



Final Report

Interactive Multimedia Design - 2015

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ACKNOWLEDGEMENTS

Firstly, I would like to offer my gratitude to my major project supervisor, Richard Davies, who offered me support throughout the completion of my Major Project. The guidance that was shown to me was of great benefit and helped me achieve the goals that had been set.

Secondly, I would like to thank the lecturers of the modules associated with the Major Project, particularly George Moore in the management of the reports during the two semesters, and also Chris Murphy for his guidance and knowledge during the design lectures.

I am extremely grateful to have a great course director who has ensured that my time in Interactive Multimedia Design has been beneficial and will equip me for the future, therefore I would like to extend my thanks to Dr. Peter Nicholl.

Lastly, I would like to thank my friends and family. My brother Nicholas has been a great help to me, for advice and helping to solve any problems that I have encountered along the way and I will be infinitely grateful for his time and patience. My wife Roisin has been my rock over this past four years and without her support and encouragement this final report would not have been possible.

Thank you all,

Sean Murray.

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1.0 INTRODUCTION

1.1 – The Challenge

After coming up with several different ideas for the basis of the Major Project, the decision was made to create a website that is dedicated to rating the accessibility of venues for people with disabilities. Having completed research in this particular area and finding countless review websites (e.g. TripAdvisor), there is a potentially huge gap in the market, as none focused solely on accessibility for disabled patrons.

Creating a review website, '**Access All Areas NI**', that would allow disabled users and carers to review different venues on the basis of their accessibility would be a very useful tool for the community. The website would allow people to see how accessible venues are, plan their trips accordingly using the information provided and post reviews of their own experiences in different locations. The ultimate goal would be to help increase a disabled persons participation in cultural activities by increasing confidence that their needs will be met when they arrive at their destination.

1.2 – The Aims and Objectives

To achieve the creation of a website that successfully meets the needs of disabled people when wanting to find out more information on a venue they intend to visit, the website has to allow you to firstly create a user profile and then submit a review based on an experience. This is one of the main features of the website. However, to offer a richer user experience and greater functionality, laying out the aims and objectives clearly will give a better overview of what actually needs to be achieved to make this project a success and genuinely make a difference to the disabled community.

1.2.1 – Aims

It has always been important to preserve the main aim that was set out at the very beginning of this project. It was: "**To create a review website catering towards disabled people and carers that focuses on the accessibility of venues in**

order to provide people with information that will empower them by allowing them to make informed decisions when planning trips, with the overall goal of increasing their confidence and participation in social and cultural activities." Keeping this aim as the principal driving force of the task should make it easier to stay focused on what requirements need to be met and ensure that the final outcome of '**Access All Areas NI**' is as close to the original ambition as possible; while creating a website that is simple to use, easy to navigate and straightforward to extract information from.

1.2.2 – Objectives

Even though the aim of '**Access All Areas NI**' has been clearly laid out, it still needs to be compartmentalised in a set of smaller objectives, that breaks down all of the tasks and sets out the targets that need to be achieved to meet the overall aim. By doing this at an initial stage of the planning process, it should make is clear what has to be completed if this project is to be a success.

Objective One – Creating a website that will host reviews of different venues is one of the important features that '**Access All Areas NI**' will provide. The main focus of the website will be to review a particular venue in the hope that the users experience will provide information that another can use to make an informed decision. This objective is fundamentally the purpose of any reviewed based website. Gaining knowledge of the PHP language and working with a database is essential to a functioning and operational review platform.

Objective Two – Reviews will include a rating system as well as a written account of the users experience. This is to give a visual guide to the accessibility of a particular venue. A star rating system is a more user-friendly way to presenting information to a user; it is simple to understand, one on the scale representing poor and five on the scale

representing excellent. After scanning some reviews the user can then decide if they would like to read a more in-depth review of the venue explaining the reasoning behind the score. The rating system will be implemented using JavaScript to take a number stored in a database and presenting it in a five star rating format.

Objective Three – Creating a website that will work across multiple platforms, is now the standard when designing for the modern day user. As people have unprecedented access to the Internet, the number of devices that offer this facility has grown also. Designing the website for use on smartphone, tablet and desktop is important as all have quite significant differences in screen display sizes. Using responsive web design techniques will allow the design of the website to adjust to the display, so that users can have a similar experience whether on smartphone or desktop. Responsive grids acknowledge the size of the screen and reformat the website to give the user the best possible experience on the device that is being used. Optimising the content for different devices is also something that needs to be considered. A smartphone user on a 3G signal will not have the best bandwidth for downloading a large amount of data and this can hamper the experience the user has, so this really needs to be recognised and planned out.

Objective Four – Including the function to allow users to create a profile is part of the aim of creating a sense of community for ‘Access All Areas NI’. To make the project a success, it must become a place where the less abled come to get information that is important to helping their confidence and increasing their participation in social activities. Creating a user profile gives the user a persona and an identity on the website, but also will be able to present information on the demographic of the users, such as age, location, gender, etc. User profiles can provide data on what disability the user has and from the reviews posted, what their needs are so that improvements can be made to enhance a users experience at a venue in the future.

Objective Five – Integrating Google Maps into the website to provide the user with visual reference of venues and its location. This is a dynamic feature that when added to the website adds an extra element of user engagement with ‘Access All Areas NI’. It is extremely user-friendly and allows the content being posted on the website to become interactive. Using the Google Maps API and gaining knowledge on how it can be customised, will offer a more personalised experience for users and conceivably lead to more interest and participation in the website.

1.3 – Overview of Work Undertaken

To create ‘Access All Areas NI’ and for it to be successful, a reasonable amount of planning and developing needed to take place so that a reviewing platform for those with disabilities and accessibility issues could use the website to their benefit. Initially, a homepage was created that clearly puts across the message of what it is trying to achieve and why this is important to the people with disabilities. Creating a well thought out headline and selecting the correct imagery shows that there is a clear vision for the website that is also suitable for the accessibility review theme. ‘Access All Areas NI’ was created using the front-end framework ‘Bootstrap’ to develop the responsive side of the project using the excellent array of CSS media queries on offer. The main reason for picking this framework was the extensive amount of features and documentation that is provided on the web to quickly develop and create the website. This provided additional time that could be devoted to the more difficult aspects in the back-end.

Another element that needs to be included on the homepage is the ability for a user to register their details and create a user profile. This was created using a form to gather the details of the registering user and post the details to the MySQL database using PHP. After registration has been completed, the user is then presented with the ability to log into their profile on ‘Access All Areas NI’, where their login details are checked against those already saved in the database. Upon a successful login the user is presented with

their 'username' in the nav bar to confirm this. However if the user supplies the incorrect login details, the PHP will not permit login and display the error message "Invalid Details" to confirm the user has an issue and will have to try again.

The Google Maps feature is embedded in the 'Home page' for easy and quick access for the users. The customised map will have the capacity to show multiple map markers and upon clicking on each, the user is presented with an info-window that appears displaying the name of the venue, an image of the front of the place, the address and rating review. This will all be generated from the 'Access All Areas NI' database, that the admin will be granted permission to generate to make sure the all locations are correctly pinned and the venue image is correct and relevant to the review that has been posted by a user.

On the 'Review page' the user is given the capability to submit a review to the database, which is then retrieved and displayed in the review section. The user is able to submit details of the venue alongside a rating and description of the experience they had regarding accessibility. This functionality is vital for 'Access All Areas NI' as the users are able to submit information to the database, which can then be retrieved and displayed so other users can read and find out helpful information. As the review section is populated by more reviews, instead of the user having to scroll through many reviews, the ability to sort the reviews by 'type' will help make the search for relevant reviews a much quicker process to perform.

1.4 – Overview of Report

In the report for the 'Access All Areas NI' project, each section of the process from the initial design to the final product will be examined in greater detail and appraised to see the progression that has been made and how much the original idea has remained the same and what has had to be altered. The initial planning lays out what exactly needs to be achieved if the website is deemed to be a success, while the development stage of

the project will show how certain features are created and if there are difficult tasks, how they can be managed and skills needed to achieve the requirements of the website. During the implementation and testing phase, expressing what is taking place and the reasoning behind it is important to show consideration has been employed and the thought process is clear to see.

During the concept phase the report will outline how the idea was first generated and explore the potential for the 'Access All Areas NI' project. The requirements phase outlines the requirements that have to be met by the website. This is explored by thinking from the viewpoint of the end user and ensuring they have all of the necessary functionality. The paper prototyping phase allows for the first consideration of the how the appearance and feel of the website takes form. Doing this on paper allows for a lot of rough sketches to be made and for all potential design avenues to be explored before focusing on a specific design.

The design phase will look at how things start to take shape when finally sitting down at the computer by wireframing and creating the first mock-ups of the design in Adobe Photoshop. This then progresses further by looking at UX (user experience) interactions and how they can benefit the user and more effective ways of communicating with the user. During implementation it will involve moving into the browser and using HTML, CSS, JavaScript and PHP to create the first instance of the website, while at the same time exploring how the data design will be employed.

When the website has been produced and finished to a high standard, the testing process will need to take place in order to check that all of the features in 'Access All Areas NI' work consistently and that any potential errors or design loopholes are caught before the website goes live, to prevent any exploitation of the system.

2.0 CONCEPT DEFINITION & TESTING

2.1 – Idea Generation

The idea of 'Access All Areas NI' initially came about through a conversation with a family member who had trouble finding out about the facilities that certain venues and public areas provide when she takes her son (who has a disability) out for the day to socialise and do activities. This in turn led to the consideration that people with a physical disability, would not be able to assess how accessible a venue or public area is before visiting it for the first time. Some research needed to be completed first to back up the theory that this was a real problem for disabled people and/or their carers before focusing in on this one area.

Statistics found in the UK Government publication on '*Disability Facts and Figures*' (Office for Disability Issues, 2014) show the huge market that there would be for a web service geared towards the disabled, and the potential good it could do for this community:

- There are over 11 million people (in the United Kingdom) with a limiting long-term illness, impairment or disability.
- The most commonly-reported impairments are those that effect mobility, lifting or carrying.
- Around a third of disabled people experience difficulties related to their impairment in accessing public, commercial, and leisure goods and services.
- Disabled people remain significantly less likely to participate in cultural, leisure and sporting activities than non-disabled people.

A review website that would allow disabled users and their carers to review different venues on the basis of their accessibility would be a very useful tool for this community. The website would allow people to see how accessible venues are; plan their trips accordingly using this information, and post reviews of their experiences in different

locations. The ultimate goal would be to help increase their participation in cultural activities by increasing their confidence that their needs will be met when they arrive at their destinations.

After the initial idea and research, then followed the beginning of the actual project. The primary objective was to get a better understanding of what features needed to be included. One of the most useful ways of coming up with ideas and how they could be shaped into a product at an early low level scale is a 'Mind Map.' In **Figure 1** it is possible to see the organic ideas process occurring. At an early stage it is possible to overthink on a project and how it is going to be tackled, which is not beneficial in moving forward positively.

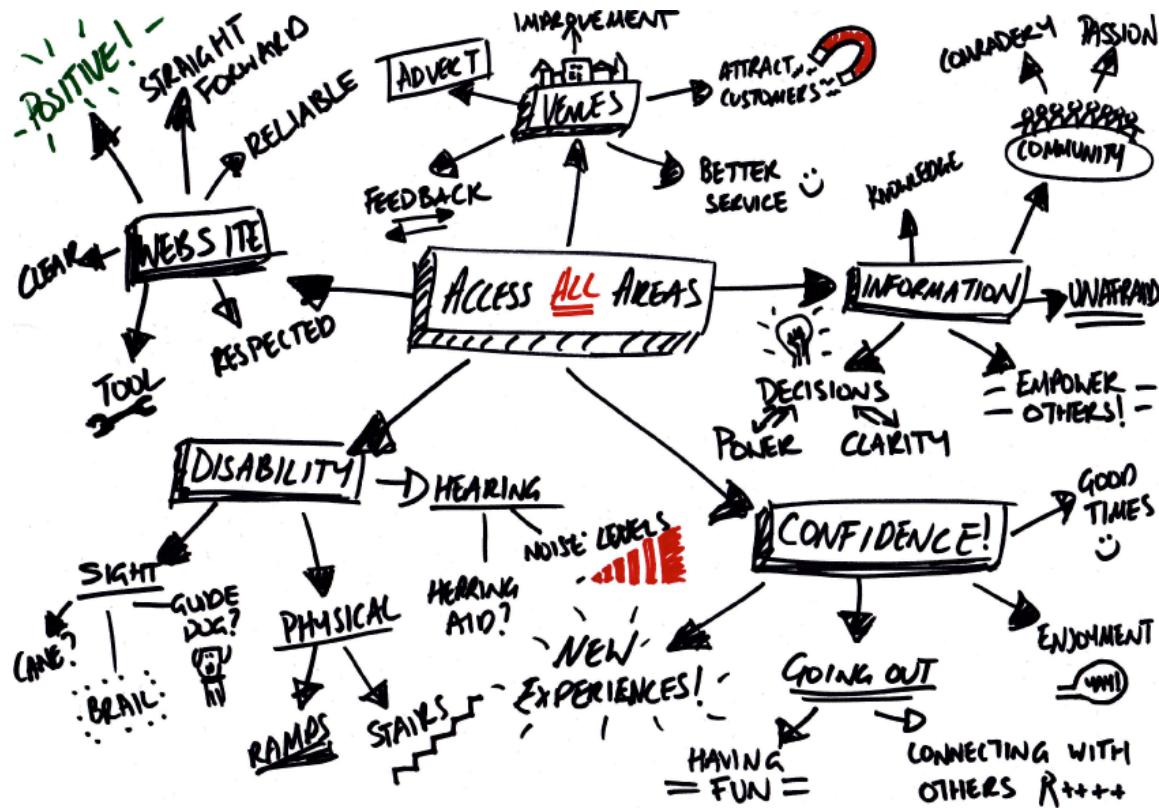


Figure 1 – Mind Map

2.2 – Requirements and Specifications

After thoroughly investigating the idea, the next stage in the process was to outline the requirements for the end user. These are mainly centred on the functionality of the product and how they will be able to interact and add information to 'Access All Areas NI'. The specifications are the set of particular needs that must be addressed to meet the higher-level requirements. The requirements and specifications are a great way of discovering all of the features that need to be included that may have not have been imagined before. Each requirement is outlined and number of specifications will be noted that will describe what must be designed to complete that requirement task.

2.2.1 – Requirements

Deciding what requirements need to be included to create all of the features for 'Access All Areas NI' had to be established at the beginning. There is a time scale that needed to be adhered to and completion date for the project already fixed for a date at the start of May and this also to be taken into consideration. Managing the project from the early stage makes it possible to avoid 'time sinks' on certain requirements and have a view of the bigger picture of what needed to be finished to make the project successful. The list was finalised and made it possible to see what visually needed to be achieved for the end user, before moving onto the next feature.

In addition to functional end user requirements, it is also important to include a list of non-functional requirements that the website could benefit from to enhance the overall design and create a richer user experience. The aim is to create a website that meets more than just the most rudimentary of requirements. To make 'Access All Areas NI' stand out and present the user with features that will boost their sociability and explore the venues that Northern Ireland has to offer with confidence.

After assuming the position of the end user, the challenge of creating a list of requirements is made easier. By adopting the users frame of mind, it is possible to figure

out what a user needs, how they would go about doing it and what they want to gain from it.

The '*Volere Requirements Specification Template*' (Robertson & Robertson, 2006) was used as the foundation to create a checklist and structure of the requirements needed for the review platform. Some of the end user requirements listed below (more examples are included in the **Appendix A**), present a detailed account of features that will need to be created and work accordingly to have a fully functional website.

Requirement 1: Create Account	
Description:	Ability for users to create a new user account.
Logic:	Each user will have their own unique identity.
Dependencies:	Requires the user to fill in own personal details to add to an existing database.

Requirement 4: Review Function	
Description:	Ability for users to review venues they have visited.
Logic:	Each user will be able to contribute a review that other users can access.
Dependencies:	Requires the user to be able to submit a review under their account name, which is linked to venue or public place.

Requirement 5: Rating System	
Description:	Ability for users to rate venues based on a scale of 1-5.
Logic:	Each user will be able to rate experiences on a scale of 1-5 stars, so there is a quantitative and qualitative review of the venues on the website.
Dependencies:	Requires the user to be able to submit a scaled rating under their account name that is linked to a venue or public place.

2.2.2 – Specifications

After considering all of the functional and non-functional requirements that needed to be recognised and delivered to the end user, the specifications can be looked at in greater detail and expanded upon. The specifications are designed to look at the project from a different viewpoint and assess how the criteria for each can be accomplished.

As the functional requirements are fundamental to the success of 'Access All Areas NI', making sure that they are achieved is the main goal to creating a website that is able to function even in its most simple format (full list of requirements specifications included in **Appendix B**). Back end development of the website using PHP, MySQL and a database is how users will be able to interact with the website, by creating a signing up and leaving reviews for others to read.

Functional Requirements Specifications

- **System permits user to register a profile** – For this functional requirement the ability of the user being able to create a new profile is of great importance. The user will supply some of their personal details along with a valid email address and password that will be used for future login to 'Access All Areas NI', by submitting all of the details via PHP and storing them inside a database. The registration form will have input fields that are validated to make sure the correct information is being supplied and no fields can be left blank.
- **System permits user to log into account** - For this functional requirement the user will initially have registered an account with the website and when logging in the email and password are verified by checking to see if the information that is stored in the database matches what the user has submitted. This will be achieved by posting the details from the login form using PHP and performing a query and checking to see if any rows in the database match. If login is successful the user is presented with their personal username as confirmation, and if unsuccessful an error message is displayed warning of incorrect credentials.

- **System permits registered user to submit a review** - For this functional requirement a logged in user is given the ability to submit a review to the website of a venue and the experience they want to share. The user will be able to rate the venue, include an image and a short description of their experience. This is all done using PHP to post information from the form to the database, where all of the reviews are stored.
- **System permits user to locate a venue interactively** - For this functional requirement the admin is able to submit a description of a venue, its rating and the location is then pinned to a personalised Google Map marker. This will be achieved through a mixture of PHP to supply the details from the database and the Google Maps API to pinpoint the location by using the latitude and longitude co-ordinates provided.
- **System permits user to search by venue type and location** – For this functional requirement any user will be permitted to tailor their search by venue type and location. The venue reviews will automatically be displayed on the 'review' page in order of most recent. To make it easier for the user to find reviews that are relevant to them, they can search using their own criteria. which will speed the process up and provide information in a well-planned and, most importantly, in an accessible manner.
- **System permits user to read a review** – For this functional requirement the information that has already been submitted to the database is then retrieved from the database using PHP and displayed using a loop to populate a list of every review that has been stored. The reviews are presented in their own container along with; an image for visual reference, a rating, and a short description for users wanting to find out more information that may be of interest to them.
- **System permits admin to edit or delete review** - For this functional requirement the admin must sign in through a hidden 'admin page', to access a page that allows reviews to be viewed. If there is any information that has been

supplied that is incorrect or untoward, it can be either edited or deleted by the admin. This would then change the information that is being displayed on the review page, by using PHP to edit a row in the review table in the database or remove it completely.

