University of Dublin
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Management Science and
Information Systems Studies

Final Year Project Report

Design and Implement a Website
for
Arócar Ltd.

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April 2013
Arócar Ltd.
Design and Implement a Website for Arócar Ltd.

3rd April 2013

Prepared By: Gavin O’Doherty                     Supervisor: Rozenn Dahyot
I declare that the work described in this dissertation has been carried out in full compliance with the ethical research requirements of the School of Computer Science and Statistics.

Signed: __________________________

Gavin O'Doherty
3/4/2013
ABSTRACT

The aim of this project was to design and construct a website for Arócar Ltd., a language service provider based in Trinity College Dublin. This website serves to provide information about the client, as well as setting up a platform for customers to contact the client and through this generate sales. The website was designed using CSS, Javascript, HTML, and PHP through Microsoft Web Expression 4.

This project was broken down into three different sections: research of existing language service provider websites, designing the layout of the website through ongoing discussion with the client, and construction, coding, and implementation of the website.

The website was successfully designed, constructed, and implemented and can be viewed at www.arocar.com. It is hosted on a Windows Server through Blacknight Solutions. It is compatible on both PCs and mobile devices alike.
PREFACE

The client for this project was Arócar, a language service provider working out of Trinity College Dublin. The company has only recently been established and aims to become a campus company in 2013. The client contact throughout the project was Mr. Donal Lyons. For the purpose of this report both Mr. Lyons and Arócar will be referred to as ‘the client’.

Initially, the only step undertaken by the client in preparing the website was the registration of the following domain names: www.arocar.com.

The new website was successfully designed and implemented and can be found at www.arocar.com. All terms of reference were met as well as some additional requirements. The website is designed and presented in a professional manner in three languages. It has a simple navigation system and provides easy maintenance to the administrator.

Throughout the life of the project I developed my coding skills and received an education in website development and implementation. Several problems occurred during the development phase. These problems have been resolved through code correction and other techniques as will be explained in Section 3.

I would like to thank Donal Lyons, the client contact throughout the project, for his help and time throughout the course of the project. I also extend thanks to Dr. Rozenn Dahyot, my project supervisor, who was an invaluable source of help, support, and feedback.
ARÓCAR Ltd.
*Design and Implement a Website for Arócar Ltd.*

3rd April 2013

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GLOSSARY OF TERMS USED

REFERENCES
1 INTRODUCTION AND SUMMARY

The purpose of this chapter is to introduce the client, provide the project background and the terms of reference that have been agreed with the client. A summary of the remaining chapters is also included.

1.1 The Client

Arócar Ltd. is a language service provider based in Trinity College Dublin. It is a start-up company that is working towards becoming a Campus Company in the year 2013. Currently Arócar provides Translation and Interpretation services mainly between English and Spanish. As a Campus Company it plans to develop a “Language Workbench” which will consist of a suite of tools designed to supplement and interface with existing translation software.

At present the client’s business model has quite a simple premise. Customers send a document to Arócar for translation. Since these documents are usually important it is necessary that they are translated correctly. At the time of writing there are very few computer programs that can do this due to the complex nature of the task. These programs are quite expensive and not always completely accurate and still require human verification on completion. An example of this is Google Translate which often mistranslates even simple sentences.

In order to obtain a fully correct translation it is important that these documents are translated manually by an actual person. This allows nuances and idioms within individual languages to be translated in the right way. The client receives these documents, translates them, and returns them to the customer. The client will charge customers for this service.

The website to be designed is intended to advertise these services and act as a platform for sales and to allow customers to contact Arócar easily.

1.2 Project Background

At present the client does not have a website and the only online sales platforms currently used by Arócar are Pro-Z and Linkedin. Before the start of the project the client had little done in the way of website ownership. The domain name www.arocar.com had been registered; however hosting had yet to be purchased. No design or implementation had been undertaken whatsoever. Therefore, a brand new website is proposed which will serve as Arócar’s main online presence.

It is important that the client’s requirements are identified correctly. Some requirements have been stated in the project outline but a more comprehensive list must be obtained through meetings with the client.
The client wishes foremost for a website which conveys a professional appearance. It was also specified that the website have multiple language versions i.e. English, French, and Spanish. It was also requested that the site should be intuitive to use and easily maintained.

1.3 Terms of Reference

The following are the final terms of reference for the project agreed with the client:

- Develop a website which will showcase Arócar’s services
- Ensure the website is professional looking and simple to navigate by both users and client alike
- Ensure ease of administration for the client
- Investigate the best Content Management System to use and agree on this with the client

Additionally, the following was undertaken:

- The website was designed to be secure and has several measures in place to protect it.
- The website is fully compatible with mobile devices such as smart phones and tablets.
- The website has been designed to optimise searches on search engines such as Google and Yahoo!. This is discussed further in Section 3.3.
- A Joomla! account and MySQL database was set up for future use. This is discussed further in Section 3.7.
- The website meets W3C regulations. This is discussed further in Section 3.5.

1.4 Summary of the Remaining Chapters

- **Chapter 2** provides an overview of the system including system objectives, the technical environment, and diagrams of the dynamic web template used, a UML Use Case diagram for the site, and the site map.

- **Chapter 3** provides a description of the work undertaken throughout the project. It will discuss research, design, development, implementation, testing, problems encountered and rectified, instructing the client on the use of the website, and the future of the website.

