



Usability Testing Methods

An E-Commerce Website Developed Using ASP.NET Web Forms

By Stacey Ann Hammond

Supervisor: Sue Maw
Second Marker: Beverly Hollands

Project submitted as part of the
requirements for the award of BSc(Hons)
Computing and Information Systems

27th April 2017

Declarations Form

I, ...STACEY ANN HAMMOND..... declare that I am the sole author of this Project; that all references cited have been consulted; that I have conducted all work of which this is a record, and that the finished work lies within the prescribed word limits.

This work has not previously been accepted as part of any other degree submission.

Signed : S.Hammond.....

Date : 27/04/2017.....

Form of Consent

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Abstract

The aim of the project is to judgementally test the usability of an e-commerce website; learning about the usability issues that may evolve. The intentions for the project are to develop an e-commerce website and investigate, as well as, apply usability testing methods. Furthermore, to practically perform and analyse the methods; along with applying, verifying and validating the findings with respect to the website. Usability testing methods help determine omissions, as well as, precisions on the developed website – Mum's Boutique. Heuristic Evaluation, Heatmaps, System Usability Scale, Cognitive Walkthrough and Retrospective Think Aloud methods were used to conduct usability tests. Many faults were detected with the usability method Retrospective Think Aloud. In contrast, all other methods verified and validated the website coherently. Thus, the project proved that usability testing methods are indeed key components in the process of web design. Testing the usability of any product or service is vital, in order to, improve its performance by applying unresolved /unidentified issues.

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Chapter 1- Introduction

The pervasive nature of e-commerce is intensifying precipitously per diem. Throughout the last five years, e-commerce has evolved by 13 percent. [1] Significantly, when producing fully-operational and comprehensible websites numerous usability tests should be conducted. Usability testing specifically denotes that the assessment of a product or service conclude to tests carried out by users. [2] This permits developers to have a vibrant interpretation on what needs to be rehabilitated, in order to, refine the website.

Aim: To critically test the usability of an e-commerce website and learn about the usability issues that may evolve during the development process.

Objectives:

- To develop an e-commerce website.
- To investigate and apply usability testing methods to better the e-commerce website's consistency and efficiency.
- To practically perform and analyse the usability testing methods on the e-commerce website.
- To apply, verify and validate my findings with regards to the usability of the e-commerce website.

In sequence to this project various topics were reviewed. Primarily, a literature review was conducted to substantiate a theoretical framework relevant to the product. Subsequently, a research and development methodology was fabricated; this section designates the strategies that have been used. In addition, the section also consists of the formation and arrangements during the development of the website. Consequently, the design and implementation section precedes; this comprises the assortment of user requirement, as well as, the website's design. The implementation section entails successes and failures of the developed website along with code snippets. In conclusion, a usability testing section was implemented; validated results can be reviewed for all testing methods conducted.

Chapter 2- Research & Review of Literature

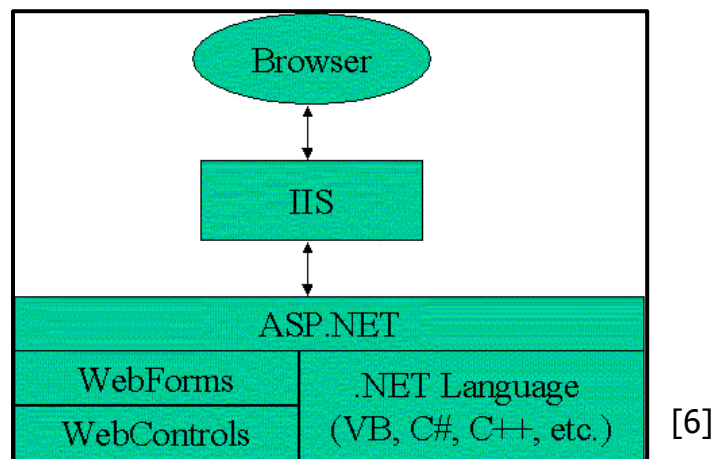
ASP.NET Programming Models

ASP.NET was first released in 2002, known as a server side technology framework model. It executes enabled computer code which is usually written in C# via an Internet server. [3] Five different programming models are available in the ASP.NET Framework, these are known as Web Forms, Model-View-Control (MVC), Web Pages, Web API and Core. [4] [3] A discussion was composed based upon a range of articles, where all available components are thoroughly explained.

Web Forms

Web Forms is known to be a drag-and-drop, event-driven model; allowing you to construct the application actively. In addition, it allows developers to form the application effortlessly as a result of its design structure; by using a vast variety of controls and components. [5]

Figure 1- Web Forms



Conferring to 'Research and Development of the Long-Distance Coach Management System Based on ASP.Net Technology'. The fact that the business logic and page display are both stored in .aspx files and .cs files is essential as the separation of both "greatly improves the maintainability of the Web application program." [7]

MVC

MVC also known as Model-View-Controller was developed as a pattern based way to build a clean separation between the Model, View and Controller. [5] Discussed by 'The Design of Website-Group for Government Based on ASP.NET', one of the key advantages is the fact that it provides "reusable components for the interactive user interface." [8] Meaning it is quick and easy to alter code; reducing the manifest of errors at a later stage.

Figure 2- Model View Controller

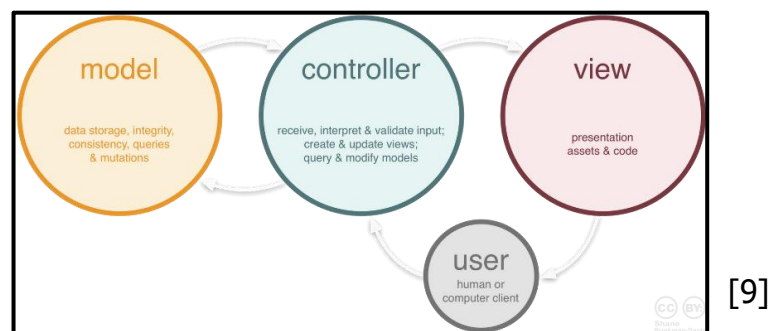


Figure 2 exemplifies the stages that MVC consists of. The segments Controller and View belong to the user part of the application; such as the interface. This works by the user sending a request to the Controller from the View. Once the request is received by the Controller it then accesses the Model; where the information corresponding to the user's input is processed, resuming the data back to the Controller which is then outputted to the View. [10]

Web Pages

ASP.NET Web Pages are basically ASP.NET sites without any project files or models, views and controllers. [11] Web Pages offer a stress-free method when combining HTML, CSS and server code all together. This programming model is easily extendable for databases, videos and many more. [12]

Web API

ASP.NET API implements HyperText Transfer Protocol (HTTP), it can be used to construct or utilize HTTP services. [13] ASP.NET API enables the creation of HTTP via ASP.NET MVC, preferring convention over configuration. Features such as model binding, routing and validation found in ASP.NET MVC are all parts of ASP.NET Web API. [14]

Core

ASP.NET Core is a framework for building cloud based internet applications, i.e. web apps and mobile back-ends. ASP.NET Core was developed to deliver enhancements in development cloud deployable apps. [15]

Usability Testing Methods

A plethora of usability testing methods were examined by reviewing a series of journals. Thus, to identify essential methods when testing the usability of a web application. [16] After wary consideration, the following methods below will be used:

- Retrospective Think Aloud (RTA)
- Heuristic Evaluation
- Cognitive Walkthrough
- Eye Tracker

Retrospective Think Aloud (RTA)

The subsequent method was used in the article: "A comparison of Usability Testing Methods for an Ecommerce Website." [16] Along with other methods used, the RTA method was thought to be the most successful, due to finding 3 times more defects in the Website. RTA is a method in which tasks are performed by users whilst using video playback, the users are also asked to explain the steps taken to complete the given tasks. [17] Meaning the developer will be able to view any difficulties the users may come across when completing a certain task.

Heuristic Evaluation

The Heuristic Evaluation is another successful method which was applied in: "Testing Web Application from Usability Perspective." [18] The method was developed to evaluate user interfaces by Nielsen and Molich. Although it is not a method for testing, when rules are followed the outcome of the application is found to be extremely usable. [19] The rules which have been taken from the Heuristic Evaluation must be followed to obtain a usable application; these rules are listed below:

- Visibility of System Status
- Match between system and the real world
- User control and freedom
- Consistency and standards
- Error prevention
- Recognition rather than recall
- Flexibility and efficiency of use
- Aesthetic and minimalist design
- Help users recognize, diagnose and recover from errors
- Help and documentation [20]

Cognitive Walkthrough

The following method was also applied in: "Testing Web Application from Usability Perspective." [18] A Cognitive Walkthrough is a set of tasks and questions which reflect on the actions and processes a user must take to complete various tasks successfully. The user must know how to perform the given task and must understand the outcome of the task. If the task is successful the users would answer "yes", otherwise, the user would answer "no". If the answer to any question is "no", the process must be reviewed and altered for the user to have a better understanding and experience. [21]

Eye Tracker

Lastly, the ensuing method scrutinised is the use of eye trackers as a usability testing procedure. In the article "Analysing Turkish E-government Websites by Eye Tracking", eye trackers were used to measure the usability of the Turkish e-government website; providing essential results to better the usability of the website. [22]

Eye trackers are used to enquire usability questions; it measures the activity of the eye, such as, recording eye's location (point of gaze) and momentum. [23] Although, use of eye tracking alone is not thought to be a comprehensive engineering approach. The additional methods could cause a significant influence to usability testing. [24]

Eye Trackers:

EyeLink 1000 [25]

Cost: **£21691.89** [26]

The EyeLink 1000 eye tracker consists of a small camera along with an infra-red illuminator which mounts on the desktop. Therefore, users must wear a small circular sticker on their forehead when using the system. The sticker empowers the devices to track the users head positions as movement occurs. Making the device extremely suitable for all types of users; such as children for instance. [27] Figure 3 illustrates the EyeLink 1000.

Figure 3 - EyeLink 1000



[28]

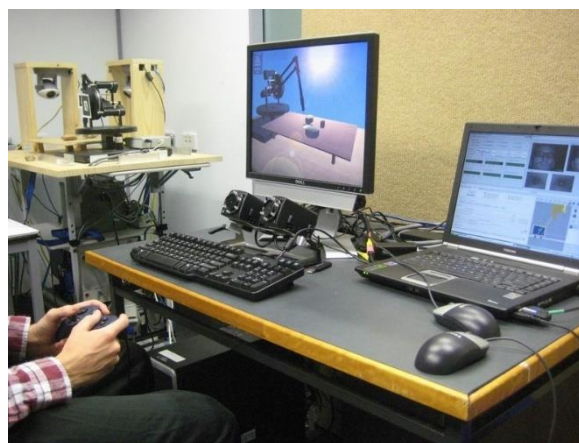
The Eyelink 1000 was used in an experiment found in 'Predictors of nutrition label viewing during food purchase decision making: an eye tracking investigations'. As stated in the aforementioned article the device "was used to precisely measure the time participants spent looking at the pieces of information on each 'shopping screen'. [29] Stating that the viewing time required for the experiment was 50ms. In contrast, the Eyelink 1000 records the user's eye position 1000 times per second. [29]

faceLAB 5 [25]

Cost: **£28171.28** [30]

The faceLAB 5 eye tracker proposes an unmatched level of suppleness without depriving its precision. It's known to propose investigators a high level of compactness, due to being customizable; enabling a wide range of operational conditions for different eye movement measurements. [31] Figure 4 illustrates the FaceLAB 5 eye tracker.

Figure 4-FaceLAB 5



[32]

Cited in 'Design of a multi-sensor system for a highly-integrated driver fatigue monitoring technology': "FaceLAB 5 tracks eye movement activity and indicates vision focusing points." [33] The device was used to validate operations of proprietary. [33]

Tobii T120 Eye Tracker [25]

Cost: **£ 28090.79** [34]

The Tobii T120 Eye Tracker carries out robust calibrations within seconds and its advanced software saves the user from the need of being an expert. It allows respondents to freely move their head and act effortlessly in front of the screen. Its high accuracy allows everyone to be tracked irrespective of their age or if they wear glasses or contact lenses. [35] Figure 5 illustrates the Tobii T120 Eye Tracker.

Figure 5- Tobii T120 Eye Tracker



[35]

A study was found where the Tobii T120 Eye Tracker was used. The study consisted of participants performing 14 set tasks; this was achievable after the calibration phase of the eye tracker. Stated in 'Individual User Characteristics and Information Visualization: Connecting the Dots through Eye Tracking': "The experimental software was fully automated and coded in Python." [36]

Pupil Labs Head Set [37]

Cost: **£1426.48** [38]

This eye tracker is unified via a head-fitted platform, which has an appearance of glasses. [39] The algorithm used firstly converts the eye image into grayscale, then primarily estimates the region of the pupil. The system then uses a filter to detect edges in the eye image, formerly looking for blue and yellow regions which subsequently gets extracted into contours. [40] Below in Figure 6 illustrates the Pupil Labs Head Set.

Figure 6- Pupil Labs Headset



As stated in 'Pupil detection for head-mounted eye tracking in the wild: an evaluation of the state of art': "If the ratio is above a threshold, the algorithm uses the raw Canny edge pixels to refine the ellipse fit and reports this final ellipse as the one defining the contour of the pupil. Otherwise the algorithm reports that no pupil was found." [42]

Tobii EyeX/ Steelseries [37]

Cost: **£94.81** [43]

The Tobii EyeX tracker has a range of 45-81 cm. [44] Three infra-red lights are used in the apparatus that produces images to obtain eye data. [45] The Tobii EyeX can track the eye up to 59 times per second; including footage of precisely where the eyes are looking at. The gaze settings also assists visualization through the thought process of the user. [46] Figure 7 exemplifies an example of the Tobii EyeX tracker.

Figure 7- Tobii EyeX/ Steel Series



As stated in 'Eye Tracker Reviews: Pupil Labs, Tobii, Eye Tribe, XLabs'; the tracker is extensively vigorous to head motion along with high exactness of eye movement. Moreover, the software is extremely user friendly. The downside to this tracker is that the user's head must be moderately truncated to the monitor, meaning that the user is not in their comfort zone. [37]

The Eye Tribe Tracker [37]

Cost: **£82** [48]

The Eye Tribe Tracker is the first affordable eye tracker produced, and its hardware consists of a table mounted device. [49] The device is set up using a USB3 cable connected to a computer. [50] The eye tracker reads the user's eye gaze with a precision of 0.5 to 1 degree. [51] Figure 5 exhibits The Eye Tribe Tracker.

Figure 8- The Eye Tribe Tracker



[52]

Stated in the article 'Accuracy and precision of fixation locations recorded with the low-cost Eye Tribe tracker in different experimental set-ups': "The Eye Tribe tracker thus clearly belongs to the category of the low-speed systems." [53] In a review, The Eye Tribe was found to have trouble when users move their head whilst being tracked. In contrast, an advantage to this apparatus is that it has the capability to intersect different visualizations at the same time. [54]

XLabs Gaze Chrome Plugin [37]

Cost: **£0.00** [55]

Finally, the XLabs Gaze Chrome Plugin uses a basic webcam as an eye tracker, meaning you don't need any special equipment. All that is needed is a plugin which is a free downloadable software found in the Google Chrome App store. [56] The plugin operates using xLab's software, providing instantaneous tracking of gaze, eye and head movement. [57] Figure 9 demonstrates the XLabs Gaze Chrome Plugin

Figure 9- XLabs Gaze Chrome Plugin



Apart from the plugin being free, it has been reviewed as a relatively good tracker. However, it is extremely sensitive to lighting and must only be used within Google Chrome. [37]

As illustrated throughout the section, the use of eye tracking is vital to gain higher usability of an application or service. With a selection of distinct efficiencies and costs, eye trackers are accessible to practically anyone; due to being extremely affordable. Figures 3-6 exhibit expensive eye trackers of which are tremendously precise. Nonetheless, the affordable eye trackers displayed in Figures 7-8, i.e. the EyeTribe tracker and the Tobii EyeX; can also provide extremely useful results. As a result to this thorough discussion and relative to research, the use of eye tracking is rapidly evolving and becoming more available, affordable and more significantly, accessible.

Usability Frameworks

Conferring to 'Human Factors for Informatics Usability': "Good System design depends upon solving the dynamic interacting needs of the four principal components of any user-system situation." [59] Meaning the use of a usability framework is essential to produce a usable website or application. A study has been conducted on various articles and journals, to find the appropriate approach for a usability framework with deliberation to an e-commerce website.

A range of guidelines for an efficient usability framework was found in 'A Framework to Support E-Commerce Development for People with Visual Impairment', the study focused on a framework in respect of the visual impaired. [60]

Developers are recommended to rationally group sub-headings via their content, to provide relaxed admittance to view the information they are interested in. [61] The use of breadcrumbs, acquaints users with their current location on the website; aiding users when traversing the website. Additionally, it allows them to go back to any preceding pages at ease. [62]

Referring to 'Web Content Accessibility Guidelines' the website logo's best placement is on the upper-left corner, as many language cultures read from left to right. [63] Another aspect to consider as part of the framework is the search function; it is a tremendous imperative attribute for e-commerce websites. As stated by 'Handbook of Human Factors in Web design', the placement of the search bar in the upper-right or upper-left corner is appropriate as it is a position where users presume to find it. [64]

As said by Nielsen et al, in 'E-commerce user Experience': "Recognising a familiar item visually is easier for some people rather than recalling its name" [65] Meaning every single product should exhibit accurate details along with germane high quality images. The user should also be able to have the option of viewing the product from different angles, allowing them to retain all relevant information about the product. [66]

An additional factor is to allow users to add items to their shopping cart without the need to register; if registration is needed before, it may drive the customer away. [65] Giving the option to the customer of whether they would or would not like to register after a purchase is more fitting to customers as they are given a choice. [67]

Existing E-Commerce Websites

Amazon.co.uk

Amazon is one of the world's major e-commerce websites, offering a variety of products and allowing people to sell their items. [68] To make a website distinguishable the user must be able to see and hear the information at ease, having different contrasts between the foreground and the background. [69]

A test was carried out on the Amazon website, testing conditions of the appearance for users with different colour blindness conditions, it was found that Amazon appeared mostly the same with some contrast reduced. [60] Stated in 'A framework to support e-commerce development for people with visual impairment': "In terms of visibility for colour blind users, the Amazon website performance and overall user experience is excellent as the webpage renders legibly." [60]

According to 'A framework to support e-commerce development for people with visual impairment' Amazon did not have substitute text features for images, meaning that the image did not have any description notifying the user what its purpose was. [66] Websites should have a refined and simple search engine for users to be able to find what they are looking for at ease. [65] In the previous mentioned article, a manual search was operated using Amazon's search engine, search results were illustrated via thumbnail images of the desired product with a description including the total cost of the item, along with a shipping charge. Research found that the colours used for delivery times and pricing could cause problems for users with a colour blindness of red and green. [66]

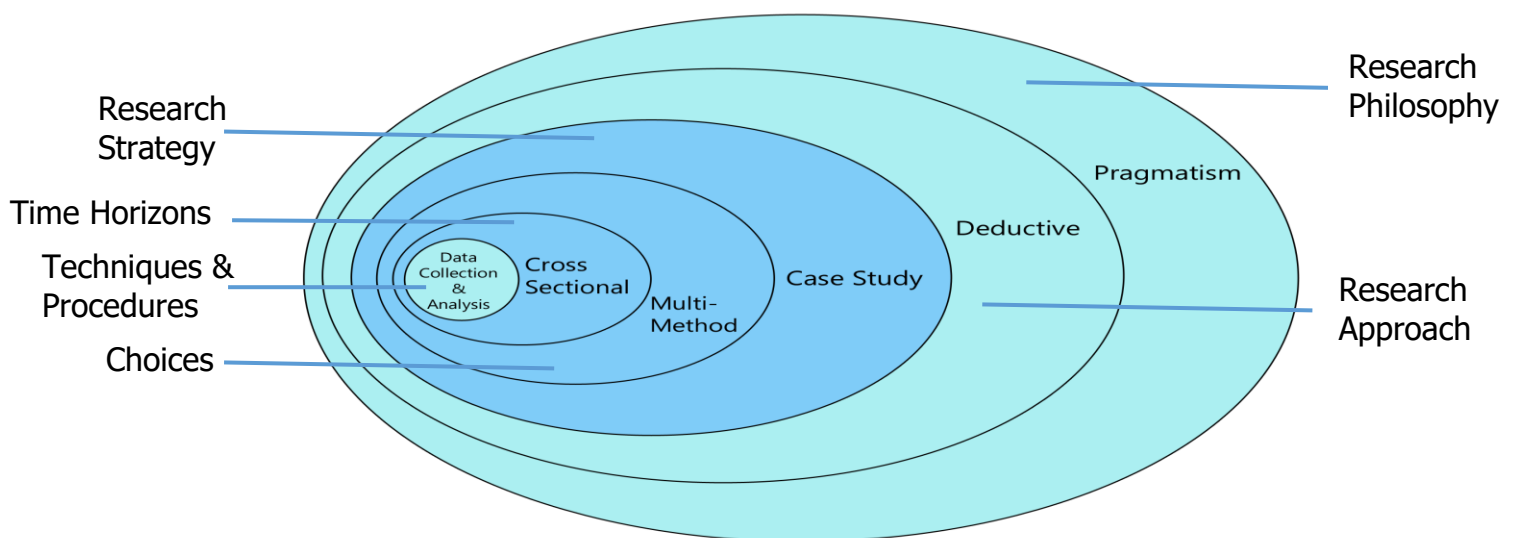
Chapter 3- Research and Development

Methodology

Research Methodology

Saunders Diagram [70] was recommended and considered as a research methodology approach, also known as the research onion. The diagram consists of six layers, working from the outer layer towards the core. Figure 1.0 illustrates Saunders Diagram; designed in prospective to the project.