Non-Functional Requirements Specifications

- The product shall function on a variety of devices including computer, tablet and smartphone – Considering how users now access content on the Internet; creating a website that is responsive is mandatory, so that the experience between different devices is similar for users. This can be achieved by using a framework like ‘Bootstrap’ by Twitter, which has CSS media queries and modifies how information is displayed depending on the screen size. This will allow for ‘Access All Areas NI’ to be tailored to different screen sizes and display, which is very important given that there is a premium on visible display area.
- The product shall be accurate with locations of venues using the information provided – For this non-functional requirement the admin will be given the responsibility of being able to pin-point the location of venues to the Google Maps feature on the website. This is to ensure that the accuracy is to a high standard, so it can be seen as a reliable tool for users. The admin will use a venue form to add a location and ‘infowindow’ information, by using PHP to post to the database, upon where this information can be retrieved to populate the map feature.
- The product shall be easy-to-use, particularly for those with disabilities – This non-functional requirement is important when taking into account the demographic that ‘Access All Areas NI’ will be attracting. All users of the website may not just have physical disabilities, so accessibility is a key element when coming up with a design layout that promotes ease of use and simple navigation. The content needs to be navigable and locatable, so that a user with a

disability has a decent experience and is therefore more likely to return in the future.

- The product shall use typefaces and colour contrasts that enable information to be easily read – This non-functional requirement focuses more on the visual design of the website. It is about aesthetics and other related material and how it is applied. When contemplating typography and how certain typefaces will be implemented, taking in account how readable the font is, the alignment, colour and spacing; all play an important part in how the user will visualise hierarchy and gain information more quickly from what they are reading. While colour contrasting puts more attention on how to make certain items on the page standout, putting emphasis in the differences in colour gives a page more impact and brings greater legibility to the user.

Questionnaire

A questionnaire was created to gain more knowledge and information on how people with disabilities have trouble finding out information about venues or public areas before planning a trip or social event. The purpose of this questionnaire is to find out any issues and provide a better product (example of questionnaire included in **Appendix C**).

2.3 – Paper Prototyping

The next stage in the process that needed to be completed for the project was the paper prototyping. It is fundamental when starting out on any new project to have a rudimentary design approach to begin with. Paper prototyping is a rapid method to determine the website layout, navigation, interface and functionality, before sitting down at a computer and starting to code. If something was not right in the layout of 'Access All Areas NI', it was only a matter of writing something on a new piece of paper and throwing the piece before in the bin. Carrying out these design ideas and concepts at an early

stage will show how the system will be used and an iterative process can be begin to improve on the initial foundations.

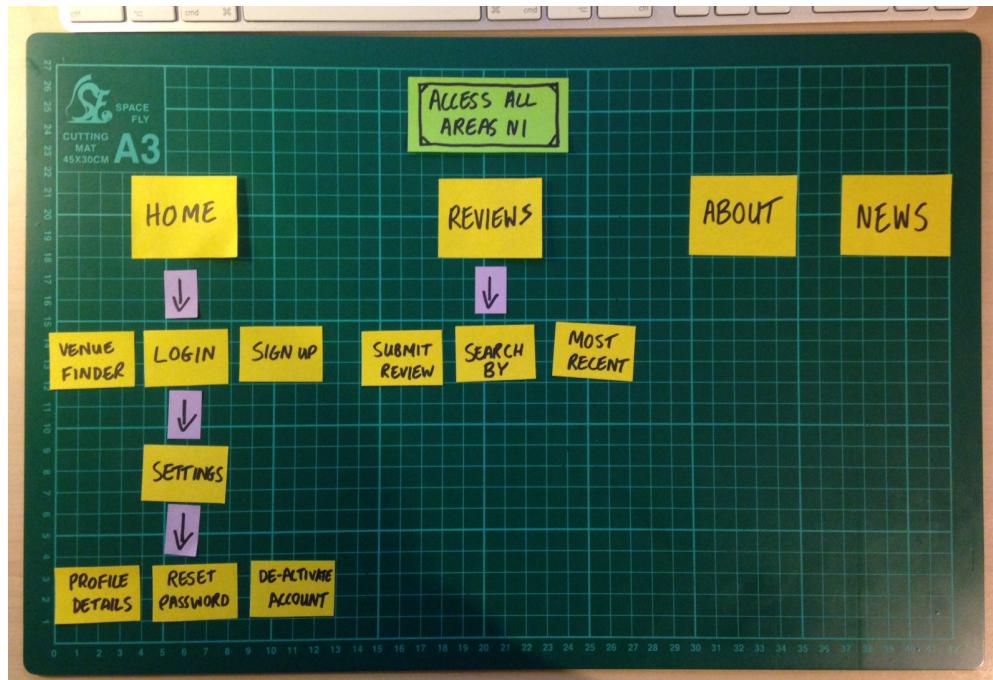


Figure 2 – Post-It Note Layout

In Figure 2, it is possible to see how the initial website layout was conceived. The 'Post-It Note' layout is a visual overview of the design of 'Access All Areas NI' and how a user might interact with a website to complete certain tasks, e.g. changing login details; even at this early stage being able to weed out potential flaws in the system is possible. One of the main aims of the website is for tasks to have as few steps as possible. Creating a simple user flow would help increase accessibility at this early development stage and make it easier to leave and read venue reviews.

After deciding on an early design layout for the project, an 'initial sketch' was the next stage to be considered before moving into '6-Ups' and 'wireframing'. A low fidelity initial sketch of how a page will be designed does not require a great deal of time or finesse and therefore brings about a freedom to explore a layout without being too self critical, as this is just the germ of the idea and not the final draught. Creating the initial sketch

brings about the thought-process of functionality of the website, what components need to be required in order for 'Access All Areas NI' to be fit for purpose, e.g. Google Maps, social media, navigation etc.

In **Figure 3** it is possible to see the freehand process occurring, without any practical restrictions getting in the way; while also being able to visualise the basic layout on paper. Going forward, the initial sketch had to be tweaked and refined as the design process progressed, but it can be seen as a blueprint for the project and reflects somewhat on features that have been included since then.

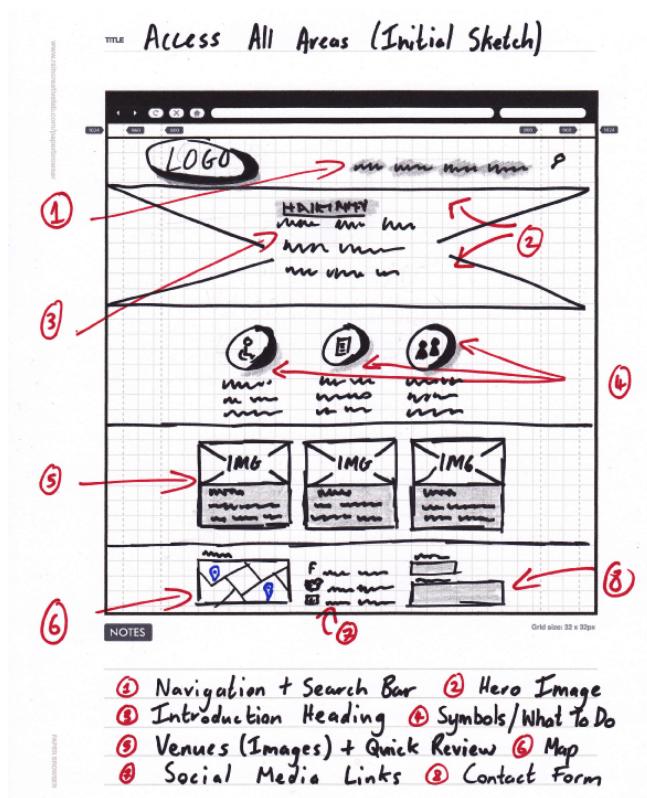


Figure 3 – Initial Sketch

The primary objective of design and layout of the main page was to promote a clean and simple design. Adopting this approach allows for the information to be passed to the end user in a more direct and logical manner. Placing the logo and navigation at the top of the page follows the same layout pattern enabling the user to familiarise with the website

and avoid any confusion. The page continues in the same simple format and while still only a rough sketch, there is potential that this can be a solid basis with improvements.

2.3.1 – 6-Ups

With the initial sketch completed, the next stage in the design process that would greatly benefit the development of the project was '6-Ups' (Downes, 2010). The theory behind 6-Ups is to generate six possible solutions to one problem. For the 'Access All Areas NI' homepage, the concern was how to best present it to the user while also being effective in putting across information. The challenge with 6-Ups, is that coming up with six layouts is not as straightforward as is first imagined; a lot of thought has to go into considering how certain elements can be looked at and how an alternative placement of that element can effect the way in which a user may interact with the website and if that has a positive or negative impact on user experience.

Only by implementing the 6-Up sketch framework, was it possible to design and consider more than the two or three different designs of how the home page would be presented. Further exploration of possible solutions led to less obvious ideas being generated and more intuitive options be investigated.

It is possible to see in **Figure 4**, the six different prototypes and how alternative layouts have been thought about.

- In Prototype 1, emphasis is heavily weighted on the map feature as being the most integral part of the website, but this design was applicable for new users of the website.
- In Prototype 2, the design is quite similar to the finished product as the navigation is clear to see, a hero image is used in conjunction with a welcome heading, followed by some more information about reviews, a Google Map displaying venue locations and a footer for social media and contact details.

- In Prototype 3, a more modular design has been put in place that is clear and simple to navigate and gain information from with importance being put on large images and social media.
- In Prototype 4, the aim of the main page is to get across to the user what 'Access All Areas NI' is trying to achieve. Without any thought really been given to how images will be used to reinforce the design visually, as imagery can be quite an important factor in the creation of something that is modern and contemporary.
- In Prototype 5, the search facility is given prominence on the page. This is in response to Google Map not being as much as an important feature, as a valid alternative of not being able to mark locations on the map dynamically with customised infowindow venue details.
- In Prototype 6, was the least attractive in terms of a possible alternative for the design of the main page. The display of the information does not have the appearance of being put effectively across to the user, with the reviews being laid out in a uniform manner without any defining features.

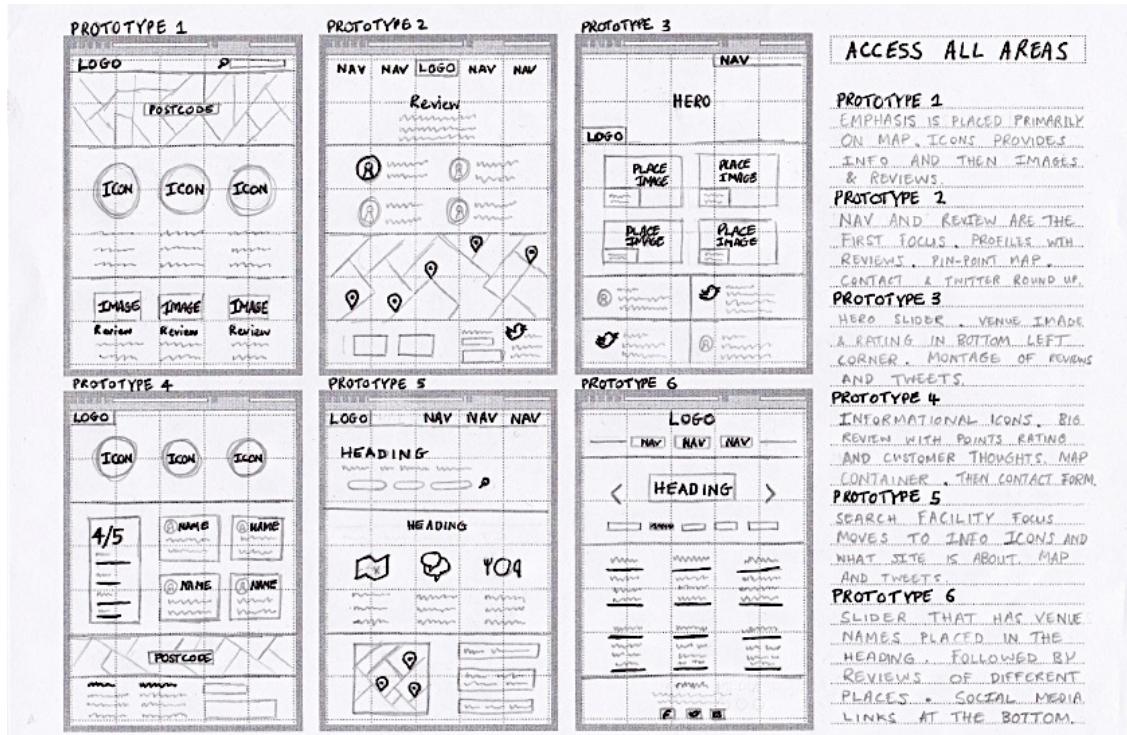


Figure 4 – 6-Ups

2.3.2 – Wireframes

After completing the 6-Ups the next phase in the paper prototyping stage was to develop these rough sketches into wireframes that are more comprehensive in detail, by initiating colour and images; before then taking these designs and creating ‘mock-ups’ in either Photoshop or Illustrator with annotations.

In the ‘High Fidelity’ prototype there was a clear introduction of colour and imagery to the design, this allowed the presentation of the website on paper to be somewhat closer to how the appearance would take shape in the browser. This stage was still before any layouts or ideas had been created on the computer with a slower, more organic approach happening. During this period, it was still possible to visualise all of the other prototyping stages coming together. The ‘high fidelity’ prototype also starts to show how a committal has been made in regard to the layout and elaborates on different elements with colour and texture. The prototype therefore became less abstract and consideration was shown to the practical implications of the design and the aesthetic impact it would have on the user.

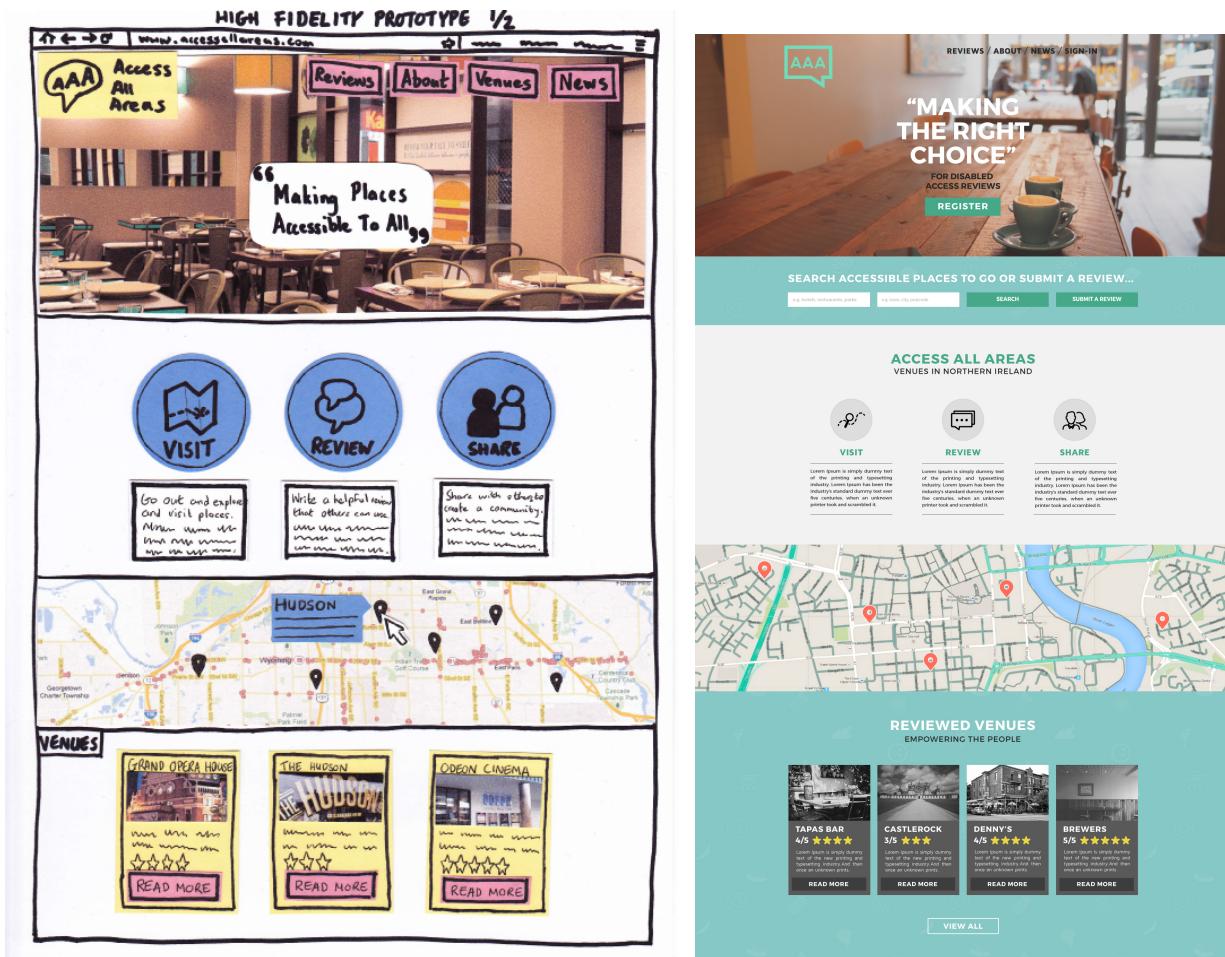
In the images that are to follow, are some of the high fidelity prototype and how it has evolved to the initial designs that were digitally created in Illustrator. Moving from one medium to another was not as big of a transition as first perceived, as the paper prototype had been refined so much, that it was clear what challenge lay ahead.

Below in **Figure 5 & Figure 6** it is clearly evident the impact that the paper prototype had on the development of the home page of the ‘Access All Areas NI’ layout and design. Elements such as having a hero image of a theme that is associated with socialising and eating out were brought through on the digital design, but with a different more polished coffee shop image being chosen, to add a better tone, give a good impression to a first time user and get them to return in the future.

In Adobe Illustrator there was the addition of a search feature that was not included the high fidelity paper prototype. This was something that had not been accounted for when

creating the home page, but this functionality was extremely important in how the user will use the website as a tool to find information quicker about different venues.