- **Chapter 4** contains conclusions reached and recommendations to the client for proper maintenance and upkeep of the website.
2 SYSTEM OVERVIEW

This chapter provides an overview of the system. It begins by outlining the system objectives and continues by explaining the technical environment and finishes with system overview diagrams.

2.1 System Objectives

At present there is no website in place and the only steps undertaken by the client is the registration of the domain name. The client had inadvertently stated that hosting had been purchased from Blacknight Solutions. However, on investigation, this was discovered not to be the case.

The objective of the website is to provide visitors with information about the client. It will act as a platform for visitors to contact the client and request translations, serving as a sales platform. The website to be designed will be dynamic and intuitive to use. Simplicity and professionalism have been requested repeatedly by the client and that will be the main focus. The site will be easy to use by both front-end and back-end users alike, with the former having a simple method of updating and editing the site. This ease of use will be proved by:

- Universal navigation: A navigation bar will appear at the top of every page of the site. This bar will be in three different languages (English, Spanish, French) depending on which version of the site is open.
- Consistency: The site will be designed using a dynamic web template (DWT). This will ensure that each page of the site has a consistent design and no features will appear out of place during navigation. It will also ensure that the site can be maintained, edited and updated easily.

The website will incorporate the green of Arócar upon a light grey/white background. The majority of the text will be black aside from the navigation bar which will use white writing upon a grey background (turning to red when as the cursor hovers above it). It is important that the site appears professional as otherwise users may leave without reading any of the content. For the same reason it is important that the website loads quickly, as many visitors will leave a site if it doesn’t load within ten seconds.

Social Media
At the request of the client there will be no Facebook, YouTube or Twitter accounts linked with the page. However, there will be a link to the client’s LinkedIn page and Pro-Z page on the contact page.
2.2 Technical Environment

The website should be stored and hosted from a Windows server as that is the type of account set up in Blacknight Solutions by the client. The site can be accessed from any device that has internet capability at www.arocar.com. The website has been successfully tested on multiple browsers and on multiple devices, as will be discussed in Section 3.5.

Multiple programming languages were used when developing the website. CSS, Javascript, HTML, and PHP were all used during implementation. The website was developed entirely through coding as this allowed for a suitable DWT to be created, ensuring uniformity across the site. The design and layout was developed entirely using HTML and CSS while certain add-ons were developed through JavaScript and PHP.

2.3 System Overview Diagrams

The site has been designed in three separate languages. For that reason there are three versions of every page (one for each language). The following is a list of each page created:

1. **DYNAMIC WEB TEMPLATE**: The DWT allows the client to create new web pages with ease. There is one designed in each language. The English one appears below. The French and Spanish versions can be found in Appendix D Page D.1 and D.2. The template has editable and un-editable regions. An editable region is one that can be changed for each individual page. An un-editable region is one that can only be changed in the template itself. This ensures that all pages will have the same basic layout.
2. **WELCOME**: This is the home page of the site. It is initially in English. The option to switch languages appears in the top right hand of this page in the form of small flags (with the Irish flag representing English as requested by the client). Upon clicking one of these flags the visitor will be sent to the “WELCOME” page of the specified language. The page should contain a brief introduction to the website. There is a sliding banner feature which features on every page. The French version of this is called “BIENVENUE” and the Spanish version is called “BIENVENIDOS”.

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Figure 2.3.1 – English Dynamic Web Template
3. **ABOUT**: This page should contain information about Arócar as well as Donal Lyons’s profile. In the sidebar are links to LinkedIn and Pro-Z. The French version of this page is called “À PROPOS” and the Spanish version is called “SOBRE”.

4. **SERVICES**: This page is very similar to the “ABOUT” page except it should provide an explanation of the services made available by Arócar. The French version of this page is called “SERVICES” and the Spanish version is called “INSERT SPANISH NAME HERE”.

5. **CONTACT**: This page allows site visitors to contact the client with any queries they may have. It contains a form requesting details and has a section for comments or questions. This form then emails the client with the visitor’s details and comments. The client’s contact details are also displayed on the page. This page acts as a sales platform by facilitating ordering and payment. The French version of this page is called “CONTACTER” and the Spanish version is called “CONTACTO”.

6. **CONFIDENTIALITY**: Within this page should be included the confidentiality policy of Arócar to its clients. The French version of this page is called “CONFIDENTIALITÉ” and the Spanish version is called “CONFIDENTILIDAD”.

Note that at present no content has been provided by the client so the website has instead been filled with Lorem Ipsum as a means of demonstrating how the site will appear once content has been included. (Lorem Ipsum is dummy text which has Latin roots).

The WELCOME page in every language can be located by clicking on the associated flag. However to get to any of the other language pages one must go through that language’s WELCOME page. Once on that page links to each other page will appear in the navigation bar. A Site Map explaining this can be seen below in Figure 2.3.2.
Figure 2.3.2 – Arócar Site Map

The above site map in Figure 2.3.2 explains the navigation of the site. Each home page can be reached in one click from any page. However, to get to any of the other pages one must navigate to the home page of whichever language version that is requested.
Use Case Diagram for the Website.

Figure 2.3.3 – UML Use Case Diagram

Figure 2.3.3 explains how different users can interact with the website. The simplicity of the website means that there are in fact only two types of user. The administrator has complete control over the system. In this case the administrator is Mr. Donal Lyons. He can access the back-end of the website, submit content, create and delete pages, change the layout of the website, and view all the pages on the website. Instructions detailing how to perform the above operations can be found in the Technical User Manual located in Appendix C.

