug fixes
3. Instant drag and drop for storyboard

It is an easy to use IDE for developing iOS application. It is easy to test the application even if you do not have an iPhone by using simulator. The simulator supports all kinds of screen sizes like all versions of iPhone and iPad.

Development Process:

1. Storyboarding

We started with creating a roadmap of the application to determine relationships between screens and how the user will navigate through the application. For getting the clear idea about the app, we

designed the paper mockups. For low fidelity prototyping we used Adobe XD. This gave us distinct idea for stating the development process.

Android studio and Xcode provide features of storyboarding, which makes the development process easy. Using storyboard, it is easy to integrate various elements such as buttons, content, images etc.

It also provides different views like scroll view, image view, table view to align content.

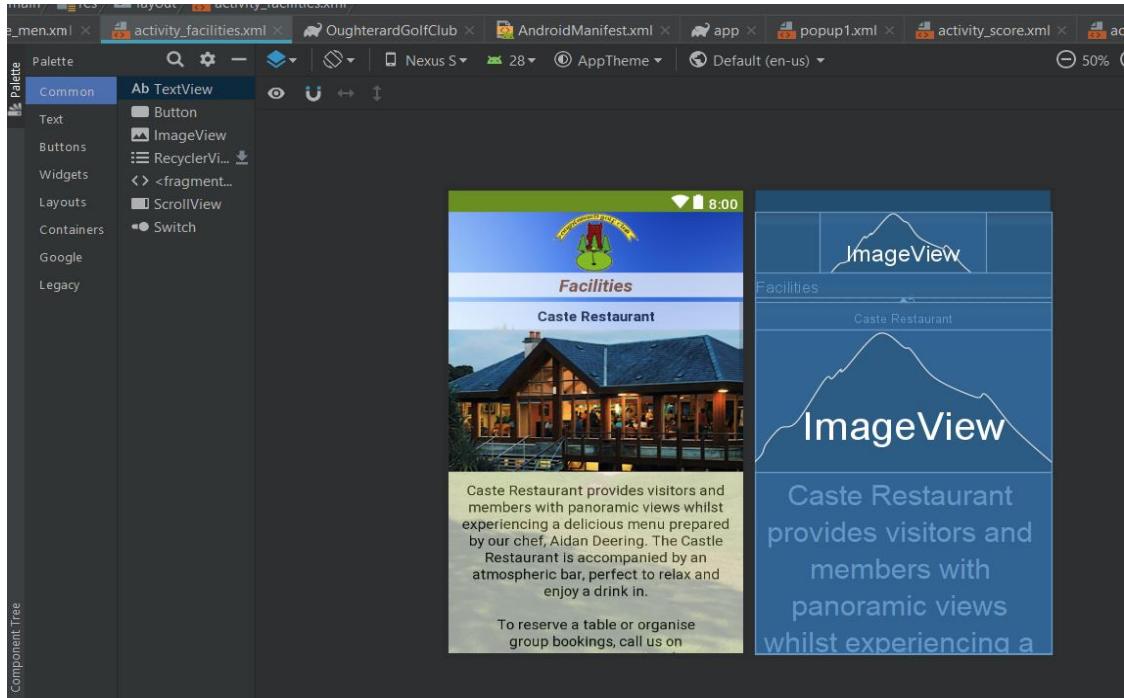


Figure 123 - Android/iOS Storyboard

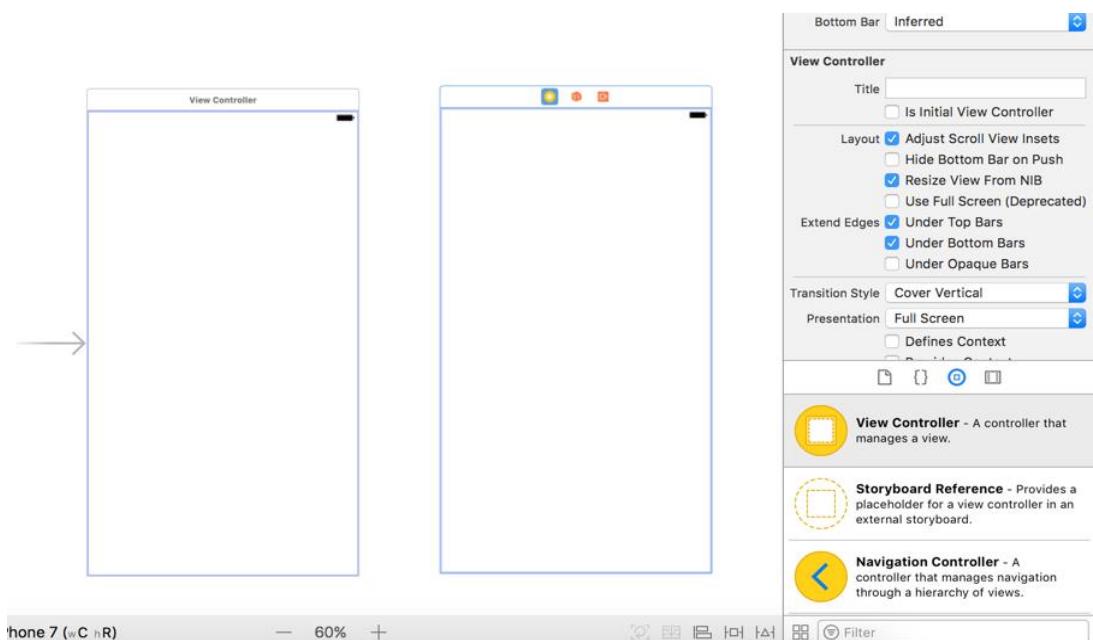
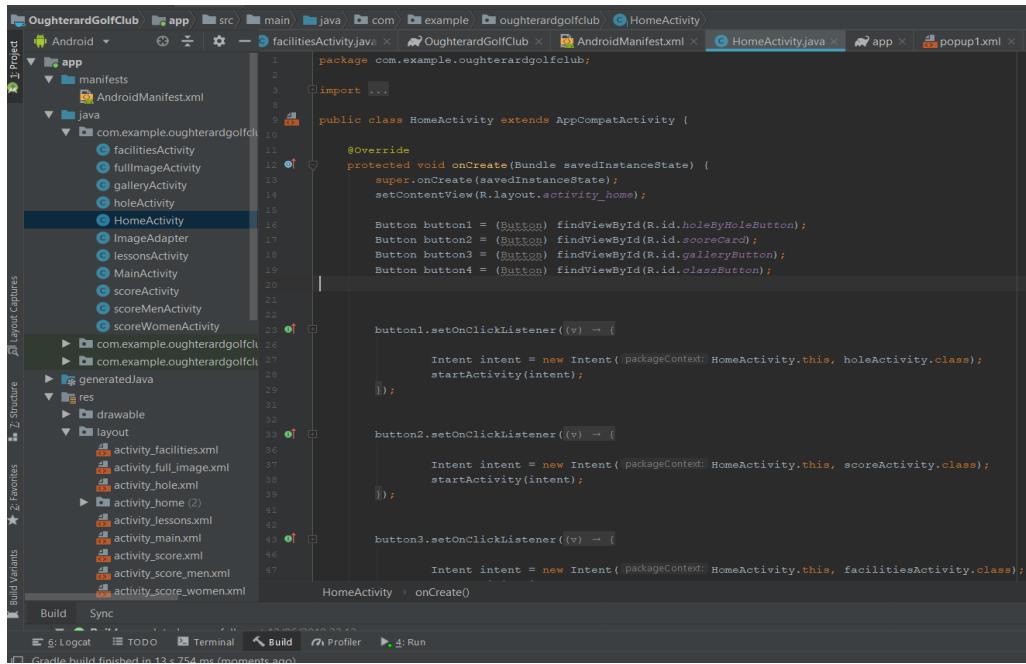


Figure 124 - Android/iOS Storyboard Generation

2. Coding:

For linking the storyboard pages and for performing the activities, we developed the application in Java for Android application and Swift for iOS application.

Score calculator used in score cards was coded in Java and Swift for both operating systems. Pop-ups used for hole details were also coded. Buttons like Clear button, Calculate button and Close button were coded for performing different operations.



The screenshot shows the Android Studio interface with the project 'OughterardGolfClub' open. The left sidebar displays the project structure under 'app'. The main editor window shows the Java code for 'HomeActivity.java'. The code defines an activity that overrides the onCreate method. It initializes four buttons (button1, button2, button3, button4) and sets their click listeners to start new intents for 'holeActivity', 'scoreActivity', 'scoreMenActivity', and 'facilitiesActivity' respectively. The code is annotated with line numbers from 1 to 47. The bottom status bar indicates a successful build.

```

1 package com.example.oughterardgolfclub;
2
3 import ...
4
5
6 public class HomeActivity extends AppCompatActivity {
7
8     @Override
9     protected void onCreate(Bundle savedInstanceState) {
10         super.onCreate(savedInstanceState);
11         setContentView(R.layout.activity_home);
12
13         Button button1 = (Button) findViewById(R.id.holeByHoleButton);
14         Button button2 = (Button) findViewById(R.id.scoreCard);
15         Button button3 = (Button) findViewById(R.id.galleryButton);
16         Button button4 = (Button) findViewById(R.id.classButton);
17
18         button1.setOnClickListener((v) -> {
19
20             Intent intent = new Intent(getApplicationContext(), holeActivity.class);
21             startActivity(intent);
22         });
23
24         button2.setOnClickListener((v) -> {
25
26             Intent intent = new Intent(getApplicationContext(), scoreActivity.class);
27             startActivity(intent);
28         });
29
30         button3.setOnClickListener((v) -> {
31
32             Intent intent = new Intent(getApplicationContext(), facilitiesActivity.class);
33             startActivity(intent);
34         });
35
36         button4.setOnClickListener((v) -> {
37
38             Intent intent = new Intent(getApplicationContext(), scoreMenActivity.class);
39             startActivity(intent);
40         });
41
42         Intent intent = new Intent(getApplicationContext(), scoreWomenActivity.class);
43         startActivity(intent);
44     }
45
46     HomeActivity > onCreate()
47

```

Figure 125 - Android Code

3. Testing:

For testing the developed application, we set up an emulator which replicates the original system. There are many different models available to test the application using emulator. It is easy to find and fix bugs in advanced IDE like Android studio and Xcode.

After completion of the application, we performed user acceptance testing for verifying the actual and expected result.

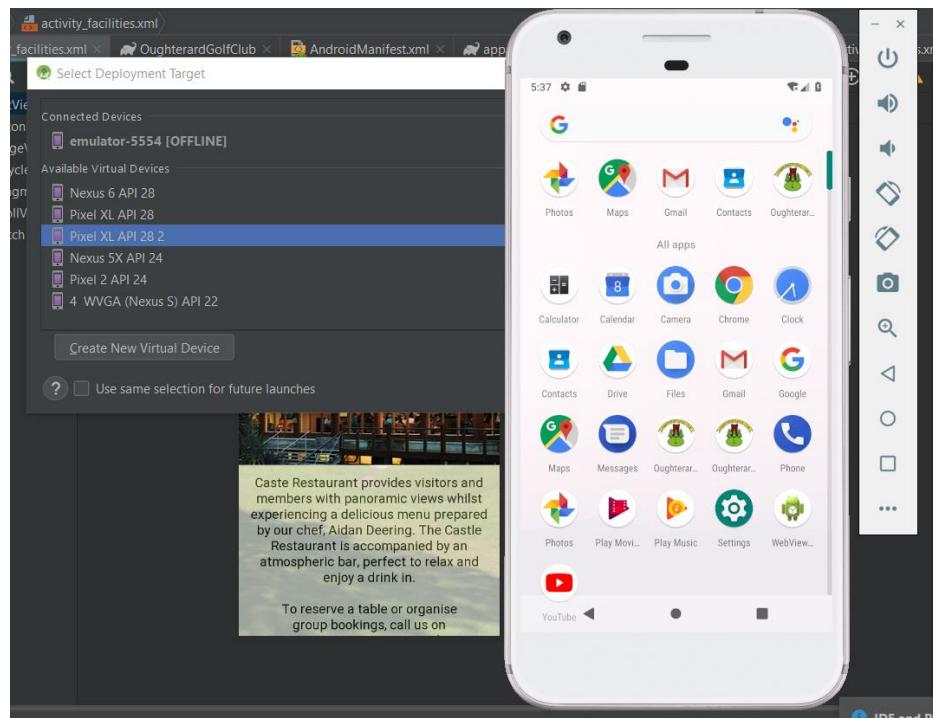


Figure 126 - Testing Application

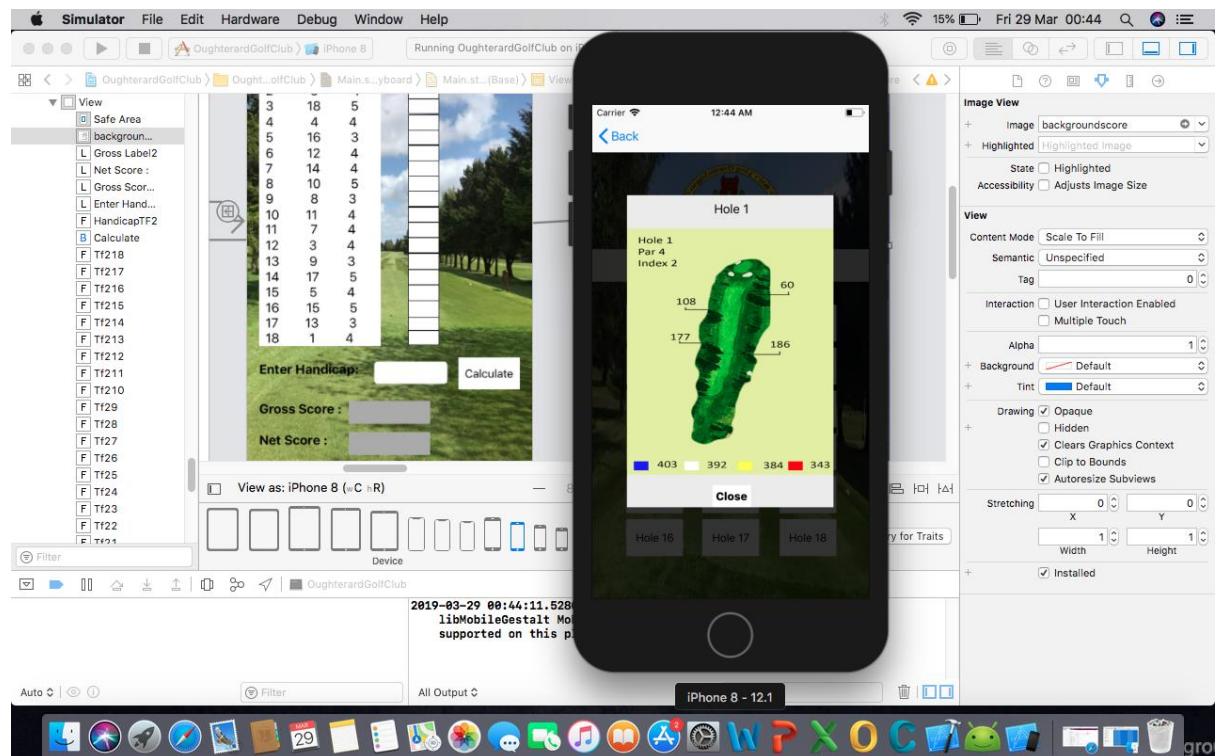


Figure 127 - iOS Testing

Appendix 1: Project Management Documentation

Project Management Summary

Project Charter

Project title: Oughterard Golf Club Member's Portal, information application and QR code generation

- Design and develop a web-based member's portal that will allow members to book lessons, view competition results, view upcoming events, view hole details and provide GDPR compliance
- The application should allow users to use an interactive score card to track their rounds, view hole by hole information, book a tee time and view the golf club facilities.
- The QR codes should contain a detail overview of each hole containing yardages.

Project Start Date: September 2018

Key Milestones

- | | |
|---|--------------------------------------|
| • Project Proposal: | October 12 th , 2018 |
| • Interim deliverable 1: | January 25 th , 2019 |
| • Interim Deliverable 2: | March 29 th , 2019 |
| • Final Report and presentation: | June 17 th and 21st, 2019 |
| • Project Documentation: | June 17 th , 2019 |

Budget Information

Our client has stated clearly that there will be no budget provided for the development of this project.

Project Objectives

- Create a web based member's portal that will allow members to book lessons and view upcoming events and competition results.
- The app should provide an interactive scorecard and hole information that will benefit the user during their time at Oughterard golf club
- The QR codes should benefit the user by providing key information of each hole

The Project Team will

- Deliver on the requirements agreed upon with the client.
- Participate fully in all weekly meetings unless a valid reason is provided.
- Perform tasks and activities assigned to each member to their upmost ability.
- Communicate effectively with one another.
- All disagreements and grievances to be handled in a mature and professional manner.

Project Success Criteria

- All requirements agreed upon with client are met and delivered in the form of the finished product.
- Positive feedback from members of Oughterard Golf club who have used the new systems.
- Positive feedback from our client.

Approach

- Use ScrumBan methodology in the development of this project.
- Follow the correct iterative process in the development and completion of this project.

<ul style="list-style-type: none"> Utilise a range of requirements gathering techniques to ensure requirements are factually based. 		
Vaishnavi Chittoor	v.chittoor1@nuigalway.ie	Project Team leader
Niall Feeney	n.feeney7@nuigalway.ie	Project Team Member
Enya McGowan	e.mcgowan7@nuigalway.ie	Project Team Member
Elizabeth Concannon	e.concannon9@nuigalway.ie	Project Team Member
Shreeya Lakore	s.lakore1@nuigalway.ie	Project Team Member
Project Team		
Sign Off		
Barbara Buckley (Client Representative)		Date:
Vaishnavi Chittor (Group representative)		Date:

Agile Frameworks

One of the first major decisions any project team, including our own project team, must make before commencing a project is to choose their project methodology. After researching various types of project management methodologies, we chose to work with the *Agile Software Development Framework*. The two most prevalent software development methodologies are, Waterfall (or Traditional) and Agile (Segue Technologies, 2019).