Figure 10- Saunders Diagram



[71]

Research Philosophy – Pragmatism

Pragmatism is the first layer of Saunders Diagram. This method is essential as it validates both constructivism and objectivism; key components for the web design. It allows the author to research two point of views; influence and social users. Using pragmatism allows the author to find a solution to a problem. [72] According to 'Mark Saunders and Paul Tosey': people who use pragmatism as their research philosophy "consider that no single viewpoint can ever give the entire picture and that there may be multiple realities." [73]

Pragmatism is germane specifically in this project, since various testing methods will be performed using multiple users of diverse backgrounds, as well as, research information previously deliberated to enhance both productivity and usability of the e-commerce website. Referring to 'Mark Saunders and Paul Tosey' a variety of methods should be performed, using a single method will not gain sufficient data to make the website usable. [73]

Research Approach – Deductive

Deductive was chosen for the second layer of Saunders Diagram. The deductive approach consists of research that is autonomous of what is being scrutinized. [74] In other words, it develops a hypothesis based upon the research philosophy. Subsequently, to test the hypothesis a research strategy is fabricated. [75] The hypothesis of this project is:

'Usability testing enhances the usability of an e-commerce website'

One advantage to using the deductive approach is that there are extensive theoretical categories which are theoretically clear, consequent from theoretical frameworks. [76]

A disadvantage when using the deductive approach is that it is time consuming; demanding the researcher to acquire a working knowledge of the occurrences under examination. [77] Therefore, with the guidance and precedence of a Gantt Chart, the problem should not transpire.

Research Strategies – Case Study

The research strategies layer, encompasses case study. The project uses the case study strategy as it ensures both a flexible approach, as well as, a flexible outcome. It allows the author to preserve general traits of real-life context. [78] In other words, it emphasizes on interpretation of the dynamics existing within single situations. [79]

Using a case study as a strategy comes with many advantages. An example of this is that it abridges compound notions; improving diagnostic thinking, interaction and emerging acceptance for different views on the same subject. [80]

In contrast, disadvantages also take effect, such as making it rather extensive; producing large amounts of documentation, making it somewhat cumbersome to conduct. [81] As previously mentioned, time is managed appropriately to overcome disadvantages encompassing time constraints.

The case study for this project is based in a real-life context. An upcoming business named Mum's Boutique, has asked the author to develop an e-commerce website for them. The shop will be based in Gibraltar and will provide a range of products for mothers to-be, as well as, recent mothers.

Choices – Multi- Method

Multi-method is the authors choice for the project. Multi-method proposes an extensive selection of methods. [82] Research is dissented into distinct fragments. Each fragment generates an explicit dataset, followed by an analysis encompassing practises derived from both quantitative and qualitative methods. [83]

An advantage to using the multi-method approach is as stated in 'J. Mingers, 2001' it helps "to obtain full answers and increase the robustness of our understanding." [84] The approach allows the author to gain awareness of different features relating to the field of study. Consequently, an enhanced and more comprehensive clarification. [85] Various methods involving users will be conducted to produce evidence and information on the usability of the website.

Time Horizons – Cross-Sectional

The fifth layer of Saunders research onion is time horizons; cross-sectional will be used. Justification of this method is due to its involvement of mustering data of a population at an explicit point in time; i.e. aspects measured at a single point in time. [86]

Techniques and Procedures – Data Collection and Analysis

Definitively, the final layer of the research onion is data collection and analysis. An appropriate approach to the project consisting of making a final evaluation from all previously gathered information. [87] Feedback will be collected from a sample group and will be applied to enhance the usability of the e-commerce website.

To evaluate the project various tasks must be accomplished. Firstly, the development of an e-commerce website; where testing will be carried out. Furthermore, a sample group who will be asked to conduct various methods of testing to determine the usability of the e-commerce website. Thus, a total of 5 users of diverse backgrounds are performing various testing methods. The testing methods are listed:

- Retrospective Think Aloud (RTA)
- Heuristic Evaluation
- Cognitive Walkthrough
- Eye Tracker (EyeTribe)

Once the testing has been performed, the data collected will be inputted into various graphs and charts, of which analyses of the results will be conducted. Finally, the author will review the results and deliberate the improvements that need to be made in the website to make it more usable. Due to time constraints and the project being a prototype, the author may be unable to satisfy Mum's Boutique's requirements completely; it will not be fully functional. However, the author will make sure that the aims of this project are fully satisfied.

Software Development Methodology

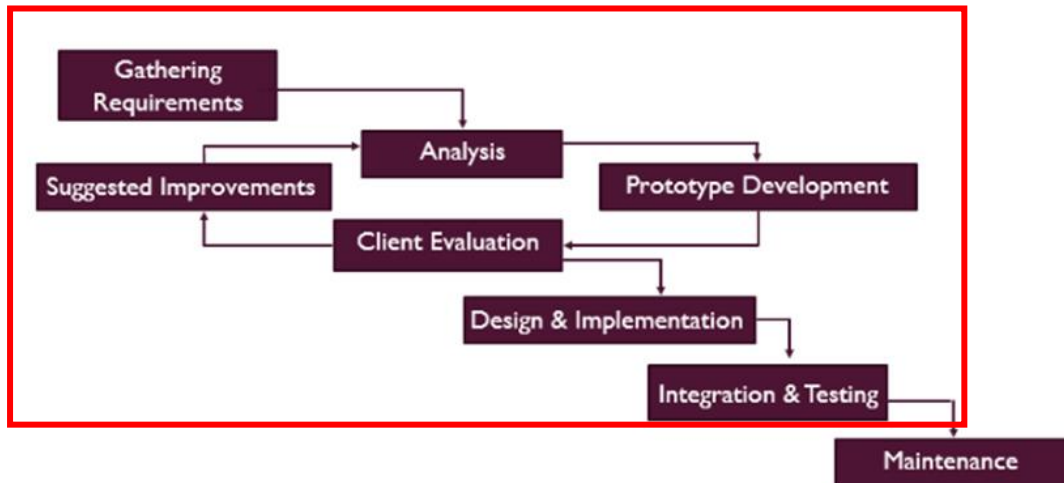
Reflecting on the research methodology, the software development method concludes to the Evolutionary Prototyping Model. The Evolutionary Prototyping Model is a lifecycle where practice is established in augmentations, meaning it can be altered in response to the end-user feedback. [88] The Evolutionary Prototyping Model can be seen in Figure 11 and was elected because it consists of the following four different stages:

1. Recognition of requirements.
2. The creation of a prototype.

3. Authenticating the prototype.
4. Adjustments to the prototype.

[89]

Figure 11- The Evolutionary Prototyping Model



[90]

Not all stages illustrated will be achieved due to time limitations. Since the design is purely based on a prototype, the iterative process becomes compulsory; due to suggested improvements being significant. Nonetheless, the Evolutionary Prototyping Model diagram also meets the standards and representation of the waterfall model, which will be demonstrated along the process of this thesis. Maintenance in this case will be excluded due to time constraints.

Using the Evolutionary Prototyping Model comes with many advantages and disadvantages.

Advantages

The said model is thought to be hastier than the Waterfall model, as many technical problems are discoverable at an early stage; meaning less risk. [91] This point is superlative to the project, as a prototype is being developed and risk should be kept to a minimum on all initial stages. This means user evaluations on the prototype will make the author cognisant of fluctuations and updates that need to be made from an early stage.

Another advantage is the total time required to complete the project will dramatically be reduced. As the developer is known to have a clearer idea on the techniques that should be performed. [92] Lastly, due to the user having a bigger involvement with the project from the beginning; users tend to be more trusting, content and fulfilled with the outcome. [93] In the case of the author, website requirements are collected from a users' prospective; this allows the development of the prototype to be clear and decipherable towards user's expectations.

Disadvantages

Disadvantages are that the prototype will evolve rapidly; meaning it is not cost-effective to produce an extensive amount of documentation. Furthermore, frequent changes made to the prototype may cause the structure to corrupt; conservation could become troublesome and inflated. [94]

The author should not face these disadvantages due to time constraints; the author will only be able to gain feedback from the users once or twice. Therefore, documentation will not overload, meaning it is cost-effective. No corruption should occur as changes to the prototype will only be made a certain amount of times. Consequently, problems should be kept to a minimum and dealt with cautiously.

As mentioned previously the author is not competent to go through the entire life cycle. Yet, the Evolutionary Prototyping Model is ideal for this project due to the processes highlighted in Figure 11. The author gathers requirements from users and is followed by an analysis of methods, of which, will be put into practice. Thus, the requirements gathered and the analysis will be applied to develop a prototype for an e-commerce website. Moreover, user testing will be performed to assess improvements that need to be applied to the prototype; by looping around the iterative section displayed in Figure 11, which hopefully discovers potential defects to further enhance web progression and design.

Software

The software tools that will be used are Visual Studio, the ASP.NET framework – Web Forms, C# and Cascading Style Sheet. The author has truncated knowledge on ASP.NET Web Forms to an intermediate level. Furthermore, the author will be challenged and forced to learn additional material during the development process; as the author is confronting the largest scaled project ever faced to this day. Web Forms are known to be a drag and drop event driven model, which actively constructs the application. Below in Figure 12 illustrates a methodical comparison on the web frameworks ASP.NET and PHP.

Figure 12- ASP.NET and PHP Comparison [95]

Factors	ASP.NET	PHP
Rapid Application Development	Yes	No
Multiple Programming Languages	Yes	No
Object Oriented Language	Strong	Weak
Database Support	Less	Many
Data Controls	Yes	No
Platform	Windows Only	Multiple Platforms
Web Servers	IIS Only	Apache, IIS
Cost	High	Low
Support & Documentation	MSDN	Multiple Sources
Exception Handling	Yes	Yes
Mobile Applications Support	High	Low
Web Services Support	Yes	Yes
Garbage Collection	Best	Constructor & Destructor
Multithreading	Yes	No

As can be seen from the table, there are many divergences amongst the two web frameworks. ASP.NET clearly describes flexibility during the course of development, and proposes additional features that PHP lacks of. ASP.NET allows a variety of languages to be programmed within the framework, and is known to have a rapid application development. This is essential to many projects developed world-wide, as well as, the project in question, due to significant time constraints. ASP.NET is programmable by two different languages; C# and Visual Basic. Figure 13 illustrates a comparison between both languages.

Figure 13- C# and Visual Basic Comparisons Table [96]

Factors	C#	Visual Basic
Object-Oriented	Hybrid	Partial Support
Static/ Dynamic Typing	Static	Static
Inheritance	Single Class, Multiple Interfaces	None
Feature Renaming	No	No
Method Overloading	Yes	No
Operator Overloading	Yes	No
Garbage Collection	Mark and Sweep or Generational	Reference Counting
Uniform Access	No	Yes
Class Variables/ Methods	Yes	No
Reflection	Yes	No
Access Control	Public, Protected, Private Internal, Protected Internal	Public, Private
Multithreading	Yes	No
Regular Expressions	Standard Library	No
Pointer Arithmetic	Yes	No

Language Integration	All .NET Languages	C (via DCOM)
Built-In Security	Yes	No

Figure 13 clearly clarifies that the programming language C# deliberates a higher-level language, contributing to flexibility and structural benefits amongst other; in contrast to Visual Basic. Therefore, due to knowledge being relatively respectable with C#; the language will be used within the ASP.NET environment. Cascading Style Sheets will also be utilized to empower ASP.NET's extra functionalities, as well as, visual design capabilities.

Hardware

A variety of hardware is desired to successfully satisfy the project's aim. Firstly, a desktop computer is needed, as the development of the application and user testing will take place on a desktop computer. Subsequently, an eye tracker will be used as part of a usability testing method, where the device will track the movement and position of user's eyes when using the application. The eye tracker will allow the author to clearly visualize what parts of the website users are mostly drawn too, in conjunction to, learning if the user experiences any difficulties when performing/finding specific functions.

Finally, a camera will be required as part of the Retrospective Think Aloud testing method; consisting of video playback whilst the user is performing an assortment of tasks on the application. Video playback is essential as the author will be able to view the tasks achieved by users, as well as, their reactions to certain functionalities.

All resources mentioned, will be available and supplied by the university, such as, the EyeTribe Eye Tracker. Furthermore, a free eye tracking software is available, allowing the author to be more flexible and use it anywhere in the presence of a desktop computer; with no additional hardware. To finish, the author owns a camera which means all resources are available free-of-charge.

Chapter 4- Design and Implementation

Requirements Analysis

User Requirements

To have a clear picture on what was expected from the owner of Mum's Boutique, a series of questions were asked to accomplish a well-structured and thorough user requirement specification. Exemplified below is a summary of the user requirements deliberated by the owner of Mum's Boutique.

- Target Audience: Ages 18+, newly or soon to be mothers as well their friends and relatives.
- A homepage illustrating the business.
- Visitors must be able to navigate through different categories.
 - Creams & Lotions
 - Maternity Clothing- Tops, Dresses, Shorts/Trousers and Skirts.
 - New Mum Clothing- Tops, Dresses, Shorts/Trousers and Skirts.
 - Bags
 - Shapewear
 - Contact Us
- Visitors must be able to view products.
- Products must have a clear description and high quality images.
- Visitors must be able to purchase the product(s)
- The shop owner must be able to add and update products.

Task Analysis

A procedure called Task Analysis was conducted on four potential users. The use of Task Analysis allows the author to discover essential tasks which the website must support, from a user's prospective. A well defined contribution towards the author's awareness of the website's structure and navigation; ensuring appropriate content is being clearly illustrated. [97] Task analysis was conducted on women within the age

group of 22-55 years of age. The candidates are all working mothers, with several children. Furthermore, one candidate is expecting her second child within a few months and another candidate is a grandmother; all candidates questioned are potential users to the website. Below is a summary on information collected from questions asked.

Who is going to use the system?

It has been deliberated that there will be various types of users using the system. Users, such as, mothers to-be; postnatal mothers are the focus of the website. In addition, other users must also be considered; such as, fathers, grandmothers, friends and relatives.

What tasks do they perform now?

Innumerable tasks were expected to be performed when questioning potential users. The most desirable task highlighted throughout all 4 answers was advice and information on what products were beneficial to them; candidates experienced difficulties when purchasing products for their first child. Along with easy navigation throughout the website and a selection of desired items; such as, bags, shapeware, pain relief, clothing and creams.

What tasks are desired?

The tasks desired by the interviewees were to be able to browse through products; learning about their properties and purposes, as well as, being able to acquire them. Furthermore, the addition of bundles informing users of essential products are vital to clients and the website. Many users will be unsure on what items to purchase if it is their first time becoming/being a mother. Bundles will also ensure quick and easy checkout of several products; ideal for mothers who leave things to the last minute.

How are the tasks learned?

All mothers answered correspondingly; they expect the website to be superficial and expeditious to use. One mother emphasized being an extremely busy person and

would only have the time to purchase items online if it is a swift and agitation-free procedure.

Where are tasks performed?

The tasks will be performed on any device with an internet connection. Due to mothers being extremely busy, the tasks will probably be performed in a hectic environment. Hence, it should be straight-forward to use.

What is the relationship between user and data?

Personal accounts are anticipated; delivery details, usernames and passwords will be stored within a database. The website will also provide the relevant information to users on products.

What other tools does the user have?

Clear and concise headings, titles and menus, as well as, being able to search for an explicit product. The user will also have two available methods to enter payment details – PayPal or Debit/Credit Card; making them feel comfort and more secure.

How many times are the tasks performed?

Tasks can be performed at any given time, as some mothers forget to purchase necessary items until they realise that they are in labour. Therefore, all tasks can be performed as many times as desired. Some customers may not want to order everything in bulk, whilst others may forget to purchase something.

What are the time constraints on the tasks?

The tasks must be quick and easy to perform, as previously stated mothers are extremely busy caring for their children. Moreover, some mothers may not think about purchasing products until closer to their due date and sometimes mothers may go into labour at an earlier stage during their pregnancy. Hence, tasks must be swift to accomplish.

What happens when things go wrong?

Items in the cart should not get lost if an error was to occur. Although, when users are filling out a form such as delivery details, the user may have to fill the data again. A phone number should be provided in the case of malfunction or miscalculation; users would be able to get a quick reply to their problem if a phone number is available.

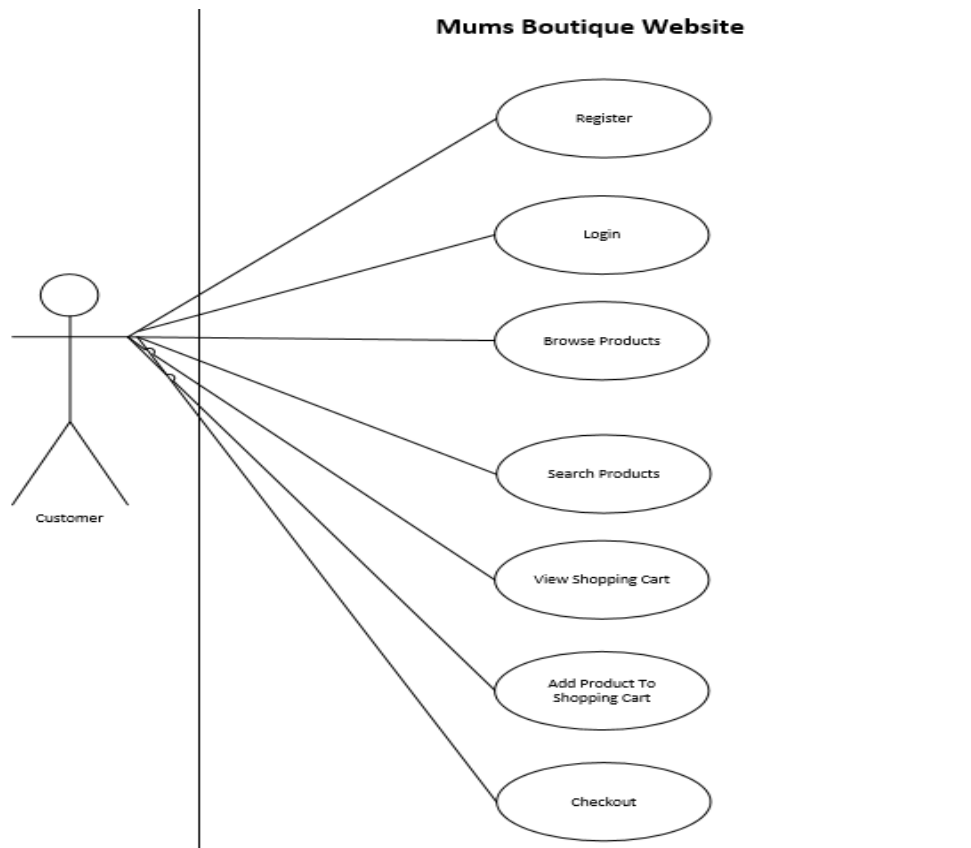
Design

Ahead of the implementation, various design techniques are used to allow the author to achieve a superlative website design. Techniques, such as, Use Case Diagrams, Paper Prototyping and a Site Map is illustrated throughout the remainder of this section.

Use Case Diagram

Initially, a Use Case Diagram was developed. This technique was used to discern actors (users) and their interactions with the application. [98] It is used to recognise, elucidate and establish system necessities. [99] Figure 14 exemplifies the Use Case Diagram developed for the application.

Figure 14- Use Case Diagram



As shown above, the actor (customer) interrelates with the system in innumerable approaches. The customer associates with various actions such as:

- Register
- Login
- Browse Product
- View Shopping Cart
- Search Products
- Add Product to Shopping Cart
- Checkout

Denoting the application should comprise of all declared interactions.

Paper Prototyping

The following technique is Paper Prototyping. The use of paper prototyping was a procedure which entails sketches of user interfaces; empowering rapid design. [100] It also consists of users testing the paper prototype; meaning the author will have an indication of usability inaccuracies. [101]

An advantage of the technique stated by 'Carolyn Snyder' was that it "provides substantive user feedback early in the development process— before you've invested effort in implementation." [102] A disadvantage to this method is that as no code is developed during this phase, it will not denote to all hitches of the interface. [103] This disadvantage is not considered a problem, as the technique is used in the premature stage of the project. Below Figures 15-22 elucidate designs of all paper prototype models.