A visitor is anyone who lands on the website over an internet connection. Visitors can view all the web pages on the site and contact the client through the CONTACT page. Basic site use is explained in Appendix C Page C.1.
3 DESCRIPTION OF WORK DONE

This chapter provides a description of work completed throughout the project. It is compromised of the following sections:

- Requirements, Research, and Planning
- Design
- Development
- Implementation
- Testing
- Problems encountered and rectified
- Instructing the client on use
- Future of the website

3.1 Requirements, Research, and Planning

Defining the requirements of the project was critical in obtaining a good platform from which to start. This was done through client meetings and research of existing language service provider websites. Through this a prototype template was established and agreed upon. This was an important part as it a clear picture of what the client wanted was required before any design work could begin.

Client Meetings
Over the timeline of the project numerous client meetings were held. In the first introductory meeting it was decided that before any design was undertaken it was important that research be carried out on existing language service provider websites. The client requested that these websites be taken from Pro-Z profiles. (Pro-Z is a website that allows translators to advertise their services and websites by creating profiles containing their information). After this meeting 20 websites were identified for research. A report was then compiled with information on the contents of each website and recommendations for the design and layout of Arócar’s website, as well as a list of suggested extras to be included. This was sent to the client for review. The client then compiled a final requirement list based on the suggestions of the report. The list can be viewed below. This requirement list was discussed in another client meeting and a site map was developed. Wireframes were used in creating the layout for the website. These can be seen in Appendix D Page D.4.

Research of other Language Service Provider Websites
Initially research was carried out on 20 websites; however, 4 were excluded immediately as they were deemed to be of very poor quality. The 16 websites that remained ranged from very basic appearance to professional quality. The websites were ranked in appearance and functionality on 1-10 scale. Those which ranked higher on the scale were deemed more suitable. From these more suitable websites a composite website for Arócar was developed. The research identified several items which were deemed necessary to include:

- a simple navigation bar,
a contact form, a confidentiality policy,
- a green colour scheme (the client requested it bear resemblance to a business card which was provided. See Appendix D Page D.4),
- a sliding image (as to make the website appear more professional), and
- useful and interesting content (this content is to be provided by the client and as of yet has not been included in the live website).

Other suggestions were deemed unnecessary by the client: customer testimonials (due to confidentiality issues), and links to Facebook and Twitter pages. These were therefore not included.

Content Management System Research
In deciding the best content management system, or whether one was needed at all, four options were researched as appear in Table 3.1. These options were considered and the simple matrix and six reasons below ultimately led to the decision not to use any content management system.

<table>
<thead>
<tr>
<th>Feature</th>
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<th>Joomla!</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Free?</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
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<tr>
<td>Simple?</td>
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<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>SQL needed?</td>
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<td>NO</td>
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<tr>
<td>Updates needed</td>
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<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Sever Type</td>
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<td>Linux</td>
<td>Windows/Linux</td>
<td>Window/Linux</td>
</tr>
</tbody>
</table>

Table 3.1. – Analysis of Content Management Systems

After researching several content management systems it was decided not to use any, and use Microsoft Web Expression 4 instead. This was decided for the following reasons:

1. CMSs need constant updating as new versions are often released on a regular basis. Each time the CMS is updated the older versions become less secure, requiring the client to update to the latest version of the CMS. These updates however often render older code and extensions obsolete. If these updates are not performed regularly then the website may become vulnerable to hackers who often attack CMSs en masse.
2. Since the website is relatively simple a CMS is deemed to be “overkill”.

3. A CMS is more suited to a website that is managed and administrated by several people. Since the client's website is just administrated by one person it was decided a CMS is not needed.

4. Using a CMS gives less control over the design and layout of the website, and also means the website is more dependent on external designers. Coding the website through HTML and CSS allowed for a Dynamic Web Template to be designed which was suited to the client’s needs.

5. The client is sufficiently knowledgeable of information systems to manage the small amount of coding that is needed to update and maintain the site.

6. Joomla! requires a Linux Server and the client is more fluent in Windows.

Microsoft Web Expression 4 was chosen over other web development tools such as Dreamweaver as it is free. It can be found online and downloaded for free at http://www.microsoft.com/en-ie/download/details.aspx?id=36179.

3.2 Design

Using the site map and wireframes agreed upon with the client in the planning stage the site was then ready to be designed. The requirements were to be incorporated into a professional, user friendly website. An incremental model was used when designing the website which can be seen in Appendix D Page D.5. This ensured that the client was pleased with the ongoing design, and could provide input and feedback throughout the design phase rather than on completion.

Appearance and Structure

For ease of use and to create a professional and pleasing design each page is divided into the following un-editable sections:

- **Wrapper**: this section holds all other sections. It is 900 pixels wide and has a white background with a 1 pixel solid black border.
- **Top**: this section contains the flags with the links to each language version of the site and the navigation bar. It is coloured the green of Arócar Ltd.
- **Topnav**: this is the navigation bar which contains links to each page of the site. It is grey and remains in the same place on every page of the site. A breadcrumbs pane was not included as the site is simple to navigate.
- **Banner**: this contains the slider displaying the Arócar logo and moving flags. The three different images in the slider can be found in Appendix D Page D.3. The slider is coded using JavaScript.
- **Subbanner**: this contains a short message explaining what Arócar does. It has white text on a grey background.
- **Footer**: this contains white text on a black background.

and the following editable sections:
• **Content:** this is the section in which the main content of each particular page is displayed. For example in the CONTACT page it contains a form, while in the ABOUT page it contains Donal Lyons’ profile.