We chose to work with an Agile methodology because it provides greater scope for requirement improvements through its iterative process cycles. It also promotes speedy delivery of the product through iterative releases (Smartsheet, 2019). With an Agile methodology, requirements change and develop over time, and feedback from users is encouraged throughout all stages of development (Smartsheet, 2019).

During the initial interview with Barbara, our client, we realized that she was uncertain about some aspects of their requirements. Therefore, using the Agile approach would enable us to involve our client in the entire project development cycle, thus allowing their requirements to evolve throughout the development period.

Scrum (Requirements)

Scrum is a framework under Agile methodology. The name ‘Scrum’ comes from a comparison, made by Hirotaka Takeuchi and Ikujiro Nonakalt, of cross-functional project teams to rugby teams’ scrum formation (Scrum Alliance, 2019). Scrum a flexible software development process where a team works towards a common goal but also enables teams to self-organize by encouraging frequent collaboration of all team members (Atlassain, 2019). The Scrum framework breaks down the development steps into units called “Sprint”. The Sprint duration may vary from a week to a month.

There are three essential roles involved in the Scrum process. These roles are:

1. *Product Owner* - the key stakeholder who interacts with the client to gain a complete understanding of the requirements and helps the development team in planning the scope and timelines of the project. The product owner will also manage the product backlog and ensure the development team delivers value to the customer (Atlassain, 2019).
2. *Scrum Master* - a servant-leader who ensures that the team follows the Scrum process and assists the team in working to their best capabilities (Smartsheet, 2019). They are responsible for facilitating meetings, leading the development teams in planning the Sprints and work with the Product owner.
3. *Development/Scrum Team* – is different to a more traditional development team and does not have distinct roles. Instead all team members work together to complete the Sprint iteration (Smartsheet, 2019).

Scrum uses User Stories for requirement gathering at a high level for estimating the scope of the project. The client requirements are gathered and consolidated as the ***Product Backlog*** by the Product Owner. The requirements in the product backlog need to be prioritized and the most important and suitable tasks are placed on top for the team to pick for the Sprint Cycles.

A typical Scrum cycle consists of 4 steps:

1. ***Sprint Planning*** - The highest priority item from the product backlog is picked up by the team, brainstormed to determine the objectives and scope.
2. ***Daily Scrum Meeting*** (stand-up meeting) - Each day the scrum team meets for a maximum of fifteen minutes. Each team member answers 3 things:
 - What did I do yesterday?
 - What do I intend to do today?

- Explain if they are facing any issues that prevent them completing their work for the day.
3. **Sprint Review Meeting** - After each sprint, the team holds a Sprint Review Meeting to demonstrate a working product increment to the Product Owner and the team.
 4. **Retrospective meeting** - occurs after the review meeting. The Scrum group meets and talks about the following points:
 - Exactly what went well in the sprint
 - Exactly what didn't go as planned in the sprint
 - Lessons learned
 - Action items to be acted on

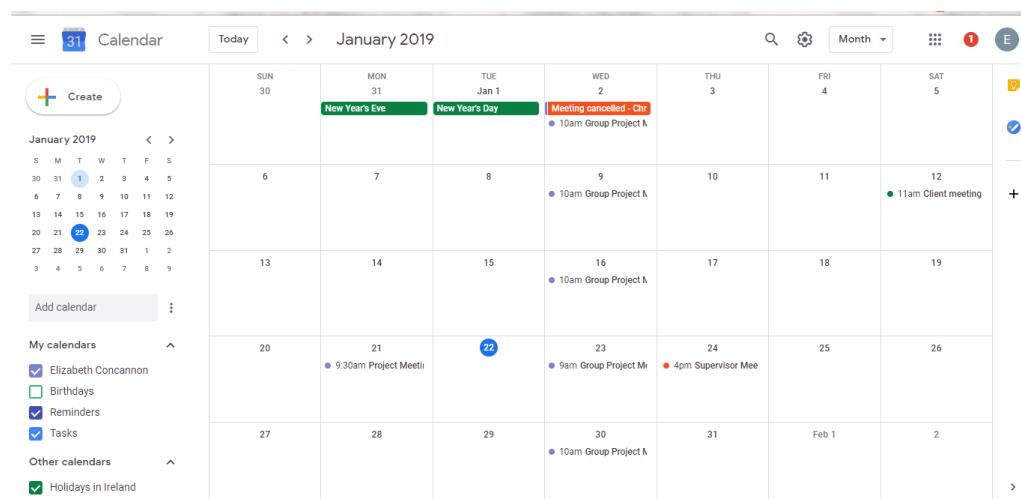


Figure 7 - Google calendar with weekly group meetings scheduled

Why Scrum?

Scrum typically involves short daily meetings where team members will discuss, their progress and their plan for the coming day (Cohn, 2019). We realised that daily meetings were becoming more challenging due to schedules with other commitments. Therefore, we chose to meet 1 to 2 times a week, we met every Wednesday as we had no classes and also met briefly before classes to discuss our progress. We selected Scrum because it enables better team communication with frequent meetings and helps prioritize and allocate tasks by creating a product backlog and choosing stories for each sprint cycle. The Scrum framework short sprint cycles ensure faster delivery of the project. It will also help ensure the project is on track and the client's requirements are met with their continuous involvement.

Scrum (Scrum + Kanban) for implementation:

During the requirement gathering phase, we believed that Scrum was an ideal project management methodology for our project. Scrum's requirement gathering and setting up of Product Backlog was quite useful. However, during the implementation, we faced issues with time management due to our study schedule, assessments and exams.

We realized that we needed a way to visualize our progress better. Kanban, which comes from the Japanese word for 'card' or 'visual sign' (Smartsheet, 2019). Also, a continual delivery seems more practical than time-boxed delivery for Scrum. Therefore, we decided to implement a hybrid of **Scrum** and **Kanban** methodology called **Scrumban**. Scrumban utilises the Scrum structure, of Sprints and Scrum roles, with the visual element of Kanban (LeanKit, 2019).

Kanban (Implementation)

Kanban is based on 3 basic principles:

- Visualize the current day's work: looking at all the items in the context of each other can be very informative.
- Limit the amount of work in progress (WIP): this helps balance the flow-based approach and ensures that teams don't start and commit to too much work at once
- Enhance flow: when a task is finished, the next important task from the product backlog is taken up.

A Kanban Board is used for visualizing and tracking the process flow while maintaining the number of work-in-progress activities. It helps ensure standardisation of workflows and identification of any issues or dependencies for a quick resolution (LeanKit, 2019). It typically consists of a 3-step workflow: To Do, In Progress, and Completed. Our team created a Kanban board using Trello, a project management application. We found being able to visualise all tasks and their stage of completion extremely useful for our team.

Pros:

- Breaking down the project into smaller tasks helps track them better
- A continuous flow of work in Kanban ensures that the teams are not burdened with too many tasks. It also ensures the completion of the tasks before taking up more.
- Shorter cycles help deliver the product faster

- The framework makes it open to changes and has minimal impact on the timeline
- Continuous client feedback ensures that they would be satisfied with the final product

Cons:

- Chances of scope creep are high due to the higher number of iterative cycles. This might cause distress for the software development teams.

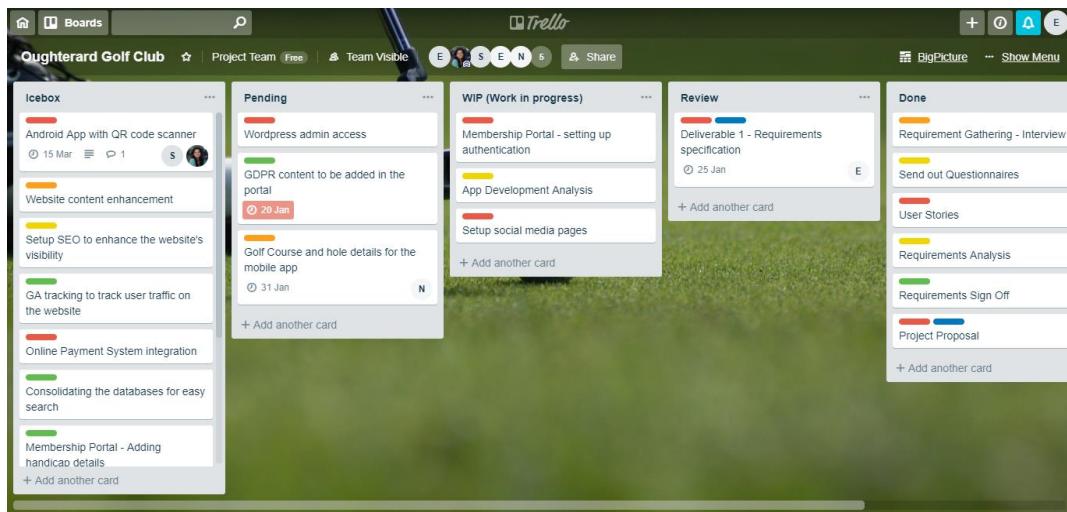


Figure 128 - Team's Trello Board

Project Management Software

Trello – Kanban Board

Kanban board is an effective visual project management application for managing work and projects in line with Kanban, designed for Scrum & Kanban teams.

We used the Trello for our project which is a free project management tool. Trello is free and has both a web based and a mobile app which helps add/modify tasks, assign tasks to members, set due dates and reminders effectively.

Boards can be created to organize projects and share information in real time. They give everyone a shared perspective on the work getting done and what still needs to be completed. Boards are made up of lists and cards.

Lists represent a workflow or process – in our case, stages of the project. Based on using the Agile approach, here are the types of lists we have created:

- **Product Backlog(Icebox)** - Using Scrum for requirements gathering, we used User Stories and interviews and created a list of tasks that were required for the project. All these tasks were added under the Product Backlog list.
- **To-Do** - List all of our key tasks and assignments that we know are going to come up next. Tasks that are to be completed tomorrow or further out are added here.
- **Work in Progress** - The task items that we are currently working on. The WIP limit frames the capacity of our team's workflow at any moment. Limiting work in progress is one of the core properties of Kanban. It allows us to manage your process in a way that creates smooth workflow and prevents overloads.
- **Done** – Once the tasks are complete, they are moved to this list.

Time Management

Time management was a vital part our project. Time management is often considered by project managers as a challenging area and a potential source of conflict for the project team members. (Schwalbe, 2015). Time management in teams can be challenging as each individual will have their own personal commitments and value of time. Therefore, the main challenge for our group was finding the balance between our own personal commitments, other college assignments and the project work. With deadlines set for each deliverable of this project, we knew that our time was not flexible and needed to be managed correctly. In order to reach all our deadlines and targets, we implemented a number of tools to enable our team to manage our time well. In order to overcome these challenges, we utilised Gantt charts and Work breakdown structure (WBS).

Work Breakdown Structure

A work breakdown structure (WBS) involves breaking down the overall scope of the project in order to develop a project schedule (Schwalbe, 2015). A WBS includes a list of tasks required to complete the project. The WBS helped to form the basis of the Gantt chart. Developing a WBS was a key stage in our project in order to analyse the scope of the project and identify the schedule of project tasks in order to complete the project. (See Appendix 4.2).

Gantt Chart

A Gantt chart is a tool used to display the project schedule and project tasks alongside commencement and completion dates in a bar chart format. The Gantt chart was first developed by Henry Gantt in the

early 1910s. The Gantt chart has since been developed and is still a widely used project management tool (Schwalbe, 2015).

We developed a Gantt chart to reflect our project deadlines and to enable our group to stay on track and meet our targets as they approached. (See Appendix 4.3).

Quality Management

The role of quality management in a project is to ensure that the project will meet the needs for which it was undertaken (Schwalbe, 2012). It is ultimately our client that will decide if the quality of the project is acceptable. Therefore, it was not sufficient for our team to simply meet the requirements for scope, time and cost, the quality also needed to be considered. If the client was unsatisfied with the quality throughout the project, changes were made to scope, time and cost in order to meet the client's expectations.

The quality management process is comprised of three main processes which we implemented throughout the course of the project:

- **Planning quality:** Quality plan including the desired objective or goal is created.
What level of quality customer is expecting is ensured? Tasks should be delegated to the respective team after confirming customer's expectation.
- **Quality assurance:** It is about evaluating the project for moving towards delivering quality services. For proceeding quality plan in effective manner, all quality characteristics should be in place. Ensuring corrective actions if the quality goals are not in process of getting achieved falls under quality assurance.
- **Quality control:** Operational techniques are used to meet quality standards. It involves monitoring project results and delivery to check if they are meeting the desired requirements.

Communication Management

Communication is an essential part of our daily life and for the success of any project, it is crucial that our project team had an effective communication relationship with each other, as well as our client and our supervisor. This included having communication methods that would maximise the project team's capabilities to achieve their goals.

Communication management is implementing the process that suits our team- ensuring that we connected, collaborated, distributed and monitored the progress of the project we are each involved in.

For this major project, we decided to use a number of technologies that would enable us to have effective communication with our client, our supervisor and within our team.

Communication Process

- To ensure that we communicated effectively, we followed a communication process that suited our team. A communication process lists a number of steps that should happen when communicating with another party for example- our client.
- Having a well-structured communication process allowed our project team to easily monitor each other's progress with individual tasks throughout the project
- If problems arise between any of the stakeholders, they have a channel to give feedback and rectify the situation.

Benefits of the communication process:

- Objectives of the project identified and broken down into manageable tasks
- Implement methods of communication best suited to your team
- Information is received by stakeholders without delay
- Allows project team to keep focused and relay their concerns to team members in a fast manner

Modes of Communication

For our major project, we used both written and oral methods of communication. The principle mediums we used include the following:

WhatsApp



- WhatsApp is an instant-messaging application. Our project team created a group chat specifically for our ISM project that allowed us to communicate updates effectively and efficiently.
- WhatsApp also has a group call feature, which we found to be particularly useful over the Christmas holidays and for after exams.

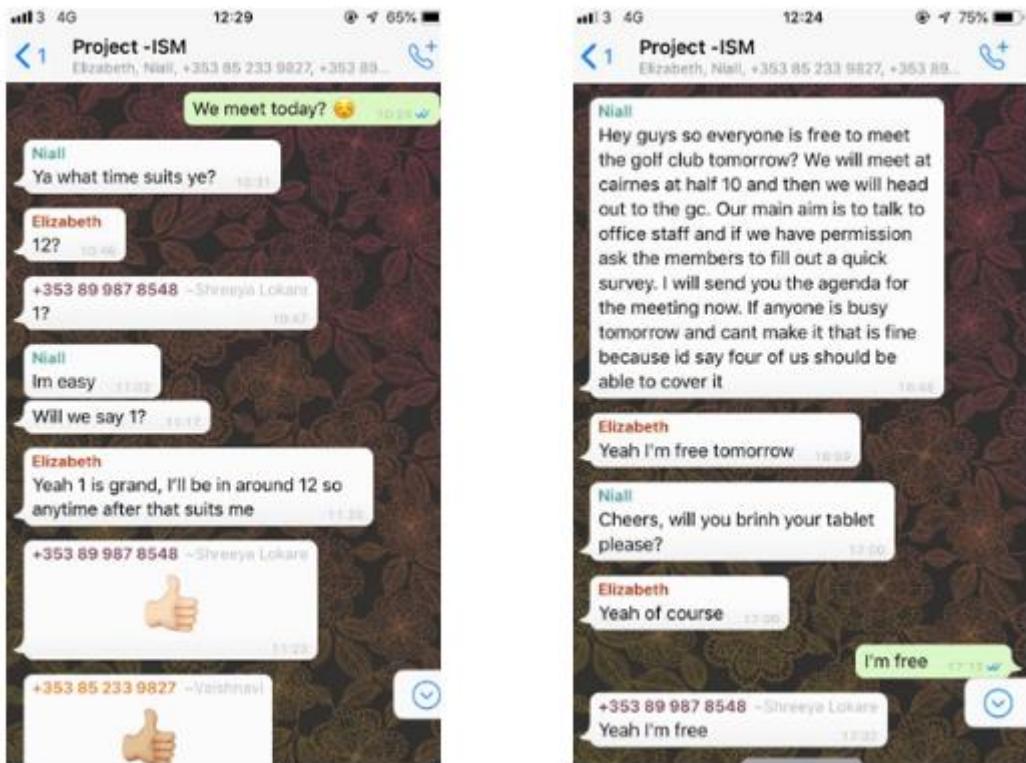


Figure 129 - Team WhatsApp Messages

Email



- By utilising our NUIG student email, we were provided with a powerful medium for sending large documents, images and files.
- Email is a cheap and fast way that our project team can use to send files that need to be reviewed, or when arranging tasks that contain a lot of information. We also used email to connect with our supervisor.
- Email proved very useful as it can be accessed almost immediately on many different devices.

Project Planning and tasks

CHITTOOR, VIJAYA VAISHNAVI
Mon 07/01, 14:11
MC GOWAN, ENYA; CONCANNON, ELIZABETH; LOKARE, SHREEYA; FEENEY, NIALL

Inbox

Hi All,

Let's get started now, holiday are coming to an end 😊

Niall and I met up to discuss the project requirements that we discussed with Barbara earlier. The first deliverable requires us to provide a complete signed off requirement specification doc. Here's an outline of our project requirements:

1. Membership Portal containing the following feature:
 - GDPR compliance
 - Account balance
 - Membership dues
 - Handicap
 - Option to pay for their membership online or to recharge their restaurant cards
2. Improving Social Media Presence
 - Search Engine Optimization by modifying the website content for search keywords
 - Content improvement
 - Social Media pages
 - Google Analytics to track the traffic on the website
3. Databases

After reviewing the archives, we've created a list of items that needs to be included in our doc and we've split up some topics for each of us.