Figure 15-Home Page Paper Prototype

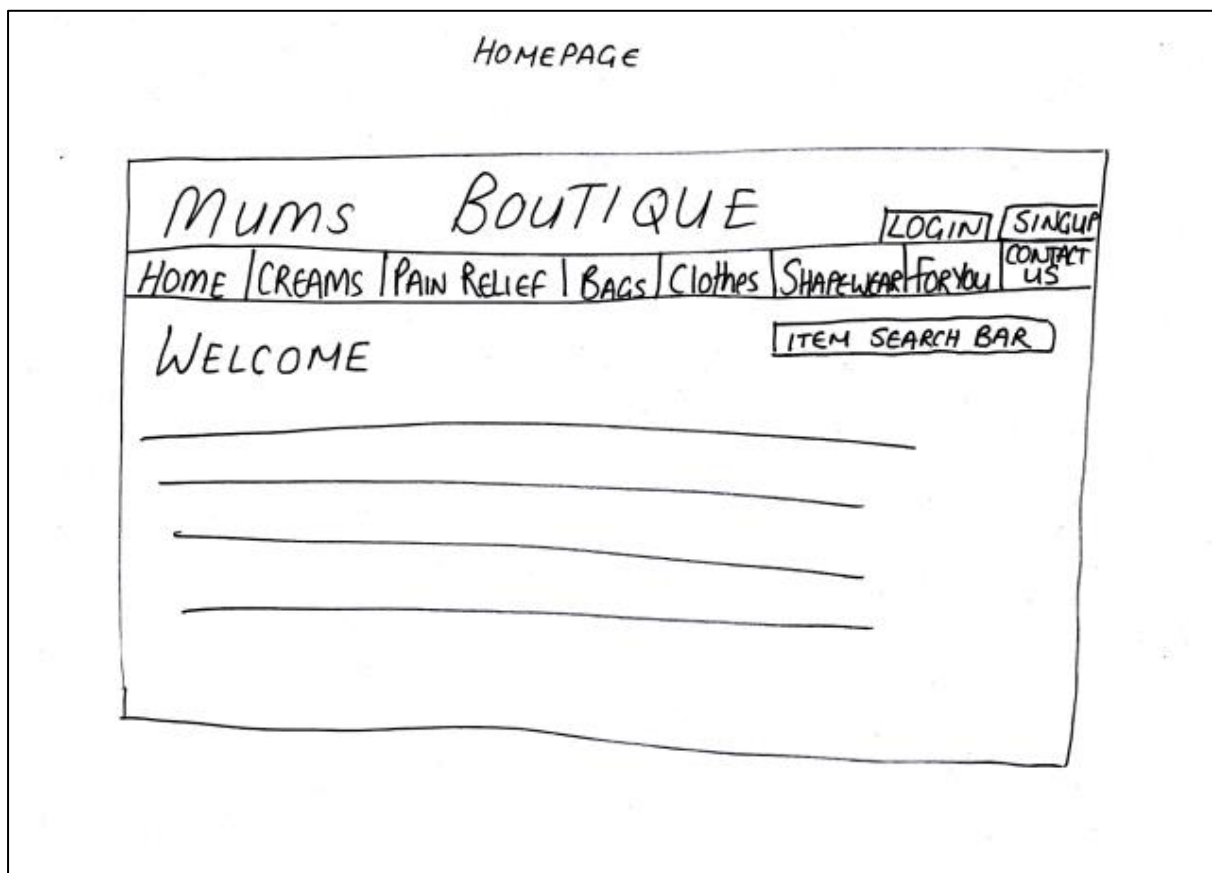


Figure 16- Best For You Page Paper Prototype



Figure 17- Products Page Paper Prototype

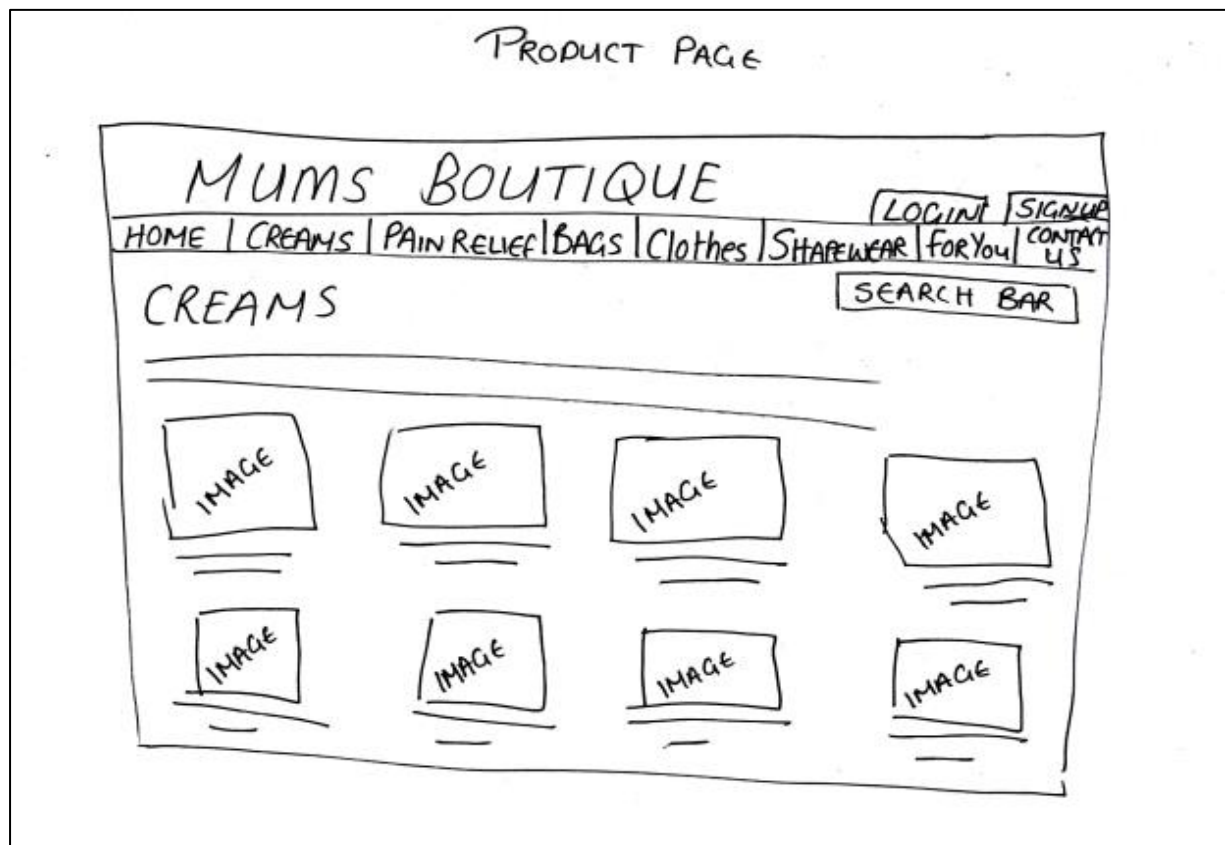


Figure 18- Product Description Page Paper Prototype

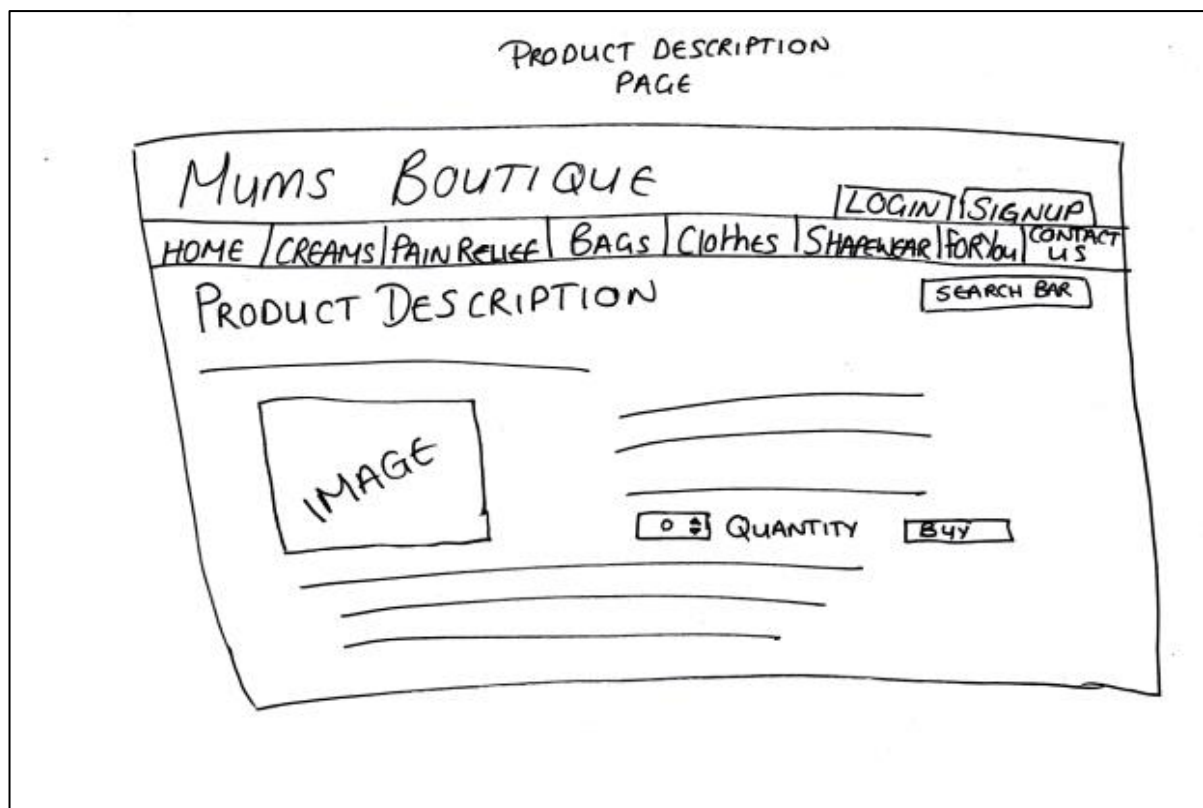


Figure 19-Checkout-Delivery Address Paper Prototype

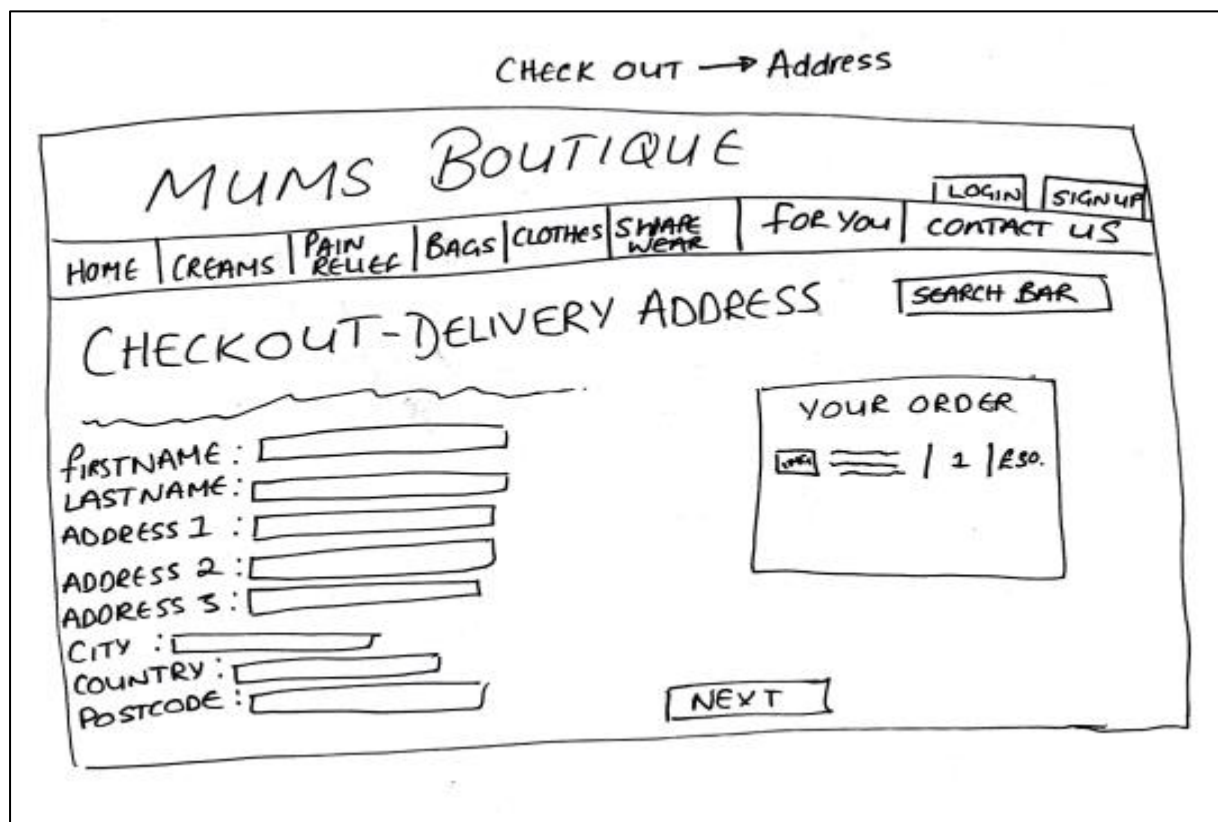


Figure 20- Checkout-Payment Details Paper Prototype

CHECKOUT → PAYMENT DETAILS

MUMS BOUTIQUE

HOME
CREAMS
PAIN RELIEF
BAGS
CLOTHES
SHAPE WEAR
FOR YOU
CONTACT US

LOGIN
SIGNUP

CHECK OUT - PAYMENT

CARD TYPE: VISA DEBIT

CARD NUMBER:

SECURITY NUMBER:

EXPIRY DATE: 15 / 12

CARDHOLDER NAME:

ADDRESS:

TOWN:

EMAIL:

YOUR ORDER

~~~ | 1 | 50.

PAY WITH PAYPAL

SUBMIT

Figure 21- Login / Signup Page Paper Prototype

### LOGIN PAGE

## MUMS BOUTIQUE

HOME
CREAMS
PAIN RELIEF
BAGS
CLOTHES
SHAPE WEAR
FOR YOU
CONTACT US

LOGIN
SIGNUP

---

### LOGIN

USERNAME:

PASSWORD:

SIGN IN

NOT A MEMBER?

SIGNUP

### SIGN UP PAGE

## MUMS BOUTIQUE

HOME
CREAMS
PAIN RELIEF
BAGS
CLOTHES
SHAPE WEAR
FOR YOU
CONTACT US

LOGIN
SIGNUP

---

### SIGNUP

FIRSTNAME:

LASTNAME:

EMAIL:

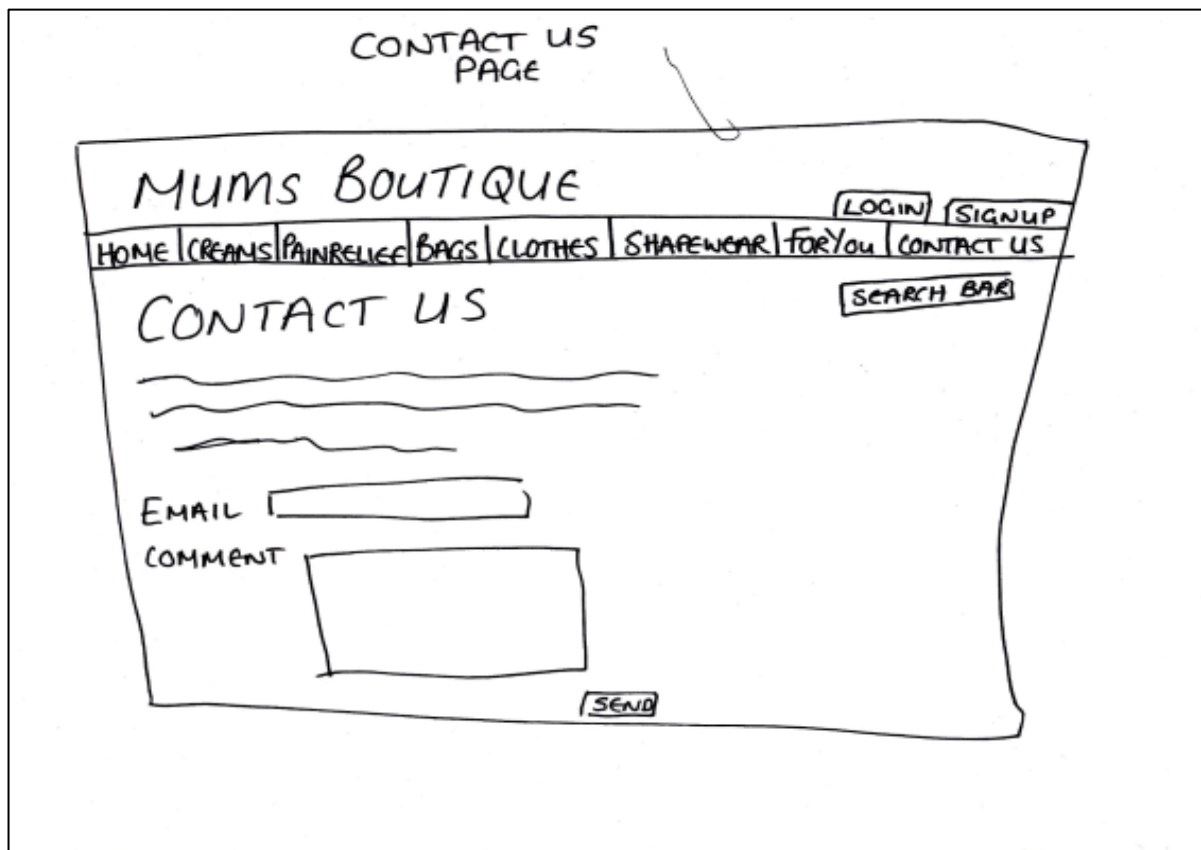
USERNAME:

PASSWORD:

RE-ENTER PASSWORD:

SIGNUP

Figure 22- Contact Us Page Paper Prototype



## User Evaluation

The paper prototype was presented to 2 different users of diverse backgrounds. The author described and clarified each of the model's functionality and the users were asked to evaluate them thoughtfully. Below is a summary of the evaluation made by the users. Full evaluation can be found in Appendix 3.

### *Home Page*

The homepage was thought to be well structured, clear and concise. Although the evaluators pointed out certain aspects that they would prefer to see. The positioning of the search bar is thought to be more desirable at the top of the page, located alongside the login and signup buttons. Another characteristic that would be changed by the evaluators was the menu bar; recommendations of encapsulating different types of products all into one "Products" list.

### *Best for You Page*

The page was thought to be a great idea to have, as new mothers do not always have a clue on what to purchase. The evaluators liked the fact that there were images displayed alongside descriptions. The only change suggested was to change the name to "Recommended Products" so the users will have a better understanding of what the page consists of.

### *Product Page*

There were no recommendations to alter this page, it was thought to be extremely well-designed.

### *Product Description Page*

It was thought to be extremely user friendly, as well as, eye catching to the users. The evaluators liked the feature where they can input an anticipated quantity, for instance, proposals; such as, including a back button so that the user can navigate back to the page. Another suggestion was to provide the user with the functionality of being able to add items to a shopping cart until they are ready to purchase. Lastly, the evaluators asked for a shopping cart so that they keep track of what items are being stored.

### *Checkout- Delivery Address*

The evaluators did not have anything bad to say about this page. They did mention they liked being able to view their order information.

### *Checkout- Payment Details*

One recommendation was made on this page; the position of the PayPal options button would be more visual if placed at the top of the page before the user enters their card details. Other than that, everything else was adored by the evaluators.

### *Login Page*

The login page is thought to be just like any other login page. The evaluators liked the occurrence of having an option to sign up if the user was not a member. Although,

it was highlighted that it would be essential to have a 'forgot password' link for users who are unable to recall their password.

### *Sign Up Page*

The sign-up page was efficient and likeable. The evaluators emphasised that unlike other websites there was diminutive fields to fill out.

### *Contact Us Page*

The only recommendation mentioned was to give the user the option to enter their mobile number, as well as, their email. The user may want to be contacted via phone rather than through email.

## **Expert Evaluation**

An evaluation was then made by a usability expert. The expert revealed that the website was extremely well laid out as it had a recognisable layout to other prevailing websites. This suggests that users already have the knowledge of how to navigate around. Affordance was perceived throughout the website, declared the expert; images and menus were well exemplified. The users would know the conclusion of these features.

Amendment were suggested, such as, disparaging the number of words used on a webpage. Another proposal was to display a magnifying glass at the end of the search bar; this would expand the use of metaphors.

As a result of the paper prototype review, many changes will be made. Initially, the encapsulation of products will go under 2 different headings; "Maternity" and "Postnatal". The recommendation of all products will go under one heading, "Products". Another indorsed minor modification that will be taken into deliberation is the change of the heading "Best for You" to "Recommended Products".

Additional alteration will be made by adjoining a shopping cart; users will be able to store items in the cart before checking out at ease. Finally, as the usability expert

suggested; the word count will be reduced per page to avoid confusion for people with disabilities, as well as, inserting a magnifying glass for the search bar to enhance metaphors on the website.

### **Site Map**

Ultimately a Site Map was designed. A Site Map is fundamentally a map of the website design/produced. It provides visuals on how navigation can be used throughout the different pages. [104] The Site Map initiated is demonstrated in Figure 23.

Figure 23- Site map



## Implementation

Throughout the development of the application, many accomplishments were attained and complications were faced; in some cases, the problem could not be resolved.

### **Successes**

One of the best achievements was the shopping cart of the website. This feature which was time consuming and troublesome to some extent. Figure 24-27 illustrates the shopping cart.

Figure 24- Shopping Cart Icon



Figure 24 exhibits the graphical representation of the shopping cart. This feature is presented throughout the website and allows users to add various items to the shopping cart ahead of purchasing them and visualize/review their items simply by clicking on it.

Figure 25- ShopApp Class (Part 1)

```
// The collection of items added by the user to the basket to order
public List<OrderItem> BasketItems = new List<OrderItem>();

// Indicates if the basket is empty or not
public bool IsBasketEmpty
{
    get { return BasketItems.Count == 0; }
}
```

To achieve this fully functional feature, a class was implemented called ShopApp; illustrated in figure 25. The class was developed to carry out various functions behind the scenes. The class has much more to it (based on functionality), however, displayed

are vital methods used to perform various actions. Firstly, a list is implemented to keep record of all products being added to the cart. If no products are added to the shopping cart, the cart will display that there are no items available.

Figure 26- ShopApp Class (Part 2)