• **Rightside:** this section allows side notes to be included on each page. For example in the ABOUT page it contains links to the clients LinkedIn and Pro-Z pages.

It should be noted that the term “un-editable” in this context does not mean that the content within that section cannot be edited. Rather, it means that any content within that section can only be edited through the Dynamic Web Template. An un-editable section, when edited, will change each of the other webpages attached to the DWT as to ensure uniformity across the site. Editable sections are those that will be different on each individual webpage such as content. Each of these sections is linked to code in the CSS styles sheet which formats it correctly. This is discussed further in section 3.3. The structure of the site can be seen in the Site Map in Figure 2.3.2 and is explained in Section 2.3. The web pages in each version of the site are as follows:

**English:** WELCOME, ABOUT, SERVICES, CONTACT, and CONFIDENTIALITY.

**French:** BIENVENUE, Á PROPOS, SERVICES, CONTACTER, and CONFIDENTIALITÉ.

**Spanish:** BIENVENIDOS, SOBRE, SERVICIOS, and CONFIDENTIALIDAD.

### 3.3 Development

When developing the site there were three elements to be considered. The first was to identify which software to use. The second was writing the code for the site and identifying any extensions or third party content that could be incorporated in the website. Lastly the content of the site had to be created and included.

**Software**

The website was designed and coded through Microsoft Web Expression 4 and uploaded to the host server through the SFTP WinScp program (Secure File Transfer Protocol program). In order to design the website it was first important to decide the best option regarding software. The decision not to use a content management system is outlined in Section 3.1. Research was conducted on several types of software to use when developing the website. Joomla!, Dreamweaver, and Web Expression were all considered. At first, before meeting the client, Joomla! was the forerunner. However, it was discovered that Joomla! requires an SQL database. The client did not wish for a database to be used as it was deemed unnecessary. The client also has knowledge of Information Systems from his work in Trinity College’s School of Computer Science and Statistics so was comfortable managing the content of the website through Web Expression. For these and other reasons outlined earlier the website was developed using Microsoft Web Expression 4. (Dreamweaver was excluded as it is very similar to Web Expression and the latter is free).

Note that Blacknight’s hosting supports Joomla! and so has been installed in case the client ever wishes to use it in the future, perhaps to expand the capabilities of the website or add additional content. A MySQL database has also been created for the same reason.
**Coding and Extensions / Third Party Software**

The website was coded using CSS, Javascript, HTML, and PHP. Each web page is a HTML file and was written in HTML and JavaScript. 15 pages were created through the three Dynamic Web Templates, screenshots of which can be found in Appendix D Page D.1 and D.2. The HTML code separates the pages into the sections discussed in Section 3.2. It provides the ability to include content, photos, Javascript extensions, and links to other pages and external sites.

To ensure a professional appearance the three templates are linked to a CSS style sheet. This sheet allows each of the HTML webpages to have the exact same layout and creates consistency throughout the website.

Third party Javascript was edited and adapted to create the sliding banner in the DWT and the form on the CONTACT (French - CONTACTER, and Spanish - CONTACTO) page(s). The code within the form on this page is linked to a PHP file which sends an email to the client once a customer inputs details into the form and clicks the submit button. This code also throws exceptions should an incorrectly formatted email or a blank field be entered. The visitor will be informed of their mistake and be requested to try to submit the form again.

The individual files including all the code can be found in Appendix E.

The website was made search engine friendly by creating an XML (Extensible Markup Language) site map and uploading this to the site. This site map was then verified and indexed by Google Webmaster. Using Google Webmaster also makes the site more secure, as it sends out notifications of malware infections. Additionally, meta tags were used to make the site more search engine friendly. Meta elements can be used to specify page description, keywords and any other metadata not provided through the other head elements and attributes. This makes it easier for search engines to understand the content of a page, and therefore makes the website more likely to appear higher up on a search.

**Creating Site Content**

It had been stated from the beginning of the project that the client would like to be able to update and edit the content of the website easily. It was not a requirement of the project to create content for the site. However, certain content has been included in the published site as example to the client to ensure he is aware what the website will look like once proper content is put in place. Sample text, images, and links to external websites have been put in place in order to do so.

**3.4 Implementation**

The website was originally meant to be uploaded using the FTP FileZilla Client. However it was decided to instead use WinSCP as this is a more secure program. The site is located in the wwwroot folder on the Blacknight server. Within that file was each language version of the site: EnglishSite, FrenchSite, and SpanishSite. However upon navigating to what should
be the home page (i.e. www.arocar.com) it was discovered that the files had been uploaded incorrectly. The files had to be taken down, and taken out of their individual folders and included individually in the wwwroot folder. This required the file paths within the links to be changed. After this was carried out the website was operational.

The website is saved and backed up on the host site (www.blacknight.com), a server in the School of Computer Science and Statistics, and on a USB device handed over to the client.

3.5 Testing

Throughout the development of the website iterations of testing were performed. With every new feature added it was important that testing was carried out to ensure the feature was implemented correctly. This testing was done through Microsoft Web Expression 4 which allowed individual pages to be previewed in different browsers. This ensured compatibility with all the main browsers. The incremental model used during design and implementation allowed for a similar model to be used in the test phase. Errors discovered through these iterations ranged from several features displaying incorrectly (such as images being in incorrect positions, the slider not working properly, and incorrect links) to the entire webpage not working in some browsers.