Figure 130 - Team Email

Fwd: Portal Mock-Ups

Niall Feeney <feeneyniall8@gmail.com>
Mon 14/01, 12:58
MC GOWAN, ENYA

Inbox

▼ Show all 4 attachments (6 MB) Download all Save all to OneDrive - National University of Ireland, Galway

----- Forwarded message -----
 From: Vaishnavi Chittoor <vaishnavi.ctr@gmail.com>
 Date: Fri, 11 Jan 2019 at 20:36
 Subject: Portal Mock-Ups
 To: Niall Feeney <feeneyniall8@gmail.com>

Figure 131 - Group Email Example

Re: MSc. ISM - Major Project Supervisor

 Edison, Henry <henry.edison@nuigalway.ie>
16/01/2019 11:48

To: CHITTOOR, VIJAYA VAISHNAVI Cc: FEENEY, NIALL; MC GOWAN, ENYA; LOKARE, SHREEYA; CONC... 

Hi guys,

I hope you all have a great Christmas and New Year break. As a year has passed, I think it is a good time to catch up on the progress of the project. What about this coming Friday, 4pm?

Henry

--
Dr. Henry Edison
 Marie Curie Fellow
 Lero Research Centre & Whitaker Institute,
 School of Business and Economics, NUI Galway, Ireland
 T: +353 91 492848, E: henry.edison@nuigalway.ie, W: www.henryedison.com

Figure 132 - Team Email Example

I shared "Final Deliverable.docx" with you in OneDrive

 Elizabeth Concannon on behalf of Elizabeth Concannon
Tue 04/06, 16:14
MC GOWAN, ENYA 

 [Final Deliverable](#)

[View in OneDrive](#)

 [OneDrive](#)

Free online storage for your files. [Check it out.](#)
[Get the OneDrive mobile app.](#)

Microsoft respects your privacy. To learn more, please read our [Privacy Statement](#).
 Microsoft Corporation, One Microsoft Way, Redmond, WA, 98052

Face to Face Meetings



- A medium that was used when meeting our client was face to face. We arranged to meet via text message, phone call or email, selecting a time and venue that suited both parties.

- With face to face meetings, if there are any queries or difficulties, it was easy to clarify with the client what was expected or ask them any questions we might have.
- As a group it was also imperative that we met up weekly to discuss and keep track of our individual tasks, as well as monitoring the progress of the project. Due to certain cultural differences, some team members may have difficulties in understanding what is expected of them, and meeting in person can help rectify this.

Collaboration Tools

Trello



- Trello is an online project management application.
- Trello is useful for our team in implementing a Kanban project management approach.

The screenshot shows a Trello board with the following structure:

- Icebox:**
 - Android App with QR code scanner
 - Website content enhancement
 - Setup SEO to enhance the website's visibility
 - GA tracking to track user traffic on the website
 - Online Payment System integration
 - Consolidating the databases for easy search
 - Membership Portal - Adding handicap details
- Pending:**
 - Wordpress admin access
 - GDPR content to be added in the portal
 - Golf Course and hole details for the mobile app
- WIP (Work in progress):**
 - Membership Portal - setting up authentication
 - App Development Analysis
 - Setup social media pages
- Review:**
 - Deliverable 1 - Requirements specification
 - 25 Jan
 - + Add another card
- Done:**
 - Requirement Gathering - Interview
 - Send out Questionnaires
 - User Stories
 - Requirements Analysis
 - Requirements Sign Off
 - Project Proposal
 - + Add another card

Figure 133 - Team's Trello Board

One Drive



- OneDrive is a cloud-based storage service by Microsoft.
- OneDrive enable us to store files securely and to share with other members of the team.

The screenshot shows the OneDrive interface with a purple header. On the left, there's a sidebar with 'NUI Galway' logo, a search bar, and navigation links for 'Recent', 'Shared', and 'Recycle bin'. The main area shows a list of files under 'Files > Group 5'. The files are:

Name	Modified	Modified By	File Size	Sharing
Document.docx	20 minutes ago	CONCANNON, ELIZABETH	10.8 KB	Private
Final Draft.docx	21 minutes ago	CONCANNON, ELIZABETH	10.8 KB	Private
Gantt.xlsx	12 minutes ago	CONCANNON, ELIZABETH	8.14 KB	Private
Meeting Minutes.docx	13 minutes ago	CONCANNON, ELIZABETH	10.8 KB	Private
Proposal.docx	11 minutes ago	CONCANNON, ELIZABETH	10.8 KB	Private

Figure 134 - Team One Drive

Minutes of Meetings




Date:	9 th October 2018
Time:	11.00am
Attendees:	Niall Feeney, Vaishnavi Chittoor
Absentees:	Enya McGowan, Elizabeth Concannon, Shreeya Lokare
Guests:	Barbara Buckley, <i>Communications Officer</i>
Location:	Moycullen
Agenda:	

- Introduction	- Meet and greet, announce what will be discussed at the meeting
- Project Description	- Discussed project description with client
- Requirements Discussion	- Discussed the requirements that was outlined by client
- Contact Details	- Exchanged phone numbers with communications officer for future contact
- Demographics	- Discussed demographics of club
Minutes:	
Agenda Item 1: Introduction	- Formally introduced ourselves to Barbara on behalf of the team. She explained her role to us and what she does for the Oughterard Golf Club.
Agenda Item 2: Project Description	- We outlined what was expected of us while carrying out this project as part of our MSc ISM.
Agenda Item 3: Requirements Discussion	- Discussed the requirements the client had outlined, confirmed that there was an expected level required by the college. Discussed that the requirements would consist of updating Database, improving SEO and social media content ,as well as improvement of GDPR.
Agenda Item 4: Contact Details	- Barbara provided us with her personal email and phone number so we could keep in contact in a fast and effective way if there was any queries or concerns.
Agenda Item 5: Demographics	- Discussed the demographics of the club, Barbara provided a sheet containing data regarding this



OUGHTERARD CHAMPIONSHIP GOLF CLUB

Date:	17 th November 2018
Time:	11.30am

Attendees:	Enya McGowan, Elizabeth Concannon, Shreeya Lokare ,Niall Feeney, Vaishnavi Chittoor
Location:	Top floor, Cairnes Building, NUIG
Agenda:	
· Minutes	- Minutes from previous meeting discussed
· Requirement Gathering	- Discussed the requirements that was gathered during the interview on 15 th November
· Prototype Development	- Discussion of prototypes that must be developed
· Next Meeting	- Arranged next team meeting
Minutes:	
Agenda Item 1: Minutes	- Discussion of previous tasks that were delegated by team leader. Reviewed status if they were completed or still in progress.
Agenda Item 2: Prototype Development	- Based on feedback from our communications liaison at the club on requirements, and our input of having a member's portal login to update balance on cards- we decided the next task was to develop low fidelity prototypes to bring out to the golf club to carry out usability testing.
Agenda Item 3: Next Meeting	- Tasks were delegated to team members and confirmed that the next meeting would be the following Wednesday in the Cairnes building.



OUGHTERARD CHAMPIONSHIP GOLF CLUB

Date:	6 th January 2019
Time:	11.30am
Attendees:	Enya McGowan, Niall Feeney, Elizabeth Concannon, Vaishnavi Chittoor, Shreeya Lokare
Absentees:	

Guests:	Barbara Buckley, <i>Communications Officer</i>
Agenda:	
- Welcome	- Announce what will be discussed at the meeting
- Website Credentials	- Ask Barbara for website credentials so that we can view the design
- Requirements Sign Off	- Get requirements signed off by Barbara
- Membership sample account Login	- Ask Barbara for a sample account login - How is each member assigned a unique login?
- Club Card details	- Discuss with staff details relating to the club card system - How many members use the system? - How often do they top it up?
Minutes:	
Agenda Item 1: Welcome	- Members of the team met with Barbara and thanked her for giving up her time. All attendees were informed on what will be discussed at the meeting.
Agenda Item 2: Website Credentials	- Barbara provided us with website credentials that ensured we could gain access and view the design of the website. Thus, keeping our design consistent
Agenda Item 3: Requirements Sign Off	- Reviewed the agreed upon requirements with Barbara and got her to sign off on them. Barbara was happy to approve these requirements and understood what our objectives were.
Agenda Item 4: Membership sample account Login	- Team was provided with Barbara's credentials for login purposes so we could have access to member facilities on the website. Strictly confidential information.
Agenda Item 5: Club Card details	- Information was given on how the staff use the club card and how many times on average they would top up their card.

	
Date:	23 rd of February 2019
Time:	16:00
Attendees:	Enya McGowan, Elizabeth Concannon, Shreeya Lokare ,Niall Feeney, Vaishnavi Chittoor
Location:	Top floor, Cairnes Building, NUIG
Agenda:	<ul style="list-style-type: none"> · Minutes - Minutes from previous meeting discussed · Discuss Barbara's update - Group discussion about Oughterard decision to change member's portal · Make a decision on Member's Portal - Group must decide on whether to keep the member's portal or scrap it · Arrange a meeting with Chris Barry - Arranged a meeting with Chris Barry
Minutes:	
Agenda Item 1: Minutes	<ul style="list-style-type: none"> - Discussion of previous tasks that were delegated by team leader. Reviewed status if they were completed or still in progress.
Agenda Item 2: Update from Barbara	<ul style="list-style-type: none"> - The group held a discussion on the recent update received from Barbara where significant elements of the member's portal must be eliminated for now. Group discussed whether to scrap the member's portal or to salvage it by adding other features. Time constraints were discussed.
Agenda Item 3: Make a decision on member's portal	<ul style="list-style-type: none"> - The group decided that too much work had already been completed on the member's portal. It was decided to remove the elements Barbara requested and add new features to the website.

Agenda item 4: Organise a meeting with Chris Barry	It was decided to try and talk with Chris Barry for advice on how this would affect our project and future mark.
---	--



OUGHTERARD CHAMPIONSHIP GOLF CLUB

Date:	20 th of May 2019
Time:	12:00
Attendees:	Elizabeth Concannon, Shreeya Lokare ,Niall Feeney, Vaishnavi Chittoor, Enya McGowan
Location:	Top floor, Cairnes Building, NUIG
Agenda:	<ul style="list-style-type: none"> - Minutes - Client Feedback form - Launch of app - Discuss Final Report
Minutes:	-
Agenda Item 1: Minutes	<ul style="list-style-type: none"> - Discussion of previous tasks that were delegated by team leader. Reviewed status if they were completed or still in progress.
Agenda Item 2: Client Feedback form	<ul style="list-style-type: none"> - It was decided that Niall would deliver the client feedback from to Barbara and set a date with her for collection
Agenda Item 3: Launch of app	<ul style="list-style-type: none"> - After Barbara's positive review and the groups satisfaction it was decided to launch the app. We decided to pay for it ourselves as we know the club does not have the budget
Agenda Item 4 : Final Report	The team discussed the final report and divided out work for the coming week for each member as we all would be apart. We agreed if required we would video conference if anyone needed help during the week.

Escalation Procedure

Escalations often happen in the IT sector where issues may require leadership to resolve the issue.

An escalation procedure refers to having an emergency plan which will set down conditions on how to deal with these issues (*Cisjournal.org*, 2019).

Apart from our organised weekly meetings, it was recognised that there would be exceptions when we would need to have meetings for unforeseen circumstances.

As a team we implemented a system that organised these circumstances into levels of urgency and who would deal with these matters.

This system allowed our team to deal with these issues in an effective and efficient manner counteracting them having a negative impact on our deliverables and project.

Below is a table depicting problems that may arise, their level of urgency, the measures that will be implemented if they arise:

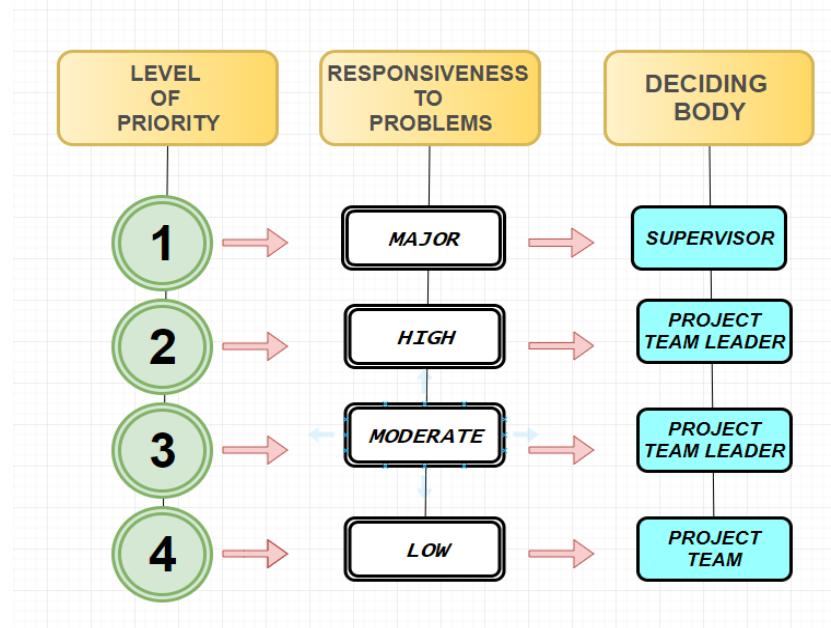


Figure 135 - Escalation Procedure

Problems that may arise:

1. Major Problems

- Conflict between team members that remains unresolved after trying to sort it out.
- Problems that may arise with the client and need guidance from supervisor

2. High Problems

- Tasks remain incomplete right before deadlines
- Glitches in the system

3. Moderate Problems

- Uncooperative team members
- Disagreements about crucial elements of the project

4. Low Problems

- Team members having issues with timing

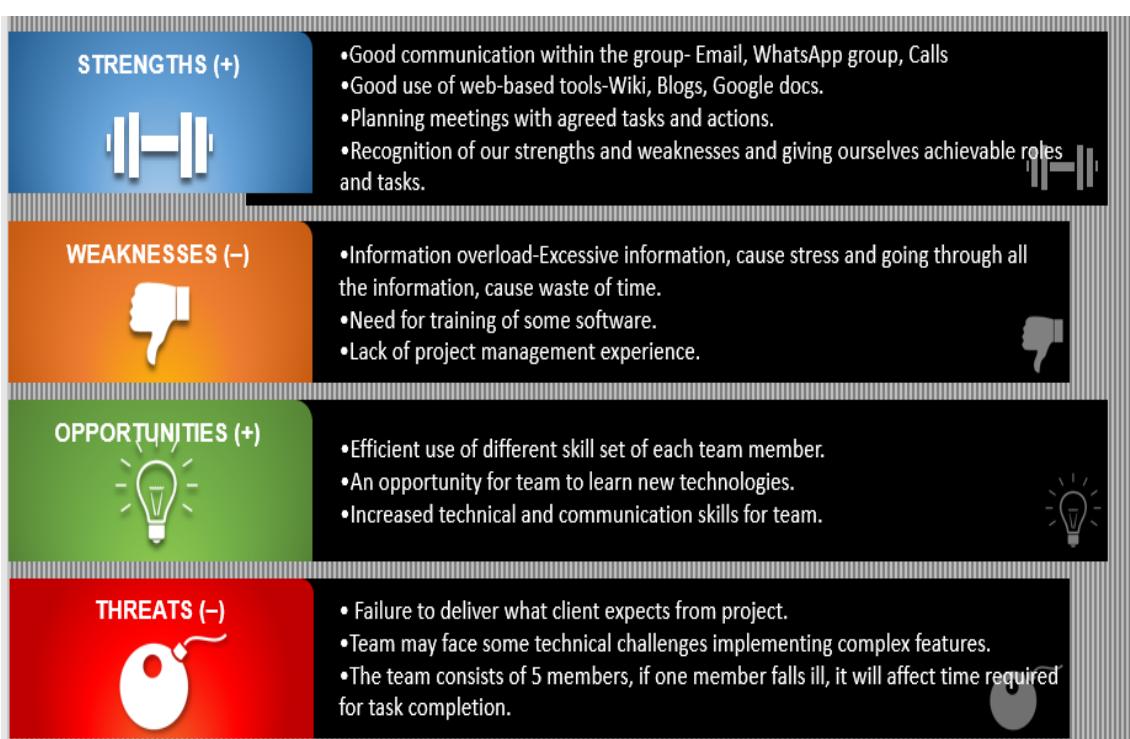
Risk Management

For developing a good quality product, we needed to keep an eye for potential risks and mitigate risks. Therefore, it was important to select an efficient way to control risk.

Controlling risk involves implementation of risk response plans, tracking risks, identifying new risks and monitoring residual risks. Planned risk response includes risk register. It is a log of identified risks, their probabilities and impact on project.

SWOT Analysis

- SWOT analysis is a method used for risk management in project management.
- It is used to highlight project opportunities and weaknesses.
- It provides encouragement and motivation to team members.
- Weaknesses and threats can be reduced by highlighting and discussing them in the early stage.



Risk Register

Risk Source	Probability	Severity	Impact	Mitigation/Response plan	Status
1 Requirements Changing	B		2 High	Maintaining good communication with client and within the team.	Open
2 Team communication	D		3 Medium	Using web based and communication tool. Weekly meetings.	Open
3 Unrealistic schedule	D		3 Medium	Involving client in scheduling process.	Open
4 Delay in client response	C		2 Serious	Informing client about updates made and setting up meetings with client on weekly basis.	Open
5 Data loss	D		4 Low	Preventing data loss by backing up data at regular intervals.	Open
6 Technical inexperience	D		4 Low	Attending online training or workshops for specific technology/tool.	Open
7 Product does not meet client needs	D		1 Serious	To avoid risk, conduct regular client meetings and ask for feedback about the progress.	Open
8 Team conflict	D		3 Medium	Assigning roles according to previous work experience or education background to avoid conflict.	Open

Constraints

Each project undertaken is subject to various constraints. These constraints can be broken down into scope, time and financial constraints, often referred to as the triple constraints or project management triangle (Schwalbe, 2015). Each of the constraints impacts on the other constraints in the triangle, e.g. An increase in the scope of a project will typically increase the cost and time frame of the project. In order to achieve project success, a project manager must be aware of the projects constraints and strike a balance between them.