The icons and information used to describe what 'Access All Areas NI' is about in the next section has been retained much of the same design and layout, but with more detail added in to resemble the appearance in a web browser.



Figures 5 & 6 – High Fidelity Paper Prototype and Mock-Up

Figure 5 & Figure 6 continue into the Google Maps feature to locating different venues via custom markers. The feature in the mock-up has been improved upon from the paper prototype by changing the colour scheme to follow the theme of the website, which when using the Google Maps API allows for the style of the map to be customised. This could be achieved with some research of the documentation Google provides. The

reviewed venues feature in the mock-up has been designed with a flat user interface kept in mind, while allowing the image to be the main item that takes precedence over the other information. This migration from paper to computer allowed for an initial design to be created and although the website has evolved more as HTML and CSS has been introduced, the essence of the reviewed venues and how they are displayed is still apparent.



Figures 7 & 8 – High Fidelity Paper Prototype and Mock-Up

In **Figure 7 & Figure 8**, the second part of the high fidelity prototype and mock-up are presented. The news section of 'Access All Areas NI' in both cases has lent itself more to using a larger image to attract the users attention and for the image to be a representation of what the news story may actually be. In the mock-up the option of displaying a date has been thought about as an improvement from the paper prototype. This is for the benefit of the user so that dates and events do not have the potential to get mixed up.

The footer in both designs have been created to display social media options for the website. This is important in establishing a community where users are able to interact with the 'administration' of the website, via Facebook, Twitter or Instagram to help increase traffic towards 'Access All Areas NI' and increase brand awareness.

2.4 – Feasibility Testing

The initial formation of the aims and objectives of the project were mainly thought about before the functional requirements, prototyping and primary mock-ups were created. After this stage had taken place, the feasibility of targets needed to be examined to see how realistic the plans for 'Access All Areas NI' actually were. Completing feasibility testing at an early stage would help to eradicate or at the least avoid any potential areas where risk played a factor in the design or coding process. Given the tight time-scale of when the project needed to be concluded, time sinks and overly complicated tasks could have a detrimental effect on the completion of the website and functionality of the end user.

When the 'Access All Areas NI' idea was initially conceived the aims were not as detailed or refined. This led to a period of thinking rationally about how the functionality of the website is going to be integrated into the design, while implementing a database into the back end with the use of the PHP language which, until this point, seemed an overwhelming task. To make sure that enough time was devoted solely to the implementation of the back end, the turn around on completion of the front end and developing the branding need to be accelerated. The front end formation of the website with HTML, CSS and JavaScript, was able to be created at a quicker pace by putting greater effort into the design work such as creating detailed wireframes and refining the UX to a high standard. This made this part of the task straightforward and only small issues were encountered. Even though implementing the 'Bootstrap framework' could have been a proverbial 'banana skin', it paid off, as the documentation online was extremely detailed for problem solving facilities and the responsive CSS meant little extra effort had to go into design for handheld devices.

When it came to the point of integrating the back end into the system, a review website needed the incorporation of a large amount of PHP to allow users to create personal

profiles, create reviews for others to read; while allowing an administrator the ability to manage the website, create content for reviews and the integration of being able to populate the Google Maps feature with map markers and information of reviewed venues. A considerable amount of time had to be set aside for reading and understanding of how PHP could be implemented to make all of this functionality work, as the technical aspects of what needed to be carried out can be a frustrating process as a certain amount of learning was taking place. If a certain amount of feasibility testing had not been considered before this stage, the project would have been in major jeopardy of not being completed in time or certain aspects of the functionality having to be abandoned.

2.5 – Methodology Testing

Regarding the methodology approach that could be implemented for 'Access All Areas NI', there were a number of different options that were considered before settling on viable methodology that would dictate the way in which the project would be advanced and kept on track. At an early concept stage some investigating was made into finding out what methodologies would be viable, as it had to work within the timescale that had been allowed but also compatible with the limited resources that were available.

The 'prototyping' methodology was considered and it dictates that before setting out the requirements, a throwaway prototype is built to help understand what the requirements are (DNB, 2011). As the user is getting a further 'feel' for the system, the project is then evaluated and further refined and another design is then created for the end user. Several iterations of 'Access All Areas NI' would need to occur before it is agreed that the criteria has been met and the final product can be produced. Although this could help to gain a better understanding of the project and help shape a good end result, the amount of iteration that needed to happen would be too much of a stretch considering the finite time and resources one person can provide.

The methodology that was then chosen was the 'waterfall' approach as it had a process model that was more suited to a smaller project that in the case of 'Access All Areas NI' was well defined and there was a good grasp of what the final website should resemble (DNB, 2011). The waterfall methodology was rigidly stuck to from the initial planning of the project until final completion. The more strict form of planning was able to provide a period of when certain parts of the project had to be completed. If this had not have been kept to, the project would have suffered greatly, as certain elements can take longer to complete when time is not thought about as a precious commodity and especially when different projects are also taking place at the same time.

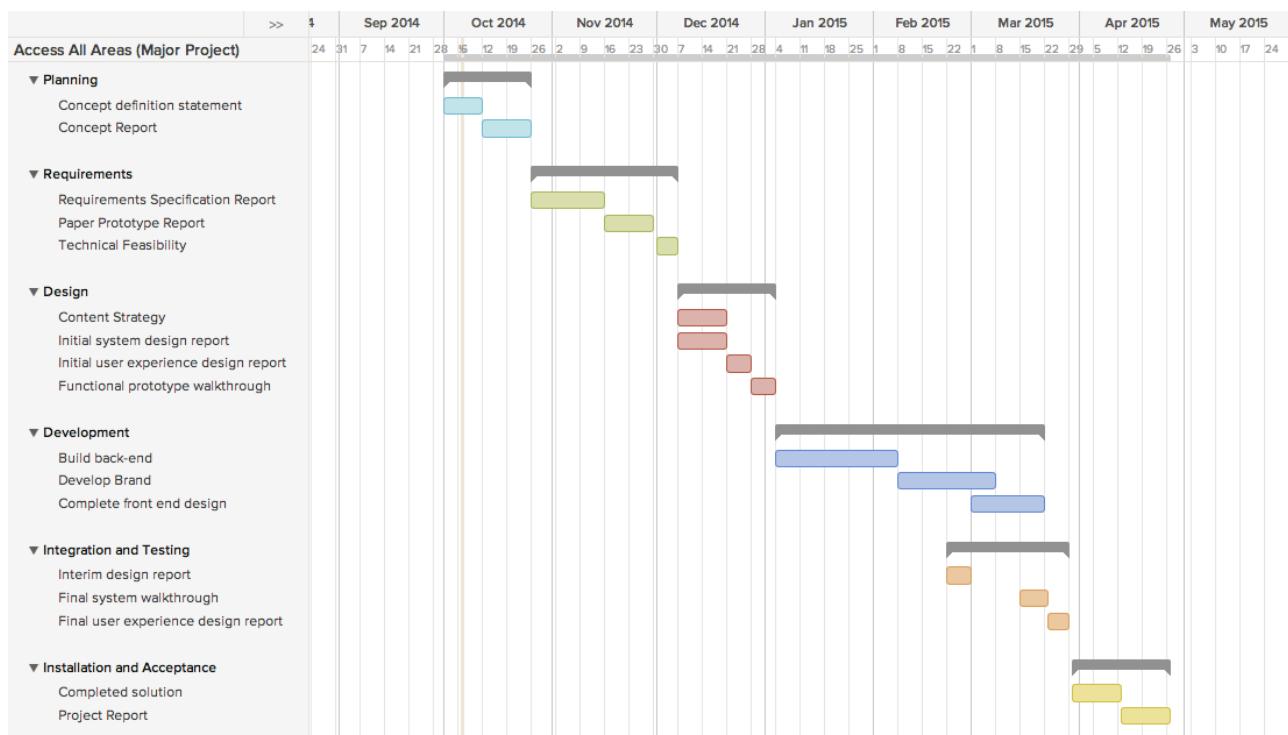


Figure 9 – Waterfall Methodology Gantt Chart

In Figure 9, it is possible to see the benefits of employing the waterfall methodology. All of the stages have been well-defined and broken down into smaller sub categories so that smaller targets could be set and planned more effectively, which made completion of the project a lot easier as it is easy to be intimidated by the enormity of the work that had to be accomplished. The Gantt chart dates back to the very start of the project. Not long after the idea was conceived, there was a clear understanding of what all of the

requirements were and by being stringent with the timescale, it was possible that 'Access All Areas NI' could be produced on time and all of the functionality and deliverables met.

One of the considerations that had to be taken into account with the waterfall methodology was the possibility that major flaws don't become apparent until the end of the project. To avoid this, at the end of each stage it was essential to step back and try to find flaws in the project so that any major errors would not go unnoticed until the end, as there would not be enough time factored in to fix or resolve the issue.

3.0 DESIGN

3.1 – UX Design Evolution

The next stage of the project was to design and create a user experience for the 'Access All Areas NI' website. The importance that was placed on this particular part of the design could be seen from the amount of time and effort put into the initial UX designs and subsequently, over a period of time, were refined until the all of the issues had been ironed out. The interface is something that needed to be produced to a very high standard as the content and functionality can be greatly overshadowed by it and lead to a negative experience.

3.1.1 – Branding

Creating the correct brand identity of 'Access All Areas NI' was imperative, as this will usually be the first impression that someone will have when they first encounter the website or have any social media interactions. The first impression is always important, as it can either impact positively or negatively on the user. Succeeding in a strong brand identity was key for everything else falling into place. By creating an initial brand identity and then iterating and refining the design led to a vast improvement when viewed before and after. Following current design trends was part of the research and investigation into

forming a brand that was current, while also possessing simple and clean design standards.

The ‘Flat UI’ design trend is something that has seen a rise in popularity in recent times and it is possible to see similarities in the brand identity that was envisaged for ‘Access All Areas NI’. Flat UI promotes a lot of different positive design considerations; the first positive design point is that information is taken into consideration more and a decision had to be made on what is and what isn’t relevant to the user, leading to a page that is free of clutter and at liberty from the being overwhelmed with information.

Simplicity is another element that is appreciated more in flat design. Adding in extra features just for the sake of it was not in the remit for the ‘Access All Areas NI’ website. A simpler design and interface means that the product will be easier to use.

Finally, and probably the most important reason for employing ‘Flat design’ is that content is what is vital for the website to be a success. If the user cannot engage properly with the website then the product will most likely fail. Making sure the user focuses primarily on the content will promote ‘Access All Areas NI’ as a valuable tool and in theory lead to more activity and ensure a positive experience.



Figure 10 – Original and Final ‘Access All Areas NI’ Logos

Reflecting this idea in the logo would prove to be a challenge, but it is something that needed to be achieved to put forward a strong brand identity. In the first iteration of the

logo design (shown in **Figure 10**), the perception that can be taken away from the illustration is that there is a very bold statement being made, which on reflection did not represent the friendly community based audience that 'Access All Areas NI' is aiming to attract. Some refinement needed to take place to achieve a friendlier feel.

The first improvement was to move from having only one speech bubble to including two. This way it was possible to visually convey that a conversation is taking place and thus represents more of a community atmosphere. Removing the sharp edges from the logo design adds a more comforting factor and makes the design much more easier to process while obtaining a better aesthetic beauty. Replacing the original cold and uninviting sans serif font for a more friendly and welcoming one captures the ethos of what is trying to be achieved by the product.

3.1.2 – Visual Design

For the visual design that would be implemented in the website, the influence of the flat design aspect will permeate through several different elements and features of the 'Access All Areas NI' website. The design will manage to complement different styles in the interface in several different ways; from the choice of the grid and how that will dictate the layout, the colour choices that need to be made to compliment a minimal design theory and how the typography is utilised to make sure that the content is given prominence. The use of style tiles at the early stage of the design process (included in **Appendix D**), helped greatly to create a solid concept of what was to be achieved.



Oswald

Roboto Slab

Open Sans

Varela Round

Figure 11 – Typeface Choices

Above in **Figure 11**, are the fonts that were eventually narrowed down, one of which would be chosen as the typography to be used in the website. Selecting the font depended on a few different essentials and whether the final chosen font could meet all of the requirements. The first consideration was to ask if the font was a sans serif, as a sans serif font has the benefit of being much cleaner and fresh to read, of which three meet the criteria. Next, finding out if the font had a range of weights and font styles to choose from would be advantageous when defining the information hierarchy on the page and a certain font will render better in different browsers and screens. The legibility of the font was also something that had to be deliberated, as users of the 'Access All Areas NI' who may have a disability will need to be able to read the chosen font on a different legibility scale, depending if they are accessing the website on a device with a smaller screen such as a tablet or smartphone.

After all of this had been reflected upon, the decision was made to choose the font 'Varela Round'. The font is served by the open source Google Fonts that has been optimized for the web, with the service being fast and reliable on multiple different devices for a consistent user experience. This is an advantage when trying to be professional in the way that the product functions, while still be able to avail of a free facility. The typeface itself compliments the appearance of the rest of website, with the flat design features that have rounded edges that promote a friendly feel and has strong ties to the logo for a strong brand identity.

Homepage

Moving from the initial design of the website to the more finalised version, there was a considerable amount of refining and thought-provoking design theory to be approached. There were a number of changes to elements; such as the typeface that would be implemented, the choice of colours that could contrast better in certain sections and focusing in more on the layout that work best in the browser.



Figure 12 – Initial Homepage



Figure 13 – Refined Homepage

It is possible to see in **Figure 12** and **Figure 13** how the final design of the top of the 'homepage' has been refined. In the initial UX design, the navigation was proving to be an issue. Placed on top of the large hero image it was hard to see, especially if the user has impaired sight. The best way to rectify this issue was to implement a solid 'nav bar' that stands out against the coffee shop hero image. The improved page option is much clearer and this should improve the users experience and make navigation of the website much easier.

The second issue that had to be resolved was that of the headline text welcoming users to the website, as there was poor contrast between the text and the background image. To counteract this issue changing the font to a darker colour and putting a green overlay on the hero image with an opacity of 50% solved this problem.

Google Map Feature

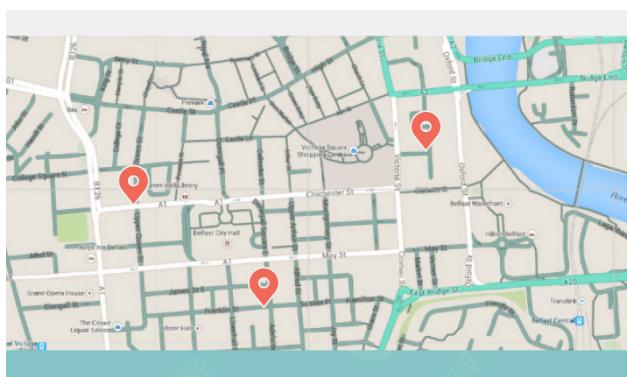


Figure 14 – Initial Map

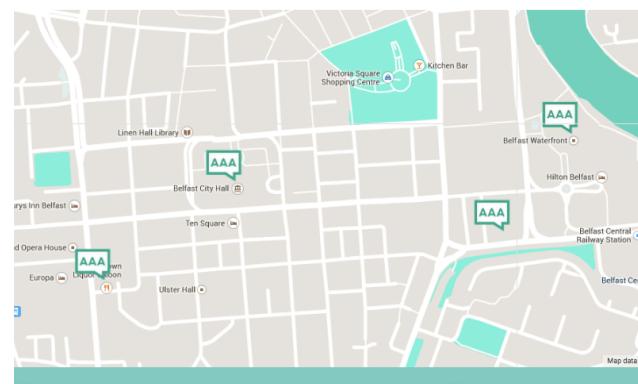


Figure 15 – Refined Map

Consideration was also given to how the map could be displayed through some refinement. In **Figure 14**, which was the original style of the Google Maps feature. The map markers do a standard task of plotting the location of different venues on the map, but did not tie in with the overall theme of the website and looked out of place.

In **Figure 15**, it is possible to see a difference in the style of the Google Map. This was achieved by reading the documentation that Google provide and experimenting with the API to achieve a custom style that ties in with the website colour scheme. The map markers have also been replaced with a variant of the 'Access All Areas NI' logo. This is to enhance the user experience and prove that more thought has gone into how the Google Map feature has been customised solely for their use.

Venue Reviews

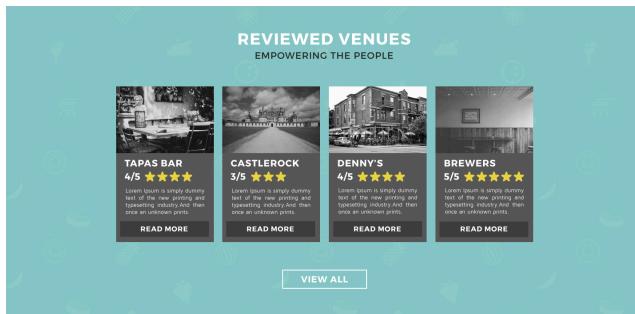


Figure 16 – Initial Reviews

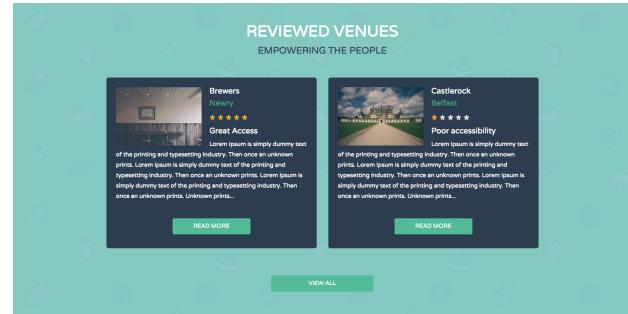


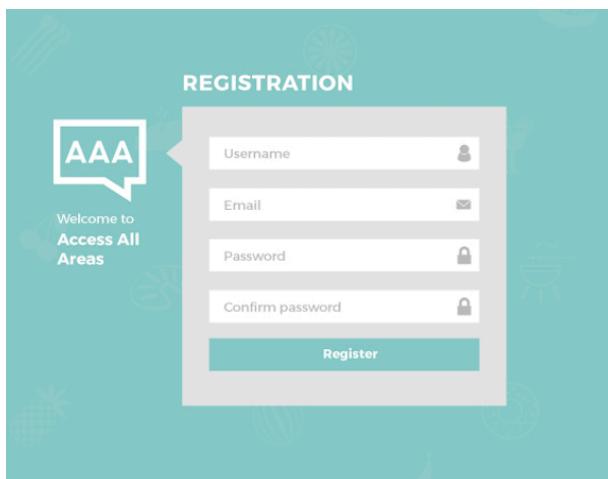
Figure 17 – Refined Reviews

The initial design layout (shown in **Figure 16**) for the review section of 'Access All Areas NI' was to create a four-column layout to fit in as many venues and descriptions as possible. At that early period this seemed like a logical setup, but after some deliberation the four-column arrangement had the appearance of being busy and overcrowded. The intention of the original image display was to have a grey scale image, which would transition to colour when hovered upon. This feature would not have really offered any more to the review section and its inclusion was set aside.