```
// Finds the basket item with the corresponding Item by the Product Id
public OrderItem GetBasketItem(int productId)
{
    // anonymous function
    return BasketItems.FirstOrDefault(item => item.productId == productId); ;
}

// Finds the matching basket item
public OrderItem GetBasketItem(OrderItem item)
{
    // anonymous function
    return BasketItems.FirstOrDefault(bItem => bItem == item);
}

public double CalculateBasketTotal()
{
    double basketSum = 0;
    // sum the items - using anonymous function
    basketSum = BasketItems.Sum(basketItem => basketItem.Price * basketItem.Quantity);

    return basketSum;
}
}
```

Figure 26 illustrates more code located within the ShopApp class. Exhibited are various functions which operate the view of the shopping cart. The methods 'GetBasketItem' displays all the products that the user has added to the shopping cart. Followed by the 'CalculateBasketTotal' method; calculating the total cost of all products within the cart.

Figure 27- Shopping Cart Code (Part 1)

```
namespace mumsBoutique
{
    public partial class ShoppingBasket : System.Web.UI.Page
    {
        protected void Page_Load(object sender, EventArgs e)
        {
            gvBasketItems.DataSource = Models.ShopApp.Instance.BasketItems;

            // If this is not a postback bind the grid
            // If you do it when it is a postback, it will overwrite the new quantities.
            if (!IsPostBack)
            {
                gvBasketItems.DataBind();
            }
        }
    }
}
```

Figure 27 exemplifies part of the code behind the shopping cart's user interface. The code illustrated is used to load the shopping cart items, and the ShoppApp class is used to grab the data of products saved to the shopping cart.

Figure 28- Shopping Cart User Interface

| Basket Items |                                                                                                              |          |                    |                                               |  |
|--------------|--------------------------------------------------------------------------------------------------------------|----------|--------------------|-----------------------------------------------|--|
| Item Number  | Item                                                                                                         | Quantity | Price              |                                               |  |
| CR103        | <br>Organic Labour Oil 70ml | 5        | £11.95             | <a href="#">Change</a> <a href="#">Delete</a> |  |
| PR101        | <br>Miracle TENS Machine    | 1        | £43.88             | <a href="#">Change</a> <a href="#">Delete</a> |  |
|              |                                                                                                              |          | <b>£103.63</b>     |                                               |  |
|              |                                                                                                              |          | Subtotal (2 items) |                                               |  |

Place Order

Figure 28 displays the user interface of the shopping cart. In this instance, the cart illustrates the products stored, as well as, item prices and overall costs. The shopping cart also demonstrates features that allows the user to make alterations to their cart. Below, Figure 29 shows the ASP.NET code which was used to generate the Change and Delete function.

Figure 29- Shopping Cart ASP.NET Code

```
<asp:GridView ID="gvBasketItems" runat="server" CssClass="table ProductsDataList" EmptyDataText="Your basket is currently empty." ShowFooter="true"
    AutoGenerateColumns="false"
    OnRowDataBound="gvBasketItems_RowDataBound"
    OnRowDeleting="gvBasketItems_RowDeleting"
    OnRowCancelingEdit="gvBasketItems_RowCancelingEdit"
    OnRowUpdating="gvBasketItems_RowUpdating" OnRowEditing="gvBasketItems_RowEditing" >
    <Columns>
```

The ASP.NET code clarified in Figure 29 is associated with the Change and Delete functions shown in Figure 28. The C# code fitting to the two highlighted fields are elucidated in Figure 30-31.

Figure 30- Shopping Cart Code- Delete Basket Product

```
2 references
private void DeleteBasketItem(int productId)
{
    // Get the matching item to delete from the basket
    Models.OrderItem basketItem = Models.ShopApp.Instance.GetBasketItem(productId);

    // Delete the item
    Models.ShopApp.Instance.BasketItems.Remove(basketItem);

    // Rebind the grid view to reflect the change - removed item
    gvBasketItems.DataBind();

    // Update the basket on the master page
    ((SiteMaster)Master).UpdateBasket();
}

0 references
protected void gvBasketItems_RowDeleting(object sender, GridViewDeleteEventArgs e)
{
    int productId = int.Parse(e.Values["Item.productId"].ToString());
    DeleteBasketItem(productId);
}
```

As illustrated two methods have been implemented to delete an item from the shopping cart. The 'DeleteBasketItem' method uses the ShopApp class previously demonstrated in Figures 25-26; the method certifies that the precise product is being removed from the basket. The basket is then updated; the product obliterated no longer appears in the cart.

Figure 31- Shopping Cart Code- Update Quantity

```
protected void gvBasketItems_RowUpdating(object sender, GridViewUpdateEventArgs e)
{
    // Check page is valid
    if (Page.IsValid)
    {
        // Get the item id and the updated quantity value
        int productId = int.Parse(e.NewValues["Item.productId"].ToString());
        int newQty = int.Parse(e.NewValues["quantity"].ToString());

        // Get the basket item to update based on the item id
        Models.OrderItem basketItem = Models.ShopApp.Instance.GetBasketItem(productId);

        // if the new quantity is greater than zero, update the quantity,
        // else delete the item from the basket (qty = 0)
        if (newQty > 0)
        {
            basketItem.Quantity = newQty;

            // Exit edit mode
            gvBasketItems.EditIndex = -1;

            // Rebind the grid view to reflect the change - new quantity
            gvBasketItems.DataBind();

            // Update the basket on the master page
            ((SiteMaster)Master).UpdateBasket();
        }
        else
        {
            DeleteBasketItem(productId);
        }
    }
}
```

Subsequently, Figure 31 embodies the Update Quantity function. In this occurrence, only one method was used. Initially, the method gets the product that is being restructured, along with its innovative quantity value. Ensued by updating the product which is stored in the ShopApp class. The method then checks if the quantity recorded is superior to zero. If the quantity is greater than zero, the basket item will then be updated and the new quantity will be presented to the user. Otherwise the product will be deleted from the basket.

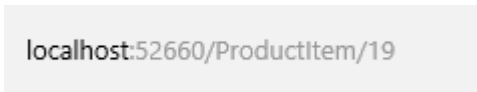
Figure 32- C# Code -Product Details (Part 1)

```
public partial class ProductItem : System.Web.UI.Page
{
    int _productID = 0;

    protected void Page_Load(object sender, EventArgs e)
    {
        IList<string> segments = Request.GetFriendlyUrlSegments();

        if (segments != null && segments.Count > 0)
        {
            //Convert the item ID to an integer and store it in the field _itemID
            int.TryParse(segments[0], out _productID);
        }
    }
}
```

Figure 32, unveils the C# code behind the products details page; illustrated in Figure 34. The code under the 'Page\_Load' method uses an object named 'GetFriendlyUrlSegment'. In this instance, the object stores the 'productID' of the selected product in the website's URL. An example of this is displayed below:



localhost:52660/ProductItem/19

Figure 33, exhibits the remainder of the method.

Figure 33- C# Code- Product Details (Part 2)

```
// If no item ID is specified, go back to the products page
if (_productID == 0)
{
    Response.Redirect("Default.aspx");
}

if (!IsPostBack && _productID > 0)
{
    // open the connection to the database
    using (var context = new ApplicationDbContext())
    {
        string sql = "SELECT * FROM Items WHERE productId = @productId";
        System.Data.SqlClient.SqlParameter parameter = new System.Data.SqlClient.SqlParameter
            ("@productId", _productID);
        Item foundItem = context.Database.SqlQuery<Item>(sql, parameter).FirstOrDefault();