There are a number of constraints that may affect the success of our project. Therefore, it was essential for our project team to be aware of these constraints, and to have a plan in place to deal with and balance these constraints in order to achieve our project goals.

Time

The time constraint involves the project deadlines and schedule. One of the main constraints facing this project was time. With the deadlines for each deliverable set for this project, there was little or no flexibility with the project deadlines. Other factors impacting on the project time include the workload of our other subjects, exam periods and also personal commitments. In order to overcome this time constraint, we have implemented a strict timeline for our group so that we can achieve our project deadlines, while not impeding on our other assignments and exams.

Scope

Scope refers to the work and processes that are required to complete the project (Schwalbe, 2015). Scope is another crucial constraint of our project. While we strive to complete all requirements set out as part of this project, it is possible that compromises may have to be made to the project scope

due to time and financial constraints. Our team has outlined the project scope and utilised a work breakdown structure to avoid any potential scope creep.

Financial

The financial constraints include the budget and cost associated with completing the project. There was no budget allocated from our client for this project. As a result, compromises were made for the scope of the project so that requirements could be met with no costs involved. In order to overcome this financial constraint, our team will make use of open-source software to avoid costs.

Change Management

Over the course of the project, the team encountered a number of changes that were required to be managed effectively in order to ensure the success of the project. Our team realised that any changes would need to be handled with care so as not to impact the project outcome. Our teams change management approach consisted of firstly ensuring that all changes were within the scope of the project and of benefit to the project's outcome. Secondly, determining how the changes will be implemented by the team, and finally effectively managing the change as it was implemented by the team.

One of the first aspects of change the team encountered was in relation to our project methodology. In the beginning stages of the project the team implemented Scrum methodology, after a period of time using this approach, we found it did not suit the team and meet the team's needs. The team discussed various methodologies and settled on a Scrumban approach, which is a blend of Scrum and Kanban methodologies. To ensure that the change was managed correctly, the team made sure that all members were happy with the change and understood the new approach.

The second major area of change the team encountered was a change to the project requirements. As discussed previously, throughout the course of the project the client required major changes to the requirements previously agreed upon by the team. This was a challenging area of change for the team, as it meant developing new requirements to ensure the scope of the project was satisfied, and that the client would receive a product that satisfied their needs. In order to overcome these changes, the team worked closely with our client, and ensured open and clear communication between team members and the client so as to implement the changes successfully.

Project Scope

Project Scope Description

Project scope is part of project planning that involves determining and documenting a list of specific project goals, deliverables, features, tasks and deadlines. In other words, it is what needs to be achieved and the work that needs to be done to deliver the project.

The scope of this project is designing an efficient system membership portal for Oughterard golf club, where members are able to check their account information and balance. This includes an online payment system for members to recharge their account and for paying membership fees. Website and social media changes suggested by the client will be added in the new system. The team was aware that if the requirements of the project were not clearly defined and documented, confusion and misconception may creep into the project which would result in a project deliverable not meeting the needs and expectations of the client. We used several aids such as Gantt charts and work breakdown structures that provided the project with some structure and guidance that ultimately helped combat the negatives aspects of scope.

For gathering requirements, the team carried out questionnaires/surveys with golf club members. According to their feedback, we created a document containing the scope of the project.

Scope management is a 5-step process:

1. Requirement gathering

A list of functional and non-functional requirements needs to be established and signed off from client.

There are 4 steps in requirement gathering:

- a) Elicitation: In this step, requirements are first gathered using interviews, questionnaires and prototypes
- b) Validation: Ensuring the requirements gathered during elicitation are accurately representing the needs of the client.
- c) Specification: Prioritizing requirements and documenting them as a deliverable or requirement report.
- d) Verification: Verifying that the document represents requirements accurately.

2. Define scope

The scope of this project was defined through a comprehensive requirement collection process. Communication with the client was carried out thoroughly to gain a deeper insight into the requirements and communication with the users was also carried out. The project description and deliverables have been developed based on the requirements collection process.

3. Create work breakdown structure

Work breakdown structure helps to identify and track activities in each phase of the project. It is the part of time management. WBS is key tool for management of scope of the project. Please refer time management section of the document where WBS is defined in detail.

4. Scope verification

It is formal acceptance of scope plan from the stakeholder. As part of acceptance, client will sign on the scope document/acceptance document indicating the deliverable is within the scope of project. It requires reviewing work product and the results to ensure all were completed correctly and satisfactorily. Scope verification occurs at the end of each project phase and the deliverable is created. Work is sometimes denied and need to be re-worked.

5. Control scope

Control Scope is the process of monitoring the status of the project and product scope and managing changes to the scope baseline. The key benefit of this process is that it allows the scope baseline to be maintained throughout the project.

It is the difference between current scope state and the baseline information. The stakeholder reviews the scope and can raise change request. The request will be reviewed by team. Technical lead will check impacts on the project and if changes are approved by project manager, necessary changes for recreating the scope will be made.

Appendix 2: Fact Finding Techniques

Data gathering for requirements

Interviews

Interviews were one of the most common and effective methods of requirements gathering for most of our high-level requirements. Both planning and preparation are required to carry out an effective interview. Questions must be developed and planned out in advance. It is important to include a mix of open and closed- ended questions to gather both quantitative and qualitative information. Barbara Buckley who is the Communication Officer in Oughterard Golf Club was appointed as the club representative and our liaison on this project. She is a member of the golf club committee but has also been a member of the golf club for many years. We decided to conduct a one on one interview with Barbara as we felt she could provide a prospective from both a committee and a member's point of view.

The interview took place on the 09/10/18 in a café in Moycullen which is located between NUIG and Oughterard golf club. Two members from our team attended the interview; Niall and Vaishnavi. It was important for two members of the team to attend. This allowed one member to conduct the interview while the other took notes. The meeting was also recorded on a recording device with Barbara's permission to be used for future analysis and to ensure nothing was overlooked. Barbara highlighted the following points as areas in which help is needed or improvement could be made:

- Gathering GDPR compliance from all members was an ongoing struggle.
- The member's club card system is ineffective for members as members can only view and top up their account from the main office.
- An online payment system to pay membership fees and top up member's accounts may be beneficial.
- The golf club needs help in improving their social media presence.
- Website content needs updating.

Questionnaire/Survey

This questionnaire was devised with the intention of getting feedback from club members on social media presence of the golf club, and how features could improve the Member's Portal. An online questionnaire was created containing twelve questions. This questionnaire was created using google forms. The questions contained in the questionnaire were designed to gather first-hand feedback from our target audience and provide justification for our proposed member's portal. The questionnaire was designed to be more quantitative than qualitative as we felt time to complete the survey may hinder our response rate.

Before distributing the questionnaire by email, we decided to make a visit to the golf club. This visit allowed us to have an informative meeting with the club's communication officer, but it also provided us with the opportunity to meet with members of the golf club, discuss our project and ask them to complete the questionnaire with us. This was a very beneficial activity as we were able to gather direct feedback from the members. The questionnaire was also distributed online by the club's communication officer via email to all club members. We received several responses to the questionnaire from the golf club members.

The questionnaire and analysis of the responses are shown below.

Oughterard Golf Club Survey

Oughterard Golf Club Survey

What is your name? (Optional)

Your answer

1. Are you a member of Oughterard Golf club?

- Yes
- No

2. Do you have a membership card? (Official GUI card)

- Yes
- No

3. How often a week, on average do you eat in the golf club restaurant?

- 1-2 times a week
- 3-5 times a week
- Over 5 times a week
- Never

4. Do you use your membership card to pay your restaurant bill?

- Yes
- No
- Sometimes

5. Would you find it beneficial if you could check your account balance online?

- Yes
- No

6. Would you avail of a service that allowed you to top up your account balance online?

- Yes
- No
- Maybe

7. Would you find it beneficial if you could pay your membership fees online?

- Yes
- No

8. What is your primary source of information relating to activities associated with the golf club?

- E-mail
- Facebook
- Golf Club official website
- Whats App
- Other

9. Do you think the golf club could improve their social media presence?

- Yes
- No

10. Please rate on a scale of 1 - 5 the golf club's social media presence.

1	2	3	4	5	
Weak	<input type="radio"/> Strong				

11. Please rate the golf club's website in terms of information and functionality on a scale of 1-5.

1	2	3	4	5	
Satisfactory	<input type="radio"/> Excellent				

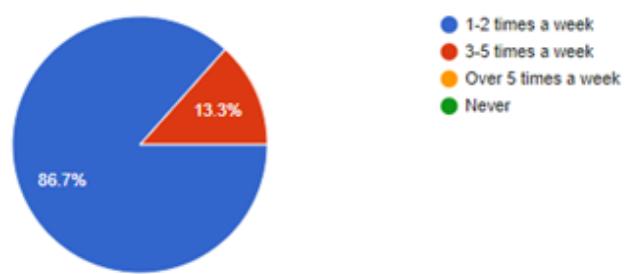
12. Any comments you might have in relation to the club website or social media pages please share below.

Your answer

Analysis of the survey responses:

3. How often a week, on average do you eat in the golf club restaurant? |

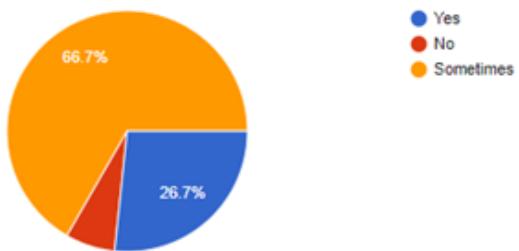
15 responses



As seen above 87% of participants outlined that they dine in the golf club restaurant once or twice a week with 13% dining between 3-5 times a week. This data informs us on how frequently the restaurant is used and also provides us with data on how often the membership card could be used by all members.

4. Do you use your membership card to pay your restaurant bill?

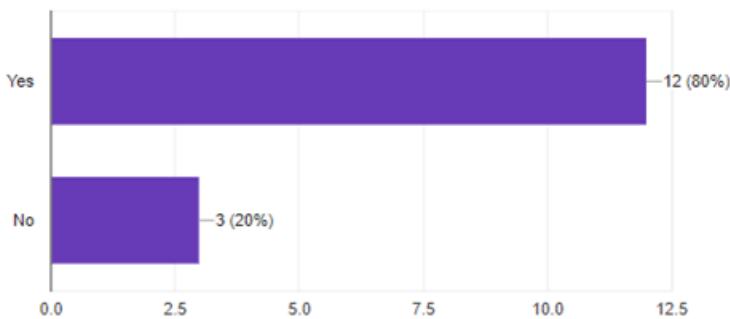
15 responses



67% of participants outlined that they “sometimes” use their membership card to pay their restaurant bill with 27% of members saying that they always use their membership card to pay their bill. This indicates that the card is a popular form of payment, but that there is also room to improve it. Improvements can be made to increase the popularity of the card as a form of payment.

5. Would you find it beneficial if you could check your account balance online?

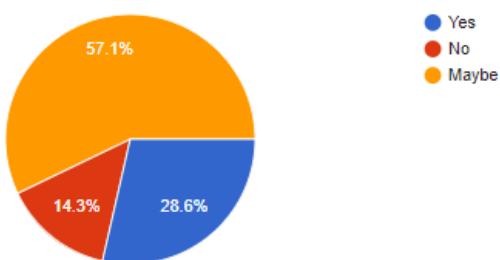
15 responses



As seen above 80% of participants believe that it would be beneficial if they could check their account balance online. This provides us with justification that the requirements regarding a facility to allow members to check their account balance is deemed important by the target audience.

6. Would you avail of a service that allowed you to top up your account balance online?

14 responses



This question as shown above received mixed responses which was not expected by us. 29% of participants believed that it would be beneficial to have a service that allowed them to update their account balance. However, 57% of people responded with maybe when presented with this question. We as a group analysed this result in great depth. At first, we viewed it as a negative response. Over time however, we began to see the truth behind this stat. This group of people is open to use this service but may take convincing or need to be provided with some reassurances. Any time people are asked to share their bank details online they need to know that their details and the transaction itself is safe and secure. Through proper testing and security measures in place we will ensure that this service is safe for all members to use.

7. Would you find it beneficial if you could pay your membership fees online?

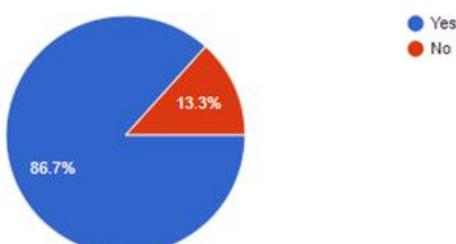
15 responses



As seen above 100% per cent of members would find it beneficial if they could pay their membership fees online. Currently they must the accounts office to pay their membership in person. We presented this data to the Oughterard golf club committee. Barbara and other members of staff found this response interesting. We proposed that we alter our requirements to include a facility that allows members to pay their membership fees through the member's portal. The committee found this idea interesting but were hesitant to move away from their current system.

9. Do you think the golf club could improve their social media presence?

15 responses



Participants in this survey responded strongly when asked if the golf club could improve their social media presence. 87% of participants believe that the golf club need to improve in this area. This is an area which was highlighted by Barbara (GC communication officer) as an area that the golf club hoped we could help them improve. Increasing the golf club's social media presence and improving content created will be included as a requirement in our project.



Figure 136 - Team conducting surveys

Usability Testing

Usability testing used for the intended users of a system and emphasises the level of usability that a system might have. By measuring a user's performance of the system, it enables an individual to collect data by using methods such as verbal protocol, questionnaires and interviews.

Verbal Protocol Session 1- 23rd November 2018

Low Fidelity Prototypes

- After developing our low fidelity prototypes, we decided to visit the Oughterard Golf Club to conduct our first usability testing session. This consisted of a verbal protocol method.

The Test:

- Our correspondent at the golf club had informed us that there were two members of the Oughterard Golf Club that were willing to take part in our usability testing session. The test participants were a married couple in their early fifties who have been members of the club for the last six years. Both participants had a club membership card and frequently used these cards as a form of payment in the club restaurant.
- One member of the team explained to the participants what the purpose of the session was (*to get feedback on the membership portal design, if they thought the membership portal would be useful*), what was expected of the users (*to think aloud their views on the design, what they liked/disliked, what might make it easy/difficult*)
- The members were directed to an office one by one, accompanied by a member of the team. There, the participants voiced their opinions on the design- whilst the team member made notes on what was said.
- Afterwards the recorded data of all sessions was compiled and analysed to identify the positives and negatives of our initial design.

Results:

Positives:
<ul style="list-style-type: none">- Liked the idea of topping up account balance online .- Enjoyed the vibrant green colours- Liked the idea of checking balance online- Menu location makes navigation simple.- Approved of simple interface design.- Participants found it beneficial to be able to check handicap information on the portal.

Verbal Protocol Session 2- 6th January 2019**High Fidelity Prototypes**

After our first verbal protocol session, we began designing high fidelity prototypes using Adobe XD. While designing the membership portal pages, we ensured that the feedback from the first session was implemented and taken into account.

After preparing the prototypes, we arranged to meet with Barbara Buckley (Oughterard Golf Club representative) to conduct the usability test. We intended on carrying out the usability test with the participants who took part in the original usability test, but these members were unavailable. Due to time constraints Barbara was the only golf club member available to take part in the usability test.

The Test:

- Web Pages were designed using Adobe XD
- Users found it more interactive
- Gave them a clearer picture of our design
- Able to provide feedback
- Provided both positives and negatives of design

Results:

Positives:	Negatives:
<ul style="list-style-type: none">- Easy to navigate and use the system- Liked the layout and colours and the use of Oughterard Golf Clubs logo- No clutter- Large menu bar- Participant liked background image.	<ul style="list-style-type: none">- Worried about putting credit card details online.- No help documentation for first time users.

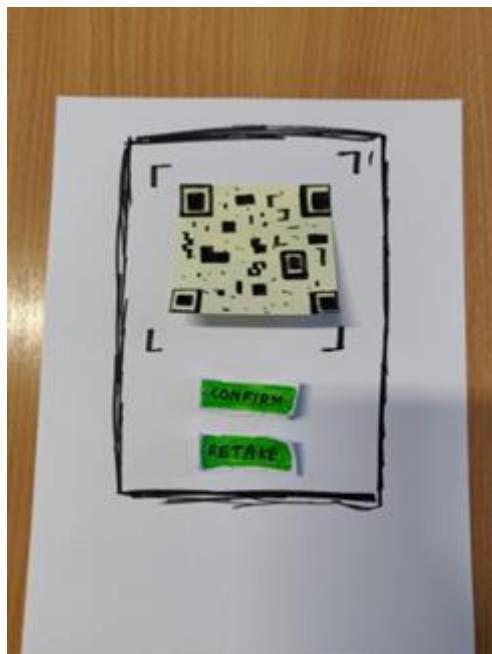
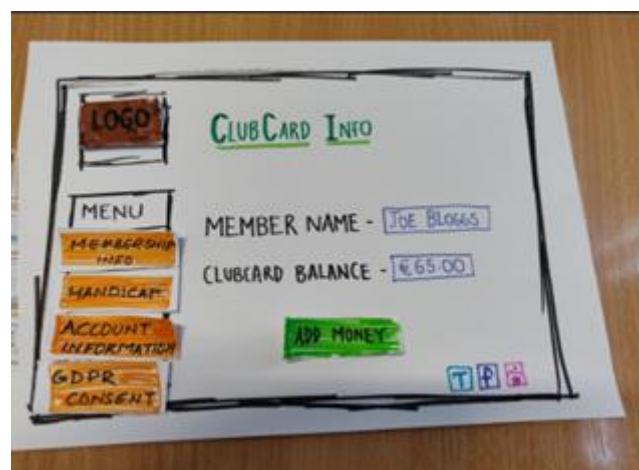


Figure 137 - Member's Portal Mock-ups

Existing System

Another technique used to gather requirements was to analyse the golf club's existing system. Before we could look to improve their current system, we must first gain an understanding of the current systems they have in place. Carrying out this analysis allowed us to identify problems and also areas of improvement.