Code Validation

The website code was tested and validated using the W3C Markup, CSS, and PHP Validation Service. This validation service returned several errors in the code. The majority of these was simply syntax error and was corrected easily. This resolved the above problem of the entire webpage not working.

Browser and Operating System Compatibility

The live website has been tested manually on the four main browsers (Microsoft Internet Explorer 9 (IE), Google Chrome, Mozilla Firefox, and Apple Safari) and multiple mobile devices (iPhone, Samsung, HTC, Huawei) and mobile operating systems (iOS and Android). At first the website displayed incorrectly in all but the latest version of IE. This problem was found to be due to the syntax errors in the code as mentioned above. On correction of those errors the website ran and displayed properly on all systems and browsers tested. The website was then tested automatically on a wide range of browsers using the internet site www.browsershots.com. This resource allows the user to enter the URL of the site and returns screenshots of the website in different operating systems and browsers. 72 combinations of browsers and operating systems were tested, of which 21 did not display correctly. It should be noted that the failed tests were those that were carried out on very obscure browsers and operating systems. These web browsers include Dillo, Iceape, Iceweasel, Kazehakase, Lynx, and SeaMonkey. The operating systems include different versions of Debian, FreeBSD, and Ubuntu. A sample of these screenshots is included in Appendix F Page F.1. The website was successfully loaded and displayed on all the main browsers and operating systems as well as all the main browsers which had been manually tested previously.
Performance Testing
An internet resource called Pingdom (located at www.pingdom.com) was used to test the load times of the website. This is an important test as if a webpage loads too slowly it runs the risk of losing visitors. Pingdom tests the site from multiple locations around the world. Tests were carried out from Canada, France, Germany, the Netherlands, Portugal, and the USA. The overall average response time was 297ms. The slowest average response time was 309ms and the fastest average was 284ms. All three of these figures mean that the response time for the website is extremely quick and will ensure visitors will not be lost to slow response times. Downtime was tested over the course of three days. In total 8 minutes of downtime was recorded. This means that the site was up 99.98% of the time. Please note that this downtime occurred 28th March 2013, the day of the largest distributed denial-of-service attack in history. This attack slowed down the internet in a worldwide capacity. Despite this downtime remained at just 0.02%.

A sample of these test results can be found in Appendix F.

Link Testing
Another online resource, from the same website used to validate the code, was used to validate the links. This resource is called W3C Link Checker. Link Checker reports any broken links in the website, both internal and external. No links were reported broken. After this test was carried out it was important to check the links were linked to the correct page. This testing process was carried out manually. Many errors were discovered due to the process of moving files between folders discussed in Section 3.5. These errors were corrected and retested, with no errors being found on the second iteration of testing.

Screen Resolution Testing
An online resource called Screen-Resolution was used to test the site in different screen resolutions. This resource allows the website to be viewed in multiple resolutions. For a desktop or laptop pc the website could be viewed at all available resolutions. The optimum resolution to view the site is 1920x1200 pixels. On high end phones the optimum screen resolution is 640x960 pixels but can also be viewed at lower resolutions. For Tablet computers the optimum screen resolution is 800x1280 pixels but can also be viewed at 768x1024 pixels.

3.6 Problems encountered and rectified
Numerous problems were encountered when creating the website. These problems will be discussed in this section.

When uploading the website files to the host site the FTP FileZilla Client was used. At the first attempt FileZilla was unable to connect to the host. It was discovered that this was due to security settings of the Trinity College Network. To rectify this, a more secure FTP program was installed: WinSCP. WinSCP uses SSH FTP which encrypts commands and data, preventing passwords and sensitive information from being transmitted in the clear over a network. Through this program files were successfully uploaded to the host site.
The sliding banner repeatedly failed to work during the development and testing of the site. Even after running the code through the V3C validator no error was reported back in relation to the banner. After manual investigation it was discovered to be an error in the path to the image file. The path was incorrectly stated with the file name “Images” as “images”. Once this was changed the sliding banner displayed correctly.

Incompatibility of the website with certain browsers occurred during test iterations. This was resolved using a code validator as discussed in Section 3.4. The problem turned out to stem from syntax errors in the code.

Hosting issues were discovered from the beginning of the project. Initially, it was discovered that the client had only registered the domain and had not purchased hosting. The client was advised to purchase hosting. Once hosting was purchased the website could be uploaded. As discussed in Section 3.5 problems were encountered regarding the file locations of web pages. This was resolved by moving the webpages to the correct file locations. This, however, led to link errors. The paths of the links were updated to reflect these new locations.

3.7 Instructing the client on use

The client has been instructed on correct technical use of the site and a technical manual has been provided for further instruction. A copy of this manual can be found in Appendix C. It is important that the client familiarises himself with the use and maintenance of the site. This has been taken into consideration when developing and implementing the website. Code has been commented clearly and files have been named and stored in an intuitive system.

All usernames and passwords needed to maintain the website have been provided to the client and are not included in this report as they are of confidential nature. It is recommended that the client change these passwords as soon as possible and continue to change them on a regular basis. These passwords should be strong and follow the guidelines outlined in Section 4.2.

3.8 Future of the Website

Currently, the only content included in the live website is randomly generated text. However the client intends to provide dynamic and interesting content which will be of use to both visitors to the site and potential customers.