        productNameLabel.Text = foundItem.productName;
        productItemNumber.Text = foundItem.productNumber;
        productCost.Text = foundItem.cost.ToString("c");
        productImage.ImageUrl = "~/\" + foundItem.picture;
        productDescription.Text = foundItem.productDecription;
    }
}
```

Once the 'productID' is stored in the webpage' URL, the code developed searches for the ID through the table Items stored in the database. An output displaying the related products information is then presented to the user. The visual is then displayed as presented in Figure 34.

Figure 34- Product Details User Interface

**Product Details**  
**Organic Labour Oil 70ml**  
CR103  
  
**£11.95**  
**Product summary**  
A relaxing and supportive blend of organic oils for massage particularly during the first stage of labour and in the final week before delivery. Professionally formulated according to aromatherapeutic principles.  
**Buy Item**  
Quantity:

## Problems

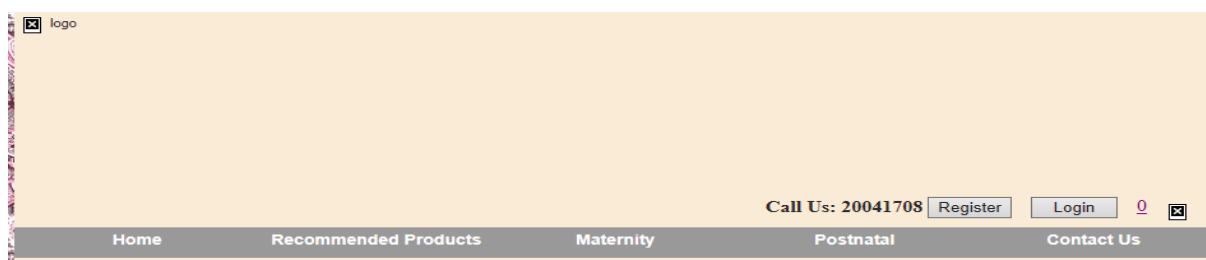
Whilst there have been many successes throughout the development, the author encountered two problems. Many problems arose when creating the product description page. The main problem which was later resolved was the fact that the page was not outputting the master page format. The original problem is elucidated in Figure 35.

Figure 35- Product Details Problem (Part 1)



After spending an extensive number of hours trying to resolute the problem, the author originated a solution. The author believed the origin of the problem was within the Product Details page, instead, the problem originated from the Master Page. The Master Page was not regulated appropriately, hence, why the problem was transpiring. Despite the main problem being fixed, another problem moulded. The heading of the website was imperceptible. This can be witnessed in Figure 36.

Figure 36- Product Details Problem (Part 2)



It is still unknown why the problem is occurring only on the Product Details page. Unfortunately, this is a problem that the author has been impotent to surmount.

The last dilemma encountered was the implementation of a search bar. Due to lack of knowledge and time constraints the author has been unable to implement this feature as previously illustrated on the paper prototypes.

## System Testing

System testing was carried out to ensure that the website is efficient and user responsive. Innumerable questions were reviewed in relation to the website, where the answer yes or no was given to justify the question. Figure 37 illustrates the system testing checklist which was performed.

Figure 37- Website Checklist [105]

| <b>System Check List</b>                                 |     |
|----------------------------------------------------------|-----|
| <b>Do all buttons work?</b>                              | Yes |
| <b>Do all menu options work?</b>                         | Yes |
| <b>Does user's registration details get saved?</b>       | Yes |
| <b>Can users sign in to their accounts?</b>              | Yes |
| <b>Are all fonts the same?</b>                           | Yes |
| <b>Is there any spelling or grammatical errors?</b>      | No  |
| <b>Are all buttons equally sized?</b>                    | Yes |
| <b>Is there a home link on every page?</b>               | Yes |
| <b>Is there any broken images?</b>                       | No  |
| <b>Are all fields accessible by keyboard shortcuts?</b>  | Yes |
| <b>Are the dropdown menus correspondingly displayed?</b> | Yes |
| <b>Is the navigation clear and simple?</b>               | Yes |
| <b>Does your logo link home?</b>                         | No  |
| <b>Is relevant information grouped together?</b>         | Yes |
| <b>Is colour used properly?</b>                          | Yes |
| <b>Is there colour consistency throughout?</b>           | Yes |
| <b>Are error messages relevant?</b>                      | Yes |
| <b>Do images have a description?</b>                     | Yes |
| <b>Can users find information quickly?</b>               | Yes |
| <b>Is there a search function?</b>                       | No  |

Results illustrated in Figure 37 exemplifies that all tests were successful; resulting to the website to be fully functional, efficient and user friendly.

In conclusion, many features proved to be extremely user friendly and demonstrated swift operations, whilst others may have concluded as a disadvantage to the website when testing the usability. Unfortunately, due to lack of knowledge and time constraints, faults should appear when testing the usability of the website; of which may contribute to proof of usability testing faults being detected. Thus, an incomplete feature that may be reviewed as a test, as well as, an advantage to usability testing.

## **Chapter 5- Usability Testing**

As mentioned in the Research Methodology section, various methods of usability testing were used. The methods used will be as prescribed:

### **Heuristic Evaluation**

The first testing method, Heuristic Evaluation has been conducted by the author. This method is task-independent, it does not ask assessors to observe a specific situation. This appraisal directs awareness mainly to the characteristics of the interface. [106] It consists of following broad rules rather than usability guidelines. Questions illustrated below are reviewed.

- Visibility of system status
- Match between system and the real world
- User control and freedom
- Consistency and standards
- Error prevention
- Recognition rather than recall
- Flexibility and efficiency of use
- Aesthetic and minimalist design
- Help users recognize, diagnose and recover from errors
- Help and documentation [107]

Successfully achieving the rules will indicate that the website is comprehensible. The following discussion provides evidence of the evaluation being performed.

#### **Visibility of System Status**

The users can understand their situation evidently; conversant of what is going on constantly. This is exemplified with the use of vibrant and pertinent headings on each webpage, as seen in Figure 38. Webpages load hastily, signifying the users are informed when the website is fully loaded; it is apparent to the user that the website is ready for use.

Figure 38- Visibility of System Status (Headings)



### Match Between System and the Real World:

All elements of the interface are consistent with user expectations; affordance can be established throughout. An example of this is the shopping basket; illustrated metaphorically as a shopping cart. Users automatically know the purpose of the feature. Another instance of this is the menu options; users know this feature navigates them through the website. Both features have been highlighted in Figure 39.

Figure 39- Match Between System and the Real World (Shopping Cart and Navigation Menu)



### User Control and Freedom:

Alternative routes have been provided on the website for users to have a feel of ease. Users have the option to turn back to the previous page when viewing a product's description; a back button is provided for rapid return to previous pages. The website does not make users sign up to make a purchase; the users are given an option to sign up upon completing their order. Otherwise, the users can register when desired.

### Consistency and Standards:

All content is consistent; buttons are relevant to the actions they state. Menu options are also relevant and navigate the user to the appropriate webpage. The structure of the website is coherent; all products are illustrated comparable. The website is extremely consistent. However, one webpage lacks on functional performance; the Product Details page. Firstly, the company logo disappears, followed by the loss of functionality on the navigation menu, register and log in buttons, as demonstrated in Figure 40. The developer has provided a back button on this page to compensate for this unforeseen circumstance; illustrated in Figure 41.

Figure 40- Consistency and Standards (Missing Logo)

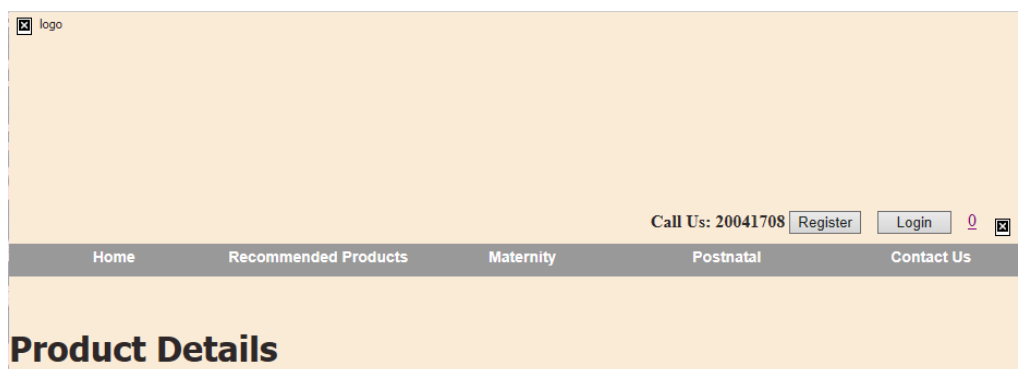
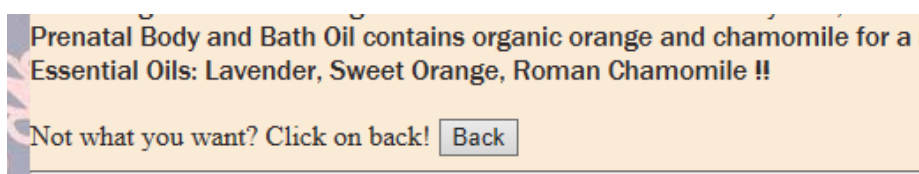


Figure 41- Consistency and Standards (Back Button)



### Error Prevention:

There are no areas on the website where users may become confused causing them to make a mistake. All interface elements are clear and do not consist of features would confuse the user into making an error.

### Recognition rather than Recall:

The website does not rely of the user's memory. The website informs the users at all times; the items and quantity stored in their shopping cart. During the checkout

process, the users are informed of their total cost, as well as, the list of items that they chose to purchase.

#### Flexibility and Efficiency of use:

The interface is straightforward and provide easy navigation throughout, as the layout is analogous to multiple existing websites. Implying that the website does not demand abundant exertion from the user's side.

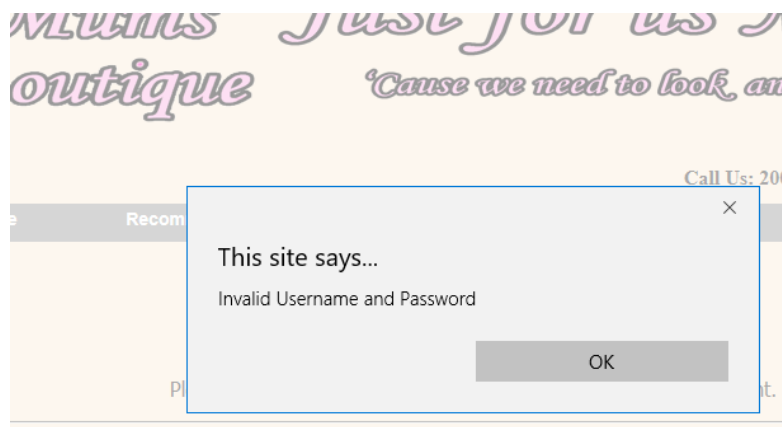
#### Aesthetic and Minimalist design:

The website does not clutter, it focuses purely on the relevant content the webpages display. Adequate information is displayed to the users signifying minimalist design.

#### Help user Recognize, Diagnose, and Recover from Errors:

Lastly, when users perform an error, they are notified in a relaxed, friendly manner. An example of this is when the user is logged into their account, but accidentally enter the wrong username or password; in this case, the exception is handled via a popup box informing them of the exact error. The error message is exemplified in Figure 42.

Figure 42- Help User Recognize, Diagnose and Recover from Errors (Error Message)



Thus, the heuristic evaluation has been efficacious; all the criteria's have been met. In contrast, the consistency and standards criteria was not achieved completely. However, the error is moderately inconsequential as the author executed a substitute route that allows users to navigate back to their preceding location.

## **Heatmaps - Eye Tracker (Eye Tribe)**

The major usability testing method used was heatmaps. This method entails the website being used by 5 different users; the users eye position has been monitored using the Eye Tribe eye tracker. These methods credit the author with a vibrant depiction of what features of the website the users are averting on, as well as, areas that users find interesting. The users were asked to perform 5 distinct tasks:

- Select a product from the postnatal category.
- Add the product to the shopping cart.
- Checkout.
- Register to the website.
- Login to the website.

Figures 43-44 elucidates 2 of 5 users executing this method.

Figure 43- Eye Tracking (Subject 1)

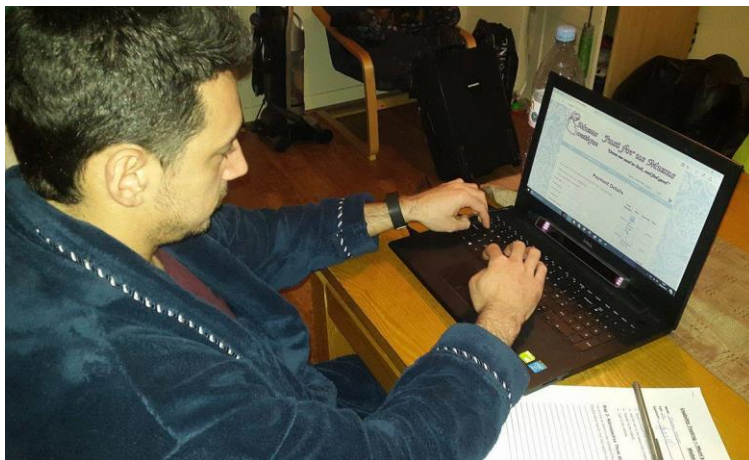


Figure 44- Eye Tracking (Subject 2)



## Heatmaps

One of the principal testing methods used are heatmaps. As stated by 'Sharon Hurley Hall': Heatmaps "measure the attention people give to a particular area of a webpage." [108] This allows the author to distinguish areas of the website which fascinate users, as well as, extents which are overlooked. The heatmaps used disclose 3 colours: Red, Yellow and Green. Red ranges designate the features which users have observed for an extensive point in time, followed by yellow and then green.

The heatmaps illustrated in Figures 45- 53 display the average gaze for all 5 users. A breakdown of each individual users can be found in appendices 6-14.

Figure 45- Heatmap (Homepage)

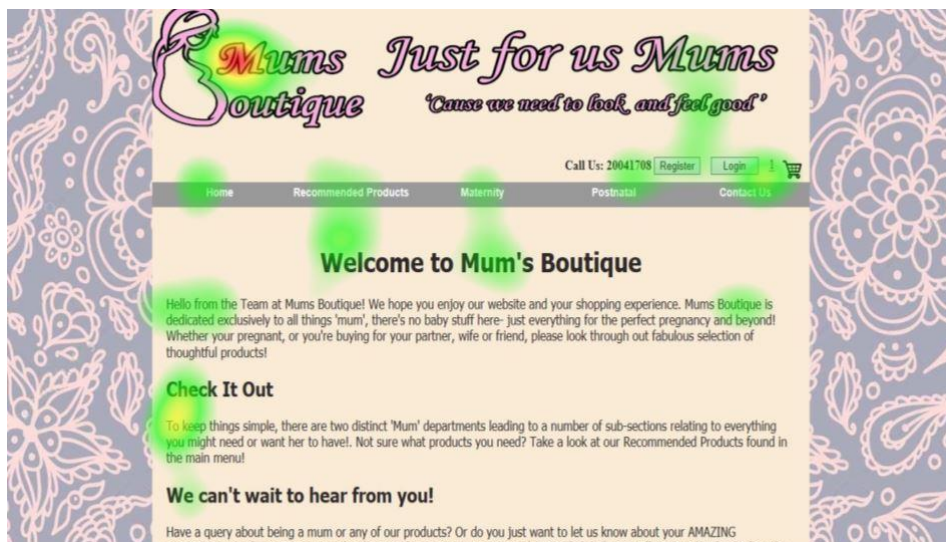


Figure 45 illustrates the Home Page, as exemplified the main area of interest in this page is the logo of the website. The results revealed are moderately virtuous, as all main features are considered by the users.

Figure 46- Heatmap (Product Page)



Two aspects of the webpage displayed in Figure 46 have caught the user's attentions for an prolonged interval. The logo seems to be a stimulating influence to the users as established also in Figure 45. Another facet emphasised in all three colours is the product situated on the far right; this could advocate that the product will be tremendously successful when purchases are made. Overall, all focal features in relation to the present page have been ascertained by the users.

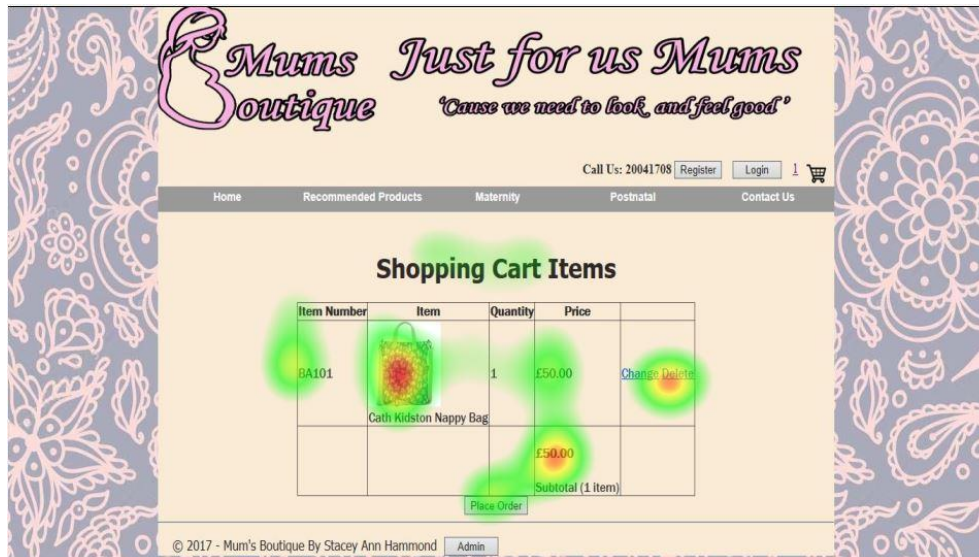
Figure 47- Heatmap (Product Details Page)



All vital features have clearly been seen by the users, as shown in Figure 47. Although one fascinating aspect is that the users did not pay copious attention to the absent logo and shopping cart icon; otherwise the heatmap would indicate this. This

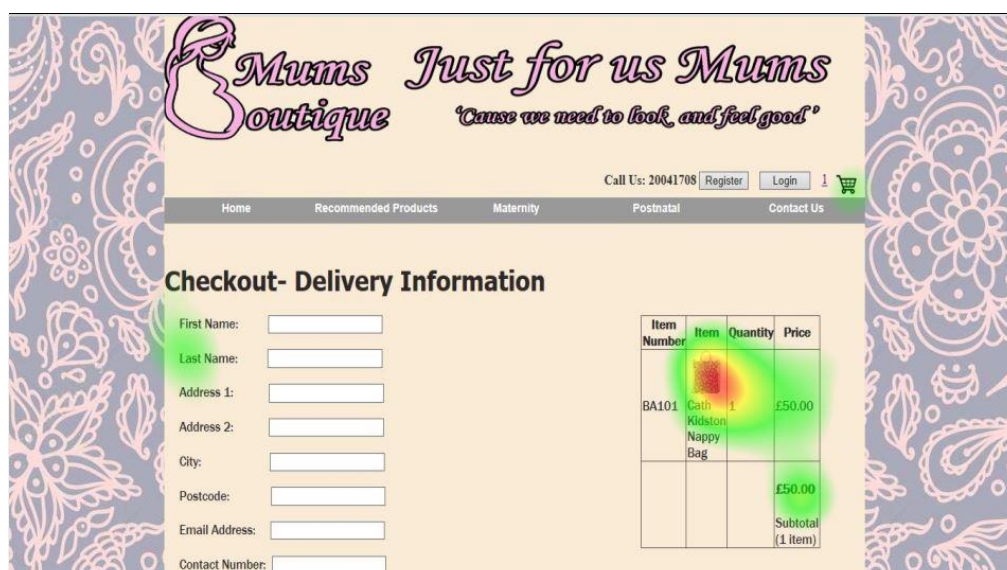
demonstrates that the heatmap has not spotted an error which would catch the users attention.

Figure 48- Heatmap (Shopping Cart)



Results shown in Figure 48 – the Shopping Cart, are exceptional; users view all compulsory information needed when observing this page. The users are relatively absorbed by the image of the product, as well as, its price. An additional feature that users found exciting were the choices to modify the quantity of the product, as well as, to obliterate the product. Furthermore, the results denote that the presentation of this webpage is outstanding.

Figure 49- Heatmap (Delivery Details Page)



One aspect of this page has brought the attention to all users. Exemplified in Figure 49, the image of the product that was being purchased is attention-grabbing to the users.

Figure 50- Heatmap (Payment Details Page)

**Mums Just for us Mums**  
*'Cause we need to look and feel good'*

Call Us: 20041708 | [Register](#) | [Login](#) | 1

[Home](#) | [Recommended Products](#) | [Maternity](#) | [Postnatal](#) | [Contact Us](#)

### Payment Details

If you would like to pay with PayPal please click here: [Pay with PayPal](#)

Otherwise enter your card details below.

You must fill fields marked with \*

\*Card Type:

\*Card Number:

\*Security Code:

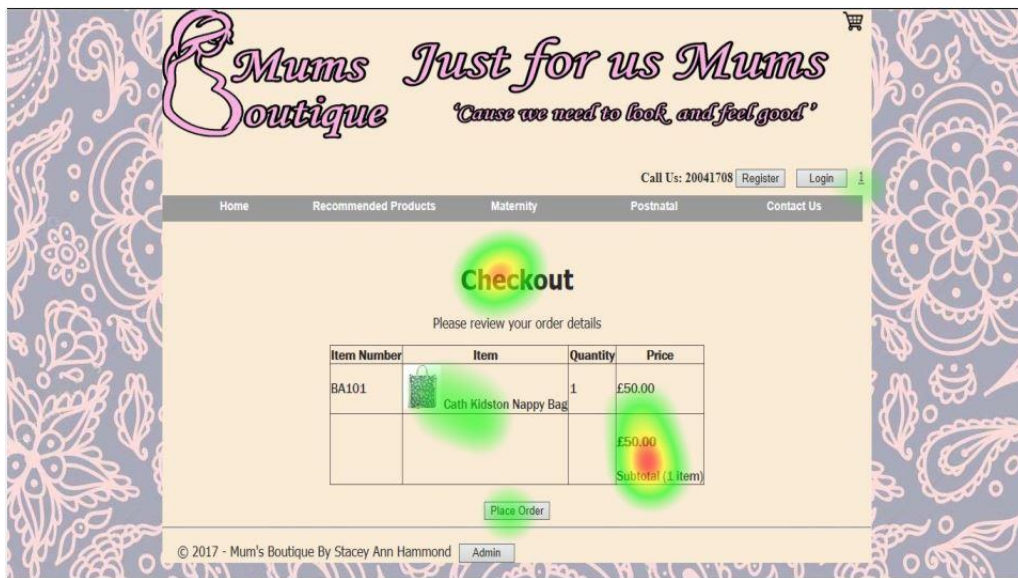
\*Expiry Date:

\*Cardholder's Name:

| Item Number | Item                   | Quantity | Price             |
|-------------|------------------------|----------|-------------------|
| BA101       | Cath Kidston Nappy Bag | 1        | £50.00            |
|             |                        |          | £50.00            |
|             |                        |          | Subtotal (1 item) |

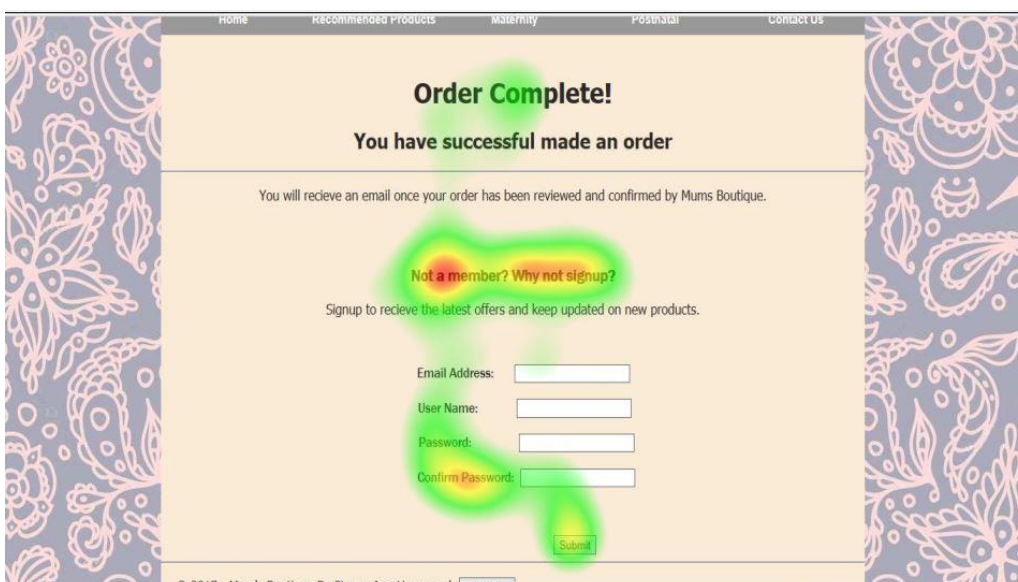
The main focal point established is the 'Payment Details' title, as can be seen in Figure 50. In relation to this, the 'Pay with PayPal' option can be apprehended to be a thought-provoking aspect to the users. Another point of interest is the 'Card Type' option; users have a choice of card types to choose from. Lastly, alike Figures 47-49 the product image is appealing to the users.

Figure 51- Heatmap (Order Summary Page)



A simple, yet effective page for users is demonstrated in Figure 51. All major aspects of this page have been viewed by the user. Implying the users have a full view of their order details; users will not avert any crucial information about their order. According to Figure 51, the 'Place Order' button is distinguished by the users; generating an effortless checkout.

Figure 52- Heatmap (Order Complete/ Signup Page)



Exhibited in Figure 52 is the 'Order Complete' page, users unambiguously see the option to become a member of the website. Evidence of this is highlighted on the title 'Not a member? Why not signup?'. All user's predisposition was to follow along the

page, where the 'Confirm Password' field caught their attention. Finally, users lucidly recognized the 'Submit' button; precipitously generating a membership for them.

Figure 53- Heatmap (Login Page)



Finally, Figure 53 illustrates the 'Login' page. Evidently, presenting that all vital features were seen by the users. Users see the features where they must input their username and their password. Followed by a distinct visual of the 'Sign In' button.

## **System Usability Scale Survey**

Once the users have used the website, they were asked to fill out a system usability scale survey. This survey consists of 10 questions where the user is asked to rate the question between 1-5; where 1 signifies strongly disagree and 5 indicates strongly agree. The questions asked were as follows:

Question 1: I think that I would like to use this system frequently.

Question 2: I found the system unnecessarily complex.

Question 3: I thought the system was easy to use.

Question 4: I think that I would need the support of a technical person to be able to use this system.

Question 5: I found the various functions in this system were well integrated.

Question 6: I thought there was too much inconsistency in the system.

Question 7: I would imagine that most people would learn to use the system very quickly.

Question 8: I found the system very awkward to use.

Question 9: I felt very confident using the system.

Question 10: I need to learn a lot of things before I could get going.

Figure 54- System Usability Scale Total Results

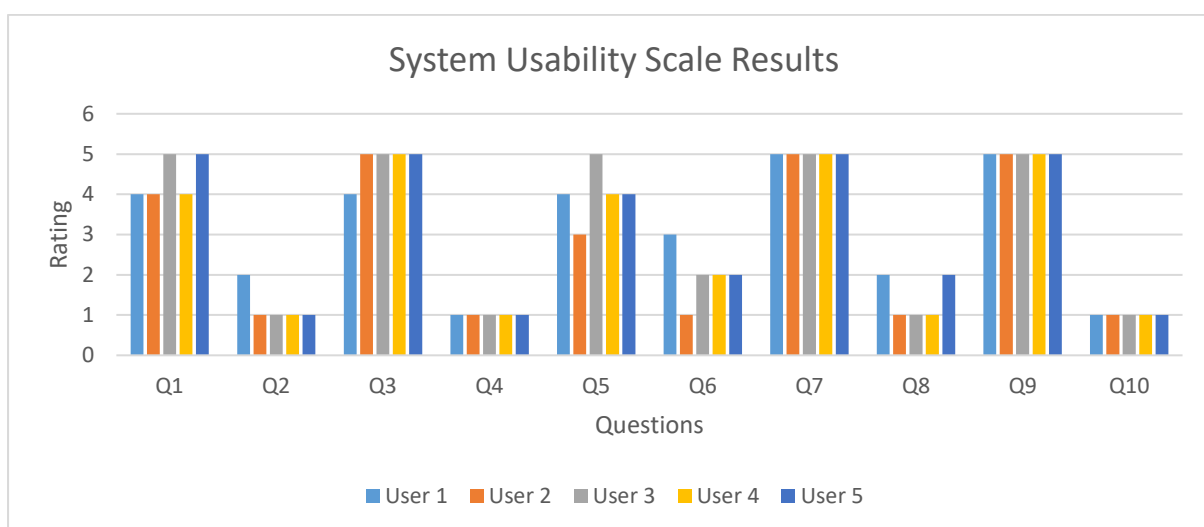


Figure 54 illustrates the results collected from each user for the System Usability Scale. User ratings for question one are similar, where user's 3 and 5 both rated strongly agree. In question 2, all users did not find the website unnecessarily complex, however, user 1 found it to some extent convoluted. Results showing for question 3 are extremely similar; strongly agreeing with the question.

The outcomes for Questions 4,7,9 and 10 are equivalent to one another. Signifying that they strongly disagreed to the fact that they needed a technical person to help them. The users also believed that they did not need to learn a lot of things. The results also showed that the user's all sturdily agreed that utmost people would learn how to use the website swiftly and that they felt confident when using the website.

Question 6 concluded to various diverse views; user 2 strongly disagreed that there was too much inconsistency in the website. User 1 did not agree nor disagree with

this statement. Lastly, question 8 results in 2 users who disagreed that the system was obstinate to use, whereas 3 users strongly disagreed with this statement.

Figure 55- System Usability Scale Total Average

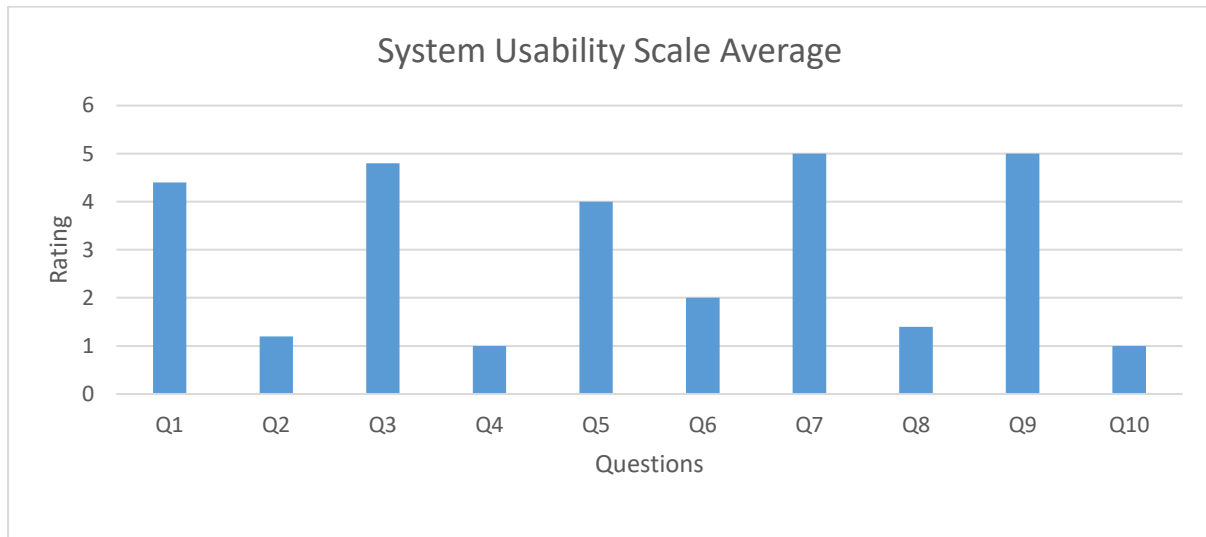


Figure 55 displays the total average of results collected by the users. The outcome of the results is as expected. Although, some results do not agree to the interviews conducted in the following section – Retrospective Think Aloud.

## **Retrospective Think Aloud (RTA)**

Along with the use of the eye tracker, the method retrospective think aloud protocol was used. The method entails users to complete a set of tasks provided by the author. As stated by 'Sanne Elling et al': "Participants work in silence and verbalize their thoughts afterwards while watching a recording of their performance." [109] The tasks which the users will be asked to perform are basic tasks which would be used frequently. The tasks that the users performed as exhibited below:

- Select a product from the postnatal section
- Add it to the basket and checkout.
- Register to the website.
- Login to the website.

A summary of the user's feedback is exhibited in Figure 56.

Figure 56- Retrospective Think Aloud Users Feedback

| Pros:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Cons:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• The interface of the website was straightforward and intuitive.</li> <li>• The website is catchy and well designed.</li> <li>• The forms didn't take much effort to complete.</li> <li>• Friendly and easy to navigate.</li> <li>• Menu bar is well-organized providing easy to find products navigation.</li> <li>• Good layout, like existing websites.</li> <li>• Good amount of information is given.</li> <li>• Perfect to use for people who are in a rush.</li> <li>• Good to see what products were being purchased throughout checkout.</li> </ul> | <ul style="list-style-type: none"> <li>• Unsure if product was successfully added to the shopping cart.</li> <li>• No message displayed stating product is added to shopping cart.</li> <li>• Missing image on a products page.</li> <li>• You can't click on the shopping cart icon to check your cart products.</li> <li>• Login button should disappear once logged in.</li> <li>• Logo and shopping cart icon does not appear on Product Details page.</li> <li>• Spacing between products are not consistent.</li> <li>• Image in Product Details page becomes distorted.</li> <li>• No notification for registration or login.</li> </ul> |

Figure 56 acquaints the author of many benefits, as well as, drawbacks to using the website. Corresponding to users, the website was extremely well structured and undemanding to use. Users proposed that it was seamless for a swift purchase of products; superlative for users who are in a rush. Thus, the website is thought to have a good dependability of information. Users particularly adored the feature of being able to view the products that they were purchasing during checkout processes.

There were many pros and there was equally as many cons to the feedback collected. Many users raised their apprehensions on the shopping cart; no notification was displayed when adding a product into the shopping cart. This concluded in users being unsure and wondering if their product was added to the shopping cart. One user pointed out that they were unable to view the cart when clicking on the shopping cart icon. There were also many opinions on the 'Product Details' page. Users noticed that the company logo suddenly disappeared from the screen, as well as, the shopping cart icon. The image displaying the product was also found to be disfigured; losing its superiority. Lastly, users pointed out that they were not notified upon successful registration or login. A recommendation made was to make the login button to disappear once logged in; this would inform the user that login was no longer necessary.

Overall, there was astonishing feedback given by the users. Even though the website is not practical as changes need to be made in order to make it fully operational and comprehensible.

## **Cognitive Walkthrough**

To conclude, the cognitive walkthrough method will be used; it formalises the way of visualising user's judgements and engagements when they use an interface. It will allow the author to identify problems that new users may experience when using the website for the first time. [110] Each task previously mentioned in the RTA method will be broken down into 4 questions, such as:

- Will the customer realistically be trying to do this action?
- Is the control for the action visible?
- Is there a strong link between the control and the action?
- Is feedback appropriate?

The user must answer each question with straight forward answer; yes or no. If the answer is no, the author is notified that there is a problem with a feature.

**Task: Select a Product from the Postnatal Menu**

Figure 57- Cognitive Walkthrough (Select a sub category from the Postnatal category)

|                                                                                       |              |              |              |              |              |
|---------------------------------------------------------------------------------------|--------------|--------------|--------------|--------------|--------------|
| <b>Task Stage:<br/>Select a sub<br/>category from<br/>the Postnatal<br/>category.</b> | Subject<br>1 | Subject<br>2 | Subject<br>3 | Subject<br>4 | Subject<br>5 |
| Do you know what<br>you want to do<br>next?                                           | Yes          | Yes          | Yes          | Yes          | Yes          |
| Can you see a<br>control to perform<br>that task?                                     | Yes          | Yes          | Yes          | Yes          | Yes          |
| Do you<br>understand the<br>feedback?                                                 | Yes          | Yes          | Yes          | Yes          | Yes          |

Figure 58- Cognitive Walkthrough (Select a product from the chose category)

|                                                                           |              |              |              |              |              |
|---------------------------------------------------------------------------|--------------|--------------|--------------|--------------|--------------|
| <b>Task Stage:<br/>Select a product<br/>from the chosen<br/>category.</b> | Subject<br>1 | Subject<br>2 | Subject<br>3 | Subject<br>4 | Subject<br>5 |
| Do you know what<br>you want to do<br>next?                               | Yes          | Yes          | Yes          | Yes          | Yes          |
| Can you see a<br>control to perform<br>that task?                         | Yes          | Yes          | Yes          | Yes          | Yes          |

|                                 |     |     |     |     |     |
|---------------------------------|-----|-----|-----|-----|-----|
| Do you understand the feedback? | Yes | Yes | Yes | Yes | Yes |
|---------------------------------|-----|-----|-----|-----|-----|

Figure 59- Cognitive Walkthrough (View Product Details)

|                                             |           |           |           |           |           |
|---------------------------------------------|-----------|-----------|-----------|-----------|-----------|
| <b>Task Stage: View Product Details.</b>    | Subject 1 | Subject 2 | Subject 3 | Subject 4 | Subject 5 |
| Do you know what you want to do next?       | Yes       | Yes       | Yes       | Yes       | Yes       |
| Can you see a control to perform that task? | Yes       | Yes       | Yes       | Yes       | Yes       |
| Do you understand the feedback?             | Yes       | Yes       | Yes       | Yes       | Yes       |

Figure 60- Cognitive Walkthrough (Add Product to Basket)

|                                           |           |           |           |           |           |
|-------------------------------------------|-----------|-----------|-----------|-----------|-----------|
| <b>Task Stage: Add Product to basket.</b> | Subject 1 | Subject 2 | Subject 3 | Subject 4 | Subject 5 |
| Do you know what you want to do next?     | Yes       | Yes       | Yes       | Yes       | Yes       |

|                                             |     |     |     |     |     |
|---------------------------------------------|-----|-----|-----|-----|-----|
| Can you see a control to perform that task? | Yes | Yes | Yes | Yes | Yes |
| Do you understand the feedback?             | Yes | Yes | Yes | Yes | Yes |

Feedback from the users exhibited in Figures 57-60 shows that all tasks performed by the users were victorious. All users answered yes to the questions when carrying out tasks stages, such as:

- Select a Sub Category from the Postnatal Menu
- Select a Product from the chosen Category
- View Product Details
- Add Product to Basket

The author has been informed that no changes should be made to these task stages as the users did not have any difficulties in completing and interpreting the outcomes.

### **Task: Checkout**

Figure 61- Cognitive Walkthrough (View Shopping Cart)

| <b>Task Stage:<br/>View Shopping<br/>Cart</b> | Subject<br>1 | Subject<br>2 | Subject<br>3 | Subject<br>4 | Subject<br>5 |
|-----------------------------------------------|--------------|--------------|--------------|--------------|--------------|
| Do you know what you want to do next?         | Yes          | Yes          | Yes          | Yes          | Yes          |
| Can you see a control to perform that task?   | Yes          | Yes          | Yes          | Yes          | Yes          |