Member Club Card System using GMS:

1. Every member of Oughterard Golf club with an official GUI handicap is issued with a unique identification card. This card is designed to be used in competitions to identify a player's handicap. Oughterard Golf Club has developed a system that allows its members to use this card as a form of payment in their on-site restaurant and bar.
2. At present the members can only check their balance on this card by visiting the club's main office and asking a member of staff to check their balance manually. By logging onto the golf club's **GMS database** and carrying out a search for the member's account.
3. At present if a member wishes to top up their account, they must visit the club's main office and get a member of staff to manually update their account by logging on to the golf club's **GMS database** and updating the member's record.
4. Office hours for staff are between nine and five Monday to Friday and ten until six on Saturday and Sunday. If a member wished to check their balance or top up their account outside of these hours this would not be possible, and the member would be unable to avail of the discount awarded for using the card.

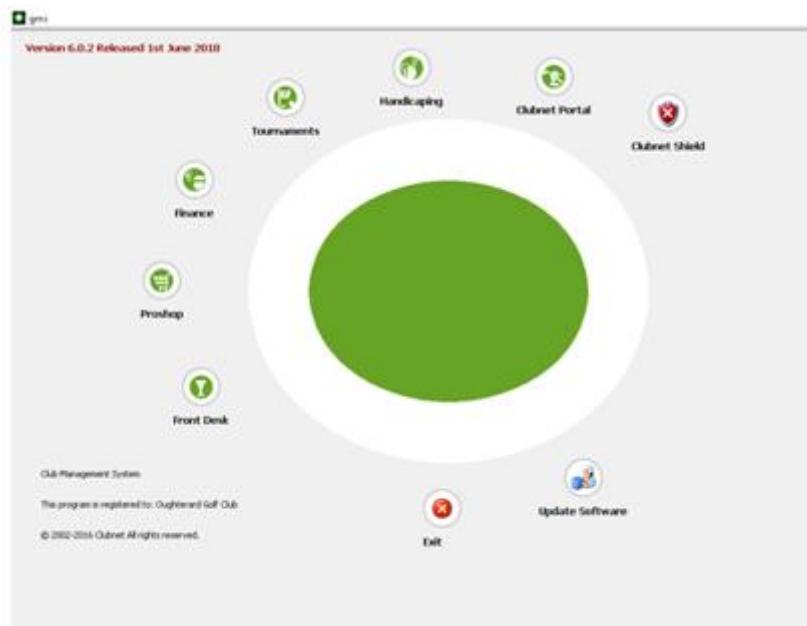


Figure 138 - OGC Existing System

Smart Card Bar Credit Usage for Buckley Barbara Current Bar credit is 0.34										Page 1
Year	Date	Item	Price 1	Price 2	Save	Old	New	Spend	Save	
2018	05 September	PT-CARLSBERG	4.70	4.56	0.14					
2018	05 September	HEINEKEN-0-BTL	3.80	3.69	0.11					
2018	05 September	New Total				38.81				
2018	05 September	SEAFOOD-SPEC	12.5	12.5	0.0					
2018	05 September	New Total				30.56				
2018	07 September	SEAFOOD-SPEC	13.5	13.5	0.0					
2018	07 September	TEA	1.70	1.7	0.0					
2018	07 September	STAFF-MEAL	2.5	2.5	0.0					
2018	07 September	New Total					18.06			
2018	07 September	Credit Top up	200	200	0					
2018	08 September	GLASS-WINE	5.50	5.33	0.17					
2018	08 September	PT-CARLSBERG	4.70	4.56	0.14					
2018	08 September	New Total				200.36				
2018	08 September	GLASS-WINE	5.50	5.33	0.17					
2018	08 September	New Total				190.47				
2018	08 September	GLASS-WINE	5.50	5.33	0.17					
2018	08 September	New Total				185.14				
2018	08 September	GLASS-WINE	5.50	5.33	0.17					
2018	08 September	New Total				179.81				
2018	09 September	PT-CARLSBERG	4.70	4.56	0.14					
2018	09 September	HEINEKEN-0-BTL	3.80	3.69	0.11					
2018	09 September	New Total					174.48			
2018	12 September	TEA	1.70	1.7	0.0					
2018	12 September	BUDDHA-BOWL	9.00	9.0	0.0					
2018	12 September	ADD-FALAFEL	2.00	2.0	0.0					
2018	12 September	New Total				166.23				
2018	12 September	GLASS-WINE	5.50	5.33	0.17					
2018	12 September	New Total				153.53				
2018	03 October	PT-CARLSBERG	4.70	4.56	0.14					
2018	03 October	GLASS-WINE	5.50	5.33	0.17					
2018	03 October	GLASS-WINE	5.50	5.33	0.17					
2018	03 October	HEINEKEN-0-BTL	3.80	3.69	0.11					
2018	03 October	CANS	2.00	1.94	0.06					
2018	03 October	New Total				148.20				
2018	03 October	AMERICANO	2.50	2.5	0.0					
2018	03 October	AMERICANO	2.50	2.5	0.0					
2018	03 October	AMERICANO	2.50	2.5	0.0					
2018	03 October	AMERICANO	2.50	2.5	0.0					
2018	03 October	APPLE-PIE	5.50	5.5	0.0					
2018	03 October	SEAFOOD-SPEC	15.50	15.5	0.0					

Figure 139 - Member's account information generated by GMS System

The golf club created the concept of a member's club card to be a solution to a problem. The golf club's aim is to handle as little cash on the premises as possible. They created the idea as a way to ensure less cash is handled by the restaurant and also as a way to give back to their members by offering discounts when the card is used. The idea may be a good one, but the system that was put in place to support it is ineffective. The system needs to be improved to support the users and to allow ease of use. By improving the system more members will be encouraged to use the member's card more often.

GDPR compliance:

On the 25th of May, the General Data Protection Regulation (GDPR) came into effect replacing the existing data protection framework. GDPR compliance has become a hugely important consideration for Oughterard Golf club. In order to be fully compliant, they need a signed privacy statement for each member. During our first meeting, the client outlined the difficulties they are facing collecting these privacy statements manually. Their current system involves asking all members to visit the on-site office and signing the privacy statement.

Website

The golf club has an official website developed using WordPress. The website contains information about the club, its restaurant and the equipment shop. The website also links to an online booking system hosted by **BRS Golf** where members or visitors can book a slot, however the payment needs to be done in the office.

Also, the website is currently listed on the second page on Google search when we look up for “golf clubs in Galway”. Hence we need to work on optimizing the website’s content to improve the website’s Search Engine Optimization (SEO). The website also does not have enough social media pages linked to it. This is also an important factor in improving the social media presence of the golf club and help increase the revenue.

Golf Course Hole Details:

The hole details are printed on small scorecards that are used by the members. The cards make it difficult to add enough information about the hole and is currently not beneficial for the players. It would be useful to have an online system (app for mobile devices) that can display the hole details for that the user wants to know about.

Competitor Analysis

By analysing our competitors, we were able to gather necessary information that would help us with our requirements.

Completing a competitor analysis of the golf clubs that we deemed to be in direct competition with our client, Oughterard golf club, was an important activity for us to complete. By completing a competitor analysis, we were able to identify the strengths and weaknesses of our competitors and we were also able to identify areas in which Oughterard golf club could improve.

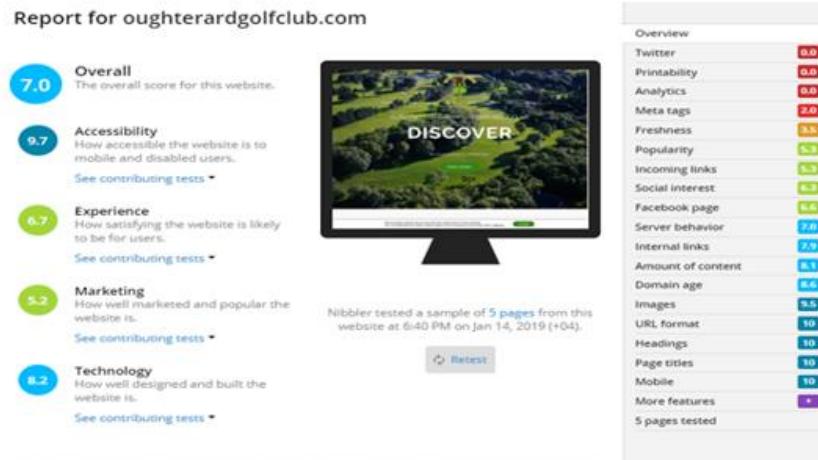
We chose four golf clubs that we deemed to be the biggest competition to Oughterard golf club. This decision was based off the facilities provided by each club and also their proximity to Oughterard golf club. We analysed each golf club’s website using a free online website evaluator called “Nibbler”. Nibbler compares websites and gives each site a score out of 10 based on various criterion such as accessibility, experience, marketing and technology. We also identified four key areas in which to compare each golf club in terms of facilities and services provided to its members and visitors.

Oughterard Golf Club

Oughterard golf club is currently ranked as the eighth best golf club in Galway by the website “Top 100 courses in Ireland”.

It appears on the second page of results of a google search for “Galway golf clubs”.

Oughterard golf club received an overall score of 7.0 from the evaluation of their website by Nibbler.

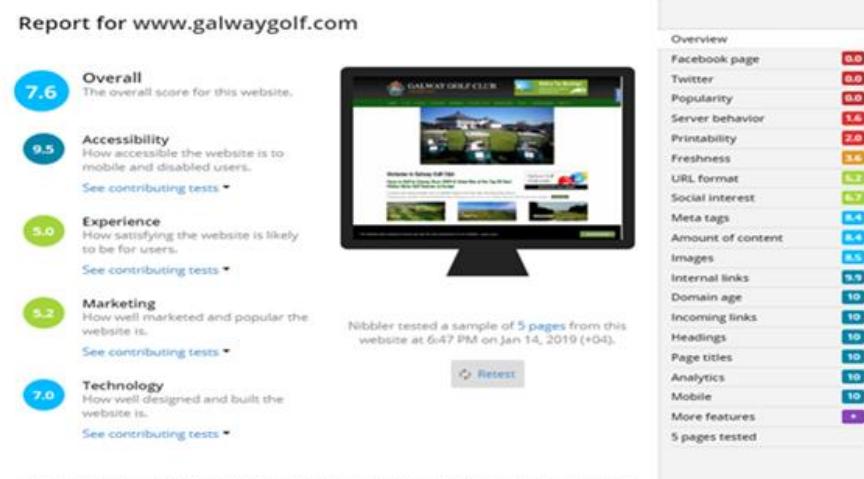


Galway Golf Club

Galway golf club is located in the Salthill, Co. Galway. It is located 26 Km from Oughterard golf club. It is currently ranked as the fourth best golf club in Galway by the website “Top 100 courses in Ireland”.

It appears as the first result on the first page of a google search for “Galway golf clubs”.

Galway golf club received an overall score of 7.6 from the evaluation of their website by Nibbler.



Galway Bay Golf Club

Galway Bay golf club is located in Oranmore, Co. Galway. It is 39 Km from Oughterard golf club. It is currently ranked as the third best golf club in Galway by the website “Top 100 courses in Ireland”.

It appears as the third result on the first page of a google search for “Galway golf clubs”.

Galway Bay golf club received an overall score of 7.9 from the evaluation of their website by Nibbler.

Report for www.galwaybaygolfresort.com

7.9 **Overall**
The overall score for this website.

9.6 **Accessibility**
How accessible the website is to mobile and disabled users.

[See contributing tests ▾](#)

8.8 **Experience**
How satisfying the website is likely to be for users.

[See contributing tests ▾](#)

5.1 **Marketing**
How well marketed and popular the website is.

[See contributing tests ▾](#)

8.5 **Technology**
How well designed and built the website is.

[See contributing tests ▾](#)



Nibbler tested a sample of 5 pages from this website at 6:59 PM on Jan 14, 2019 (+04).

[↻ Retest](#)

Overview	
Facebook page	8.8
Twitter	8.8
Popularity	9.0
Meta tags	7.6
Social interest	6.6
Server behavior	7.8
Amount of content	7.5
Images	8.0
Internal links	8.7
Freshness	8.8
Headings	7.0
Domain age	10
URL format	10
Printability	10
Incoming links	10
Page titles	10
Analytics	10
Mobile	10
More features	10
5 pages tested	

Bearna Golf Club

Bearna golf club is located in Connemara, Co. Galway. It is 21 Km from Oughterard golf club. It is currently ranked as the sixth best golf club in Galway by the website “Top 100 courses in Ireland”.

It appears as the second result on the first page of a google search for “Galway golf clubs”.

Bearna golf club received an overall score of 7.6 from the evaluation of their website by Nibbler.

Report for www.bearnagolfclub.com

7.6 **Overall**
The overall score for this website.

9.0 **Accessibility**
How accessible the website is to mobile and disabled users.

[See contributing tests ▾](#)

8.4 **Experience**
How satisfying the website is likely to be for users.

[See contributing tests ▾](#)

7.0 **Marketing**
How well marketed and popular the website is.

[See contributing tests ▾](#)

8.3 **Technology**
How well designed and built the website is.

[See contributing tests ▾](#)



Nibbler tested a sample of 5 pages from this website at 7:09 PM on Jan 14, 2019 (+04).

[↻ Retest](#)

Overview	
Analytics	8.8
Meta tags	2.0
Popularity	2.8
Internal links	5.7
Social interest	6.6
Server behavior	7.8
Facebook page	7.5
Amount of content	7.7
Headings	8.8
Images	8.8
Twitter	8.8
Domain age	10
URL format	10
Printability	10
Incoming links	10
Page titles	10
Mobile	10
Freshness	10
More features	10
5 pages tested	

Athenry Golf Club

Athenry golf club is located in Oranmore, Co. Galway. It is 41 Km from Oughterard golf club. It is currently ranked as the fifth best golf club in Galway by the website “Top 100 courses in Ireland”.

It appears as the fourth result on the first page of a google search for “Galway golf clubs”.

Athenry golf club received an overall score of 7.0 from the evaluation of their website by Nibbler.



From the above analysis of competitors websites, it is evident that Oughterard Golf Club is falling behind its competitors on two number fronts which we believe can be improved. The first major issue is the website ranks the lowest on a Google search for “Galway Golf Clubs” appearing on the second page. The second issue is that when we compared Oughterard’s website to its competitors’ websites it ranked as the joint worst.

As part of the competitor analysis we also highlighted four areas in which we wanted to compare each golf club in terms of facilities and service provided to customers.

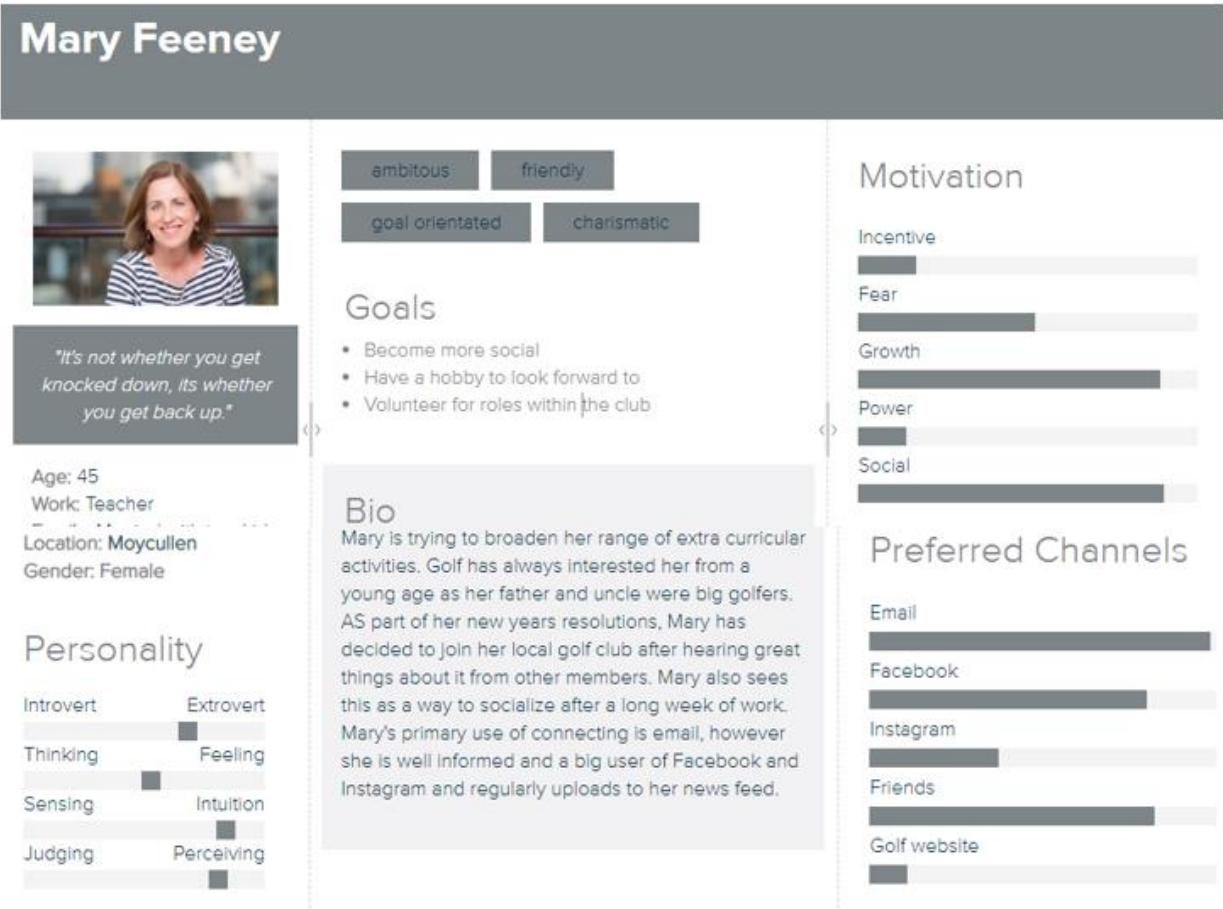
These four areas are as follows:

1. Does the golf club have an online booking system that allows members and non-members to book a tee time?
2. Does the golf club have a facility that allows members and non-members to pay their green fees online?
3. Does the golf club have the facility that allows members to pay their membership fees online?
4. Does the golf club provide a membership/loyalty card for its members to use in the club’s restaurant/bar?