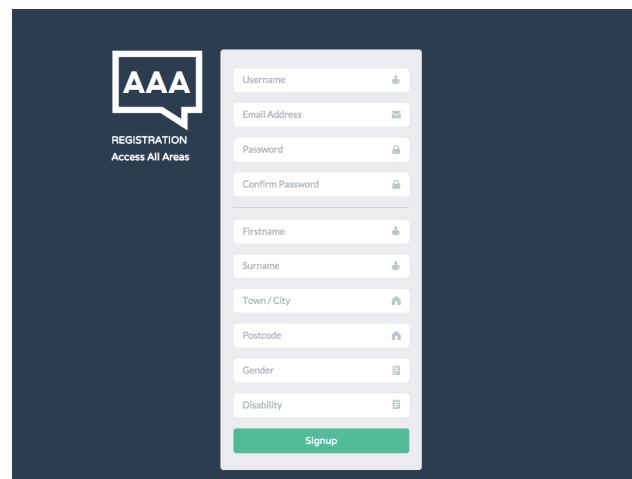
In **Figure 17**, it is possible to see that the four-column layout has been exchanged for two-columns. This led to an improvement in the organisation of the reviews; presenting

an uncluttered impression, presented more of an area to work within and brought greater importance to the reviews. This presents the user with the perfect amount of review information that can be digested easily with the eyes. In the refined reviews the images are now displayed in colour without any added effects on hover. Eliminating this feature makes the simple and clean design of the website more cohesive. Just to add a little extra consistency in the design, a border radius has been applied to the venue images to remove any sharp edges and conform to the rest of the flat user experience.

Registration



The initial registration form is set against a teal background featuring a speech bubble icon with 'AAA' and the text 'Welcome to Access All Areas'. The form itself is white with a light gray border. It contains four input fields: 'Username' (with a person icon), 'Email' (with an envelope icon), 'Password' (with a lock icon), and 'Confirm password' (with a lock icon). Below these is a green 'Register' button.



The refined registration form is set against a dark blue background. At the top left is a white speech bubble icon with 'AAA' and the text 'REGISTRATION Access All Areas'. The form is white with a light gray border and contains ten input fields: 'Username' (with a person icon), 'Email Address' (with an envelope icon), 'Password' (with a lock icon), 'Confirm Password' (with a lock icon), 'Firstname' (with a person icon), 'Surname' (with a person icon), 'Town / City' (with a house icon), 'Postcode' (with a house icon), 'Gender' (with a gender icon), and 'Disability' (with a gender icon). Below these is a green 'Signup' button.

Figure 18 – Initial Registration

Figure 19 – Refined Registration

In the initial registration form design (shown in **Figure 18**), the original plan was to have the user only fill in ‘essential’ information. The concept of this idea was to improve the conversion rate of people visiting the website and then actually registering an account with ‘Access All Areas NI’. The amount of input fields conveys the sense of the registration being simple, fast and concise. However for the community element that is envisaged, whereby users use the product on a regular basis, then collecting some more information about each of the users would be vital to get an overview of the demographic and cater for their needs better. At this early stage the inclusion of iconography in the input fields was given some thought to help users with input of information, but the selection of icons needed to be refined more.

In **Figure 19**, the registration form has been refined with the initial issues being kept in mind. The colour scheme of the form has been changed to create a more polished and elegant feel, making it clean and easy to use. There has been the addition of more input fields to gain more information about the user. The 'essential' registration details are kept to the top of the form, while a simple horizontal rule divides the form up into another section to gather other personal details such as name, address, disability, etc. The more refined icons on the right hand side denote the different types of data being collected, in a way for users who have learning disabilities and may need the help of iconography.

Submit a Review

Figure 20 – Initial Submission

Figure 21 – Refined Submission

Being consistent in the design of the other forms in 'Access All Areas NI' is what can be seen in the initial submitting of a review (in **Figure 20**). Primarily, when thinking of all the possible inputs that needed to be included when reviewing a venue, it was necessary to give the user all of the necessary tools to be able to post an informative review of the experience that they encountered. The addition of extra inputs can be detrimental to the overall user experience, so only necessitating the minimum required information prevents the task from being tiring or arduous. Avoiding this will likely lead to more contributions and create a better knowledge base for new and existing users.

In the refined 'submit a review' design in **Figure 21**, there was a realisation that something had been forgotten in the review process. After some research and examination of what had already been designed, the ability to upload an image of the venue to the database had been neglected. Adding an image to the review promotes a richer user experience, whilst giving a visual reference to the review, therefore this feature needed to be included. The div that contains the review form will expand down from the top of the page; this is to eliminate the amount of steps that need to be taken for submission. The removal of any undesirable friction should increase the amount of completed reviews.

3.1.3 – Interactions

Interacting with any website is a significant part of the user experience. To make sure that the users of 'Access All Areas NI' have the best possible involvement with the product, a lot of attention had to be directed towards how the user clicks on a button and the event that it initiates. Interaction occurs when the user wants to register, login or submit a review. To make sure that the steps that complete these tasks are easy to comprehend, the design needed to be simple and thought-process of the user assumed to create an understandable environment.

There were two possible ways of displaying the input forms to the users, in either the style of a 'modal box' or a 'collapsible and expandable panel'.

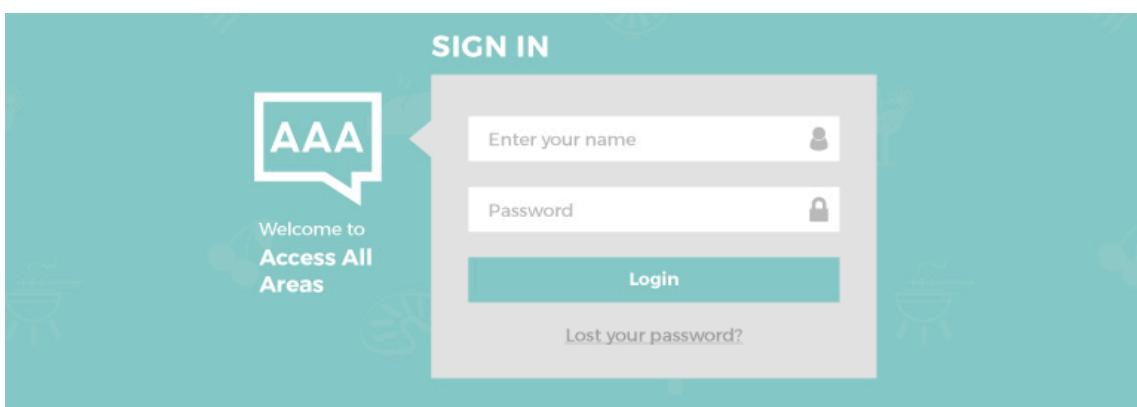


Figure 22 – Initial Sign-In Form

A ‘modal box’ is an effect that is run by script, which allows an element to be overlaid on top of the webpage. During the initial design of the UX this idea was explored as a possible method of users to input data, as shown in **Figure 22**. The main reason to have implemented this feature was solely for the capture of data. A lot of companies use this method to get people to sign up to their website. The modal box idea was eventually abandoned after some consideration, as there is a belief that modals should be kept to a minimum i.e. error alerts, as they can be quite frustrating and are detrimental to the user workflow.

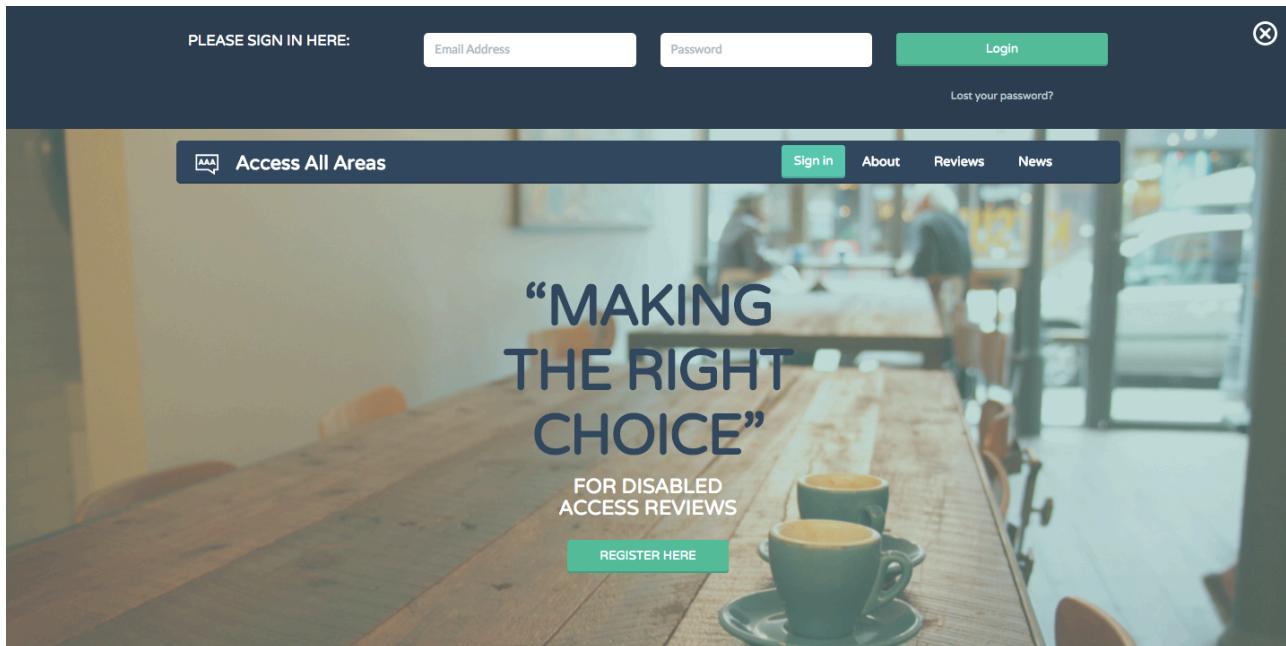


Figure 23 – Refined Sign-In Form

The ‘collapsible and expandable panel’ was chosen over the ‘modal box’ for the simple reason, that is less obtrusive and does not steal the user’s focus from the content of ‘Access All Areas NI’. The user is able to hide or reveal the form at the top of each page by clicking a button instead of being taken to a new page, which just adds another draining step to completing a rather straightforward task. In **Figure 23** above, it is possible to see the advantage of displaying the extra content using this method. The expanded ‘sign-in’ section is very clean and does not clutter the layout of the page in any

way. Exploring this alternative idea led to a better way of improving the user experience by trying to avoid as many extra steps as possible, which the user may find irritating or poorly conceived.

3.2 – System Design

After completion of the UX design stage, creating and planning the system design structure was the next phase that had to be examined in greater detail. Considering that this was the foundation to constructing a robust foundation for the system to run on, a significant amount of time had to be put into organising how different elements would interact with each other and how, through coding of the website, this was made possible.

3.2.1 – System Structure

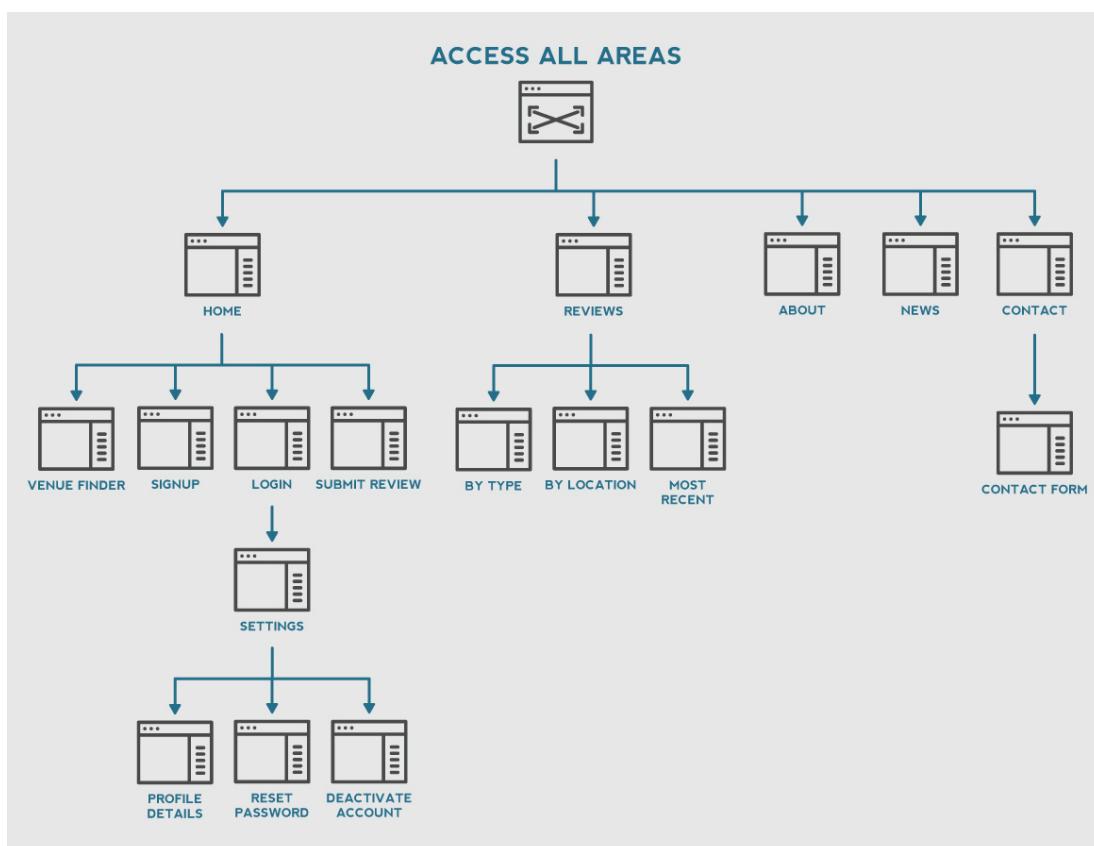


Figure 24 – Refined Sitemap

Creating a site map gave the ability to see a visual representation of the product website and see a hierarchy of the structure, to decide the layout and how different features relate to each other in terms of location. Nevertheless, it was important to see where the product could develop. The refined sitemap (in **Figure 24**) had been improved upon from an earlier design initially created during the prototyping stage, the structure had changed from what had originally been planned out and a better level of organisation has resulted from this iteration process. Evaluating what pages need to be included and gave importance to functionality needs that the user had an expectation of when using the 'Access All Areas NI' website.

3.2.2 – Identify Elements and Technologies

When giving thought to the technologies that could be implemented into the 'Access All Areas NI' design, it was important to identify all the different choices that are currently available. After reviewing several different technology options it was then easier to decide what needed to be implemented and how it could make a difference to the performance and overall design of the website.

- Registering user profile – PHP was implemented in the interaction with the database that allows a user to register an account on the website, shown in **Figure 25**. When the user clicks the 'Register Here' button they are presented with a registration form, which gathers some information about themselves along with a username, email address and password. Upon hitting the 'Signup' button with the registration form the details are posted to the database and upon being received is inserted into the USERS table in the database relating to the corresponding values. When this post performs correctly a message is presented to the user in the top menu confirming "Signup Successful!"

```
24▼ } elseif($_POST['action']=="signup") {  
25  
26     $username = $_POST['username'];  
27     $email = $_POST['email'];  
28     $password = $_POST['password'];  
29     $confirmpassword = $_POST['confirmpassword'];  
30     $firstname = $_POST['firstname'];  
31     $surname = $_POST['surname'];  
32     $location = $_POST['location'];  
33     $postcode = $_POST['postcode'];  
34     $gender = $_POST['gender'];  
35     $disability = $_POST['disability'];  
36  
37     $query = "SELECT email FROM users where email='".$email."'";
38     $result = mysql_query($conn, $query);
39     $numResults = $result;  
40  
41  
42     $sql = "INSERT INTO users(username, email, password, confirmPassword, firstname, surname, location, postcode, gender, disability)
43     VALUES('".$username."', '".$email."', '".$password."', '".$confirmpassword."', '".$firstname."', '".$surname."', '".$location."', '".$postcode."'";
44  
45     if ($conn->query($sql) == TRUE) {
46         $message = "Signup Successful!!";
47     } else {
48         $message = "Error: " . $sql . "<br>" . $conn->error;
49     }
50 }
```

Figure 25 – Signup Script

- **Logging In as a User** – When ‘Logging In’ a returning registered user is able to type in an email address and password into the ‘Sign In’ form, where the email and password query’s details already saved in the database (as shown in **Figure 26**). If details correspond it will return `$result->num_rows > 0`, and display the username in the top menu to confirm sign in. If the sign in details provided are incorrect, the user will be presented with a message: “Invalid Details”.

```
5 if($_POST['action']=="login")
6 {
7     $email = $_POST['email'];
8     $password = $_POST['password'];
9
10    $sql = "SELECT username from users where email='".$email."' and password='".$password."'";
11    $result = $conn->query($sql);
12
13    $message = "initial value";
14
15    if ($result->num_rows > 0) {
16        // output data of each row
17        while($row = $result->fetch_assoc()) {
18            $message = $row["username"];
19        }
20    } else {
21        $message = "Invalid Details";
22    }
23}
```

Figure 26 – Login Script

- Google Map API Visual Customisation – The first initial benefit on the design front is the ability to totally customise the colours scheme of the map through a JavaScript Style Array. This applies colours to certain elements of the maps, such as natural landscape, roads and water; so that it is possible create a

style that matches the theme of the website (as shown in **Figure 27**). Secondly, to enrich the users experience and further the brand, replacing the map marker icons with the ‘Access All Areas’ logo shows attention to detail and by reading through the documentation provided this was achievable (Google Developers, 2015).