|                                 |     |     |     |     |     |
|---------------------------------|-----|-----|-----|-----|-----|
| Do you understand the feedback? | Yes | Yes | Yes | Yes | Yes |
|---------------------------------|-----|-----|-----|-----|-----|

Figure 62- Cognitive Walkthrough (Purchase Items: Go to Checkout)

|                                                               |              |              |              |              |              |
|---------------------------------------------------------------|--------------|--------------|--------------|--------------|--------------|
| <b>Task Stage:<br/>Purchase<br/>Items: Go to<br/>Checkout</b> | Subject<br>1 | Subject<br>2 | Subject<br>3 | Subject<br>4 | Subject<br>5 |
| Do you know what you want to do next?                         | Yes          | Yes          | Yes          | Yes          | Yes          |
| Can you see a control to perform that task?                   | Yes          | Yes          | Yes          | Yes          | Yes          |
| Do you understand the feedback?                               | Yes          | Yes          | Yes          | Yes          | Yes          |

Figure 63- Cognitive Walkthrough (Enter Delivery Details)

|                                                    |              |              |              |              |              |
|----------------------------------------------------|--------------|--------------|--------------|--------------|--------------|
| <b>Task Stage:<br/>Enter delivery<br/>details.</b> | Subject<br>1 | Subject<br>2 | Subject<br>3 | Subject<br>4 | Subject<br>5 |
| Do you know what you want to do next?              | Yes          | Yes          | Yes          | Yes          | Yes          |

|                                             |     |     |     |     |     |
|---------------------------------------------|-----|-----|-----|-----|-----|
| Can you see a control to perform that task? | Yes | Yes | Yes | Yes | Yes |
| Do you understand the feedback?             | Yes | Yes | Yes | Yes | Yes |

Figure 64- Cognitive Walkthrough (Enter Payment Details and Successfully Checkout)

|                                                                         |           |           |           |           |           |
|-------------------------------------------------------------------------|-----------|-----------|-----------|-----------|-----------|
| <b>Task Stage:<br/>Enter payment details and successfully checkout.</b> | Subject 1 | Subject 2 | Subject 3 | Subject 4 | Subject 5 |
| Do you know what you want to do next?                                   | Yes       | Yes       | Yes       | Yes       | Yes       |
| Can you see a control to perform that task?                             | Yes       | Yes       | Yes       | Yes       | Yes       |
| Do you understand the feedback?                                         | Yes       | Yes       | Yes       | Yes       | Yes       |

The final set of tasks stages are demonstrated in Figures 61-64. The outcome of the results show that all tasks were also accomplished successfully. Thus, the author knows that changes to these stages are impeccable due to the outcome of the results.

## **Chapter 6- Evaluation**

In accordance to the data collected, there are many alterations that need to be made to the website to make this abundantly unadulterated. All methods conducted were tremendously beneficial; the author learnt a lot about the effects and imperfective aspects of the websites.

The methods used were backed up by the research reviewed in the literature review. The research conducted by the literature review found that the RTA method detected more defects than any other testing method and practical testing officially proved that statement. The Heatmap method proved that users detected all relevant aspects of the website. Furthermore, the Cognitive Walkthrough method verified that the website was flawless with no amendments required. The System Usability Scale was exceptionally beneficial, as results established that the website desired further modifications. This was a disbelief, as the author thought that all methods would work equally the same.

The most effective method used was the Retrospective Think Aloud Protocol; this method liberated many deficiencies to the website in divergence to other methods used. The remainder of methods delivered results notifying the author that the website was immaculate. A beneficial method to use for e-commerce; faults are verbally pointed out by the users.

Evaluation of results determined the accomplishment of all objectives;

- The development of an e-commerce website was successfully accomplished.
- An investigation on usability testing methods was applied to improve the e-commerce website's reliability.
- The usability testing methods were performed and analysed.
- Validation and verification of the authors findings were achieved.
- Critical tests were performed to test the usability of the website

Firstly, an e-commerce website was successfully developed. A study on usability testing methods was conducted; the methods were critically performed and analysed. Finally, validation and verification of the authors findings were achieved.

The outcome of the results collected when conducting the usability testing methods were as predicted, as many features of the website were incomplete due to time constraints and lack of knowledge. However, faults and perfections contributed to a superseding learning curve in regards to the author's prospective and comprehension of E-Commerce Websites. Moreover, if the project was to be reconstructed, a plethora of usability testing methods would be conducted; such as Contextual Interviews [111], Concurrent Think Aloud (CTA) [112] and Questionnaires [113] as these methods are verbal evaluations, in conjunction, to prior methods used. Furthermore, complete functionality would be administrated and adopted efficiently; as the author believes that knowledge was exceptionally gained and could therefore, be reapplied and enhanced further. Thus, delivering a fully functional E-Commerce website.

## **Chapter 7- Conclusions and Recommendations**

An investigation was performed to prove that usability testing enhances the operability of e-commerce websites; many steps were accomplished in doing so.

Firstly, a literature review was conducted where research helped the author to authenticate a hypothetical framework for the project. A research and development methodology section was then conducted; this process entailed the author electing their strategies, as well as, the construction and organization of the website's development. Furthermore, the design and implementation section necessitated a collection of user requirements, as well as, a website design. Moreover, leading to the implementation section, the website was coded and implemented with respect to prior planning and procedures; this section highlights the successes, as well as, issues that the author experienced. To finalise the project, usability testing methods were conducted and results were verified and validated; the author discovered benefits and drawbacks to the website from a user's prospective.

The project suggests that there are many further avenues for research. All objects and software's must be tested to understand that all functionalities, as well as, responsiveness is paramount. Without testing, all services and hardware's would be at risk; developers do not witness faults as testers do. Therefore, usability testing should be conducted on any product or service that interacts with users; this fundamental is crucial, as users who do not understand a product or service will become aggravated. Thus, the product or service may become obsolete. Although usability testing becomes more useful when usability guidelines are followed; some testing techniques will not detect any faults due to obeying the guidelines.

## **Chapter 8- Reflection**

Developing a web application and accomplishing my goals has been the highlight of my university experience. An accomplishment that has led me to believe in myself and my capabilities; overall aiding me to become bigger as a person. In addition, it made me feel content, confident and astonished, as a result of my performance. It has given me the confidence in overcoming any obstacle, whether it be developing a complete website, conducting and executing distinct testing methods or attend an interview.

This experience has allowed me to learn how to design interfaces professionally and program with C#, ASP.NET and CSS; something that I thought would be impossible to accomplish. I now know the importance of web security and accessibility, without it websites would be impractical. When designing the web application, one thing I learnt was that you must take into consideration an audience, especially those who will be using the application; as people are pervasive, though, distinct in nature.

I am extremely happy with the outcome of the project and I have enjoyed producing it. I have learnt that many websites fail due to lack of knowledge (in some cases), testing, prioritizing and time keeping. Working with the EyeTribe eye tracker was not as smooth of a process as imagined. Installing the software, as well as, using it made me experience certain difficulties, such as, 'black screens' after recording; making a couple of users having to repeat their testing. Tools were not easily accessible for download either. Therefore, I recommend for developers to familiarize themselves with tools that are somewhat familiar; unfamiliar tools can become troublesome, as well as, an undesired risk to time management.

If I had a chance to revisit the process undertaken, it would have definitely been to manage my time better, as well as, choose the best tools for the job (cheap, efficient and familiar). As a result, I believe that time would have been more flexible, and functional issues may have had a larger chance to being resolved. Furthermore, I would have specialised in other testing techniques, such as, semi-structured interviews and surveys.

In relation to this journey, I have apprehended the importance of prioritizing, time keeping, research and technical awareness. This aided my learning of how to develop a large project, as well as, structure an extensive report. Upon completion, I realised the importance of testing when dealing with web applications. It is vital to understand the different types of testing methods and mechanisms – something that I have definitely been educated with and will gladly take it on board for further education. In conclusion, I discovered that all testing methods and techniques fabricate distinct results; some better than others. Thus, further justifying the importance of understanding them.

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# **Appendices**

## **Appendix 1 - Requirements**

### ***Why do you need a website?***

Since I am opening a shop, I would like people to be able to look through the products we sell as well as order products from our website.

### ***Who is the audience? What are the age ranges and interests of potential site visitors?***

The audience would mainly be mums to be and mums who have given birth recently. Although it could also be targeted to the men whose partner is about to give birth or has just given birth. The age ranges from 18 years and above I would say, basically anyone who has/ going to have a baby. Also, friends and family may be interested in purchasing items for their loved ones so they would be potential site visitors.

### ***How will they use the Web site?***

They should be able to navigate to different categories, depending on what they are looking for. Once they find the category of their desire, they should then be able to view products in relation to the category. The visitor should be able to find all the necessary information on the product page and give them the option to buy it at that moment.

### ***What are the key reasons users may have for visiting the site?***

To purchase or to have a look at products that the shop sells.

### ***What should visitors of the site come away with?***

A purchase or an idea of a product to purchase in store.

### ***What content will be needed for the site?***

A home page, describing my shop. Also, a range of pages highlighting the different types of products that I sell. I'd like to see images matching to each product. The user should be able to have the option of purchasing the product. I would also like to be able to add and update products myself.

***List the sections and features that will be included.***

- Creams & lotions
- Pain Relief
- Maternity Clothing- Tops, Dresses, Shorts/Trousers and Skirts
- New mum clothing- Tops, Dresses, Shorts/Trousers and Skirts
- Bags
- Shapewear

***What already exists and what needs to be developed?***

Now, the only thing that exists are the products. Therefore, I would need a website displaying all the products to kick-start the business.

***What are the primary objectives and goals (long term and short-term) for the site?***

To be able to sell products in store as well as online. To give the visitors more flexibility.

## **Appendix 2- Task Analysis**

|                                                                        |                                                                                                                                                               |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Name: Arianne Ullger (Mother of 1, Expecting another in August)</b> |                                                                                                                                                               |
| <b>Who is going to use the system?</b>                                 | Anyone who needs to purchase things for a pregnant friend or family; even for themselves.                                                                     |
| <b>What tasks do they now perform?</b>                                 | Viewing advice on what products are best. As well as purchasing comfortable clothing, pain relief (during labour and after pregnancy).                        |
| <b>What tasks are desired?</b>                                         | To study the different types of products that are out there for mums and to be able to purchase them.                                                         |
| <b>How are the tasks learned?</b>                                      | Should be straight-forward to use. Buttons should be relevant to the information if displays.                                                                 |
| <b>Where are the tasks performed?</b>                                  | On a device with internet. E.g. a computer.                                                                                                                   |
| <b>What's the relationship between user &amp; data?</b>                | Being able to sign up and have your details saved for next time.                                                                                              |
| <b>What other tools does the user have?</b>                            | Searching for a product easily by relevant categories. Having a separation between mums to be and newly mums as the products needed are completely different. |
| <b>How do users communicate with each other?</b>                       | N/A                                                                                                                                                           |
| <b>How often are tasks performed?</b>                                  | As much as the user wants too.                                                                                                                                |
| <b>What are the time constraints on the tasks?</b>                     | You shouldn't need to have an account to make a purchase.                                                                                                     |
| <b>What happens when things go wrong?</b>                              | Nothing should happen. I would not like to have a shopping cart full for then it to be deleted if an error was to occur.                                      |

## **Appendix 2.1 – Task Analysis**

|                                                         |                                                                                                                                                                                    |
|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Name: Giovanna Hammond<br/>(Mother of 2)</b>         |                                                                                                                                                                                    |
| <b>Who is going to use the system?</b>                  | Mums to be, mums and their partners. Possibly friends and relatives would like to purchase things.                                                                                 |
| <b>What tasks do they now perform?</b>                  | Buying clothing and creams. Also reading on some advice on what to buy.                                                                                                            |
| <b>What tasks are desired?</b>                          | To purchase or browse products. To learn about what is essential for newly mums or soon to be mums.                                                                                |
| <b>How are the tasks learned?</b>                       | You should be able to know how to use it once you see it.                                                                                                                          |
| <b>Where are the tasks performed?</b>                   | On a computer or mobile phone. Somewhere with internet access.                                                                                                                     |
| <b>What's the relationship between user &amp; data?</b> | The data should be provided to me. An account would be nice, so no need to enter all your details again.                                                                           |
| <b>What other tools does the user have?</b>             | Searching for products under different categories e.g. Maternity or Post-Pregnancy                                                                                                 |
| <b>How do users communicate with each other?</b>        | N/A                                                                                                                                                                                |
| <b>How often are tasks performed?</b>                   | As many times as wanted to make a purchase. It can be used if your pregnant or recently had a baby. It can also to be used to buy gifts for friends or relatives expecting a baby. |
| <b>What are the time constraints on the tasks?</b>      | Should be quick and easy to find and purchase products.                                                                                                                            |
| <b>What happens when things go wrong?</b>               | Nothing, just refresh the page.                                                                                                                                                    |

## **Appendix 2.2- Task Analysis**

|                                                         |                                                                                                                                                                          |
|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Name: Marilyn Buhagiar (Mother of 2)</b>             |                                                                                                                                                                          |
| <b>Who is going to use the system?</b>                  | Couples who are expecting a baby or who have recently had a baby.                                                                                                        |
| <b>What tasks do they now perform?</b>                  | To purchase products at ease. One product that I found it hard to find was shapewear when after my pregnancy, so it would be nice to have a place to purchase them from. |
| <b>What tasks are desired?</b>                          | To look at products, finding out information about them as well as being able to buy them.                                                                               |
| <b>How are the tasks learned?</b>                       | You shouldn't need to learn anything. I wouldn't like to learn anything just to buy products online. It should be easy and hassle-free.                                  |
| <b>Where are the tasks performed?</b>                   | On any device that you can use internet on.                                                                                                                              |
| <b>What's the relationship between user &amp; data?</b> | Information on products should be given to me.                                                                                                                           |
| <b>What other tools does the user have?</b>             | Finding products easily, with relevant headings and subheadings.                                                                                                         |
| <b>How do users communicate with each other?</b>        | N/A                                                                                                                                                                      |
| <b>How often are tasks performed?</b>                   | Whenever the user wants too. They shouldn't be restricted to how often they can purchase products.                                                                       |
| <b>What are the time constraints on the tasks?</b>      | Not too many steps have to be taken to purchase the product. I like to use PayPal, so having that option would be essential to me.                                       |
| <b>What happens when things go wrong?</b>               | Nothing should happen.                                                                                                                                                   |

## **Appendix 2.3- Task Analysis**

|                                                         |                                                                                                                                                                                                          |
|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Name: Gynaika Moreno (Mother of 2)</b>               |                                                                                                                                                                                                          |
| <b>Who is going to use the system?</b>                  | Anyone who is going to have a baby or who has had one as well as their friends and family.                                                                                                               |
| <b>What tasks do they now perform?</b>                  | To find packs of products with details information and ease. I didn't know what products I was going to need when I had my two sons. Finding it easy to view Bags to carry baby things in would be nice. |
| <b>What tasks are desired?</b>                          | Learn about all the products that are out there, and what is best for me. Also to make a purchase on any product I'd like.                                                                               |
| <b>How are the tasks learned?</b>                       | I wouldn't waste anytime on learning how to use a website. I am a mum and I haven't got time for that. I like using websites that are straight-forward to use.                                           |
| <b>Where are the tasks performed?</b>                   | Anywhere with internet access.                                                                                                                                                                           |
| <b>What's the relationship between user &amp; data?</b> | My information should be saved into an account as well as the website should be displaying information about the products.                                                                               |
| <b>What other tools does the user have?</b>             | Well structured and stress-free to use. With clear buttons and titles.                                                                                                                                   |
| <b>How do users communicate with each other?</b>        | N/A                                                                                                                                                                                                      |
| <b>How often are tasks performed?</b>                   | As many times as needed.                                                                                                                                                                                 |
| <b>What are the time constraints on the tasks?</b>      | Can't be time consuming to use, as mentioned previously easy to use with not too many steps needing to be taken when purchasing a product.                                                               |
| <b>What happens when things go wrong?</b>               | I wouldn't like my information to be lost, as that would mean I need to type everything out again. I wouldn't make a purchase if that was the case.                                                      |

## **Appendix 3- Expert Evaluation**

### **Mum's Boutique Website – Prototype Evaluation**

Walk through of how the Website is used

- \* Select tab from home screen i.e. Creams, Pain Relief, Bags, Clothes etc.
- \* Best for You – site gives suggestions of products
- \* Creams – select image or use search bar
- \* Product Description page – view product description, select quantity, add to basket
- \* Checkout (Address) – Enter delivery details
- \* Checkout (Payment Details) – Enter payment details e.g. card type, number, expiry
- \* Sign Up - Create an account
- \* Login page – for customers who already have an account
- \* Contact Us page – Send comments and contact email address

Website is laid out in the same style for each screen with a row of tabs across the top and a login and signup button. I like the fact the website has been laid out in a familiar format to websites that already exist e.g. Amazon and therefore the user already have an idea of how to navigate around the site.

There is some use of affordance on the screens in that users will know that they need to click on the tab in order to select that option and the same with the images, the user needs to click the image to view the product description page.

If there were amendments to be made I would suggest minimizing the number of words used on each screen. The use of words may cause users with visual impairments difficulties. In place of words, I would recommend using images as this would increase the use of metaphors, for example, instead of using a button with the word next, use