	Online Booking	Pay Green Fees	Pay Membership	Member/Loyalty
	System	Online	Online	Card
Galway Golf Club	✓	✓	✓	✓
Galway Bay Golf Club	✓	✓	✓	✗
Bearna Golf Club	✓	✓	✗	✗
Athenry Golf Club	✓	✓	✗	✗
Oughterard Golf Club	✓	✗	✗	✓

Personas

Persona 1:



Persona 2:

Margaret Harris



assertive competitive leader
team player

"Doing what you love is the best way to relax."

Age: 61
Work: Retired
Family: Single
Location: Bearna
Gender: Female

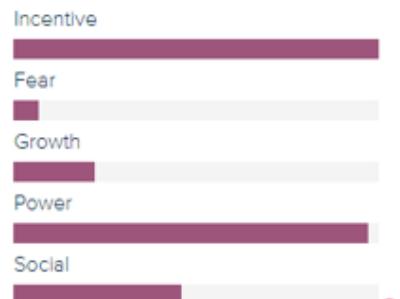
Personality



Goals

- Making people aware of clubs facilities
- Gain more volunteers for club

Motivation



Bio

Margaret is an avid golf player and is enjoying having more time to play golf after her retirement. Margaret enjoys taking part in competitions in the club as well as inter club competitions. Margaret is also very involved with the running of the club and was previously president. Margaret would love for her locality to become more involved in golfing and makes them aware of all the facilities available to them. Although Margaret is not that tech savvy, she is open to developments in the website and is eager to make changes for the upcoming younger generations and to make it appealing to them via social media.

Preferred Channels



Persona 3:

Michael O'Reilly

"The objective of golf is not to win. It is to play like a gentleman and win."

Age: 35

Work: Nurse

Family: Married, One child

Location: Galway City

Gender: Male

Personality

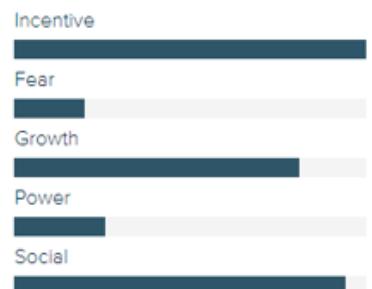
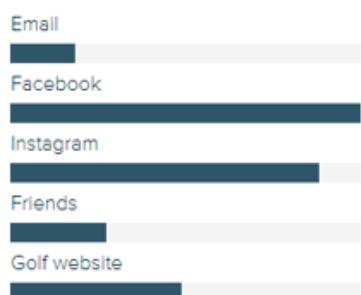
hard working fun team player
sporty

Goals

- To lower handicap
- Have a bigger input in the running of the golf club

Bio

Michael is a working professional and enjoys to golf on the weekends and during the weekdays if he has spare time. He is an enthusiastic individual and is constantly trying to improve the clubs name and tells his friends about how much fun he has golfing and how it is a great stress reliever. Michael is up to date with current technological advances and is open to changes on the website to make it more advanced. Michael also believes that the use of social media such as Instagram and Facebook can influence the taking part of younger generations.

Motivation**Preferred Channels**

Scenarios

Due to the fact our requirements had changed over the course of this project, we developed a new set of Scenarios that addressed our new objectives.

Scenario 1

Joe is a regular member at the Oughterard Golf Club. Recently Joe has been playing in a group of 4 members. He has noticed how his short game is not on par with the rest of the members and wants to rectify the situation. Joe is informed of the new features on the Oughterard Golf Clubs website which will allow him to make a booking with the clubs PRO. Joe logs into the member's portal and picks a date and time for his lesson. He awaits confirmation for his choice and receives an email confirming his choice. Joe finishes his round of gold that day knowing it won't be long before he will be just as good as the other members with his short game.

Scenario 2

Marie is a visitor from France to the Oughterard Golf Club. A keen golfer, Marie plays golf every day back home and can't wait to get started on the course. Unfortunately, Marie is not familiar with the layout of the golf course and is struggling with the measurements. Marie spots a QR code on the sign for the hole she is now playing. Using her phone, Marie is able to scan the QR code and instantly is provided with all the necessary information on the hole. She is over the moon. Marie finishes her game of golf and informs her friends of the fantastic features available at the golf club.

Scenario 3

Oughterard Golf Club's Lady Captain Debbie is out playing a leisurely round of golf with the girls. She cannot wait to inform them about the new application that was designed for the club. The girls are informed that there are many functions available to them that they can use during their game of golf. One such feature is the interactive scorecard. After downloading the application, the ladies are able to keep track of their scores during their game of golf easily. The girls are delighted with this app and also use the booking feature to book their next tee time.

Storyboards

Due to the fact our requirements had changed over the course of this project, we developed a new set of Storyboards that addressed our new objectives.

Storyboard 1

The storyboard consists of two main panels. The left panel shows three people on a golf course, with one person pointing towards the right. The right panel shows a computer screen displaying the 'Oughterard Championship Golf Club' website with a sign-in form.

Joe is out playing a round of golf with his fellow members of Oughterard Golf Club but notices his short game is severely lacking.

Joe decides to go on the Oughterard Golf Club website and book a lesson with the local PRO.

A screenshot of a booking interface. On the left is a calendar for May 2014, with the 10th highlighted. On the right is a list of tee times from 9:00 AM to 9:30 AM. The 9:00 AM slot is selected.

Confirmation

Hi Rainier Paul, you have successfully booked a tee time. An email has been sent to rainier.paul@yahoo.com.ph for your reference. Tee Time online reservation must be canceled 24 hours before "no show penalty" of Php 1000. To cancel kindly call Ira, Elena Golf Club RECEPTION between 6:00 AM and 6:00 PM Sunday:

• Globe:	=63.917.TEE.TIME
• Smart:	=63.918.TEE.TIME
• Sun:	=63.922.TEE.TIME
• Manila:	=63.2.273.GOLF
• Laguna:	=63.49.543.10.34 to 35

Reference Number:	DTB18	Your Reference Number
Play Date:	Sunday, November 10, 2013	
Course:	Banshore	
Tee Time:	06:00	

Notice to Members:

1. One (1) member - One (1) guest until 11:00 am on Weekends and Holidays.
2. One (1) member - Three (3) guests after 11:00 am on Weekends and Holidays.
3. Please keep up with the group in front. [Call us now at local no. 791 or 38818](#). If you miss your

Joe picks a date and time and confirms his booking on the website.

Joe receives an email straight away confirming his booking. He looks forward to improving in golf and meeting the PRO.

Storyboard 2



Here we see Marie from France on the Tee Box in Oughterard Golf Club. Unfortunately, Marie is unfamiliar with the layout of the course and the measurements for the holes.

Marie spots a QR Code on the hole she is playing on. Marie has used a QR Code scanner in the past and decides to use her phone to scan the code.

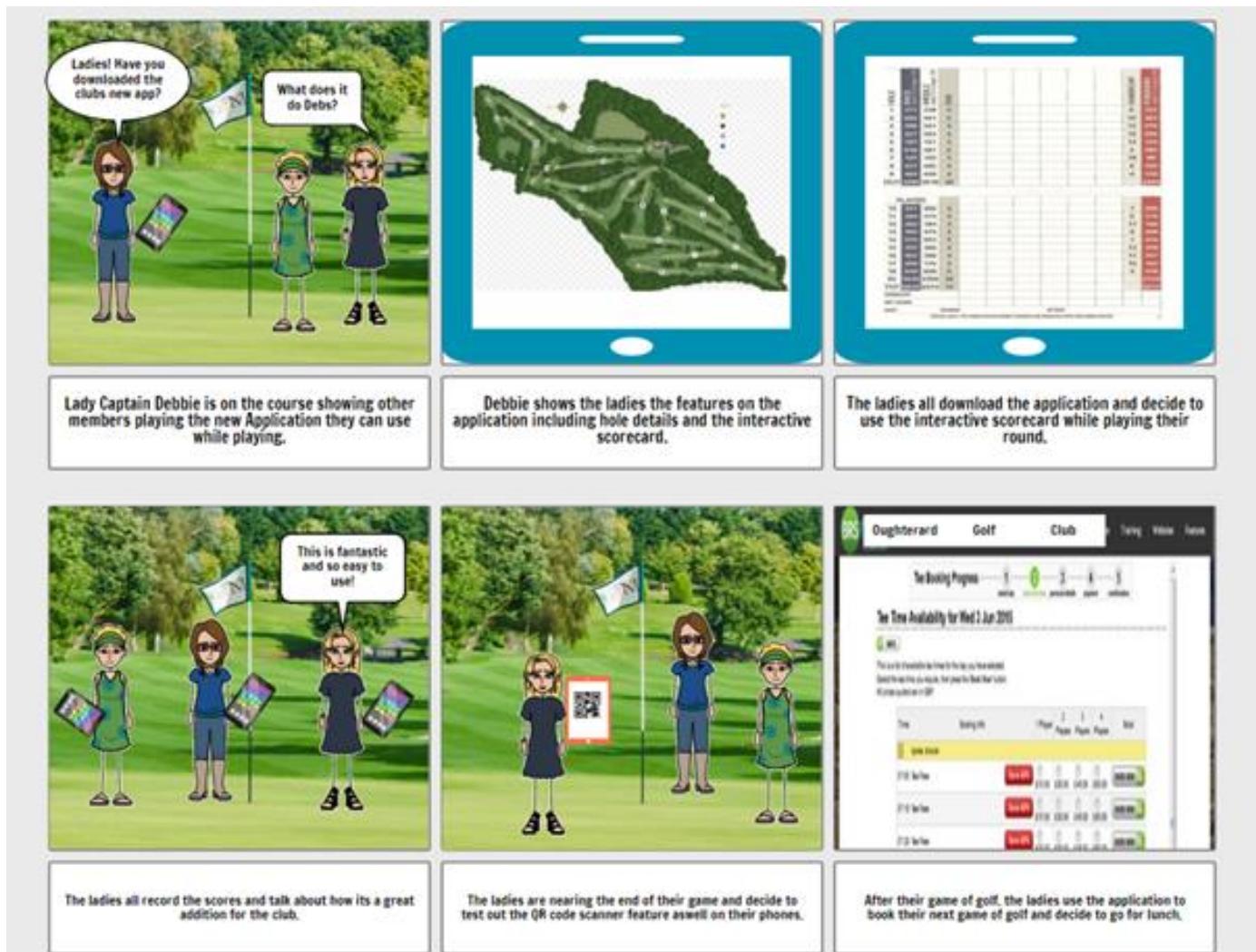


Here we see Marie scanning the QR code on Hole 13, she is delighted that the golf club has such a fantastic feature.



Marie enjoyed her game of golf as she was able to get the information at every hole she needed to ensure she played to her best form.

Storyboard 3



Prototypes

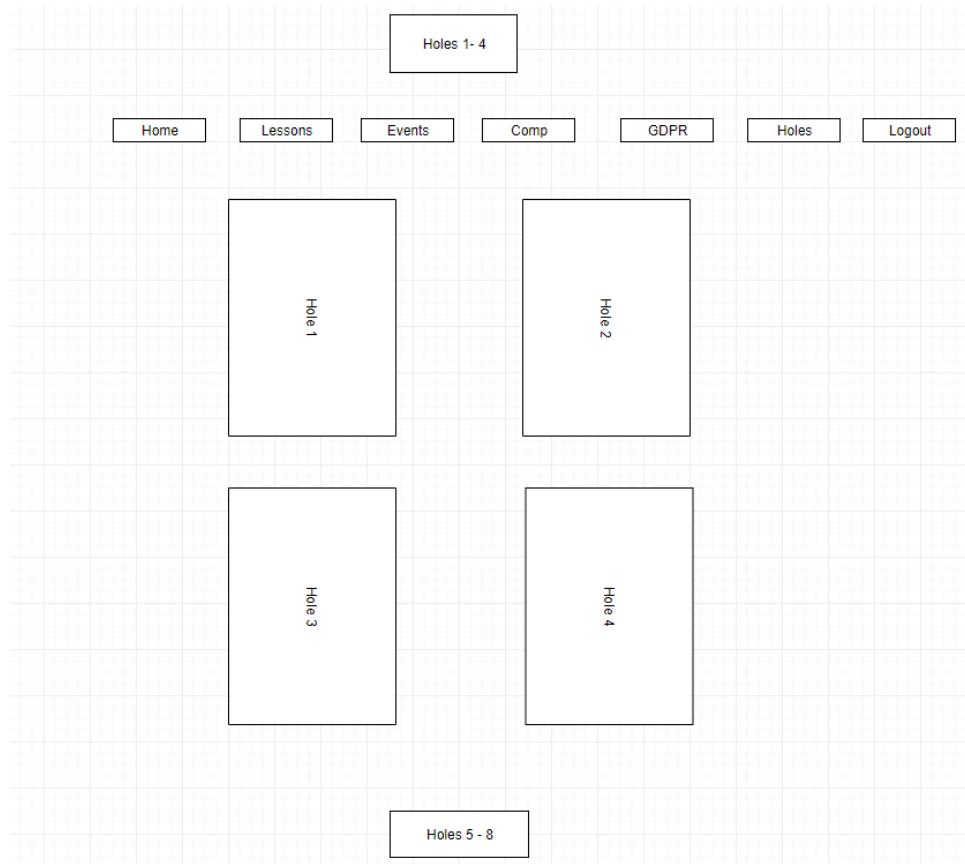


Figure 140 - Member's Portal Mock-up 1

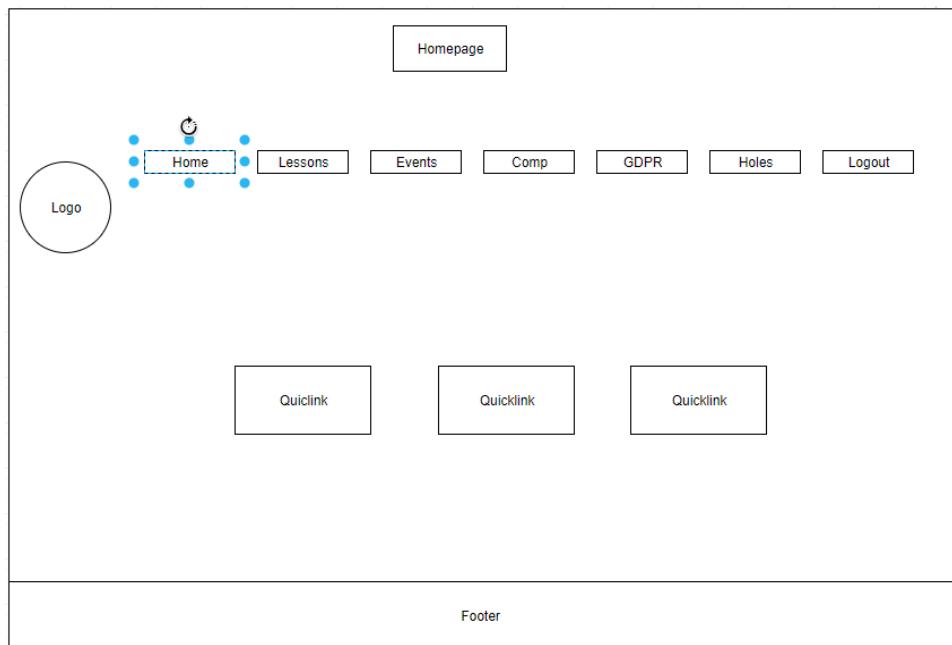


Figure 141 - Member's Portal Mock-up 2

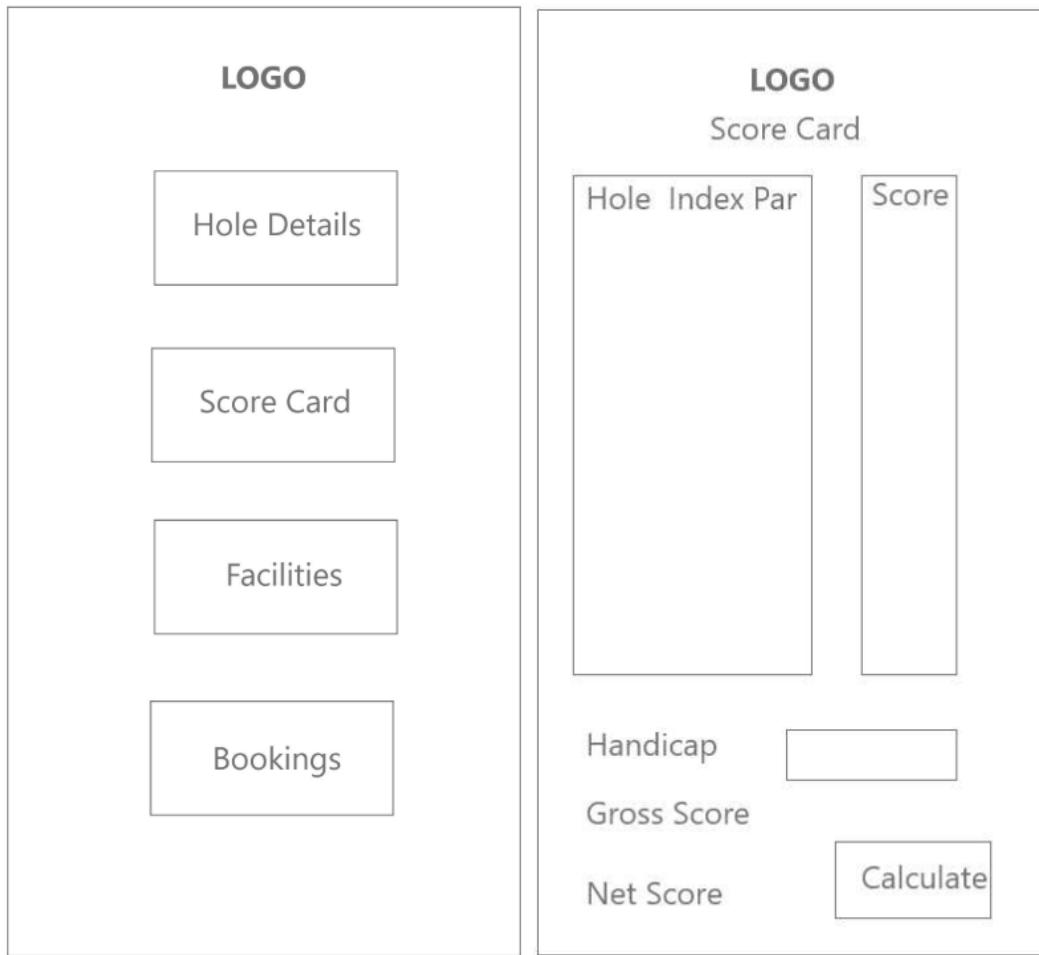


Figure 142 - Andriod/iOS App Mock-ups

Appendix 3: Testing

Testing Documentation

Tester: Niall Feeney

Google Chrome (Desktop)