At present, the website does not use a content management system for the reasons discussed in Section 3.1. However, if in the future the client does wish to expand the capabilities of the website, add more administrators, and perhaps allow customers to sign up
or create a user account the following has been undertaken to make this as easy as possible:

- A MySQL database has been set up. This is named db1258311_arocar and can be accessed through Blacknight Solutions at www.blacknight.com. The client's username and password is needed to access this.
- A Joomla! account has been set up. The username and password have been provided to the client. Through Joomla! the client can import the template of the site to maintain the same design and layout. This account can be accessed by navigating to www.arocar.com/joomla.

The website was designed as to ensure the client will not encounter any future expenses. The annual hosting fee is the only cost that will be encountered through future use of this website.
4 CONCLUSIONS AND RECOMMENDATIONS

This section will discuss conclusion reached and provide recommendations to the client on the upkeep and maintenance of the website.

4.1 Conclusions

The work carried out on this project was split into six different phases as discussed in Section 3. Defining the client’s requirements and designing the website around these was the most significant aspect of the work done. Identifying the requirements was undertaken through client meetings and research of existing language service provider websites. Development, implementation, and testing were the most time consuming aspects of the project.

A fully operational and professionally designed website was designed, developed, and implemented. It fulfilled all the client’s requirements as well as some additional others. The website can be found at www.arocar.com. The website was developed through Microsoft Web Expression 4 and coded using CSS, JavaScript, HTML, and PHP. It was uploaded to the host (Blacknight Solutions) through the SFTP resource WinSCP. The annual hosting fee is the only cost that Arócar will encounter in future use of the website.

This project has been challenging in many ways. In a technical sense, it required knowledge of several programming languages which, at first, the developer was not familiar with. Creatively, it was important that the site was professional in appearance as to ensure no loss of potential site visitors. From an academic of view, the project incorporated a wide range of the material that is covered in the Management Science and Information Systems course, and it is felt the project will have benefited greatly from the inclusion of this material.

All terms of reference agreed upon with the client were successfully met, as well as several additional requirements. These terms of reference and additional requirements can be found in Section 1.3.
4.2 Recommendations

The following is a list of recommendations for the future upkeep and maintenance of the website.

Content
At present, the content included in the site was created through an online random Lorem Ipsum generator as no particular content has been provided by the client. Lorem Ipsum is dummy text which has Latin roots. In order for the website to be a success it is advised the client include interesting and dynamic content. This process has been made simple for the client as it requires the client to merely paste or type any content he wishes into each particular section. The CSS styles sheet will automatically format the content correctly. Instructions on how to add content to the website have been provided in Appendix C.

Design
The design of the website should be maintained as it represents Arócar in a professional manner. The design of the website is representative of Arócar as a business and it is important that it is maintained to the highest standard. It is this design that visitors to the page see first and ultimately how they make judgement on the company.

Security
It is recommended that the client use strong passwords and keep them safe as well as changing them regularly according to the following guidelines:

- Password should contain at least 8 characters.
- Password should contain at least one uppercase letter, one lowercase letter, one number and one symbol.
- Never use the same password twice.
- Do not write down password.

The client should upload files using a SFTP client and make sure to protect his PC from virus infection.

Images
Images that are hosted on the site should be compressed to minimize the file size. Instructions on how to upload images can be found in Appendix C Page C.8.

User Feedback Form
It is recommended that, after the site has been running for a number of months, the client issue a user feedback form to its customers. This will allow the client to understand how its customers use the site and the level of ease at which they can navigate to the content they are looking for. A click counter could also be included in the site to discover the number of clicks it takes a visitor to reach their intended page.
ARÓCAR LTD.

Design and Implement a Website for Arócar Ltd.

Appendices
## APPENDICES

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GLOSSARY OF TERMS USED

REFERENCES
APPENDIX A – ORIGINAL PROJECT OUTLINE

Client: Arócar Ltd, Language Service Provider
Project: Design and Implementation of a Website
Location: In TCD
Client and Dept. Contact: Donal Lyons, MD

Client Background

Arócar is a start-up company which, in 2012/13, will be working towards becoming a Campus Company. It is a Language Service Provider (LSP) and currently provides Translation and Interpretation services, mainly in the (English, Spanish) language pair. As a Campus Company, it plans to develop a "Language Workbench" which will consist of a suite of tools designed to supplement and interface with existing translation software such as SDL Trados.

Project Background

The company needs a professional website to showcase its products and, if feasible, provide a sales platform for them. The initial steps of reserving domains and purchasing hosting (through BlackKnight) are complete. The next step is to design and implement the company Website.

Client Requirement

The primary client requirement is to implement a website which conveys a professional appearance. Versions of the site must be available in multiple languages (initially English, Spanish and French). Hence, full consideration must be given to multi-language support of display and printing – presumably using Unicode.

The site should be intuitive to use and easily maintained. Ideally, an Open Source content management system will be integrated to facilitate maintenance.

Ideally, the site will also include online ordering and payment facilities – this, however, is a secondary priority.

What is involved for the student?

• Consult with client to scope project and clarify deliverables and expectations;
• Agree project timeline;
• Analyze existing LSP websites;
• Recommend on site layout, based on this analysis;
• Design site based on these recommendations;
• Implement agreed design in new website;
• Meet client on a regular basis to update project timeline.
APPENDIX B – INTERIM REPORT

Management Science and Information Systems Studies

Project: Design a website for Arócar Ltd. (henceforth referred to as Arócar)
Client: Arócar – Mr. Donal Lyons
Student: Gavin O’Doherty
Supervisor: Rozenn Dahyot

Review of Background and Work to Date

Arócar is a language service provider based in Trinity College, Dublin. It is working to becoming a Campus Company in 2012/2013. The domain name www.arocar.com has been reserved and purchase hosting is complete (through Blacknight.com). However, this is as far as the website has been developed. Mr. Lyons has requested a professional website to showcase its products and act as a sales platform for them. He has also requested multiple language versions of the site. As a secondary priority he has requested an online ordering platform and payment facility.