the image of an arrow. Or include the image of a magnifying glass at the end of the search bar.

## **Appendix 4- Retrospective Think Aloud (Amy Vivian)**

**Usability Testing – Mum’s Boutique E-commerce**

**Website**

Name: Amy Vivian

Age: 28

Signature: 

**Step 1 – Eye Tracking**

Please complete the following tasks:

- Select a product from the postnatal section.
- Add the item to the basket and checkout.
- Register to the website.
- Login to the website.

**Step 2- Retrospective Think Aloud**

You will now be shown a video playback of the tasks completed. Please verbalize your thoughts about features that have caught your attention, whether it be good or bad.

Good layout throughout, reminds  
me of other websites I have  
used in the past. Very easy  
to use.

Its a shame that on the  
product details page the logo  
doesn't appear as well as the  
shopping cart ~~text~~ icon.

Good amount of information  
is given. Not too much and  
not too little.

Spacing between products  
are not consistent.

The website does not notify me when I have successfully logged in or registered. The page just refreshes.

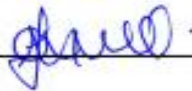
## **Appendix 4.1- Retrospective Think Aloud (Jordan Mauro Buhagiar)**

### **Usability Testing – Mum’s Boutique E-commerce**

#### **Website**

Name: Jordan Mauro

Age: 27

Signature: 

#### **Step 1 – Eye Tracking**

Please complete the following tasks:

- Select a product from the postnatal section.
- Add the item to the basket and checkout.
- Register to the website.
- Login to the website.

#### **Step 2- Retrospective Think Aloud**

You will now be shown a video playback of the tasks completed. Please verbalize your thoughts about features that have caught your attention, whether it be good or bad.

- The website look tidy and user-friendly.
- Checkout should be more clearly displayed.
- Menu bar looks well-organized providing easy to find products and allows easy navigation.
- Registering to website is nice and easy.
- Though, a message displaying Login Successful would eliminate slight confusion when login-in.
- And Login button should disappear once login was successful.
- The rest looks good and professional.

## Appendix 4.2- Retrospective Think Aloud (Majedaldeh)

### Usability Testing – Mum's Boutique E-commerce

#### Website

Name: Majedaldeh Almahafseh (Jal)

Age: 25

Signature: 

#### **Step 1 – Eye Tracking**

Please complete the following tasks:

- Select a product from the postnatal section.
- Add the item to the basket and checkout.
- Register to the website.
- Login to the website.

#### **Step 2- Retrospective Think Aloud**

You will now be shown a video playback of the tasks completed. Please verbalize your thoughts about features that have caught your attention, whether it be good or bad.

The interface of the website was straight forward and intuitive. I like how simple it was for me to find my desired item and buy it.

I only ~~but~~ was not sure when I tried to add an item to my cart, I wasn't sure if the item was actually added or not, as it didn't show any message to confirm that it ~~was~~ was successful.

The website was catchy and well designed. I only would ~~have~~ have liked it more if it had more colors. ~~my~~  
I was happy with the registration page, it was straight forward and short. it didn't take so much effort for me to complete the form.

## **Appendix 4.3- Retrospective Think Aloud (Harry Byrnes)**

### **Usability Testing – Mum’s Boutique E-commerce**

#### **Website**

Name: HARRY BYRNE

Age: 40

Signature: H Byrne

#### **Step 1 – Eye Tracking**

Please complete the following tasks:

- Select a product from the postnatal section.
- Add the item to the basket and checkout.
- Register to the website.
- Login to the website.

#### **Step 2- Retrospective Think Aloud**

You will now be shown a video playback of the tasks completed. Please verbalize your thoughts about features that have caught your attention, whether it be good or bad.

1. Postcode should be mandatory selection
2. Register key works occasionally unless on Home Screen
3. missing Images.
4. You don't click on shopping basket to get to carts, only the number next to it.
5. Don't have to input data to proceed.
6. Friction, easily navigation.

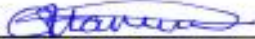
## **Appendix 4.4- Retrospective Think Aloud (Giovanna Hammond)**

### **Usability Testing – Mum’s Boutique E-commerce**

#### **Website**

Name: GIOVANNA HAMMOND

Age: 50

Signature: 

#### **Step 1 – Eye Tracking**

Please complete the following tasks:

- Select a product from the postnatal section.
- Add the item to the basket and checkout.
- Register to the website.
- Login to the website.

#### **Step 2- Retrospective Think Aloud**

You will now be shown a video playback of the tasks completed. Please verbalize your thoughts about features that have caught your attention, whether it be good or bad.

VERY NICE + STRAIGHTFORWARD TO  
USE, ESPECIALLY IF YOU ARE IN  
A RUSH, LIKE MOST OF US MUMS.  
PRODUCTS DETAILS PAGE SHOULD  
BE FORMATTED A BIT BETTER AS  
IMAGE BECOMES DISTORTED. ONCE  
THE ITEM WAS ADDED TO THE CART  
IT WAS A LITTLE HARD TO LOCATE  
THE CART AS ONLY A NUMBER  
APPEARED. OTHER THAN THAT CHECKOUT  
WAS STRAIGHTFORWARD TO USE  
AND WAS NICE TO SEE WHAT I WAS  
PURCHASING THROUGHOUT. LASTLY  
REGISTER WAS SIMPLE, BUT WAS NOT  
NOTIFIED IF SUCCESSFUL, SAME GOES  
TO THE LOGIN. WELL DONE NICE  
WEBSITE!

## Appendix 5- System Usability Scale Survey (Amy Vivian)

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### Step 3 – System Usability Scale

Please complete the following survey. Rate the questions provided from 1-5; where 1 is strongly disagree and 5 is strongly agree.

|                                                                                              | Strongly<br>Disagree                |                                     |                          |                          | Strongly<br>Agree                   |
|----------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|--------------------------|--------------------------|-------------------------------------|
| 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 checked="" type="checkbox"/> |
|                                                                                              | 1                                   | 2                                   | 3                        | 4                        | 5                                   |
| 2. I found the system unnecessarily complex                                                  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
|                                                                                              | 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 checked="" type="checkbox"/> |
|                                                                                              | 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 checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
|                                                                                              | 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 checked="" type="checkbox"/> |
|                                                                                              | 1                                   | 2                                   | 3                        | 4                        | 5                                   |
| 6. I thought there was too much inconsistency in this system                                 | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
|                                                                                              | 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 checked="" type="checkbox"/> |
|                                                                                              | 1                                   | 2                                   | 3                        | 4                        | 5                                   |
| 8. I found the system very awkward to use                                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
|                                                                                              | 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 checked="" type="checkbox"/> |
|                                                                                              | 1                                   | 2                                   | 3                        | 4                        | 5                                   |
| 10. I needed to learn a lot of things before I could get going                               | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
|                                                                                              | 1                                   | 2                                   | 3                        | 4                        | 5                                   |

## **Appendix 5.1- System Usability Scale Survey (Jordan Mauro Buhagiar)**

### **Step 3 – System Usability Scale**

Please complete the following survey. Rate the questions provided from 1-5; where 1 is strongly disagree and 5 is strongly agree.

|                                                                                              | Strongly<br>Disagree                |                                     |                          |                                     |                                     | Strongly<br>Agree |
|----------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|--------------------------|-------------------------------------|-------------------------------------|-------------------|
| 1. I think that I would like to use this system frequently                                   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |                   |
|                                                                                              | 1                                   | 2                                   | 3                        | 4                                   | 5                                   |                   |
| 2. I found the system unnecessarily complex                                                  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |                   |
|                                                                                              | 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 checked="" type="checkbox"/> |                   |
|                                                                                              | 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 checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |                   |
|                                                                                              | 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 checked="" type="checkbox"/> | <input type="checkbox"/>            |                   |
|                                                                                              | 1                                   | 2                                   | 3                        | 4                                   | 5                                   |                   |
| 6. I thought there was too much inconsistency in this system                                 | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |                   |
|                                                                                              | 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 checked="" type="checkbox"/> |                   |
|                                                                                              | 1                                   | 2                                   | 3                        | 4                                   | 5                                   |                   |
| 8. I found the system very awkward to use                                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |                   |
|                                                                                              | 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 checked="" type="checkbox"/> |                   |
|                                                                                              | 1                                   | 2                                   | 3                        | 4                                   | 5                                   |                   |
| 10. I needed to learn a lot of things before I could get going                               | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |                   |
|                                                                                              | 1                                   | 2                                   | 3                        | 4                                   | 5                                   |                   |

## **Appendix 5.2- System Usability Scale Survey (Majedaldeh)**

### **Step 3 – System Usability Scale**

Please complete the following survey. Rate the questions provided from 1-5; where 1 is strongly disagree and 5 is strongly agree.

|                                                                                              | Strongly<br>Disagree                |                                     |                                     |                                     |                                     |                          | Strongly<br>Agree |
|----------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------|-------------------|
| 1. I think that I would like to use this system frequently                                   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |                   |
|                                                                                              | 1                                   | 2                                   | 3                                   | 4                                   | 5                                   |                          |                   |
| 2. I found the system unnecessarily complex                                                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> |                   |
|                                                                                              | 1                                   | 2                                   | 3                                   | 4                                   | 5                                   |                          |                   |
| 3. I thought the system was easy to use                                                      | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |                   |
|                                                                                              | 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 checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> |                   |
|                                                                                              | 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 checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |                   |
|                                                                                              | 1                                   | 2                                   | 3                                   | 4                                   | 5                                   |                          |                   |
| 6. I thought there was too much inconsistency in this system                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> |                   |
|                                                                                              | 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 checked="" type="checkbox"/> | <input type="checkbox"/> |                   |
|                                                                                              | 1                                   | 2                                   | 3                                   | 4                                   | 5                                   |                          |                   |
| 8. I found the system very awkward to use                                                    | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> |                   |
|                                                                                              | 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 checked="" type="checkbox"/> | <input type="checkbox"/> |                   |
|                                                                                              | 1                                   | 2                                   | 3                                   | 4                                   | 5                                   |                          |                   |
| 10. I needed to learn a lot of things before I could get going                               | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> |                   |
|                                                                                              | 1                                   | 2                                   | 3                                   | 4                                   | 5                                   |                          |                   |

## **Appendix 5.3- System Usability Scale Survey (Harry Byrnes)**

### **Step 3 – System Usability Scale**

Please complete the following survey. Rate the questions provided from 1-5; where 1 is strongly disagree and 5 is strongly agree.

|                                                                                              | Strongly<br>Disagree                |                          |                                     |                                     |                                     | Strongly<br>Agree |
|----------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------|
| 1. I think that I would like to use this system frequently                                   | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |                   |
|                                                                                              | 1                                   | 2                        | 3                                   | 4                                   | 5                                   |                   |
| 2. I found the system unnecessarily complex                                                  | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |                   |
|                                                                                              | 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 checked="" type="checkbox"/> |                   |
|                                                                                              | 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 checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |                   |
|                                                                                              | 1                                   | 2                        | 3                                   | 4                                   | 5                                   |                   |
| 5. I found the various functions in this system were well integrated                         | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |                   |
|                                                                                              | 1                                   | 2                        | 3                                   | 4                                   | 5                                   |                   |
| 6. I thought there was too much inconsistency in this system                                 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |                   |
|                                                                                              | 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 checked="" type="checkbox"/> |                   |
|                                                                                              | 1                                   | 2                        | 3                                   | 4                                   | 5                                   |                   |
| 8. I found the system very awkward to use                                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |                   |
|                                                                                              | 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 checked="" type="checkbox"/> |                   |
|                                                                                              | 1                                   | 2                        | 3                                   | 4                                   | 5                                   |                   |
| 10. I needed to learn a lot of things before I could get going                               | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |                   |
|                                                                                              | 1                                   | 2                        | 3                                   | 4                                   | 5                                   |                   |

## **Appendix 5.4- System Usability Scale Survey (Giovanna Hammond)**

### **Step 3 – System Usability Scale**

Please complete the following survey. Rate the questions provided from 1-5; where 1 is strongly disagree and 5 is strongly agree.

|                                                                                              | Strongly<br>Disagree                |                                     |                          |                                     |                                     | Strongly<br>Agree |
|----------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|--------------------------|-------------------------------------|-------------------------------------|-------------------|
| 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 checked="" type="checkbox"/> |                   |
|                                                                                              | 1                                   | 2                                   | 3                        | 4                                   | 5                                   |                   |
| 2. I found the system unnecessarily complex                                                  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |                   |
|                                                                                              | 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 checked="" type="checkbox"/> |                   |
|                                                                                              | 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 checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |                   |
|                                                                                              | 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 checked="" type="checkbox"/> | <input type="checkbox"/>            |                   |
|                                                                                              | 1                                   | 2                                   | 3                        | 4                                   | 5                                   |                   |
| 6. I thought there was too much inconsistency in this system                                 | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |                   |
|                                                                                              | 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 checked="" type="checkbox"/> |                   |
|                                                                                              | 1                                   | 2                                   | 3                        | 4                                   | 5                                   |                   |
| 8. I found the system very awkward to use                                                    | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |                   |
|                                                                                              | 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 checked="" type="checkbox"/> |                   |
|                                                                                              | 1                                   | 2                                   | 3                        | 4                                   | 5                                   |                   |
| 10. I needed to learn a lot of things before I could get going                               | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |                   |
|                                                                                              | 1                                   | 2                                   | 3                        | 4                                   | 5                                   |                   |

## **Appendix 6- Cognitive Walkthrough (Amy Vivian)**

### **Step 4- Cognitive Walkthrough**

The tasks you have just completed have been broken down into sub sections. Please answer the following questions with Yes or No. If you would like to mention anything please include your message in the comments box.

Task: Select a Product From Postnatal Menu

| Task stage<br>(Action description)             | Select a sub category from the postnatal menu |          |
|------------------------------------------------|-----------------------------------------------|----------|
|                                                | Yes/No                                        | Comments |
| 1: Do you know what you want to do next?       | Y                                             |          |
| 2: Can you see a control to perform that task? | Y                                             |          |
| 3: Do you understand how the control works?    | Y                                             |          |
| 4: Do you understand the feedback?             | Y                                             |          |

| Task stage<br>(Action description)             | Select a Product from the chosen category |          |
|------------------------------------------------|-------------------------------------------|----------|
|                                                | Yes/No                                    | Comments |
| 1: Do you know what you want to do next?       | Y                                         |          |
| 2: Can you see a control to perform that task? | Y                                         |          |