Homepage Testing

Step	Action	Expected Result	Actual Result	Pass/ Fail
1.	Enter Local Host into Web Browser	Member's portal home page loads	Member's portal home page loads	Pass
2.	Click on Oughterard logo	Home page reloads	Home page reloads	Pass
3.	Click on 'Golf Lessons' from main menu	Golf lesson's page loads	Golf lesson's page loads	Pass
4.	Click on 'Competition' from main menu	Competition page loads	Competition page loads	Pass
5.	Click on 'Events' from main menu	Event's page loads	Event's page loads	Pass
6.	Click on 'Rules' from main menu	Rules pages loads	Rules page loads	Pass
7.	Hover over 'Stroke Saver' from main menu	Drop down menu appears	Drop down menu appears	Pass
8.	Click on 'Holes 1-6' from drop down menu	Holes 1-6 page loads	Holes 1-6 page loads	Pass
9.	Click on 'Holes 7-12' from drop down menu	Holes 7-12 page loads	Holes 7-12 page loads	Pass
10.	Click on 'Holes 13-18' from drop down menu	Holes 13-18 page loads	Holes 13-18 page loads	Pass
11.	Click on 'Scorecard' from drop down menu	Scorecard page loads	Scorecard page loads	Pass
12.	Click on 'GDPR' from main menu	GDPR page loads	GDPR page loads	Pass

13.	Click 'Logout' from main menu	User is logged out and taken to login page	User is logged out and taken to login page	Pass
14.	Click on 'Book lesson' from shortcut menu	Golf lessons page loads	Golf lessons page loads	Pass
15.	Click on 'Check Events' from shortcut menu	Events page loads	Events page loads	Pass
16.	Click on 'Stroke Saver' from shortcut menu	Holes 1-6 page loads	Holes 1-6 page loads	Pass
17.	Click on right arrow on photo slider	Photos slide from right to left	Photos slide from right to left	Pass
18.	Click on left arrow on photo slider	Photos slide from left to right	Photos slide from left to right	Pass

Golf lesson's Page

Step	Action	Expected Result	Actual Result	Pass/ Fail
1	Click on Services drop down menu	Drop down menu of three services appears	Drop down menu of three services appears	Pass
2	Select one of three services	Calendar becomes available	Calendar becomes available	Pass
3	Select a date from calendar	Available times relevant to that service appears	Available times relevant to that service appears	Pass
4	Select a time slot	Personal information form appears	Personal information form appears	Pass
5	Click 'Submit' from bottom of page	Reservation email received	Reservation email received	Pass
6	Click 'Submit' from bottom of page	Confirmation message and page reloaded	'Done' message received page not reloaded	Fail

Stroke Saver Pages

Step	Action	Expected Result	Actual Result	Pass/ Fail
1	Scroll down Holes 1-6 page	Page scrolls showing images of holes without error	Page scrolls showing images of holes without error	Pass
2	Click on 'Hole 7-12' button on bottom of page.	Page 'Holes 7-12' loads	Page 'Holes 7-12' loads	Pass
3	Scroll down Holes 7-12 page	Page scrolls showing images of holes without error	Page scrolls showing images of holes without error	Pass
4	Click on 'Hole 13-18' button on bottom of page.	Page 'Holes 13-18' loads	Page 'Holes 13-18' loads	Pass
5	Scroll down Holes 13-18 page	Page scrolls showing images of holes without error	Page scrolls showing images of holes without error	Pass

Events

Step	Action	Expected Result	Actual Result	Pass/ Fail
1	Click on 'Show Events search' drop down menu	Drop down menu appears	Drop down menu appears	Pass
2	Enter search key word and click 'Find Events'	Searched competition appears	No action occurs	Fail
3	Click 'View as list'	Calendar of events now appears as list of events	Calendar of events now appears as list of events	Pass
4	Click 'View as Day'	Calendar of events now appears as events per day	Calendar of events now appears as events per day	Pass
5	Click on 'Next Day'	Calendar moves to following day	Calendar moves to following day	Pass

6	Click on 'Previous Day'	Calendar moves to Previous day	Calendar moves to Previous day	Pass
7	Hover over event on calendar	Information relevant to event appear in information box	Information relevant to event appear in information box	Pass

Login/Logout

Step	Action	Expected Result	Actual Result	Pass/ Fail
1	Click on 'Register' from Login page	Registration page loads	Registration page loads	Pass
2	Enter details and chosen password and click on 'Register'	Registration email sent	Registration email sent	Pass
3	Enter username and password and click 'Login'	Homepage loads	Homepage loads	Pass
4	Click 'Lost my password'	Password recovery page loads	Password recovery page loads	Pass
5	Enter email or username and click 'Get new password'	Password recovery email received	Password recovery email received	Pass
6	Click on 'Login' from password recovery page	Login page loads	Login page loads	Pass
7	Click on 'Register' from password recovery page	Registration page loads	Registration page loads	Pass
8	Click 'Logout' from main menu	User is logged out and taken to login page	User is logged out and taken to login page	Pass

Mozilla Firefox (Desktop)

Homepage Testing

Step	Action	Expected Result	Actual Result	Pass/ Fail
1.	Enter Local Host into Web Browser	Member's portal home page loads	Member's portal home page loads	Pass
2.	Click on Oughterard logo	Home page reloads	Home page reloads	Pass
3.	Click on 'Golf Lessons' from main menu	Golf lesson's page loads	Golf lesson's page loads	Pass
4.	Click on 'Competition' from main menu	Competition page loads	Competition page loads	Pass
5.	Click on 'Events' from main menu	Event's page loads	Event's page loads	Pass
6.	Click on 'Rules' from main menu	Rules pages loads	Rules page loads	Pass
7.	Hover over 'Stroke Saver' from main menu	Drop down menu appears	Drop down menu appears	Pass
8.	Click on 'Holes 1-6' from drop down menu	Holes 1-6 page loads	Holes 1-6 page loads	Pass
9.	Click on 'Holes 7-12' from drop down menu	Holes 7-12 page loads	Holes 7-12 page loads	Pass
10.	Click on 'Holes 13-18' from drop down menu	Holes 13-18 page loads	Holes 13-18 page loads	Pass
11.	Click on 'Scorecard' from drop down menu	Scorecard page loads	Scorecard page loads	Pass
12.	Click on 'GDPR' from main menu	GDPR page loads	GDPR page loads	Pass
13.	Click 'Logout' from main menu	User is logged out and taken to login page	User is logged out and taken to login page	Pass
14.	Click on 'Book lesson' from shortcut menu	Golf lessons page loads	Golf lessons page loads	Pass

15.	Click on 'Check Events' from shortcut menu	Events page loads	Events page loads	Pass
16.	Click on 'Stroke Saver' from shortcut menu	Holes 1-6 page loads	Holes 1-6 page loads	Pass
17.	Click on right arrow on photo slider	Photos slide from right to left	Photos slide from right to left	Pass
18.	Click on left arrow on photo slider	Photos slide from left to right	Photos slide from left to right	Pass

Golf lesson's Page

Step	Action	Expected Result	Actual Result	Pass/ Fail
1	Click on Services drop down menu	Drop down menu of three services appears	Drop down menu of three services appears	Pass
2	Select one of three services	Calendar becomes available	Calendar becomes available	Pass
3	Select a date from calendar	Available times relevant to that service appears	Available times relevant to that service appears	Pass
4	Select a time slot	Personal information form appears	Personal information form appears	Pass
5	Click 'Submit' from bottom of page	Reservation email received	Reservation email received	Pass
6	Click 'Submit' from bottom of page	Confirmation message and page reloaded	'Done' message received page not reloaded	Fail

Stroke Saver Pages

Step	Action	Expected Result	Actual Result	Pass/ Fail
1	Scroll down Holes 1-6 page	Page scrolls showing images of holes without error	Page scrolls showing images of holes without error	Pass
2	Click on 'Hole 7-12' button on bottom of page.	Page 'Holes 7-12' loads	Page 'Holes 7-12' loads	Pass
3	Scroll down Holes 7-12 page	Page scrolls showing images of holes without error	Page scrolls showing images of holes without error	Pass
4	Click on 'Hole 13-18' button on bottom of page.	Page 'Holes 13-18' loads	Page 'Holes 13-18' loads	Pass
5	Scroll down Holes 13-18 page	Page scrolls showing images of holes without error	Page scrolls showing images of holes without error	Pass

Events

Step	Action	Expected Result	Actual Result	Pass/ Fail
1	Click on 'Show Events search' drop down menu	Drop down menu appears	Drop down menu appears	Pass
2	Enter search key word and click 'Find Events'	Searched competition appears	No action occurs	Fail
3	Click 'View as list'	Calendar of events now appears as list of events	Calendar of events now appears as list of events	Pass
4	Click 'View as Day'	Calendar of events now appears as events per day	Calendar of events now appears as events per day	Pass
5	Click on 'Next Day'	Calendar moves to following day	Calendar moves to following day	Pass

6	Click on 'Previous Day'	Calendar moves to Previous day	Calendar moves to Previous day	Pass
7	Hover over event on calendar	Information relevant to event appear in information box	Information relevant to event appear in information box	Pass

Login/Logout

Step	Action	Expected Result	Actual Result	Pass/ Fail
1	Click on 'Register' from Login page	Registration page loads	Registration page loads	Pass
2	Enter details and chosen password and click on 'Register'	Registration email sent	Registration email sent	Pass
3	Enter username and password and click 'Login'	Homepage loads	Homepage loads	Pass
4	Click 'Lost my password'	Password recovery page loads	Password recovery page loads	Pass
5	Enter email or username and click 'Get new password'	Password recovery email received	Password recovery email received	Pass
6	Click on 'Login' from password recovery page	Login page loads	Login page loads	Pass
7	Click on 'Register' from password recovery page	Registration page loads	Registration page loads	Pass
8	Click 'Logout' from main menu	User is logged out and taken to login page	User is logged out and taken to login page	Pass

Internet Explorer (Desktop)

Homepage Testing

Step	Action	Expected Result	Actual Result	Pass/ Fail
1.	Enter Local Host into Web Browser	Member's portal home page loads	Member's portal home page loads	Pass

2.	Click on Oughterard logo	Home page reloads	Home page reloads	Pass
3.	Click on 'Golf Lessons' from main menu	Golf lesson's page loads	Golf lesson's page loads	Pass
4.	Click on 'Competition' from main menu	Competition page loads	Competition page loads	Pass
5.	Click on 'Events' from main menu	Event's page loads	Event's page loads	Pass
6.	Click on 'Rules' from main menu	Rules pages loads	Rules page loads	Pass
7.	Hover over 'Stroke Saver' from main menu	Drop down menu appears	Drop down menu appears	Pass
8.	Click on 'Holes 1-6' from drop down menu	Holes 1-6 page loads	Holes 1-6 page loads	Pass
9.	Click on 'Holes 7-12' from drop down menu	Holes 7-12 page loads	Holes 7-12 page loads	Pass
10.	Click on 'Holes 13-18' from drop down menu	Holes 13-18 page loads	Holes 13-18 page loads	Pass
11.	Click on 'Scorecard' from drop down menu	Scorecard page loads	Scorecard page loads	Pass
12.	Click on 'GDPR' from main menu	GDPR page loads	GDPR page loads	Pass
13.	Click 'Logout' from main menu	User is logged out and taken to login page	User is logged out and taken to login page	Pass
14.	Click on 'Book lesson' from shortcut menu	Golf lessons page loads	Golf lessons page loads	Pass
15.	Click on 'Check Events' from shortcut menu	Events page loads	Events page loads	Pass
16.	Click on 'Stroke Saver' from shortcut menu	Holes 1-6 page loads	Holes 1-6 page loads	Pass
17.	Click on right arrow on photo slider	Photos slide from right to left	Photos slide from right to left	Pass

18.	Click on left arrow on photo slider	Photos slide from left to right	Photos slide from left to right	Pass
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Golf lesson's Page

Step	Action	Expected Result	Actual Result	Pass/ Fail
1	Click on Services drop down menu	Drop down menu of three services appears	Drop down menu of three services appears	Pass
2	Select one of three services	Calendar becomes available	Calendar becomes available	Pass
3	Select a date from calendar	Available times relevant to that service appears	Available times relevant to that service appears	Pass
4	Select a time slot	Personal information form appears	Personal information form appears	Pass
5	Click 'Submit' from bottom of page	Reservation email received	Reservation email received	Pass
6	Click 'Submit' from bottom of page	Confirmation message and page reloaded	'Done' message received page not reloaded	Fail

Stroke Saver Pages

Step	Action	Expected Result	Actual Result	Pass/ Fail
1	Scroll down Holes 1-6 page	Page scrolls showing images of holes without error	Page scrolls showing images of holes without error	Pass
2	Click on 'Hole 7-12' button on bottom of page.	Page 'Holes 7-12' loads	Page 'Holes 7-12' loads	Pass
3	Scroll down Holes 7-12 page	Page scrolls showing images of holes without error	Page scrolls showing images of holes without error	Pass

4	Click on 'Hole 13-18' button on bottom of page.	Page 'Holes 13-18' loads	Page 'Holes 13-18' loads	Pass
5	Scroll down Holes 13-18 page	Page scrolls showing images of holes without error	Page scrolls showing images of holes without error	Pass

Events

Step	Action	Expected Result	Actual Result	Pass/ Fail
1	Click on 'Show Events search' drop down menu	Drop down menu appears	Drop down menu appears	Pass
2	Enter search key word and click 'Find Events'	Searched competition appears	No action occurs	Fail
3	Click 'View as list'	Calendar of events now appears as list of events	Calendar of events now appears as list of events	Pass
4	Click 'View as Day'	Calendar of events now appears as events per day	Calendar of events now appears as events per day	Pass
5	Click on 'Next Day'	Calendar moves to following day	Calendar moves to following day	Pass
6	Click on 'Previous Day'	Calendar moves to Previous day	Calendar moves to Previous day	Pass
7	Hover over event on calendar	Information relevant to event appear in information box	Information relevant to event appear in information box	Pass

Login/Logout

Step	Action	Expected Result	Actual Result	Pass/ Fail
1	Click on 'Register' from Login page	Registration page loads	Registration page loads	Pass

2	Enter details and chosen password and click on 'Register'	Registration email sent	Registration email sent	Pass
3	Enter username and password and click 'Login'	Homepage loads	Homepage loads	Pass
4	Click 'Lost my password'	Password recovery page loads	Password recovery page loads	Pass
5	Enter email or username and click 'Get new password'	Password recovery email received	Password recovery email received	Pass
6	Click on 'Login' from password recovery page	Login page loads	Login page loads	Pass
7	Click on 'Register' from password recovery page	Registration page loads	Registration page loads	Pass
8	Click 'Logout' from main menu	User is logged out and taken to login page	User is logged out and taken to login page	Pass

Ios Application testing:

Tester: Shreeya Lakore

Step	Action	Expected Result	Actual Result	Pass/ Fail
1	Enter Oughterard Golf Club Application	Splash screen and Home screen appears	Splash screen and Home screen appears	Pass
2	Click on 'Hole Details'	'Hole-by-Hole' details page appears	'Hole-by-Hole' details page appears	Pass
3	Click on Hole button (1 to 18)	Hole details pop up screen appears	Hole details pop up screen appears	Pass
4	Click on back button	Navigates to homepage	Navigates to homepage	Pass
5	Click on 'Score Card'	Score card options page appears	Score card options page appears	Pass
6	Click on 'Women's score card'	Women's Score card page appears	Women's Score card page appears	Pass
7	Enter score and click on 'Calculate score' button	Gross score and Net Score appear	Gross score and Net Score appear	Pass
8	Click on 'Clear' button	Resets the page	Resets the page	Pass
9	Click on 'Men's score card'	Men's Score card page appears	Men's Score card page appears	Pass
10	Enter score and click on 'Calculate score' button	Gross score and Net Score appear	Gross score and Net Score appear	Pass
11	Click on 'Facilities'	Facilities page appears	Facilities page appears	Pass
12	Click on any facility	Facility details pop up appears	Facility details pop up appears	Pass
13	Click on 'Bookings'	Navigates to Login page on website	Navigates to Login page on website	Pass

Android Application Testing:

Tester: Shreeya Lakore

Step	Action	Expected Result	Actual Result	Pass/ Fail
1	Enter Oughterard Golf Club Application	Splash screen and Home screen appears	Splash screen and Home screen appears	Pass
2	Click on 'Hole Details'	'Hole-by-Hole' details page appears	'Hole-by-Hole' details page appears	Pass
3	Click on Hole button (1 to 18)	Hole details pop up screen appears	Hole details pop up screen appears	Pass
4	Click on back button	Navigates to homepage	Navigates to homepage	Pass
5	Click on 'Score Card'	Score card options page appears	Score card options page appears	Pass
6	Click on 'Women's score card'	Women's Score card page appears	Women's Score card page appears	Pass
7	Enter score and click on 'Calculate score' button	Gross score and Net Score appear	Gross score and Net Score appear	Pass
8	Click on 'Clear' button	Resets the page	Resets the page	Pass
9	Click on 'Men's score card'	Men's Score card page appears	Men's Score card page appears	Pass
10	Enter score and click on 'Calculate score' button	Gross score and Net Score appear	Gross score and Net Score appear	Pass
11	Click on 'Facilities'	Facilities page appears	Facilities page appears	Pass
12	Click on 'Bookings'	Navigates to Login page on website	Navigates to Login page on website	Pass
13	Click on 'Bookings'	Navigates to Login page on website	Navigates to Login page on website	Pass

Appendix 4 – Additional Material

Appendix 4.1 – Client Email

 **Barbara Buckley** <barbaraannebuckley48@gmail.com>
to me ▾ 25 Mar 2019, 23:26 ⭐ ↗ ⋮

25-03-2019

Niall Feeney,

NUIG Masters IT Programme 2019.