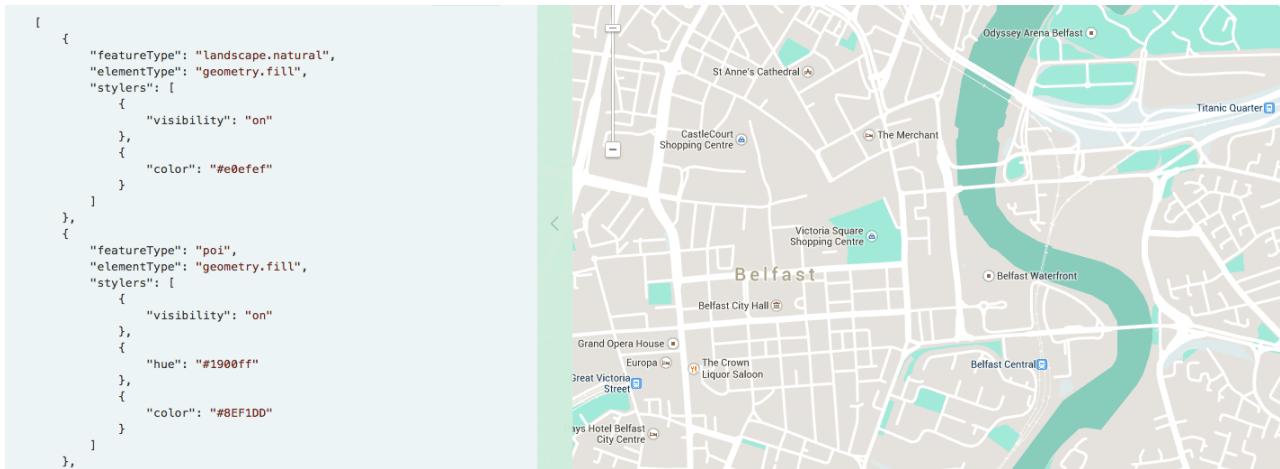


Figure 27 – Google Map JavaScript Styling

- **Map Focusing** – As the reviewing of venues will initially be based in Northern Ireland, the decision has been made to focusing the map on Belfast city centre (shown in **Figure 28**), as this should be an area with the most activity when you take into account the amount of venues and where a large proportion of the population socialise.

```
4▼  function initialize() {
5
6    var centerMap = new google.maps.LatLng(54.596409, -5.930042);
7
8▼  var myOptions = {
9    zoom: 16,
10   center: centerMap,
11   mapTypeId: google.maps.MapTypeId.ROADMAP,
12   scrollwheel: false, // Disable Mouse Scroll zooming (Essential for responsive sites!)
13   styles: [{"featureType": "landscape.natural", "elementType": "geometry.fill", "stylers": [{"visibility": "on"}, {"color": "#e0efef"}]}, {"featureType": "poi", "elementType": "geometry.fill", "stylers": [{"visibility": "on"}, {"hue": "#1900ff"}, {"color": "#8EF1DD"}]}]
14
15 }
```

Figure 28 – Google Map Focus

- Multiple Map Markers and InfoWindows – Placing multiple map markers and using latitude and longitude co-ordinates to highlight specific venue locations was made possible using a tool that is able to convert an address into a coordinate position and apply it to the map (as shown in **Figure 29**). When each of the map markers are clicked it is important that an ‘infowindow’ appears to give the user a small parcel of information about the venue. For example an image of the exterior of the building as a visual reference, alongside a user rating and address. Google Maps API does not supply sufficient details in their documentation on how to edit the map for this capacity. But with sufficient research and other developers having the same issue there was a method to ‘add a listener to each marker’, which allows information to be shown individually and automatically opens and closes a ‘infowindow’ when another marker is clicked.

```

28     var sites = [
29       ['Castlerock', 54.596409, -5.930042, 4, '<p>Castlerock</p><IMG BORDER="0" ALIGN="center" SRC="img/venues/castlerock.jpg">'],
30       ['Brewers', 54.594681, -5.933979, 2, '<p>Brewers</p><IMG BORDER="0" ALIGN="center" SRC="img/venues/brewers.jpg">'],
31       ['Dennys', 54.595537, -5.921964, 1, '<p>Dennys</p><IMG BORDER="0" ALIGN="center" SRC="img/venues/dennys.jpg">'],
32       ['Tapas Bar', 54.597237, -5.919934, 3, '<p>Tapas Bar</p><IMG BORDER="0" ALIGN="center" SRC="img/venues/tapas-bar.jpg">']
33     ];
34
35
36
37   function setMarkers(map, markers) {
38     var iconBase = 'img/';
39
40     for (var i = 0; i < markers.length; i++) {
41       var sites = markers[i];
42       var siteLatLng = new google.maps.LatLng(sites[1], sites[2]);
43       var marker = new google.maps.Marker({
44         position: siteLatLng,
45         map: map,
46         icon: iconBase + 'aaa-marker.png',
47         title: sites[0],
48         zIndex: sites[3],
49         html: sites[4]
50       });
51
52       var contentString = "Some content";
53
54       google.maps.event.addListener(marker, "click", function () {
55         infowindow.setContent(this.html);
56         infowindow.open(map, this);
57       });
58     }
59   }
60 }
```

Figure 29 – Google Map Markers and InfoWindows

3.2.3 – Use Case Diagram

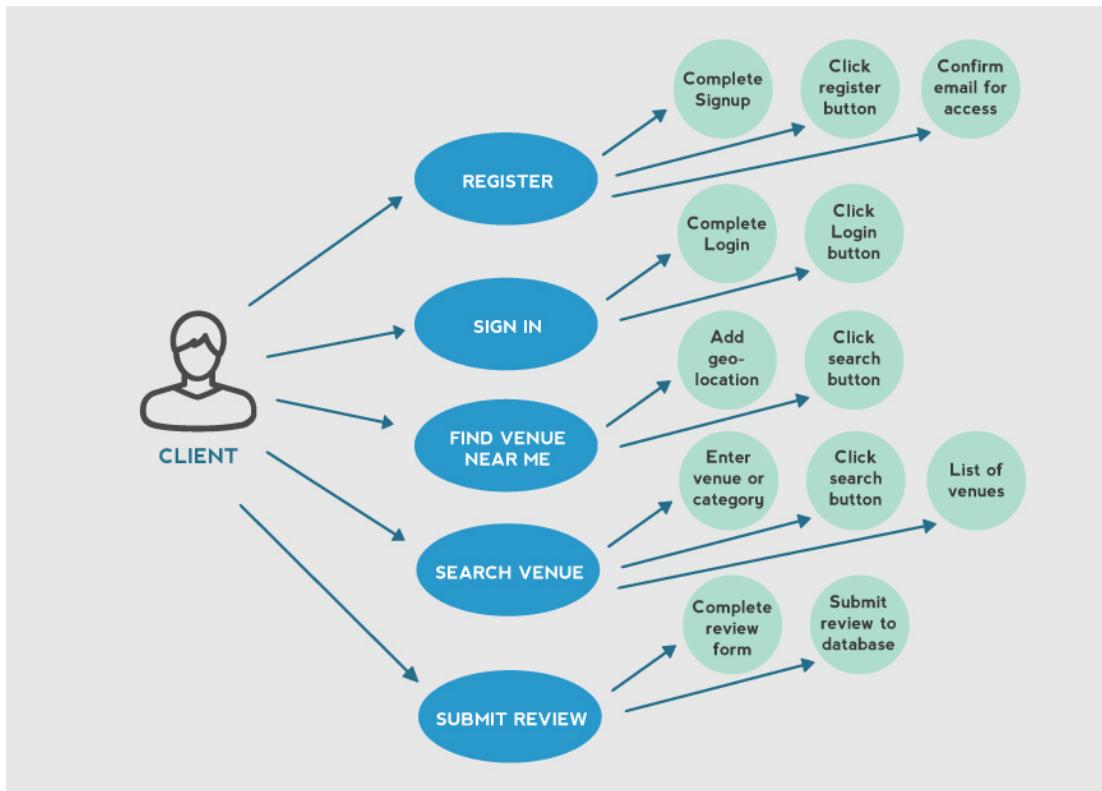


Figure 30 – Use Case Diagram for 'Access All Areas NI'

As an alternative to presenting the Use Cases for the end user in a table format, which made it harder to read and was repetitive, in the information being provided, a visual diagram was created to display the end users usage requirements of the website in its most simplest form (see **Figure 30**). The end user interacts with the website in different scenarios depending on what task they are trying to complete. This diagram above not only identifies but also clarifies how the system will be used, to give an uncomplicated overview of the project at hand.

For the client there are five main cases when using the website; registering as a member when they first use the site, a returning user who has already registered and wants to log into their profile, finding a venue in the locality depending on their current location, search for a venue in a particular area or within a certain category and then being able to submit a review of a venue based on an experience they have had.

3.2.4 – Languages, Libraries, Frameworks and APIs

Some of the candidate languages, libraries, frameworks and APIs needed to be evaluated before the ‘Access All Areas NI’ website could be built. Examining different frameworks used to support the development of the website, languages to communicate with the database, libraries that allow for the easier development of the product and APIs, could all help power the product further.

Markup and Scripting Languages

- HTML5 – When deciding on the markup language that will be implemented in the building of the website, it is important to use the most up to date form of HTML as this will future proof the design and integrity of the product. HTML5 is able to offer many features that are able to work in the browser without the need for any additional plugins that have become an issue in the recent past. Popular browsers such as Chrome, Safari and Internet Explorer all support this latest HTML standard, so there are very few issues that can arise by adopting this markup language approach.
- CSS3 – CSS3 is the latest standardised version of the CSS specification, which will give the ability to create a better user interface for ‘Access All Areas’ by exploiting all of the new features that visually control the style and layout of the website, but also create cleaner markup that is easier to read and append in the future. It is essential to consider the range of different devices and the methods that people use to connect to the Internet, as CSS3 can significantly enhance the performance of the website. This makes download times to smart phones and tablets much quicker, as it is no longer possible to determine whether a user is accessing the website via a fixed line, Wi-Fi or 3G.
- PHP – PHP is a scripting language that will be used in the ‘Access All Areas NI’ product to complete all of the server side tasks such as creating username and password login pages for the users, checking the details of reviews that have been

left about venues, etc. PHP is able perform all of the tasks related to the database that will store all of the information needed to make the website functional, by allowing the website to post and retrieve data as efficiently as possible.

Libraries

- jQuery – Utilising the jQuery library is essential when creating any current web product. It makes JavaScript much easier to use on a website, as it is 'lightweight' by having less lines of code to write, while having the power to add much more functionality. It can enable the manipulation of the CSS to hide or expand certain divs or containers on the page by clicking a button. Even displaying images in a slideshow of different venues would involve using a jQuery plugin that can present images that would save on large amounts of JavaScript code being included in the web pages.

Frameworks

- Bootstrap – Using a framework can greatly accelerate the timescale in which a website can be created, this is vital when development has a strict deadline. A front-end framework that is powerful and intuitive to use is Bootstrap. The amount of features it provides is almost unparalleled to other frameworks in the web development market. Some of the main advantages that can be harnessed in this project are: that it is totally customisable and any bit of the framework that is not needed can be discarded and only the required pieces of code are retained, Bootstrap is a responsive framework that adapts to a devices display whilst still offering a great user experience. Finally, Bootstrap will resolve the front-end issues that can be found when websites are displayed on different browsers, thus making the website consistent across many different platforms and removing future testing issues (Bootstrap, 2015).

APIs

- Google Maps API – After creating the functional prototype for the ‘Access All Areas NI’ website, it soon became clear which API would best to implement for all of the location features. The FourSquare API has been traded in, in return for the functionality that the Google Maps API presents.

3.3 – Logic Design

During system design process the logic strategy was essential to get a sense of how the data would be managed by looking at the hardware and being able to visualise the transfer of data and the steps needed to achieve it.

3.3.1 – Client-Server Model

The client server model aims to show how the workload is distributed around the application structure and takes into account relationships between the clients and servers. There will be two different exchange threads that will take place when clients and administrators interact with the website, as shown in **Figure 31**.

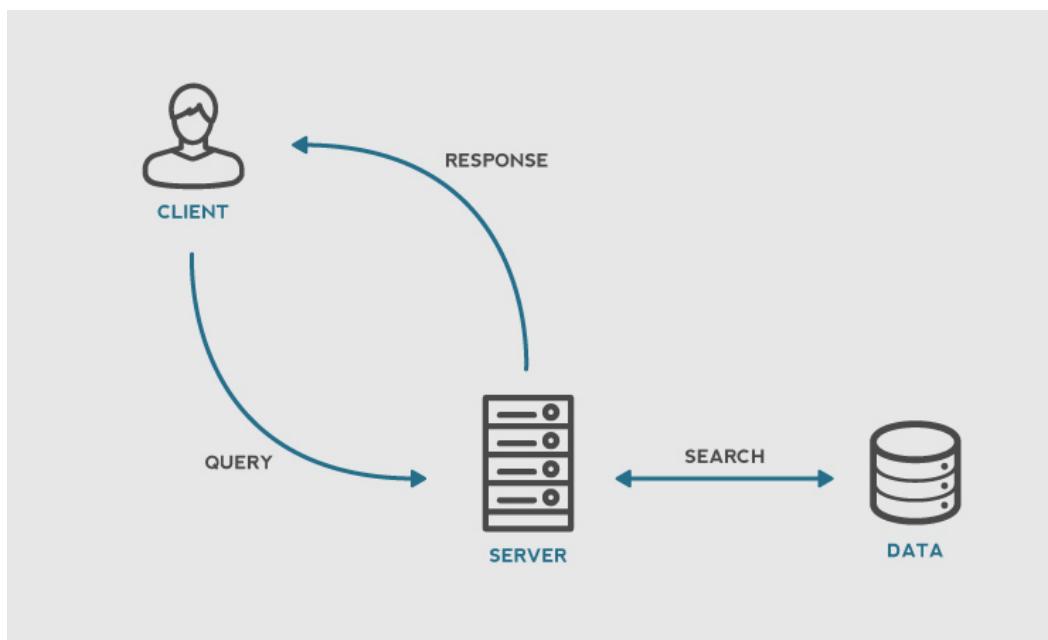


Figure 31 – Client-Server Model Diagram

Clients will interact with 'Access All Areas' in this format:

- Client accesses website
- Client searches a location and venue type
- Query request is passed to the server
- Server locates the file
- Server returns a response to client

3.3.2 – Platform Architecture

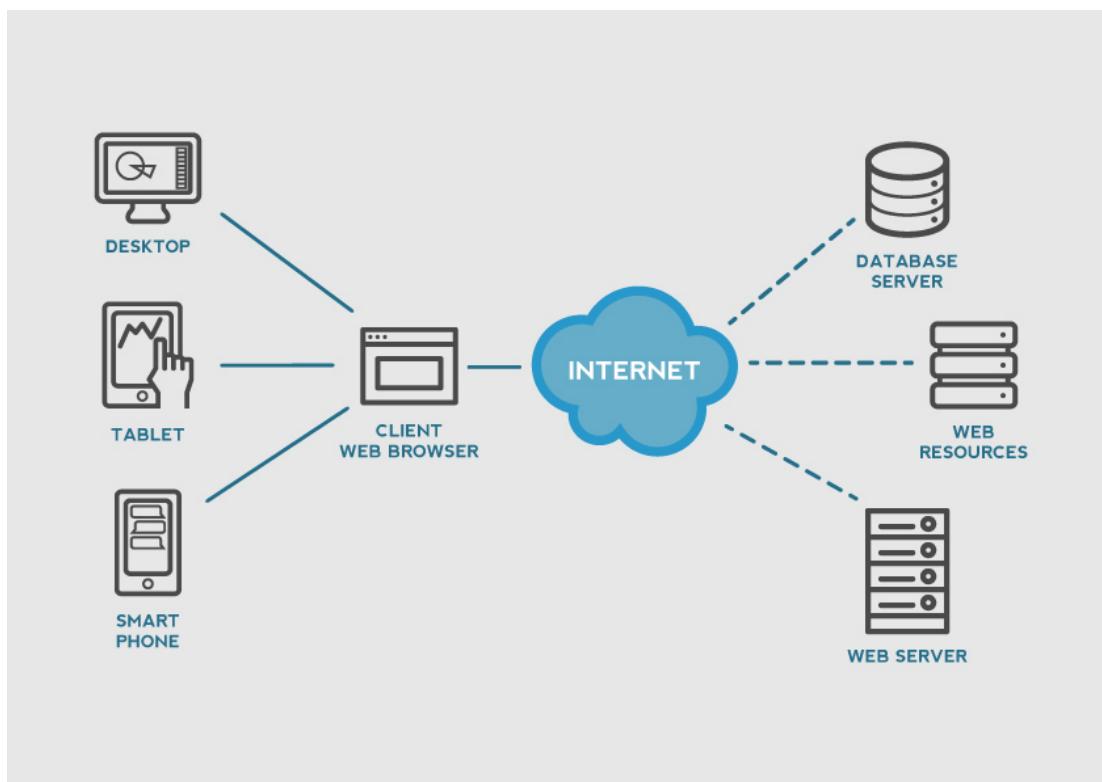


Figure 32 – Platform Architecture for 'Access All Areas NI'

When visualising the platform architecture of 'Access All Areas NI', looking at the website's structure from a hardware standpoint conveys how the user stores data and then how information is then delivered back. It is clear to see the functionality of the hardware components. The website can be accessed on multiple devices through a web browser of the users choice that is connected to the Internet, the web server is used to

host the website and runs the HTML, CSS, JavaScript and PHP. For certain types of functionality on the website there is the need for scripts like those connected to the Google Maps API to have outside access to web resources to display and populate maps with up-to-date information. The database server will receive and save the details of new users of 'Access All Areas NI', and save reviews of venues by users so that they can be presented on the venues page for the community to make informed decisions and help others. The visual representation of this is represented in **Figure 32** above.