To date, several client meetings have been held in order to establish the work involved. Research has been conducted analyzing existing language service provider websites and a basic site layout has been agreed upon. It has been decided to consult on a regular basis as the website is being developed as to ensure client satisfaction.

Terms of Reference

- Develop a website which will showcase Arocar’s products and services
- Ensure website is professional looking and simple to navigate by both users and client alike
- Ensure ease of administration for the client
- Investigate the best Content Management System to use and agree on this with the client

Further Work

- Agree with client on a timeline for the development and testing the website
- Ensure the website is secure
- Investigate the possibility of a mobile site

Conclusions

To date, Joomla! CMS is the only system to have been investigated.
APPENDIX C – TECHNICAL USER MANUAL

The user manual for the Arócar Ltd. website is attached as a separate document. It contains detailed instructions on how to use the system.
APPENDIX D – DESIGN DOCUMENTATION

The following graphics (D.1 to D.4) accompany Section 3.1 of the main report.

Figure D.1 – French Dynamic Web Template
New Title

Add another heading here

Sidebar title

Figure D.2 – Spanish Dynamic Web Template

Please note that the large flag in the banner is not representative of the language of the current page. In the live website it rotates between the three different flags which can be seen below in Appendix D.3.

The Dynamic Web Templates are HTML-based master copies of the website that allow the client to easily create new web pages.
Figure D.3 – Images contained in the sliding banner
The client requested a colour scheme representative of the business card in Figure D.4. This was the reasoning behind the green header of the site and the green writing in the sliding banner.

Figure D.5 – Wireframe for Dynamic Web Template.
Figure D.5 shows the wireframe created during the planning stage of the project. A wireframe is in essence a blueprint for a website. Using wireframes allowed for the client to visualise the layout and make recommendations before the design phase began.

This is the incremental model used during the designing, developing, and implementing of the website. It is important to go through the loop in grey very fast, showing each stage to the client for approval. This model ensures the client is satisfied with each stage of development. It allows for a website to be built that is going to satisfy the clients requirements. This model is a derivative of the waterfall model.
APPENDIX E – CODE USED

The CSS, HTML, JavaScript, and PHP code has been provided on a separate CD labeled Appendix E – Code Used.
APPENDIX F – TESTING OUTPUT

The following graphics (F.1 to F.4) accompany Section 3.5 of the report.

<table>
<thead>
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<th>Overall Average</th>
<th>Slowest Average</th>
<th>Fastest Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>297 ms</td>
<td>309 ms</td>
<td>284 ms</td>
</tr>
</tbody>
</table>

Figure F.1 – Upload times

Figure F.2 – Browsershots

Figure F.2 above shows an example of the output of browsershots. Due to the amount of browsers and operating systems this resource tests it would be infeasible to include them all. Therefore only thumbnails have been included.
Pingdom tested the response times of the site from 7 countries worldwide. The results can be seen in Figure F.3 above.
Pingdom tested the total uptime and downtime of the website over three days from March 25th 2013 to March 28th 2013. The results are provided above in Figure F.4.
GLOSSARY OF TERMS USED

CSS – Cascading Style Sheets
- Presents the style of web pages written in HTML

DWT – Dynamic Web Template
- is a HTML-based master copy of a web page that you can create to contain settings, formatting, and page elements

FTP – File Transfer Protocol
- A computing network protocol for accessing and managing files on remote file systems

Host
- A computer with a web server that serves the pages for websites

HTML – Hypertext Mark-up Language
- A language used for the creation of websites

IE – Internet Explorer
- Microsoft’s internet browser

MySQL – Structured Query Language
- MySQL is a relational database management system

PHP – Hypertext Preprocessor
- A language embedded with HTML which is used to create dynamic content

URL - Uniform Resource Locator
- This specifies the unique location in which a resource can be found.
  www.arocar.com is the URL for Arócar’s website

SSH FTP (SFTP) – Secure File Transfer Protocol
- A secure computing network protocol for accessing and managing files on remote file systems

UML – Unified Modelling Language
- A language which is not specific to any individual code.

XML – Extensible Mark-up Language
- A markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable.
REFERENCES

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Design and Implement a Website for Arócar Ltd.

Gavin O’Doherty

April 2013
TRINITY COLLEGE DUBLIN
Management Science and Information Systems Studies
Project Report

APPENDIX C – TECHNICAL USER MANUAL
FOR WEBSITE

ARÓCAR LTD.
Design and Implement a Website
3rd April 2013

Prepared By: Gavin O’Doherty        Supervisor: Rozenn Dahyot
APPENDIX C

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C.1 Introduction

This user manual accompanies the full project report entitled “Design and Implement a Website for Arócar Ltd.” The purpose of this manual is to provide the client an overview of the developed system and explain how to use, update, and maintain the system.

This manual will cover basic site usage such as navigation of the site. The manual will also explain how to use the site as an administrator. It will use a simple step by step guide system for administrator instructions. It is designed to be concise and easy to follow.