Re: NUIG Masters IT Project for Oughterard Golf Club.

Dear Niall,

On behalf of the Management Committee we are looking forward very much to seeing the finished product of you and your team's research work this academic season. Further to our 'phone conversation some 4 weeks ago whereby you requested that I formalise our understanding of the procedure.

Oughterard Golf Club held a committee meeting in early February at which I was present. Your project with us was discussed and the committee members were and are very excited about many of the features of the app and in particular, the QR codes. However, they have reservations relating to certain elements of the members portal. The committee believe that allowing the members to view their account balance is a feature that we would like to defer to a later date. We believe that certain in-house changes to our members' accessibility to their accounts would need to occur first. I apologise for this change in requirement. However, further to our more recent phone conversation, maybe this is something you would like to work on with us in the future as we do believe that this is direction that the Golf Club needs to move towards although not quite at this moment in time.

Yours sincerely,

Barbara Buckley,

Communications Officer

Appendix 4.2 – Work Breakdown Structure



Appendix 4.3 – Gantt Chart



Appendix 5

Achievements

Search Engine Optimisation

Search Engine Optimisation is a critical factor for any website, it allows the website to attract a steady and healthy amount of traffic. When searching for a website, the search engine for eg., Google, Bing, Yahoo- will rank these websites in an order that they believe are the most relevant to the searcher. The deciding factors for the ranking of the sites are due to keywords and meta tags/meta descriptions that fit the criteria of the search- for example when searching for Oughterard Golf Club, keywords would include, “Golf, Galway, 18 Hole Golf course, Golf Course.”

To help with the analysis of the golf club's SEO, we used SEOptimer- Analyze Websites with Free Seo Audit and Reporting Tool. This website allowed us to gauge where the golf club placed currently and how we could improve their awareness on search engines. Overall before beginning this project. Oughterard Golf Club had an SEO rating of 56 C-, after the completion of this project they had progressed to a B+ rating.

By installing Yoast SEO, we were able to improve the websites presence by using meta tags, and meta descriptions coupled with SMO. Originally, Oughterard Golf Club had placed halfway down the third page on Google search (pictured below, Figure 138).

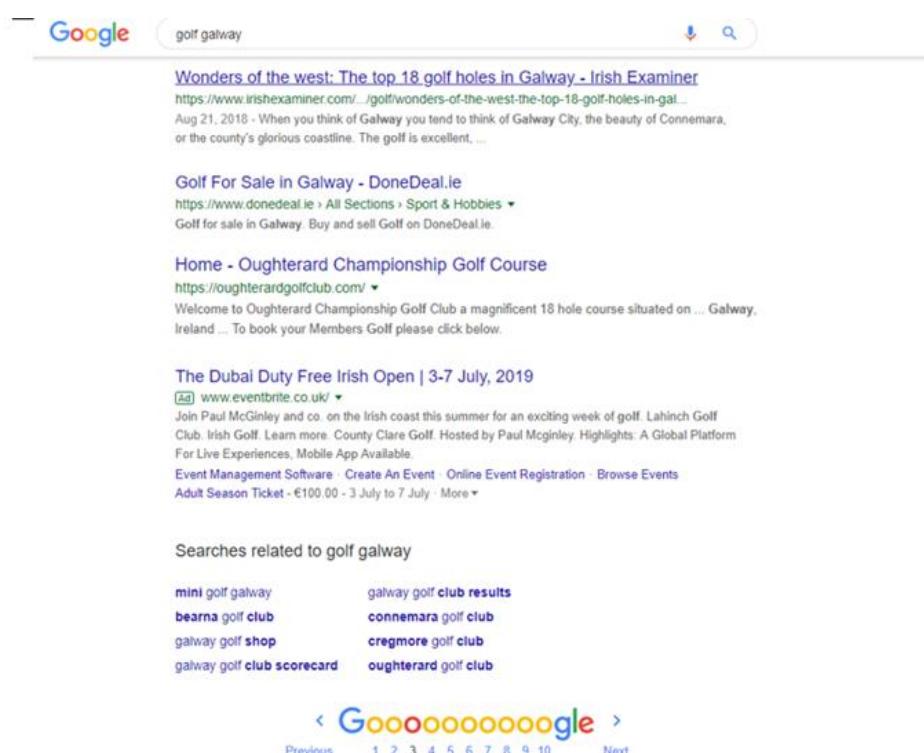


Figure 143 – Original Google search results

Now, Oughterard Golf Club is in fifth position on the first page of google results (pictured below, Figure 139).

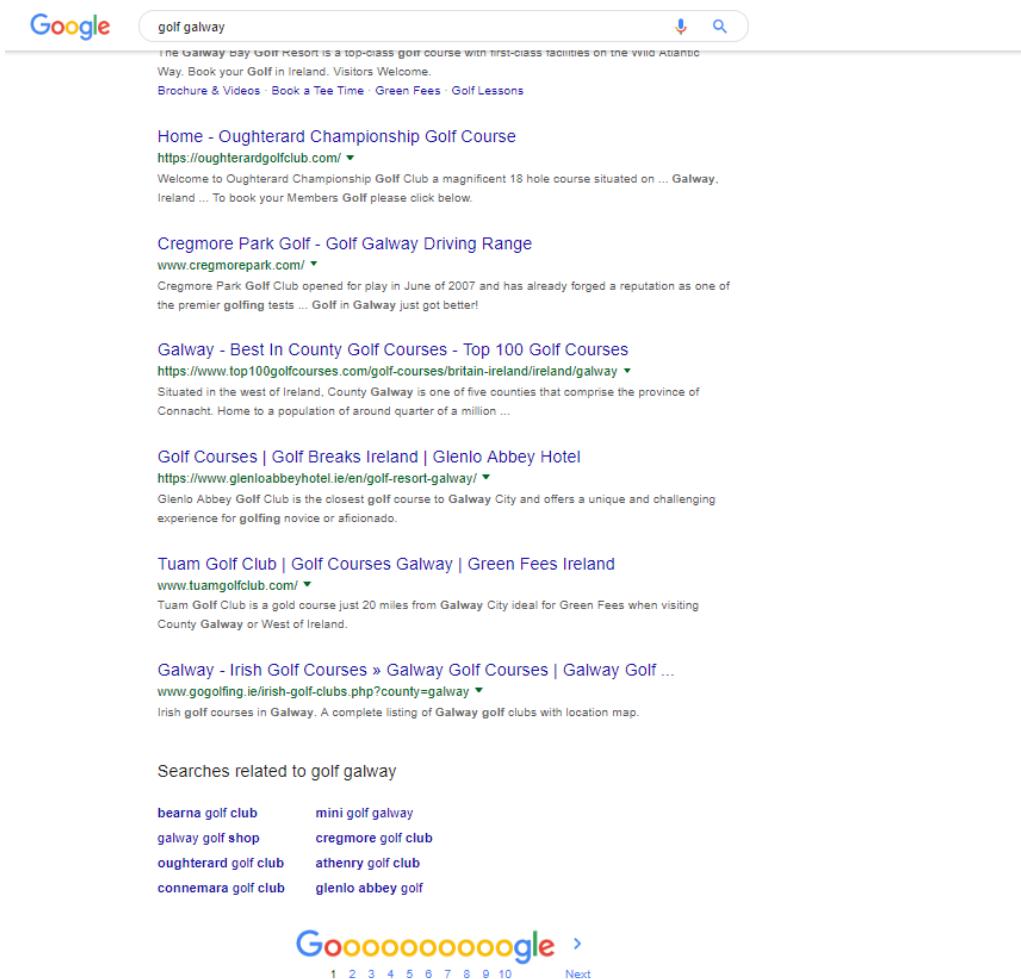


Figure 144 - Current Google search results

Reflection

If the golf club had a budget to contribute to this requirement, we as a team believe we could bring their SEO rating to an A. We would use paid plugins such as SEMrush and Yoast premium to ensure Oughterard Golf Clubs website obtained maximum views. We would also implement the paid version of Google AdWords to maximise their advertising.

Social Media

Instagram

Through the creation of an Instagram account, our team were able to improve the social media awareness of Oughterard Golf Club. Currently, the Instagram page has a following of 109 people and has an average like of 65.

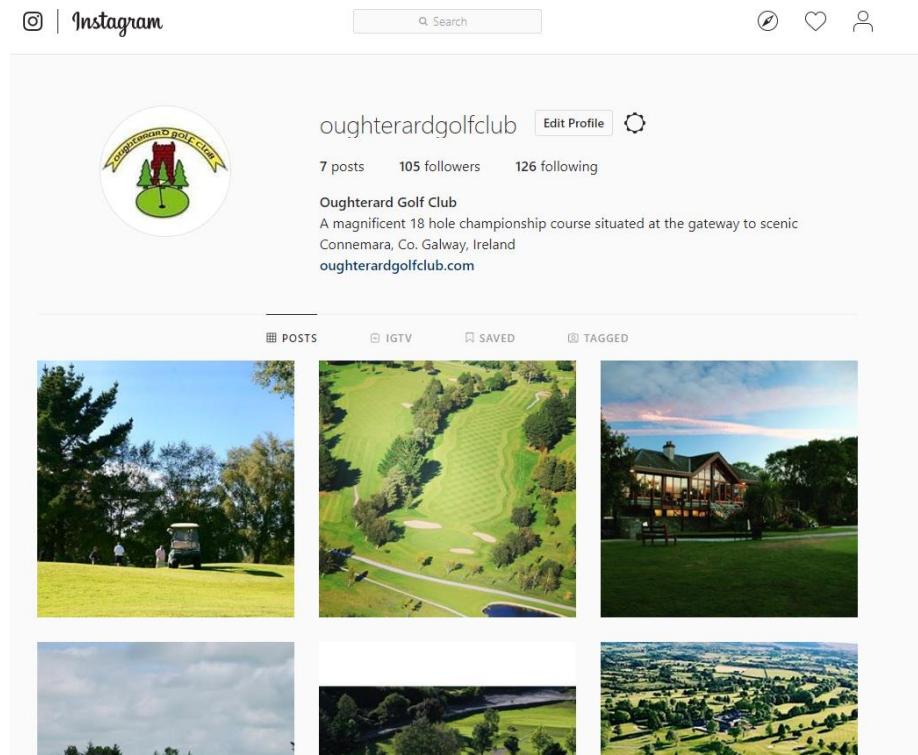


Figure 145 - OGC Instagram Account

Bibliography

Atlassian. (2019) Scrum - what it is, how it works, and why it's awesome. [ONLINE] Available at: <https://www.atlassian.com/agile/scrum>. [Accessed 10 January 2019].

Bright Hub PM. 2019. Benefits of SWOT Analysis for Good Teamwork and Project Success. [ONLINE] Available at: <https://www.brighthubpm.com/resource-management/119988-motivating-solid-team-performance-through-swot-analysis/>. [Accessed 16 January 2019].

Brsgolf.com. (2019). BRS Golf – Online Golf Tee Time Booking Reservation System Software – BRS Golf – Ireland, UK, England, Scotland, Wales. [online] Available at: <https://www.brsgolf.com/web/> [Accessed 22 Jan. 2019].

Chegg.com. (2019). Chegg.com. [online] Available at: <https://www.chegg.com/homework-help/functional-decomposition-diagram-fdd-would-use-one-explain-c-chapter-4-problem-8q-solution-9781285633190-exc> [Accessed 10 May 2019].

Cisjournal.org. (2019). [online] Available at:

http://www.cisjournal.org/journalofcomputing/archive/vol5no8/vol5no8_8.pdf [Accessed 3 Jan. 2019].

Communications Process. 2019. Communications Process. [ONLINE] Available at: <https://www.method123.com/communication-process.php>. [Accessed 20 January 2019].

Fair, J. (2012). Agile versus Waterfall: approach is right for my ERP project? Paper presented at PMI® Global Congress 2012—EMEA, Marsailles, France. Newtown Square, PA: Project Management Institute.

Fairfieldhillsgolfcourse.com. (2019). *Changing the Game: The Impact of Social Media on Golf*. [online] Available at: <http://www.fairfieldhillsgolfcourse.com/changing-the-game-the-impact-of-social-media-on-golf/> [Accessed 3 April. 2019].

Fairfieldhillsgolfcourse.com. (2019). *Changing the Game: The Impact of Social Media on Golf*. [online] Available at: <http://www.fairfieldhillsgolfcourse.com/changing-the-game-the-impact-of-social-media-on-golf/> [Accessed 11 Jan. 2019].

Fat Guy Media. 2019. What is a Target Audience, and why is it so Important?. [ONLINE] Available at: <https://fatguymedia.com/inbound-marketing/target-audience/>. [Accessed 16 January 2019].

Gregersen, E. (2012) QR Code. Britannica Academic, Encyclopædia Britannica. Available at: academic.eb.com/levels/collegiate/article/QR-Code/574116. [Accessed 8 Mar. 2019]

Gyires.inf.unideb.hu. (2019). Chapter3.System modeling. [online] Available at: <https://gyires.inf.unideb.hu/GyBITT/07/ch03.html> [Accessed 16 May 2019].

- LeanKit. (2019). What is Scrumban? | LeanKit. [online] Available at: <https://leankit.com/learn/agile/what-is-scrumban/> [Accessed 12 Jan. 2019].
- LeanKit. 2019. What is Scrumban? | LeanKit. [ONLINE] Available at: <https://leankit.com/learn/agile/what-is-scrumban/>. [Accessed 13 January 2019].
- Mike Cohn. 2019. Scrum Methodology and Project Management. [ONLINE] Available at: <https://www.mountaingoatsoftware.com/agile/scrum>. [Accessed 06 January 2019].
- Nutcache. 2019. The Importance of Communication | Nutcache. [ONLINE] Available at: <https://www.nutcache.com/blog/five-reasons-justify-importance-communication-project-management/>. [Accessed 20 January 2019].
- Patel, S.K., Rathod, V.R. and Prajapati, J.B. (2011) Performance Analysis of Content Management Systems - Joomla, Drupal and WordPress. International Journal of Computer Applications, 21(4), pp.39-43.
- Patil, S. and Neve, J. (2018). Productivity Improvement of Software Development Process Through Scrumban: A Practitioner's Approach - IEEE Conference Publication. [online] IEEEXplore. Available at: <https://ieeexplore.ieee.org/document/8529405> [Accessed 13 May 2019].
- Project Management Knowledge. 2019. Control Risks - Project Management Knowledge. [ONLINE] Available at: <https://project-management-knowledge.com/definitions/c/control-risks/>. [Accessed 16 January 2019].
- Schwalbe, K., 2015. *Information Technology Project Management*. Cengage Learning.
- Scrum Alliance. 2019. Information About Scrum Project Management Strategies . [ONLINE] Available at: <https://www.scrumalliance.org/learn-about-scrum>. [Accessed 12 January 2019].
- SearchSoftwareQuality. (2019). What is use case? - Definition from WhatIs.com. [online] Available at: <https://searchsoftwarequality.techtarget.com/definition/use-case> [Accessed 10 Jan. 2019].
- Segue Technologies. 2019. Waterfall vs. Agile: Which Methodology is Right for Your Project?. [ONLINE] Available at: <https://www.seguetech.com/waterfall-vs-agile-methodology/>. [Accessed 23 January 2019].
- Sharp, H., Rogers, Y. and Preece, J. (2007). Interaction design. Chichester: Wiley.
- Simplilearn.com. 2019. Quality Management in Project Management | Six Sigma. [ONLINE] Available at: <https://www.simplilearn.com/quality-management-in-project-management-article>. [Accessed 16 January 2019].
- Slideshare.net. (2019). WordPress For Beginners. [online] Available at: <https://www.slideshare.net/AlicePhieu/wordpress-for-beginners-64262091> [Accessed 22 Jan. 2019].

Smartdraw.com. (2019). Activity Diagram - Activity Diagram Symbols, Examples, and More. [online] Available at: <https://www.smartdraw.com/activity-diagram/> [Accessed 18 May 2019].

Smartsheet. 2019. Full Comparison: Agile vs Scrum vs Waterfall vs Kanban . [ONLINE] Available at: <https://www.smartsheet.com/agile-vs-scrum-vs-waterfall-vs-kanban>. [Accessed 06 January 2019].

Statista. (2019). Global Instagram user age & gender distribution 2019 | Statistic. [online] Available at: <https://www.statista.com/statistics/248769/age-distribution-of-worldwide-instagram-users/> [Accessed 28 Mar. 2019].

The Balance Small Business. 2019. What is Your "Target Audience" in Marketing?. [ONLINE] Available at: <https://www.thebalancesmb.com/what-is-a-target-audience-2295567>. [Accessed 16 January 2019].

Tutorialspoint.com. 2019. Communications Management. [ONLINE] Available at: https://www.tutorialspoint.com/management_concepts/communications_management.htm. [Accessed 20 January 2019].

Wpbeginner.com. (2019). [online] Available at: <https://www.wpbeginner.com/glossary/plugin/> [Accessed 18 May 2019].

Yalçın, N. and Köse, U., (2010) What is search engine optimization: SEO? Procedia-Social and Behavioural Sciences, 9, pp.487-493.