3.4 – Data Design

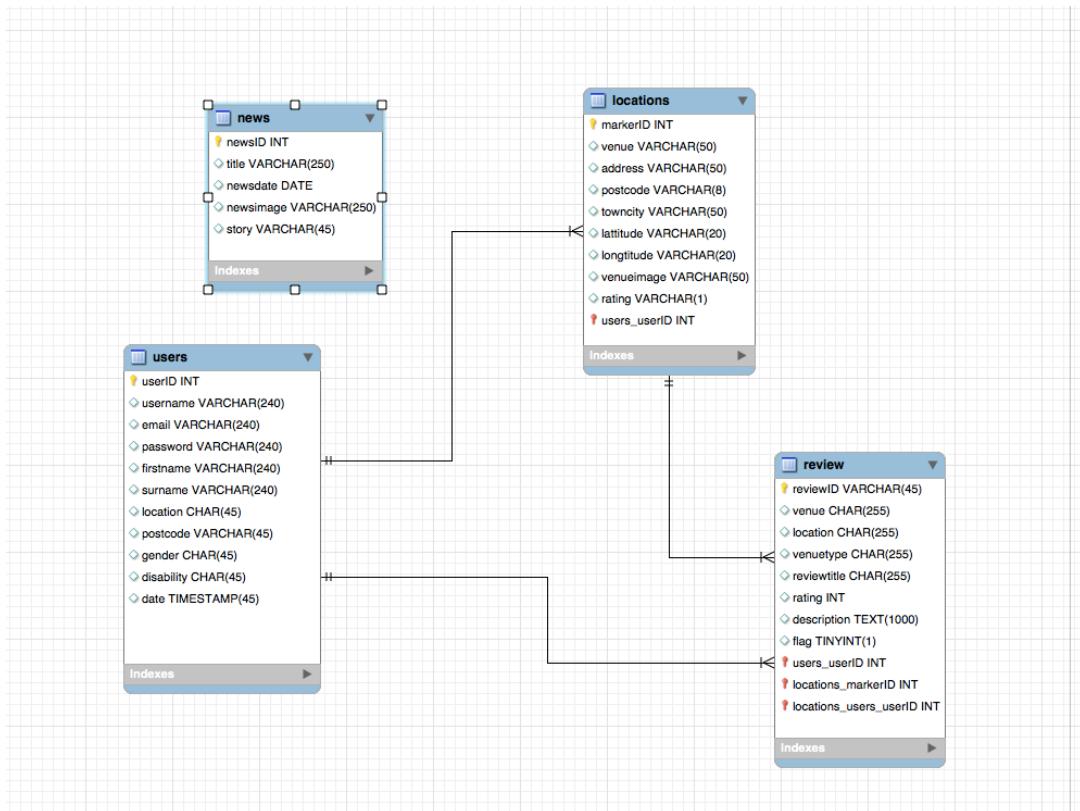


Figure 33 – 'Access All Areas NI' Database ER Diagram

By using the program MySQL Workbench it was possible to create an entity-relationship diagram that displays a graphical representation of the relationships between entities that will be used for the database of 'Access All Areas NI'. Working out the relationships between the entities in the user, venue and review tables (shown in **Figure 33**), shows

that there is a 'One-to-Many' relationship pattern on how data will be stored and connected. For example, it is possible to see that a user can visit many locations (one-to-many) and one location can have many reviews (one-to many). Even though there are only three tables that are connected to each other, it brings a level of organisation to how the database would function and for future referral of any possible changes that could be made.

4.0 IMPLEMENTATION

4.1 – Technology / Tool Selection

One of the most important phases of the project about to be undertaken, having completed the planning approach and the design of 'Access All Areas NI'. Construction of the website would provide the platform for users to register, submit reviews, read news articles and use the map to locate a variety of venues in geographical area of Northern Ireland. After investigating what tools and technology will make all of this functionality possible, the task was set and all of the preliminary effort would be employed to create a product that functions correctly and efficiently.

During the system design section there was already reference made to the tools and technologies. This was a study and research period to become familiarised with what was ahead and read up on the relevant material pertaining to languages such as; PHP that would form the back-end of the system, the framework of Bootstrap that would enable quick creation of the user interface with additional features, and the Google Map API documentation to customise the map feature for the needs of 'Access All Areas NI'.

Beginning with the Google Map, it was one of the first pieces of technology that needed to be comprehended, as not only was there to be customisation of the style of the map but the API needed to be understood, so that the admin was given the ability to post new markers to the map and populate the contents of the infowindow relating to each one.

```

function setMarkers(map, markers) {
    var iconBase = 'img/';
    for (var i = 0; i < markers.length; i++) {
        var sites = markers[i];
        var siteLatLng = new google.maps.LatLng(sites[1], sites[2]);
        var marker = new google.maps.Marker({
            position: siteLatLng,
            map: map,
            icon: iconBase + 'aaa-marker.png',
            title: sites[0],
            zIndex: sites[3],
            html: sites[4]
        });
        var contentString = "Some content";
        google.maps.event.addListener(marker, "click", function () {
            infowindow.setContent(this.html);
            infowindow.open(map, this);
        });
    }
}

```

Figure 34 – Google Maps JavaScript API customisation

In Figure 34 it is possible to see the JavaScript function that sets a new marker on the map and how the sites are stored as variables that can be continuously increased to populate the map. There was also the matter of ‘adding listeners’ to each of the markers so that when one is clicked an infowindow appears that allows custom content on the venue to be displayed. Even when some of the documentation provided by Google was not quite detailed enough, there was a helpful link to ‘StackOverflow’ of developers who were having issues and trying to get certain pieces of functionality working.

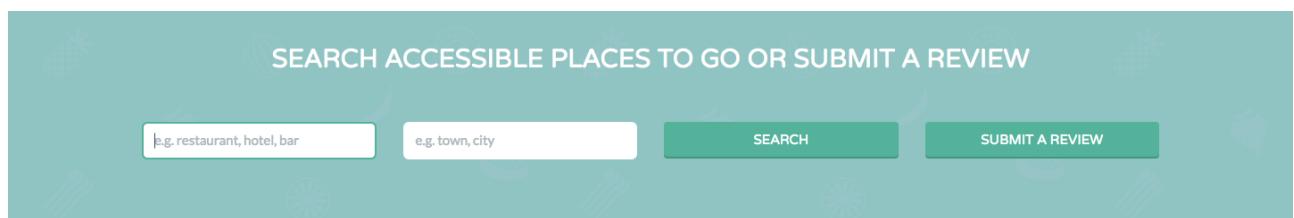


Figure 35 – Bootstrap Responsive Framework Inputs and Buttons

Bootstrap was the main tool used in construction of the front-end of the ‘Access All Areas NI’ website. The main advantage in using this tool is that it provided a solid foundation that standard websites require but have the flexibility to allow enough customisation to make the design personal and distinctive. The responsive grid system that Bootstrap is built upon, allowed the website to be rapidly created for all devices with only a small slice of time needed to troubleshoot at smaller screen sizes and choose an alternative layout.

Bootstrap also offered a lot of component and JavaScript functionality so that buttons and input fields etc. could be quickly styled. The ‘Flat UI’ kit was used in conjunction with Bootstrap to design the user interface of ‘Access All Areas NI’ (as see in **Figure 35**), to create a similar look and feel that of the visual designs produced in Adobe Illustrator (DesignModo, 2014).

4.2 – Technology / Tool Use

With the tools being selected, the next stage was to implement them in creation of the ‘Access All Areas NI’ website. The venue-reviewing platform has to employ PHP and the Google Maps API appropriately if the website is to function as stated in the previous objectives and requirements.

Google Map Markers

```

if($_POST['action']=="location")
{
    $venue = $_POST['venue'];
    $address = $_POST['address'];
    $towncity = $_POST['towncity'];
    $postcode = $_POST['postcode'];
    $latitide = $_POST['latitude'];
    $longitude = $_POST['longitude'];
    $rating = $_POST['rating'];

    $target_dir = "mapmarkers/";
    $target_file = $target_dir . basename($_FILES["venueimage"]["name"]);
    $uploadOk = 1;
    $imageFileType = pathinfo($target_file,PATHINFO_EXTENSION);

    if (move_uploaded_file($_FILES["venueimage"]["tmp_name"], $target_file)) {
        echo "The file ". basename( $_FILES["venueimage"]["name"]). " has been uploaded.";
    } else {
        echo "Sorry, there was an error uploading your file";
    }

    $venueimage=basename( $_FILES["venueimage"]["name"])."jpg"; // used to store the filename in a variable

    $sql = "INSERT INTO locations(venue, address, towncity, postcode, latitude, longitude, venueimage, rating)
VALUES('".$venue."','".$address."','".$towncity."','".$postcode."','".$latitide."','".$longitude."','".$$venueimage."','".$rating."')";

    if ($conn->query($sql) == TRUE) {
        $message1 = "Mapmarker Submitted!!!";
    } else {
        $message1 = "Error: " . $sql . "<br>" . $conn->error;
    }
}

```

Figure 36 – Location Form

Figure 37 – PHP Post Location

After the decision was made to use the Google Maps API as a tool, the task was then set on providing a method of making it functional. The map was populated with co-ordinates to position the map marker and information that is presented when a user clicks on the marker to see details on the reviewed venue. The first part of this task was to collect the information from an input form on the administration page that would convert the data into variables and then posted into a database, which was all made possible by PHP. It is possible to see in **Figure 37**, how the PHP code is able to collect the information from the ‘location’ form, especially the latitude and longitude, as they will decide where the

marker is placed on the map. Venue image upload is included, where the image is stored in an upload folder and a path is stored in the database for reference when it is to be displayed later in the ‘homepage’. When the submit button is clicked, the data is posted to the ‘locations’ table in the database, waiting to be called at a later stage.

```
$sql = "SELECT * FROM locations";
$result = $conn->query($sql);
$i = 1;

while($row = $result->fetch_assoc())
{
    $venue = $row['venue'];
    $address = $row['address'];
    $towncity = $row['towncity'];
    $postcode = $row['postcode'];
    $latitude = $row['latitude'];
    $longitude = $row['longitude'];
    $venueimage = $row['venueimage'];
    $rating = $row['rating'];
}
```

Figure 38 – Retrieve Location Data

```
'<?php echo ($venue)?>, <?php echo ($latitude)?>,
<?php echo ($longitude)?>, <?php echo ($i)?>
'<?php echo ($venue)?></p><p class="infowindow"><?php echo ($address)?></p>
<p class="infowindow">Rating: <?php echo ($stars)?></p>
'],
    <?php
    $i++;
    }'
```

Figure 39 – Google Map Echo

In the both **Figure 38 & Figure 39**, it is possible to see how all of the data is selected from the ‘locations’ table and the variables are declared again. This is in preparation for the variables to be echoed out and put in the same format that the Google Maps script posts a new marker on the map. The first few variables such as \$venue, \$latitude, \$longitude and \$i all pertain to the actual map marker, whilst the rest of the variables are echoed out into the infowindow and display all of the extra information when a marker is clicked on. In **Figure 40** below, it is possible to see how the Google Maps is using PHP to generate content saved to the database for display in the ‘homepage’ feature. This functionality was extremely important in working out how Google Maps API could be customised for the needs of ‘Access All Areas NI’ and exploited as an integral user experience feature.

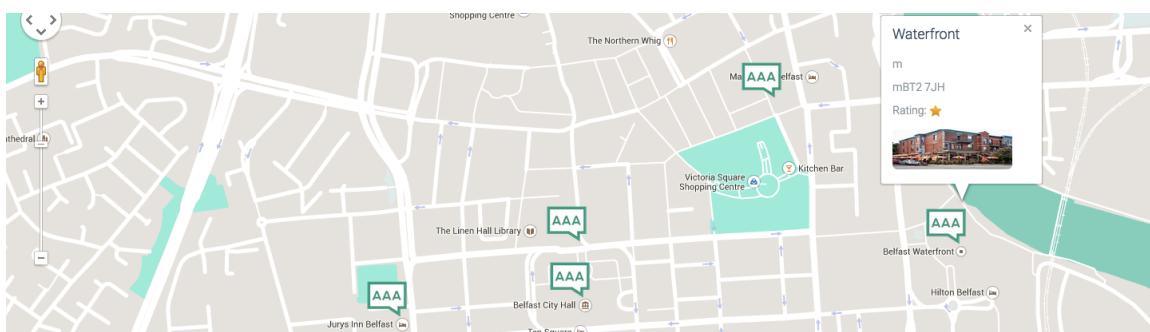


Figure 40 – Google Maps Feature

4.3 – Notable Challenges

There were a few notable challenges that had been laid out at the beginning of the formation of 'Access All Areas NI'. To realise the final product these challenges had to be prevailed and although the tasks seemed daunting to begin with, by completing the research and developing problem solving skills, the languages, framework and API became much easier to deal with.

One of the first main obstacles encountered was the PHP language and communicating with the database to post and retrieve data. PHP is a server-side scripting language that would enhance the product and allow users to register to the website, post reviews and be able to see reviews posted by other users. PHP would provide the administrator with the ability to upload content to the map, post news stories and edit reviews and profile where necessary. Getting a basic grasp of PHP in the very early stages of the project, made the harder aspects of the code easier to understand. When a stumbling block was encountered, it was easier to cope with by visiting StackOverflow where people with similar problems can resolve issues and seeing the possible alternatives of getting a function to work properly.

Another notable challenge that was encountered was the ability to display multiple map markers with InfoWindows in the Google Map feature. The problem to start with was the InfoWindows would only display the last one, so some method needed to be found that would create an array for the InfoWindows, bind each one to a marker and display the information correctly. Google did not provide any documentation online regarding this issue, so being able to alter the JavaScript to be able to do this was another test on the way to attaining the functionality needed. Again after several days of troubleshooting on StackOverflow the issue was resolved and the importance of familiarising with the JavaScript code early in the project was effective.

4.4 – Notable Achievements

During the creation of 'Access All Areas NI' there were many achievements that pride could be taken from. Producing a fully functional accessibility-reviewing platform was the main aim. By achieving successes along the way regarding functionality, it helped to accomplish the more daunting aspects of the project.

After completion of the website and having all of the functionality working correctly, it is possible to see that the effort gone into researching and developing the product has paid off. The goals that had been set from possessing only a very basic knowledge of PHP to begin with, to producing a fully functioning review system that a user is able to explore and make informed decisions about where they socialise is an achievement that pride can be taken in. The PHP implemented in the system is able to function in many different ways; being initially able to 'register' on the system and then 'log in' and create a user session using the correct credentials, also the user is then able to populate the reviews with their own experiences to share with others and additionally the administrator has the ability to edit and delete profile and review information. At the beginning it was quite hard to see how creating all of this would be possible, but breaking down the larger scale of project into smaller tasks meant that with each milestone another success could be appreciated.

After enjoying the visual design of the product in Adobe Illustrator, there was some apprehension in using Bootstrap for the first time and if it was possible to achieve a design and layout that was representative of the initial UX design. As the feedback received from the design department had been positive up until that point, being consistent was incredibly satisfying while also being able to get to grip with a framework that until the implementation stage was something that was a leap into the unknown. Even more rewarding is that the website in some places has turned out better than expected and it was down to the curiosity of wanting to work within a new framework.

5.0 TESTING

5.1 – Testing Approach Selection

After constructing and developing the functioning ‘Access All Areas NI’ website, the next phase in the project that needed to be accomplished was the testing of the system. This is an essential part in creating a successful a website, particularly when the amount of pages include different features and there is a certain amount of intricate coding elements being carried out in the back-end of the system. The main aim is to eradicate any bugs in the website before it is released into the public domain, which could cause major problems and give a negative image of the brand before it has been given the chance to establish itself. Not only could testing help in the discovery and removal of bugs or errors in the system, but the user feedback could be used to iron out any issues the design of the user experience and how to best change certain elements on the website to accommodate the testers feedback. When the sufficient amount of testing has been achieved, the data will be studied to provide information on what components need the most attention. There are a number of different tools that could have been used in the testing phase; the key was to choose a testing method that was appropriate for ‘Access All Areas NI’ that would benefit the project, considering the time constraints in place for the project deadline and the amount of people that can give up their free time to test the website.

White Box Testing

‘White Box Testing’ was the initial method chosen, as it is based more on the internal structure of the code and checks whether the system meets the requirements that were first outlined in the specification report. The white box test user will have some test cases, where an input of some kind will be put into the system and inspecting the output. The test user had to have an implicit knowledge of the internal system, as this form of testing went beyond the user interface, to make sure that the system was working correctly ‘under the hood’. The functionality of the product in the back-end and ensuring that the

data can be submitted and retrieved from the database correctly using PHP is an important objective on the way to creating a robust and successful website for the user (Redstone Software, 2008).

Black Box Testing

'Black Box Testing' is another form of testing that needs to be fulfilled for the 'Access All Areas NI' website to fully meet its requirements. This approach considered the system to be a 'black box', so the implicit knowledge of the internal system required before was not essential. Significant attention was placed on the functionality of the website in its entirety, to make sure that the system behaved in the way that was expected and display of the outcomes are visible to the test user. Test cases needed to be provided to the test user, to assess each procedure and see if the result was either successful or a failure (Redstone Software, 2008). It was a much simpler to find test users for this testing approach as there were no knowledge of specific coding languages or structures needed. Employing Black Box was an advantage because the designer and the tester were separate of each other, permitting an unbiased test.

System Usability Scale (SUS)

Implementing the 'System Usability Scale' as the final alternative approach to testing, as it provided a reliable tool for measuring usability on the 'Access All Areas NI' website. The questionnaire consists of ten questions that the user answers on a scale, with five different response options ranging from 'Strongly Agree' to 'Strongly Disagree'. This allowed for an evaluation of the system on first impressions as the test users were encouraged to record their immediate to each item, rather than over-thinking the question and spending a long period of time mulling over different elements. The main advantages of considering this approach; is that it could be administered to participants without a lot of explanation, the results of the test are reliable even on a small sample size and the

validity of SUS is that it can successfully separate usable and unusable systems (Brooke, 1996).

5.2 – Test Process

With three different types of testing being chosen and explored to make sure that they were applicable for the needs of 'Access All Areas NI', and the testing process was able to begin. As each test was completed any issues would rise to the surface and become apparent, so that they could be resolved before the venue-reviewing platform would be released into the public domain.

White Box Testing was the first method used to test the system; this procedure was carried out consistently during the development of 'Access All Areas NI' as well thoroughly testing at the end to confirm that all of the PHP functionality was working correctly. If this was not the case the output being displayed would have either displayed the incorrect information or failed to work at all. Testing along the way by echoing out the SQL statements on to the page was an excellent way to monitor the input forms and check to see if the variables were being gathered to send and update the database, which can be seen in **Figure 41** (with white box testing continued in Appendix E).

The screenshot shows a web-based application interface. On the left, there is a code editor window containing the following SQL UPDATE statement:

```
UPDATE users SET username = 'RoisinCowan',
firstname = 'Roisin', surname = 'Cowan',
location = 'Newry', postcode = 'BT35 8LR',
disability = 'Blind' WHERE userID = '36'
```

Below the code editor is a dark header bar labeled "User Credentials". To the right is a database table titled "users" with the following columns: userID, username, email, password, firstname, surname, location, postcode, gender, and disability. The table displays four rows of data. At the bottom of the interface, there is another code editor window showing the same SQL UPDATE statement, indicating it has been echoed back from the database.

userID	username	email	password	firstname	surname	location	postcode	gender	disability
38	IreneMooney	irenenmooney@hotmail.com	password	Irene	Mooney	Newry	BT35 8LR	Female	Blind
36	RoisinCowan	roisincowan@me.com	password	Roisin	Cowan	Newry	BT35 8LR	Female	Blind
37	nicholasmurray	nicholasmurray@gmail.com	password	Nicholas	Murray	Newry	BT35 8LR	Male	Deaf

Figure 41 & 42 – Echoed SQL Statement & Database

While in **Figure 42**, it was possible to check the 'users' table in the database through 'phpMyAdmin', to see the rows of users being correctly submitted through the system. Using this method enabled the success of the website, as if there was any doubts

between the validity of the code or whether the connection to the database had failed could be visually assessed and rectified. This white box testing helped to improve the finding of any errors and towards the end of the project the issues were small in numbers.