C.2 Basic Site Usage

The website can be found at www.arocar.com. It can be accessed by all users.

Navigation
The website was designed to be simple, easily navigated, and inviting. It is has been implemented in three different language versions: English, French, and Spanish. Each version has the following pages:

- WELCOME (this is the home page)
- ABOUT
- SERVICES
- CONTACT
- CONFIDENTIALITY POLICY

In total there are 15 different pages on the site at present. A description of each page can be found in Section 2.3 of the main report that accompanies this technical user manual.

Each page of the website has a similar layout with little variation. An illustration of a typical page is provided below in Figure C.2.1. The common features include:

- A header section with the flags linked to each language version of the site
- A footer section
- A universal navigation bar
- A sliding banner displaying the title of the website
- A blank space in the centre for the main content of each page
- A sidebar on the right of the main content

These features remain constant throughout the site. The CONTACT page is the only exception. On this page, instead of the main content section, is the contact form.
FIGURE C.2.1 – Screenshot of typical page layout for the site.

The site can be navigated using the navigation bar. Different language versions of the site can be reached by choosing the correct flag in the top right hand corner. These can be seen in Figure C.2.1.
The contact form has been designed to be simple and straightforward. There are four required fields which the user must enter (first name, last name, email, and comments) and one unrequired field (telephone number). If the user presses the submit button without filling in a required field he/she will be advised to go back and fill out that field. If an incorrectly formatted email address is filled out the user will again be instructed to correct the error. Once each field has been filled correctly and the submit button has been pressed an email will be sent to the client containing the visitor’s details.
C.3 Administrator Use

This section provides step by step guides for the following:

1. Creating a webpage
2. Adding content to a webpage
3. Adding an image to a webpage
4. Adding an external link to a webpage
5. Uploading a webpage to the internet
6. Removing a webpage

Note that within each individual HTML file the code is commented to make sections easier to locate. These comments appear in green text. It is also important to note that each of these must be done separately for each language version of the webpage.

C.3.1 Creating a webpage

Creating a webpage is done through Microsoft Web Expression 4. Once the page is created it must be saved and uploaded to the server. A new link must also be placed in the navigation bar so that page can be accessible through the website.

1. In Microsoft Web Expression 4: In the top navigation bar go to “File” -> “New” -> “HTML”.

2. Go to “Format” -> “Dynamic Web Template” -> “Attach Dynamic Web Template”.

FIGURE C.3.1 – Open new HTML document
3. Choose the .dwt file for the correct language.
   a. English: main.dwt
   b. French: frenchmain.dwt
   c. Spanish: spanishmain.dwt

4. Save the new HTML document within the correct file with the new webpage’s name (e.g. newpage.html).

The new page has now been created and saved and will appear in the same format as every other page. Submit content using the instructions in C.3.2.

Creating a link to the new page in the navigation bar:
5. Go to "File" -> "Open"
6. Select the .dwt file for the correct language.
7. At the bottom of the page select “Code”.
8. Within the “topnav” section paste in the following:

```html
<li><a href="newpage.html"> NEW PAGE </a></li>
```
directly under the other links. The other links are in the same format as the code above.
(Note that “newpage.html” and NEW PAGE should be the name of the webpage and the name of the link as it is to appear in the navigation bar, respectively).

9. Save the .dwt file.
C.3.2 Adding content to a webpage

Adding content to a page is simple and intuitive.

1. Open the webpage in Microsoft Expression 4.
2. Type or paste in content into the correct section.

Be sure to upload the page to the server once content has been added. Instructions on how to do this follow in C.3.3

C.3.3 Uploading a webpage to the internet

In order for webpages to appear on the internet they must be uploaded to the server of Blacknight Solutions. This is done as follows:

1. Open WinSCP.
2. Connect to the server by entering the following details:
   a. FTP: ftp.arocar.com
   b. Username: donal@arocar.com
   c. Password: ********** (Note that this password has been supplied to the client confidentially)

![FIGURE C.3.4 – Connecting to the server](image)

3. Drag the webpage to be uploaded into the wwwroot folder in the remote site section. This will appear once WinSCP has connected to the server.

![FIGURE C.3.5 - WinSCP](image)
C.3.3 Adding an image to a webpage

1. Upload the image to the Blacknight using the same process as in Section C.3.3. Place the image within the Images file.
2. Open the webpage in Microsoft Web Expression 4.
3. Locate the section into which the image is to be inserted.
4. Paste in the following code:
   ```html
   <img src="/Images/IMAGENAME" alt="">
   ```
5. Note that IMAGENAME will be the name of the image.
6. Upload the webpage to the server (see C.3.3).

C.3.4 Adding an external link to a webpage

1. Open the webpage in Microsoft Web Expression 4.
2. Locate the section into which the link is to be inserted.
3. Paste in the following code:
   ```html
   < href="http://www.SITENAME.com">
   ```
4. Upload the webpage to the server (see C.3.3).

C.3.6 Removing a webpage

2. Login using account details (the client currently has these details and cannot be stated here as they are of confidential nature).
3. Within Blacknight navigate to “Website” -> “arocar.com” -> “File Manager” -> “Open File Manager”.
4. Select the webpage that is to be deleted.
5. Click “delete”.
6. Ensure links to the page are deleted within other webpages by deleting the code. This is simply the reverse procedure of adding links as is discussed in C.3.1.
7. Once these links are deleted it is important to uploaded the pages again following the steps out lined in C.3.3.