5.2.1 – System Usability Scale Survey

The System Usability Scale (SUS), shown below, (Brooke, 1996) has a selected number of statements that are designed to cover a wide variety of aspects in the 'Access All Areas NI' system. The individual statements are not principally significant when isolated and are generally relevant regardless of technology, but the sum of the 10 readings together led to a general measure of the perceived usability of the system.

1. I think that I would like to use this system frequently	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					Strongly agree
	1	2	3	4	5	
2. I found the system unnecessarily complex	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					Strongly agree
	1	2	3	4	5	
3. I thought the system was easy to use	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					Strongly agree
	1	2	3	4	5	
4. I think that I would need the support of a technical person to be able to use this system	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					Strongly agree
	1	2	3	4	5	
5. I found the various functions in this system were well integrated	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					Strongly agree
	1	2	3	4	5	
6. I thought there was too much inconsistency in this system	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					Strongly agree
	1	2	3	4	5	
7. I would imagine that most people would learn to use this system very quickly	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					Strongly agree
	1	2	3	4	5	
8. I found the system very cumbersome to use	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					Strongly agree
	1	2	3	4	5	
9. I felt very confident using the system	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					Strongly agree
	1	2	3	4	5	
10. I needed to learn a lot of things before I could get going with this system	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					Strongly agree
	1	2	3	4	5	

5.3 – Test Results

Testing the ‘Access All Areas NI’ website across the different web browsers was another stage of the testing process that needed to be examined. This ensured that the product was consistently functional across the major browsers that are available, such as Google Chrome, Safari and Mozilla Firefox. There can be aspects of functionality that do not work in the same way across all of the browsers, so by taking into account that discrepancies that like these could creep in, the goal was to keep the user experience on each to a high standard with no significant differences. All of the different areas of functionality needed to be tested to prove the reliability of the project. Fortunately browsers in recent years have become more standard compliant making websites easier to develop for all. The browsers chosen for testing were the three available on iMac.

- Chrome – During the creation of the website Google Chrome was the designated browser that the website was being tested in. All of the design and features presented in Chrome would become the standard that other test browsers would need to comply with; as the rendering of fonts, jQuery animations and layout were executed perfectly in the implementation stage.
- Safari – The browser supplied by Apple was another platform that had to be tested on, considering its popularity across desktop, tablet and mobile devices applications. Apart from some very small font rendering issues, the website user experience was to the same high standard as the Chrome browser.
- Firefox – The final browser that needed to be tested, but with a lower proportion of users than Chrome or Safari, was Firefox. Again the issues were not in any great abundance, but a few niggles need to be corrected for cross browser consistency.

The Bootstrap framework played a significant role in the cross browser consistency of the user experience and made the implementation an effortless task and was time efficient and therefore the considerable time saved could be spent on other important matters.

After completing the white box testing and further investigation into the System Usability Scale, the black box testing could then be reviewed on some of the principal functionality that 'Access All Areas NI' provides to the user. It was highly important that the functions worked correctly and suitably to meet the users needs. If there were any failures in the black box testing then further scrutiny would need to go into why this was the case and if this was a bug or an error in the coding of the website, shown in the testing below.

Test ID	Test Name	Description	Expected Results	Actual Results
Test 1	Signup	User completes registration form and clicks the button to submit	Signup successful with user being redirected back to home page	Signup successful

Test ID	Test Name	Description	Expected Results	Actual Results
Test 2	Login	After user has completed registration, login is possible by submitting email and password	Login successful with user being redirected to home page with username displayed	Login successful

Test ID	Test Name	Description	Expected Results	Actual Results
Test 3	Write Review	User writes a review of experience of venue and clicks button to submit	Review submission successful with user being redirected to review page	Write review successful

Test ID	Test Name	Description	Expected Results	Actual Results
Test 4	Search venues by type	User search venues by type by inputting venue category and location, then submitting	User is redirected to review page where the values will retrieve the desired venues	Search venues by type successful

Test ID	Test Name	Description	Expected Results	Actual Results
Test 5	Populate map feature with venues	Admin completes location posting form and clicks button to submit	Google Map is populated with markers and venue information	Population of map successful

5.4 – System Usability Scale (SUS) Responses

After users had been given the opportunity to use the 'Access All Areas NI' website, the System Usability Scale (SUS) survey was administered to different people so that results could be collected and investigated. The SUS survey permitted a good measure of usability, which is determined by covering three different factors:

- **Effectiveness** - Measures the ability of users to complete tasks using the system, and the quality of the output of those tasks.
- **Efficiency** – Measures the level of resource consumed in performing tasks.
- **Satisfaction** – Measures the users' subjective reactions to using the system.

To provide the best results and get a true interpretation of what the users thought of the website, five surveys were sent out to members of the public, who would potentially avail of this reviewing platform in the future. Taking into account the responsive nature of the website and how consideration was taken to make sure the user experience was consistent across all browsers, three users where each asked to test 'Access All Areas NI' on a particular browser, with the three choices consisting of Google Chrome, Safari and Mozilla Firefox. The other two users where asked to test on different devices, with one testing on tablet and the other on a smartphone.

6.0 EVALUATIONS

6.1 – System Usability Scale Survey Results

After completing the SUS survey with the five different users, the next stage was to interpret the scores. The participating users scores for each question on the survey are converted to a new number by making a quick calculation, and then adding the final number up and multiplying it by 2.5. There is a score determined between 0-100, the result is not deemed a percentage but a percentile. To achieve an 'A' grade for the usability of 'Access All Areas NI' the score needed to be above 80 to get into the top 10% of scores. Reaching an A grade is also the point where users are more likely to

recommend the product to a friend. The users scores presented below in **Figure 43** show that all of the scores achieved the highest grade and over the five users there was an average score of 86.5 (completed SUS surveys included in **Appendix F**).

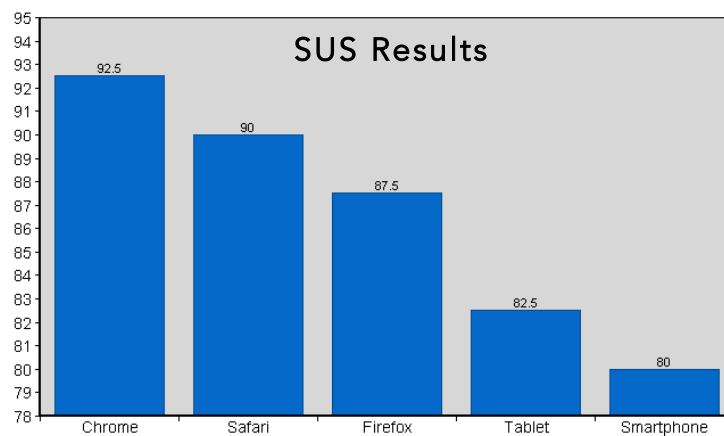


Figure 43 – System Usability Scale Results

There was a noticeable trend in the results that was interesting to examine. The highest result was reached when the user tested the usability on Chrome, with the scores decreasing with each new browser but still remaining quite high. The usability decreased slightly for the tablet and smartphone but this is to be expected as the website had to work within smaller screen parameters, but the user experience also still remained in the A grade bracket which was satisfying. In **Figure 44**, the graph presents how the percentile ranks relate with the System Usability Scale scores and letter grades.

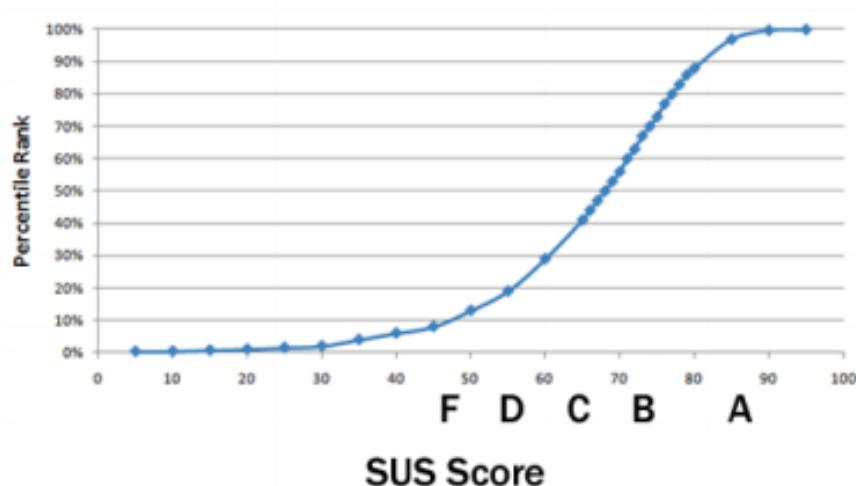


Figure 44 – System Usability Scale Ranking

6.2 – Evaluate Project Outcomes

As the conclusion of 'Access All Areas NI' neared with all of the design, implementation and testing finally completed, the next step was assessing the final project to see if it had met its original objectives and requirements. This was important to gauge the success of the website. Being able to reflect on the project in this way gives an indication of where improvements could be made along the way, but also the successes that were achieved by having a clear plan and being able to sustain it from start to completion.

One of the main aims stated at the very beginning of the project was "*To create a review website catering towards disabled people and carers that focuses on the accessibility of venues in order to provide people with information that will empower them by allowing them to make informed decisions when planning trips, with the overall goal of increasing their confidence and participation in social and cultural activities.*" Throughout the creation of 'Access All Areas NI' this aim had always been at the forefront of every consideration taken on what features needed to included on the website, how the layout would be designed for ease-of-use and in which way the review system would gather information and display it back to other users in a clear and helpful manner. After completing the testing and evaluating the results form the SUS survey, it was clear to see that the usability of the website was greeted with a positive response which was a key element all along.

On reflection, focusing on the original five objectives for the project to be a success was the perfect way of breaking down the system into smaller sections. Achieving these milestones rather focussing solely on the end product, which at times seemed to be quite distant, was a good way to maintain momentum when undertaking the project. Considering the timescale that had to be adhered to, the amount of functionality included for a great user experience and the overall appearance of the website, 'Access

All Areas NI' can be deemed successful. There were no apparent oversights to be remarked upon and implementation of website ran smoothly as significant effort was put into the planning and development in the early stages of the project.

6.3 – Evaluate Methodology

With the 'Waterfall' methodology being chosen during the concept definition and testing stage, it was now possible to evaluate the implementation of this methodology for 'Access All Areas NI'. One of the main advantages of using this system to complete the project on time was the rigidity of the model. This made the managing of all that needed to be completed easier as each phase had particular deliverables. Another advantage was that each of the phases was completed one at a time. This meant there was no overlapping, which in other methodologies can prove to be a confusing process that hinders project being completed on time. Prominence being put on the requirements and design before the implementation and coding of 'Access All Areas NI' led to a significant amount of time and effort being saved and the tight schedule being kept on track, as completing this phase earlier on the process allowed for flaws to be recognised and corrected before the testing phase.

6.4 – Evaluate Plan

The Water Methodology Gantt Chart (Figure 9) included during the concept definition and testing stage, with a time plan of all the stages that needed to be accomplished, contained a break down of all of the different smaller sections that needed to be fulfilled in order to successfully complete each task. When the Gantt chart was being created, research and investigation was put into all the deliverables that were expected, as well as the time there was to complete the project by, so a well-defined schedule could be devised and could be trusted. By keeping production of 'Access All Areas NI' to this strict timing schedule, the management of the project was effective and all of the smaller sections were achieved to a higher standard as older issues were already concluded at

particular dates as dictated in the chart. This in turn led to a much better end product for the user.

7.0 CONCLUSION

7.1 – Summarise Report

'Access All Areas NI' consisted of many different stages that needed to be completed to make sure a successful project was achieved by planning effectively, developing competently and implementing efficiently. In the introduction of the report the challenge of what needed to be created was established and the aims and objectives of the project were determined. Once all of the aims and objectives had been conceived the next stage that followed was that of defining the concept. In this section of the report emphasis was placed on investigating the initial concept more and being able to consider all of the functional and non-functional requirements that needed to be recognised and delivered to the end user. As the functional requirements were fundamental to the success of 'Access All Areas NI', making sure that they were achieved was the main goal to creating a website that is able to function even in its most simple format.

The next stage that had to be examined further was the design stage that went into achieving the layout and aesthetic of the product. Initially beginning with paper prototyping helped to determine the website layout, navigation, interface and functionality, before sitting down at a computer and starting to code. This was followed by 6-Ups and wireframing to develop rough initial sketches into wireframes that were more comprehensive in detail. With the design stage finally culminating the creation of the user interface to create a great user experience for the 'Access All Areas NI' users.

With the website being fully implemented, a certain amount of testing need to be fulfilled in order to make sure that the product functioned correctly and any issues could be resolved before release to the public. Without testing and then evaluating the results, it

would have been hard to identify if 'Access All Areas NI' has the potential to be a success and also where improvements can be made to refine the system.

7.2 – Reflect On What Happened

When first starting out on the project there were many challenges that were set regarding the implementation of the PHP language to create a review platform that could communicate with a database and provide a service to people with accessibility needs to make informed choices. Planning the project beforehand with time deadlines on each stage really provided an incentive to complete work on time and alleviated stressful situations by having another goal or target marked off the 'to-do list'. There is also the question of what could have been done differently. With hindsight some stages could have been planned better to create an even better product, but with the tests results there is a sense of pride that can be taken from the achievement of creating the fully functional 'Access All Areas NI' website.

7.3 – Reflect On Your Role

From the beginning of the project, there has been significant effort put into all elements whether it was reporting writing, designing on paper, creating mock-ups in Adobe Illustrator, coding of the website, to conducting tests. Attaining a high standard in all of these different areas was the fundamental goal. Some of the particular areas were a struggle, but by putting in extra effort by researching and for example learning more about PHP and APIs the sense of accomplishment was much more rewarding. With an expanded skillset now achieved through working on this project, going out into the professional world does not seem to be as daunting a task. The feeling is that 'Access All Areas NI' has helped equip me with more knowledge and experience for the future to make websites of a high standard.

7.4 – Suggest Future Work

With 'Access All Areas NI' finally released, there is always the option to develop the website further and make improvements that the timescale would not allow for. There are many possible ideas that can be floated, but they also need to done for the right reason of making the users experience better. One aim, would be for the user to be able to populate the venue information to the Google Map dynamically without the need for the administrator to fill this role, by 'geo-tagging' the image, the latitude and longitude co-ordinates could be extracted to from the image to place the marker on the map. Another other possible improvement that could be made, is the creation of a native app for iOS and Android devices. In the usability tests although the scores were quite high, there was a slight dip in the usability of tablet and smartphone devices. This is a potential possibility but would need a lot of research and investigation into different coding languages and designing specifically for the vast array of devices available and the operating system that they function on.

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9.0 APPENDIX

Appendix A – End User Requirements

Requirement 2: Account Login	
Description:	Ability for users to login to existing account.
Logic:	Each user will be able to contribute to the website via their own personal profile.
Dependencies:	Requires an existing account to be present in the database.

Requirement 3: Edit Profile	
Description:	Ability for users to edit the already existing profile.
Logic:	Each user will be able to update personal details.
Dependencies:	Requires the ability to login to account and make changes to personal details already stored in the database.

Requirement 6: Observing Reviews	
Description:	Ability for users to read other users reviews.
Logic:	Users of the website will be able to observe the reviews left by others. This information will be available to every visitor and you will not need to be logged in to view it.
Dependencies:	Requires reviews to be displayed in an organised format that can be easily accessed.

Requirement 7: Map Venue Location	
Description:	Ability for users to find a venue by interacting with Google Map feature.
Logic:	Each user will be able to quickly access information on venues in Northern Ireland, enhancing the user experience.
Dependencies:	Requires location to pinpoint on the geographical area of Northern Ireland and generate venue information accordingly.

Requirement 8: Search Function	
Description:	Ability for users to search for venues according to category and/or location.
Logic:	A user can search for venues for a future trip depending on what activities they want to do and where they are going.
Dependencies:	Requires the user to search for reviews based on the parameters of location and venue type.

Appendix B – Requirements Specifications

Functional Requirements

In order for the product to function both efficiently and effectively, there are some system requirements that must first be established:

- System permits the user to register a profile.
- System permits the user to log into an account.
- System permits a registered user submit a review.
- System permits a registered user to edit or delete a review.
- System permits a registered user or visitor to locate a venue interactively.
- System permits a registered user or visitor to search by venue and location.
- System permits a registered user or visitor to read a review.

Non-Functional Requirements

Usability

- The product shall be easy to use, particularly for those with disabilities.
- The product shall be simple to navigate and find information efficiently.
- The product shall use symbols and words that are understandable by its intended users.

Performance

- The product shall attain high standard of up time.
- The product shall be capable to support venue reviews, venue ratings and images.
- The product shall be scalable as geographical demands increase.
- The product response times shall be quick, to avoid disrupting the user's flow of thought.
- The product shall be accurate with locations of venues using the information provided.

Look and Feel

- The product shall have an appearance that is contemporary and modern.
- The product shall have a colour scheme that is evocative of the content.
- The product shall use typefaces and colour contrasts that enable information to be easily read.

Operational

- The product shall be able to operate in the last two releases of current browsers, including Chrome, Safari, Firefox, Internet Explorer and Opera.
- The product shall only let users with a profile review a venue.
- The product shall let any user, whether registered or not, to read reviews.
- The product shall function on a variety of devices including computer, tablet and smartphone.

Maintainability and Support

- The product shall have a low level support system; the user can get help or raise an issue via email if necessary.

Security

- The product shall only allow access to a profile via username and password verification.
- The administrator shall monitor incorrect data being posted about a venue.
- The product shall protect user data from hacking by putting in place sufficient security measures.

Legal

- The product shall be strict on the subject of sharing personal information to comply with Data Protection Act.

Appendix C – Questionnaire

I am currently developing a website to cater for people with disabilities who have trouble finding out information about venues or public areas before planning a trip or social event. The purpose of this questionnaire is to find out any issues and provide a better product depending on the users requirements:

Q1. Have you ever struggled to find information about disabled access of a venue or public place before visiting?

Yes []

No []

Q2. Have you ever had an issue with misinformation of a venue or public areas, which has led to problems?

Yes []

No []

Q3. Are you usually happy with the level of accessibility that venues and public areas provide?

Yes []

No []

Q4. In your opinion which venues or public areas would you class as having a '**good**' level of accessibility?

- Restaurants** []
Cinemas []
Hotels []
Cafes []
Museums []
Shops []
Sport Venues []
Airports []
Train Stations []
Other []

Q5. In your opinion which venues or public areas would you class as having a '**poor**' level of accessibility?

- Restaurants** []
Cinemas []
Hotels []
Cafes []
Museums []
Shops []
Sport Venues []
Airports []
Train Stations []
Other []

Q6. Are you more likely to return to venues or public areas that have a good level of accessibility?

- Very Likely** []
Likely []
Not sure []
Not relevant []
Other []

Q7. Who do you travel to venues or public areas with?

- Friends and family** []
Carer []
By myself []
Other []

Q8. What factors influence your choice when visiting a venue or public areas?

- Car parking nearby** []
Accessible toilet []
Mobility around venue []
Staff are helpful & friendly []
Other []

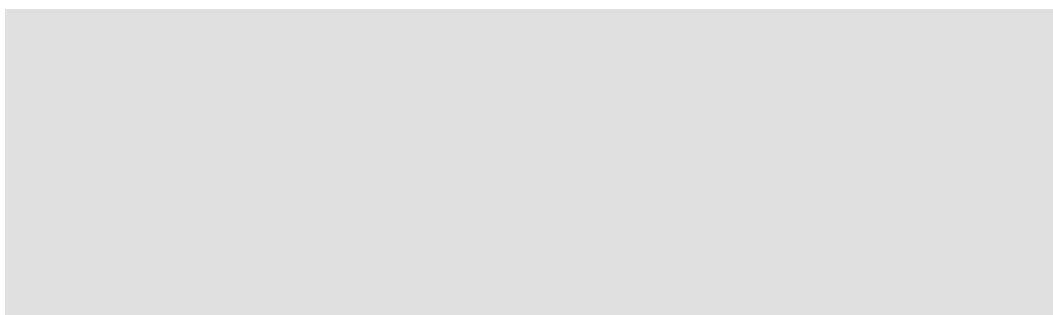
Q9. How do you find out information before planning to visit a venue or public area?

- Venue Website** []
Word of mouth []
Phone venue []
Paper/Magazine []
Social Media []
Community Group []
Other []

Q10. Are you...

- A disabled person** []
Family Member []
Friend []
Carer []
Teacher []
Social Worker []
Other []

Anything else you wish to tell us:



Appendix D – Style Tiles

Style Tiles were used to generate 3 different ‘looks’ for the ‘Access All Areas NI’ project. This stage is not focused on the layout of the website, rather it is more concerned with the ‘style’ of it. This means different combinations of colours, fonts and textures are presented and considered in order to assess what will correlate most effectively with the aims and objectives of the website.

Version 1 (see **Figure 45** below) uses soft and engaging colours. Green is the most prominent colour, making the website seem fresh and welcoming. The fonts are easy to read and complement one another. The use of serif fonts makes the design feel personable.

Version 2 (see **Figure 46** below) used a darker, stronger scheme, based around a dark aubergine colour. This creates a more authoritative style. This has been balanced by using a selection of fonts and that are neutral in appearance.

In **Version 3** (see **Figure 47** below) Experimentation has begun with a high impact style. Using striking colours such as black and yellow and sans serif fonts. Achieving a greater contrast with the colours and textures to create a more commanding style.

Overall, Version 1 is most effective in trying to make a website that is inviting and friendly so that people will feel confident in the information provided and comfortable when engaging with it.

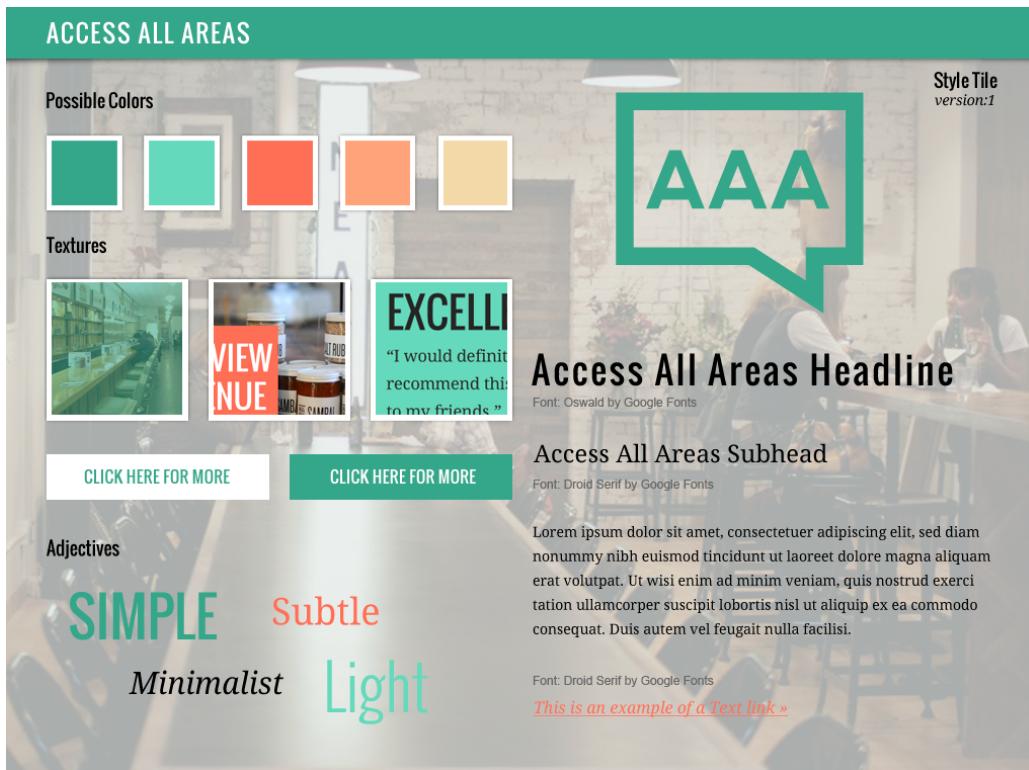


Figure 45 – Style Tile Version 1

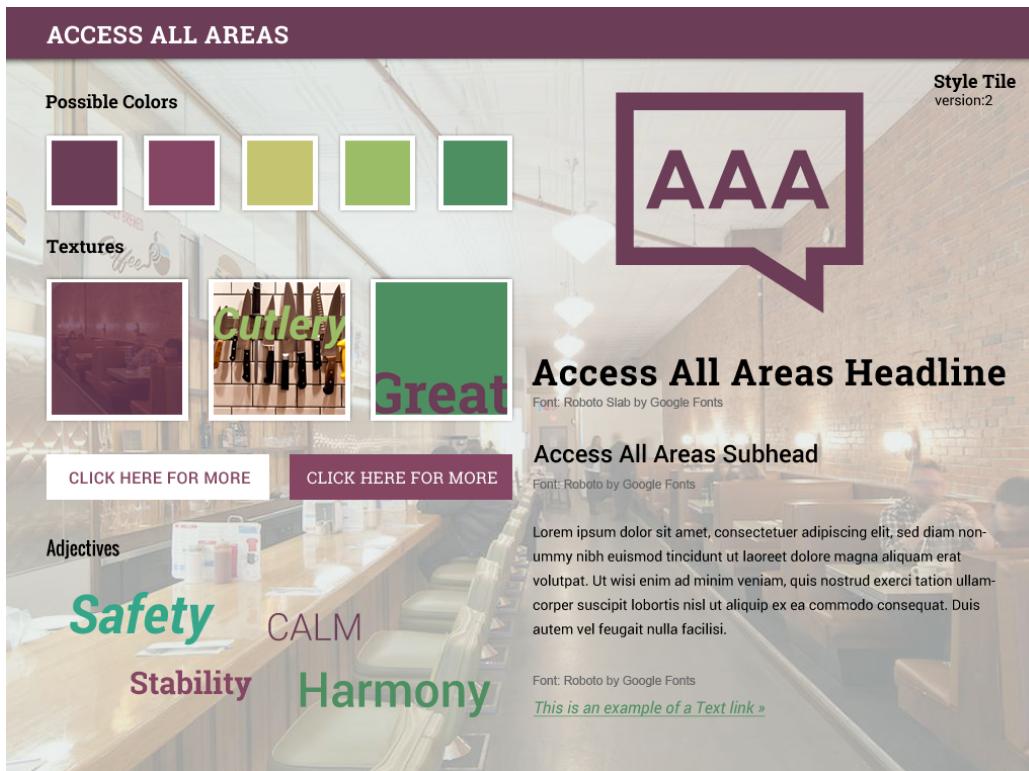


Figure 46 – Style Tile Version 2

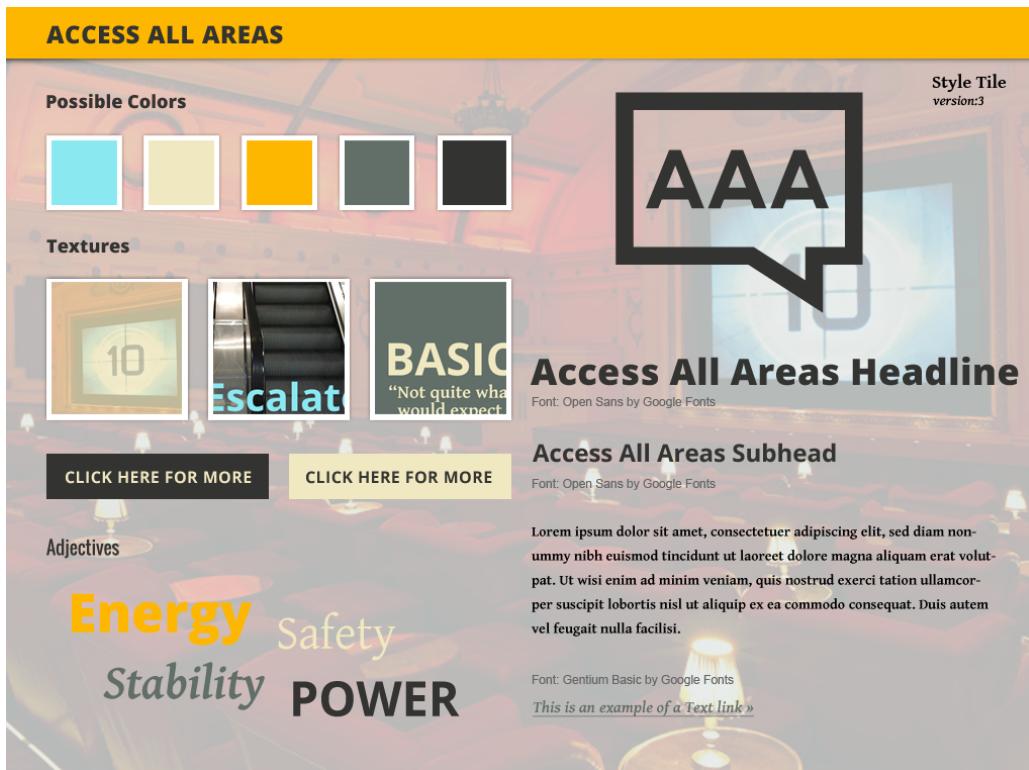


Figure 47 – Style Tile Version 3

Appendix E – White Box Testing

Test ID	Test Description	Expected Outcome	Actual Outcome	Pass/Fail
Test 1	IF statement executes correctly when user tries to register	It is expected when a new user submits their details an IF statement will execute. Success message show if details submitted correctly. ELSE an error message displayed.	The actual outcome of this test is the same as expected	Pass

Test ID	Test Description	Expected Outcome	Actual Outcome	Pass/Fail
Test 2	IF statement executes correctly when user tries to login	It is expected when a new user submits their login details an IF statement will execute. Success message show if login match details in database allowing login. ELSE an error message displayed and login denied.	The actual outcome of this test is the same as expected	Pass

Test ID	Test Description	Expected Outcome	Actual Outcome	Pass/Fail
Test 3	Logged in users session continues as user moves from one page to next	It is expected that the users session created at login will be maintained over multiple pages. With username being displayed in the nav bar.	The actual outcome of this test is the same as expected	Pass

Test ID	Test Description	Expected Outcome	Actual Outcome	Pass/Fail
Test 4	IF statement executes correctly when user is logged a new button is presented	It is expected that when the user is logged in an IF statement will execute. The session is recognised and a 'sign out' button is displayed. ELSE session non-existent 'sign in' button displayed.	The actual outcome of this test is the same as expected	Pass

Test ID	Test Description	Expected Outcome	Actual Outcome	Pass/Fail
Test 5	IF statement executes correctly when admin adds map marker	It is expected that when the administrator submits map marker details to the database an IF statement will execute. When details are inserted in to the 'locations' table is equal to TRUE a success message is displayed. ELSE error message is displayed.	The actual outcome of this test is the same as expected	Pass

Test ID	Test Description	Expected Outcome	Actual Outcome	Pass/Fail
Test 6	IF statement checks for review and allows to delete by reviewID	It is expected that when the admin deletes a review an IF statement will execute. When reviewID is equal to review record held in the database it will be deleted.	The actual outcome of this test is the same as expected	Pass

Test ID	Test Description	Expected Outcome	Actual Outcome	Pass/Fail
Test 7	Update posted to the database and review details are set with new values	It is expected that when the admin updates a review an IF statement will execute. New review details will be updated to the record in the database .	The actual outcome of this test is the same as expected	Pass

Test ID	Test Description	Expected Outcome	Actual Outcome	Pass/Fail
Test 8	IF statement checks for user and allows to delete by userID	It is expected that when the admin deletes a user profile an IF statement will execute. When userID is equal to review record held in the database it will be deleted.	The actual outcome of this test is the same as expected	Pass

Test ID	Test Description	Expected Outcome	Actual Outcome	Pass/Fail
Test 9	Update posted to the database and user details are set with new values	It is expected that when the admin updates a user profile an IF statement will execute. New user profile details will be updated to the record in the database .	The actual outcome of this test is the same as expected	Pass

Appendix F – Completed SUS Surveys

Participant ID: 1 Site: AAANI - Google Chrome Date: 17/4/15

System Usability Scale

Instructions: For each of the following statements, mark one box that best describes your reactions to the website today.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I think that I would like to use this website frequently.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. I found this website unnecessarily complex.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I thought this website was easy to use.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. I think that I would need assistance to be able to use this website.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I found the various functions in this website were well integrated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6. I thought there was too much inconsistency in this website.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I would imagine that most people would learn to use this website very quickly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8. I found this website very cumbersome/awkward to use.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I felt very confident using this website.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10. I needed to learn a lot of things before I could get going with this website.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please provide any comments about this website:

Really enjoyed using the Access All Areas website early and can tell that from using the different areas it can be a success!!!

This questionnaire is based on the System Usability Scale (SUS), which was developed by John Brooke while working at Digital Equipment Corporation. © Digital Equipment Corporation, 1996.

Figure 48 – Completed SUS Survey Google Chrome

Participant ID: 2 Site: AAANI - Safari Date: 17 / 4 / 15

System Usability Scale

Instructions: For each of the following statements, mark one box that best describes your reactions to the website today.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I think that I would like to use this website frequently.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. I found this website unnecessarily complex.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I thought this website was easy to use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. I think that I would need assistance to be able to use this website.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I found the various functions in this website were well integrated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6. I thought there was too much inconsistency in this website.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I would imagine that most people would learn to use this website very quickly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8. I found this website very cumbersome/awkward to use.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I felt very confident using this website.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
10. I needed to learn a lot of things before I could get going with this website.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please provide any comments about this website:

Great site! Easy to use & understand.

This questionnaire is based on the System Usability Scale (SUS), which was developed by John Brooke while working at Digital Equipment Corporation. © Digital Equipment Corporation, 1988.

Figure 49 – Completed SUS Survey Safari

Participant ID: 3 Site: AAANI - Mozilla Firefox Date: 17 / 4 / 15

System Usability Scale

Instructions: For each of the following statements, mark one box that best describes your reactions to the website today.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I think that I would like to use this website frequently.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. I found this website unnecessarily complex.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I thought this website was easy to use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. I think that I would need assistance to be able to use this website.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I found the various functions in this website were well integrated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6. I thought there was too much inconsistency in this website.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I would imagine that most people would learn to use this website very quickly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8. I found this website very cumbersome/awkward to use.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I felt very confident using this website.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
10. I needed to learn a lot of things before I could get going with this website.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please provide any comments about this website:

*Very positive website. Good functionality.
Would recommend to a friend.*

This questionnaire is based on the System Usability Scale (SUS), which was developed by John Brooke while working at Digital Equipment Corporation. © Digital Equipment Corporation, 1988.

Figure 50 – Completed SUS Survey Mozilla Firefox

Participant ID: 4 Site: AAANI - Tablet Date: 18/4/15

System Usability Scale

Instructions: For each of the following statements, mark one box that best describes your reactions to the website today.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I think that I would like to use this website frequently.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. I found this website unnecessarily complex.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I thought this website was easy to use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. I think that I would need assistance to be able to use this website.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I found the various functions in this website were well integrated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6. I thought there was too much inconsistency in this website.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I would imagine that most people would learn to use this website very quickly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8. I found this website very cumbersome/awkward to use.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I felt very confident using this website.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10. I needed to learn a lot of things before I could get going with this website.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please provide any comments about this website:

I found the website easy to use.
Explored it on my tablet & was pleased to see it was responsive.

This questionnaire is based on the System Usability Scale (SUS), which was developed by John Brooke while working at Digital Equipment Corporation. © Digital Equipment Corporation, 1988.

Figure 51 – Completed SUS Survey Tablet

Participant ID: 5 Site: AAANI - Smartphone Date: 18/4/15

System Usability Scale

Instructions: For each of the following statements, mark one box that best describes your reactions to the website today.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I think that I would like to use this website frequently.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. I found this website unnecessarily complex.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I thought this website was easy to use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. I think that I would need assistance to be able to use this website.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I found the various functions in this website were well integrated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6. I thought there was too much inconsistency in this website.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I would imagine that most people would learn to use this website very quickly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8. I found this website very cumbersome/awkward to use.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I felt very confident using this website.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10. I needed to learn a lot of things before I could get going with this website.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please provide any comments about this website:

Really liked the website. Loaded it onto my phone very quickly even though I only had 3G.
Was responsive to my device. Almost like using an App.

This questionnaire is based on the System Usability Scale (SUS), which was developed by John Brooke while working at Digital Equipment Corporation. © Digital Equipment Corporation, 1988.

Figure 52 – Completed SUS Smartphone