| 3: Do you understand how the control works?    | Y                                         |          |
| 4: Do you understand the feedback?             | Y                                         |          |

| Task stage<br>(Action description)             | View Product Details |          |
|------------------------------------------------|----------------------|----------|
|                                                | Yes/No               | Comments |
| 1: Do you know what you want to do next?       | Y                    |          |
| 2: Can you see a control to perform that task? | Y                    |          |
| 3: Do you understand how the control works?    | Y                    |          |
| 4: Do you understand the feedback?             | Y                    |          |

| Task stage<br>(Action description)             | Add Product to Basket |          |
|------------------------------------------------|-----------------------|----------|
|                                                | Yes/No                | Comments |
| 1: Do you know what you want to do next?       | Y                     |          |
| 2: Can you see a control to perform that task? | Y                     |          |
| 3: Do you understand how the control works?    | Y                     |          |
| 4: Do you understand the feedback?             | Y                     |          |

### Task: Checkout

| Task stage<br>(Action description)             | View Shopping Basket |          |
|------------------------------------------------|----------------------|----------|
|                                                | Yes/No               | Comments |
| 1: Do you know what you want to do next?       | Y                    |          |
| 2: Can you see a control to perform that task? | Y                    |          |
| 3: Do you understand how the control works?    | Y                    |          |
| 4: Do you understand the feedback?             | Y                    |          |

| Task stage<br>(Action description)             | Purchase items: Go to checkout |          |
|------------------------------------------------|--------------------------------|----------|
|                                                | Yes/No                         | Comments |
| 1: Do you know what you want to do next?       | Y                              |          |
| 2: Can you see a control to perform that task? | Y                              |          |
| 3: Do you understand how the control works?    | Y                              |          |
| 4: Do you understand the feedback?             | Y                              |          |

| Task stage<br>(Action description)             | Enter Delivery Details |          |
|------------------------------------------------|------------------------|----------|
|                                                | Yes/No                 | Comments |
| 1: Do you know what you want to do next?       | Y                      |          |
| 2: Can you see a control to perform that task? | Y                      |          |
| 3: Do you understand how the control works?    | Y                      |          |
| 4: Do you understand the feedback?             | Y                      |          |

| Task stage<br>(Action description)             | Enter Payment Details and Successfully Checkout |          |
|------------------------------------------------|-------------------------------------------------|----------|
|                                                | Yes/No                                          | Comments |
| 1: Do you know what you want to do next?       | Y                                               |          |
| 2: Can you see a control to perform that task? | Y                                               |          |
| 3: Do you understand how the control works?    | Y                                               |          |
| 4: Do you understand the feedback?             | Y                                               |          |

## **Appendix 5.1- Cognitive Walkthrough (Jordan Mauro Buhagiar)**

### **Step 4- Cognitive Walkthrough**

The tasks you have just completed have been broken down into sub sections. Please answer the following questions with Yes or No. If you would like to mention anything please include your message in the comments box.

Task: Select a Product From Postnatal Menu

| Task stage<br>(Action description)             | Select a sub category from the postnatal menu |          |
|------------------------------------------------|-----------------------------------------------|----------|
|                                                | Yes/No                                        | Comments |
| 1: Do you know what you want to do next?       | Yes                                           |          |
| 2: Can you see a control to perform that task? | Yes                                           |          |
| 3: Do you understand how the control works?    | Yes                                           |          |
| 4: Do you understand the feedback?             | Yes                                           |          |

| Task stage<br>(Action description)             | Select a Product from the chosen category |          |
|------------------------------------------------|-------------------------------------------|----------|
|                                                | Yes/No                                    | Comments |
| 1: Do you know what you want to do next?       | Yes                                       |          |
| 2: Can you see a control to perform that task? | Yes                                       |          |
| 3: Do you understand how the control works?    | Yes                                       |          |
| 4: Do you understand the feedback?             | Yes                                       |          |

| Task stage<br>(Action description)             | View Product Details |          |
|------------------------------------------------|----------------------|----------|
|                                                | Yes/No               | Comments |
| 1: Do you know what you want to do next?       | Yes                  |          |
| 2: Can you see a control to perform that task? | Yes                  |          |
| 3: Do you understand how the control works?    | Yes                  |          |
| 4: Do you understand the feedback?             | Yes                  |          |

| Task stage<br>(Action description)             | Add Product to Basket |          |
|------------------------------------------------|-----------------------|----------|
|                                                | Yes/No                | Comments |
| 1: Do you know what you want to do next?       | Yes                   |          |
| 2: Can you see a control to perform that task? | Yes                   |          |
| 3: Do you understand how the control works?    | Yes                   |          |
| 4: Do you understand the feedback?             | Yes                   |          |

Task: Checkout

| Task stage<br>(Action description)             | View Shopping Basket |                   |
|------------------------------------------------|----------------------|-------------------|
|                                                | Yes/No               | Comments          |
| 1: Do you know what you want to do next?       | Yes                  |                   |
| 2: Can you see a control to perform that task? | Yes                  | was not too clear |
| 3: Do you understand how the control works?    | Yes                  |                   |
| 4: Do you understand the feedback?             | Yes                  |                   |

| Task stage<br>(Action description)             | Purchase Items: Go to checkout |                   |
|------------------------------------------------|--------------------------------|-------------------|
|                                                | Yes/No                         | Comments          |
| 1: Do you know what you want to do next?       | Yes                            |                   |
| 2: Can you see a control to perform that task? | Yes                            | was not too clear |
| 3: Do you understand how the control works?    | Yes                            |                   |
| 4: Do you understand the feedback?             | Yes                            |                   |

| Task stage<br>(Action description)             | Enter Delivery Details |          |
|------------------------------------------------|------------------------|----------|
|                                                | Yes/No                 | Comments |
| 1: Do you know what you want to do next?       | Yes                    |          |
| 2: Can you see a control to perform that task? | Yes                    |          |
| 3: Do you understand how the control works?    | Yes                    |          |
| 4: Do you understand the feedback?             | Yes                    |          |

| Task stage<br>(Action description)             | Enter Payment Details and Successfully Checkout |          |
|------------------------------------------------|-------------------------------------------------|----------|
|                                                | Yes/No                                          | Comments |
| 1: Do you know what you want to do next?       | Yes                                             |          |
| 2: Can you see a control to perform that task? | Yes                                             |          |
| 3: Do you understand how the control works?    | Yes                                             |          |
| 4: Do you understand the feedback?             | Yes                                             |          |

## **Appendix 5.2- Cognitive Walkthrough (Majedaldeh)**

### **Step 4- Cognitive Walkthrough**

The tasks you have just completed have been broken down into sub sections. Please answer the following questions with Yes or No. If you would like to mention anything please include your message in the comments box.

Task: Select a Product From Postnatal Menu

| Task stage<br>(Action description)             | Select a sub category from the postnatal menu |          |
|------------------------------------------------|-----------------------------------------------|----------|
|                                                | Yes/No                                        | Comments |
| 1: Do you know what you want to do next?       | Y                                             |          |
| 2: Can you see a control to perform that task? | Y                                             |          |
| 3: Do you understand how the control works?    | Y                                             |          |
| 4: Do you understand the feedback?             | Y                                             |          |

| Task stage<br>(Action description)             | Select a Product from the chosen category |          |
|------------------------------------------------|-------------------------------------------|----------|
|                                                | Yes/No                                    | Comments |
| 1: Do you know what you want to do next?       | Y                                         |          |
| 2: Can you see a control to perform that task? | Y                                         |          |
| 3: Do you understand how the control works?    | Y                                         |          |
| 4: Do you understand the feedback?             | Y                                         |          |

| Task stage<br>(Action description)             | View Product Details |          |
|------------------------------------------------|----------------------|----------|
|                                                | Yes/No               | Comments |
| 1: Do you know what you want to do next?       | Y                    |          |
| 2: Can you see a control to perform that task? | Y                    |          |
| 3: Do you understand how the control works?    | Y                    |          |
| 4: Do you understand the feedback?             | Y                    |          |

| Task stage<br>(Action description)             | Add Product to Basket |          |
|------------------------------------------------|-----------------------|----------|
|                                                | Yes/No                | Comments |
| 1: Do you know what you want to do next?       | Y                     |          |
| 2: Can you see a control to perform that task? | Y                     |          |
| 3: Do you understand how the control works?    | Y                     |          |
| 4: Do you understand the feedback?             | Y                     |          |

### Task: Checkout

| Task stage<br>(Action description)             | View Shopping Basket |          |
|------------------------------------------------|----------------------|----------|
|                                                | Yes/No               | Comments |
| 1: Do you know what you want to do next?       | Y                    |          |
| 2: Can you see a control to perform that task? | Y                    |          |
| 3: Do you understand how the control works?    | Y                    |          |
| 4: Do you understand the feedback?             | Y                    |          |

| Task stage<br>(Action description)             | Purchase Items: Go to checkout |          |
|------------------------------------------------|--------------------------------|----------|
|                                                | Yes/No                         | Comments |
| 1: Do you know what you want to do next?       | Y                              |          |
| 2: Can you see a control to perform that task? | Y                              |          |
| 3: Do you understand how the control works?    | Y                              |          |
| 4: Do you understand the feedback?             | Y                              |          |

| Task stage<br>(Action description)             | Enter Delivery Details |          |
|------------------------------------------------|------------------------|----------|
|                                                | Yes/No                 | Comments |
| 1: Do you know what you want to do next?       | Y                      |          |
| 2: Can you see a control to perform that task? | Y                      |          |
| 3: Do you understand how the control works?    | Y                      |          |
| 4: Do you understand the feedback?             | Y                      |          |

| Task stage<br>(Action description)             | Enter Payment Details and Successfully Checkout |          |
|------------------------------------------------|-------------------------------------------------|----------|
|                                                | Yes/No                                          | Comments |
| 1: Do you know what you want to do next?       | Y                                               |          |
| 2: Can you see a control to perform that task? | Y                                               |          |
| 3: Do you understand how the control works?    | Y                                               |          |
| 4: Do you understand the feedback?             | Y                                               |          |

## **Appendix 5.3- Cognitive Walkthrough (Harry Byrnes)**

### **Step 4- Cognitive Walkthrough**

The tasks you have just completed have been broken down into sub sections. Please answer the following questions with Yes or No. If you would like to mention anything please include your message in the comments box.

Task: Select a Product From Postnatal Menu

| Task stage<br>(Action description)             | Select a sub category from the postnatal menu |          |
|------------------------------------------------|-----------------------------------------------|----------|
|                                                | Yes/No                                        | Comments |
| 1: Do you know what you want to do next?       | Y                                             |          |
| 2: Can you see a control to perform that task? | X                                             |          |
| 3: Do you understand how the control works?    | Y                                             |          |
| 4: Do you understand the feedback?             | Y                                             |          |

| Task stage<br>(Action description)             | Select a Product from the chosen category |          |
|------------------------------------------------|-------------------------------------------|----------|
|                                                | Yes/No                                    | Comments |
| 1: Do you know what you want to do next?       | Y                                         |          |
| 2: Can you see a control to perform that task? | Y                                         |          |
| 3: Do you understand how the control works?    | Y                                         |          |
| 4: Do you understand the feedback?             | Y                                         |          |

| Task stage<br>(Action description)             | View Product Details |          |
|------------------------------------------------|----------------------|----------|
|                                                | Yes/No               | Comments |
| 1: Do you know what you want to do next?       | Y                    |          |
| 2: Can you see a control to perform that task? | Y                    |          |
| 3: Do you understand how the control works?    | Y                    |          |
| 4: Do you understand the feedback?             | Y                    |          |

| Task stage<br>(Action description)             | Add Product to Basket |          |
|------------------------------------------------|-----------------------|----------|
|                                                | Yes/No                | Comments |
| 1: Do you know what you want to do next?       | Y                     |          |
| 2: Can you see a control to perform that task? | Y                     |          |
| 3: Do you understand how the control works?    | Y                     |          |
| 4: Do you understand the feedback?             | Y                     |          |

|                |
|----------------|
| Task: Checkout |
|----------------|

| Task stage<br>(Action description)             | View Shopping Basket |          |
|------------------------------------------------|----------------------|----------|
|                                                | Yes/No               | Comments |
| 1: Do you know what you want to do next?       | Y                    |          |
| 2: Can you see a control to perform that task? | Y                    |          |
| 3: Do you understand how the control works?    | Y                    |          |
| 4: Do you understand the feedback?             | Y                    |          |

| Task stage<br>(Action description)             | Purchase Items: Go to checkout |          |
|------------------------------------------------|--------------------------------|----------|
|                                                | Yes/No                         | Comments |
| 1: Do you know what you want to do next?       | Y                              |          |
| 2: Can you see a control to perform that task? | Y                              |          |
| 3: Do you understand how the control works?    | Y                              |          |
| 4: Do you understand the feedback?             | Y                              |          |

| Task stage<br>(Action description)             | Enter Delivery Details |          |
|------------------------------------------------|------------------------|----------|
|                                                | Yes/No                 | Comments |
| 1: Do you know what you want to do next?       | Y                      |          |
| 2: Can you see a control to perform that task? | Y                      |          |
| 3: Do you understand how the control works?    | Y                      |          |
| 4: Do you understand the feedback?             | X                      |          |

| Task stage<br>(Action description)             | Enter Payment Details and Successfully Checkout |          |
|------------------------------------------------|-------------------------------------------------|----------|
|                                                | Yes/No                                          | Comments |
| 1: Do you know what you want to do next?       | Y                                               |          |
| 2: Can you see a control to perform that task? | Y                                               |          |
| 3: Do you understand how the control works?    | Y                                               |          |
| 4: Do you understand the feedback?             | Y                                               |          |

## **Appendix 5.4- Cognitive Walkthrough (Giovanna Hammond)**

### **Step 4- Cognitive Walkthrough**

The tasks you have just completed have been broken down into sub sections. Please answer the following questions with Yes or No. If you would like to mention anything please include your message in the comments box.

Task: Select a Product From Postnatal Menu

| Task stage<br>(Action description)             | Select a sub category from the postnatal menu |          |
|------------------------------------------------|-----------------------------------------------|----------|
|                                                | Yes/No                                        | Comments |
| 1: Do you know what you want to do next?       | Y                                             |          |
| 2: Can you see a control to perform that task? | Y                                             |          |
| 3: Do you understand how the control works?    | Y                                             |          |
| 4: Do you understand the feedback?             | Y                                             |          |

| Task stage<br>(Action description)             | Select a Product from the chosen category |          |
|------------------------------------------------|-------------------------------------------|----------|
|                                                | Yes/No                                    | Comments |
| 1: Do you know what you want to do next?       | Y                                         |          |
| 2: Can you see a control to perform that task? | Y                                         |          |
| 3: Do you understand how the control works?    | Y                                         |          |
| 4: Do you understand the feedback?             | Y                                         |          |

| Task stage<br>(Action description)             | View Product Details |          |
|------------------------------------------------|----------------------|----------|
|                                                | Yes/No               | Comments |
| 1: Do you know what you want to do next?       | Y                    |          |
| 2: Can you see a control to perform that task? | Y                    |          |
| 3: Do you understand how the control works?    | Y                    |          |
| 4: Do you understand the feedback?             | Y                    |          |

| Task stage<br>(Action description)             | Add Product to Basket |          |
|------------------------------------------------|-----------------------|----------|
|                                                | Yes/No                | Comments |
| 1: Do you know what you want to do next?       | Y                     |          |
| 2: Can you see a control to perform that task? | Y                     |          |
| 3: Do you understand how the control works?    | Y                     |          |
| 4: Do you understand the feedback?             | Y                     |          |

Task: Checkout

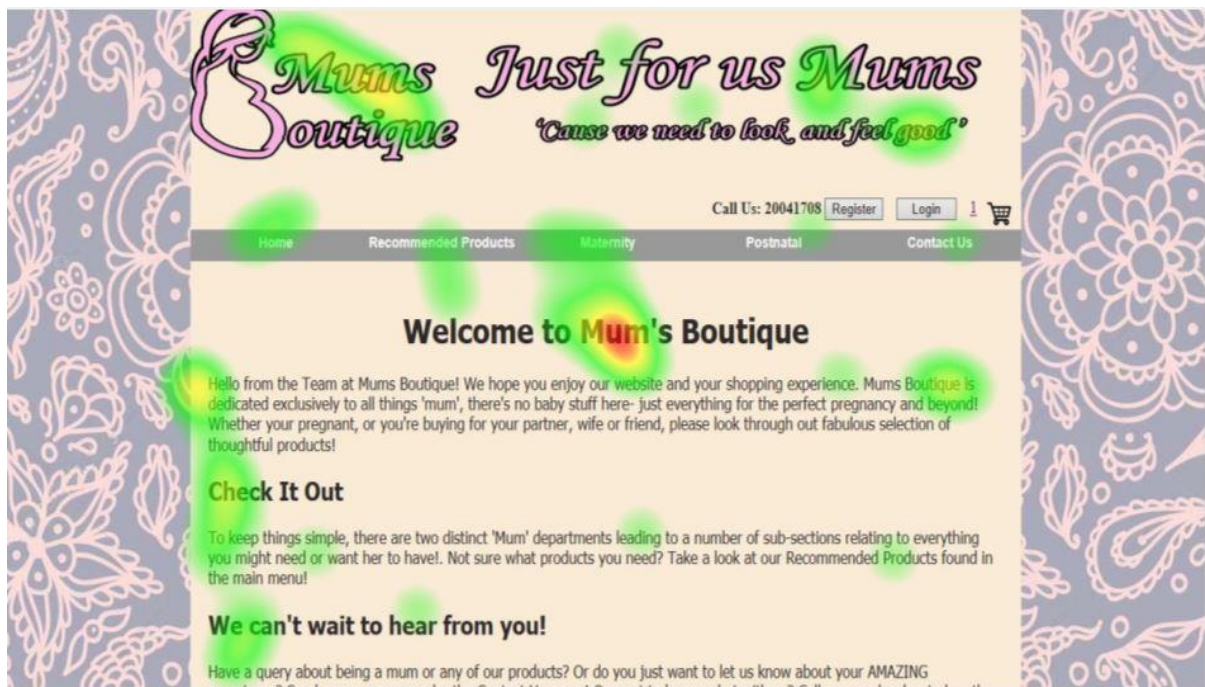
| Task stage<br>(Action description)             | View Shopping Basket |          |
|------------------------------------------------|----------------------|----------|
|                                                | Yes/No               | Comments |
| 1: Do you know what you want to do next?       | Y                    |          |
| 2: Can you see a control to perform that task? | Y                    |          |
| 3: Do you understand how the control works?    | Y                    |          |
| 4: Do you understand the feedback?             | Y                    |          |

| Task stage<br>(Action description)             | Purchase Items: Go to checkout |          |
|------------------------------------------------|--------------------------------|----------|
|                                                | Yes/No                         | Comments |
| 1: Do you know what you want to do next?       | Y                              |          |
| 2: Can you see a control to perform that task? | Y                              |          |
| 3: Do you understand how the control works?    | Y                              |          |
| 4: Do you understand the feedback?             | Y                              |          |

| Task stage<br>(Action description)             | Enter Delivery Details |          |
|------------------------------------------------|------------------------|----------|
|                                                | Yes/No                 | Comments |
| 1: Do you know what you want to do next?       | Y                      |          |
| 2: Can you see a control to perform that task? | Y                      |          |
| 3: Do you understand how the control works?    | Y                      |          |
| 4: Do you understand the feedback?             | Y                      |          |

| Task stage<br>(Action description)             | Enter Payment Details and Successfully Checkout |          |
|------------------------------------------------|-------------------------------------------------|----------|
|                                                | Yes/No                                          | Comments |
| 1: Do you know what you want to do next?       | Y                                               |          |
| 2: Can you see a control to perform that task? | Y                                               |          |
| 3: Do you understand how the control works?    | Y                                               |          |
| 4: Do you understand the feedback?             | Y                                               |          |

## Appendix 6- Heatmaps – Home Page (Amy Vivian)



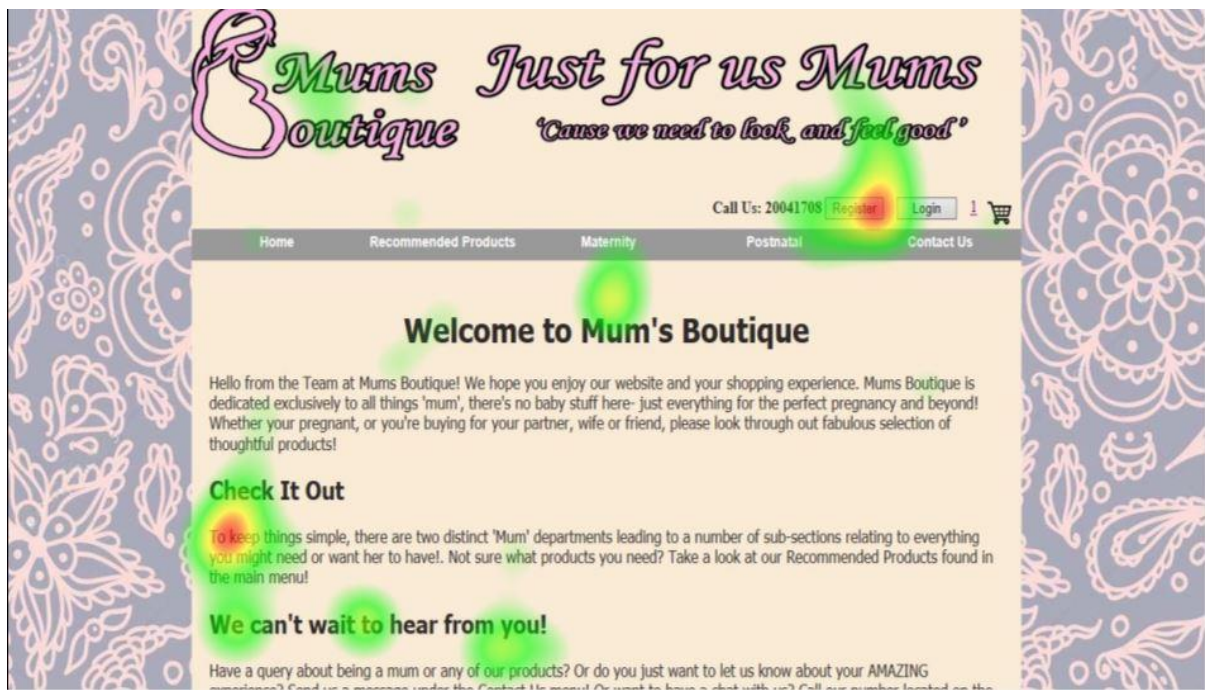
## Appendix 6.1- Heatmaps – Home Page (Jordan Mauro)



## Appendix 6.2- Heatmaps – Home Page (Majedaldeh)



## Appendix 6.3- Heatmaps – Home Page (Harry Byrnes)



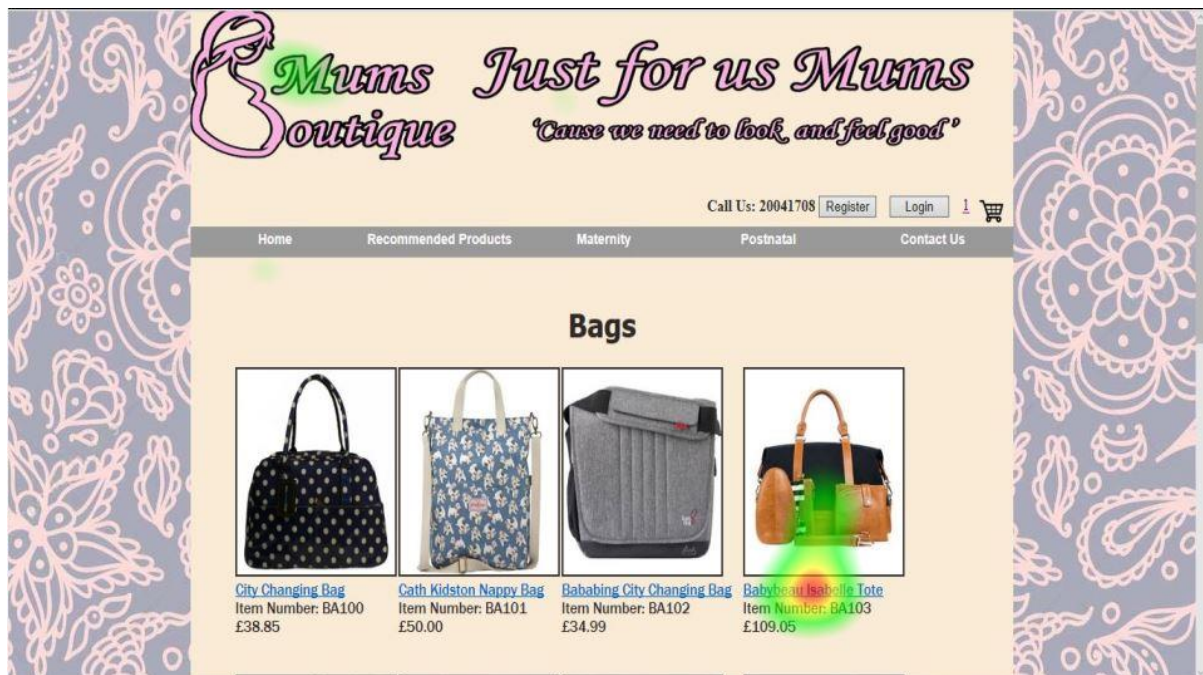
## Appendix 6.4- Heatmaps – Home Page (Giovanna Hammond)



## Appendix 7- Heatmaps – Products Page (Amy Vivian)



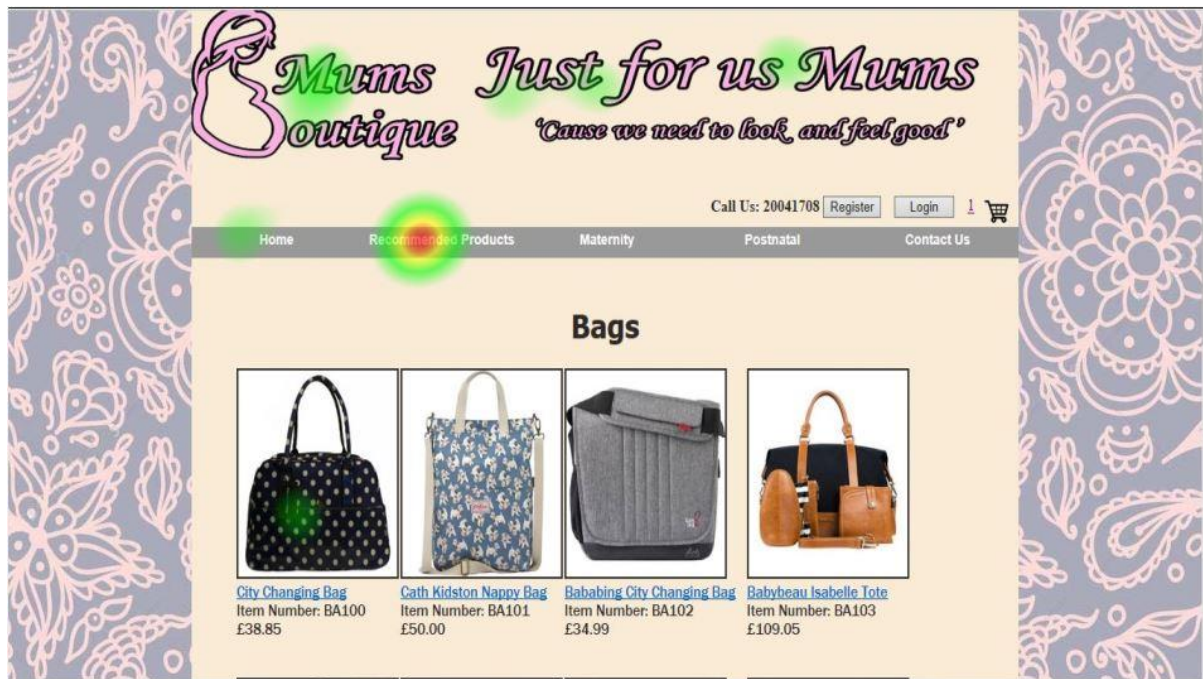
## Appendix 7.1- Heatmaps – Products Page (Jordan Mauro Buhagiar)



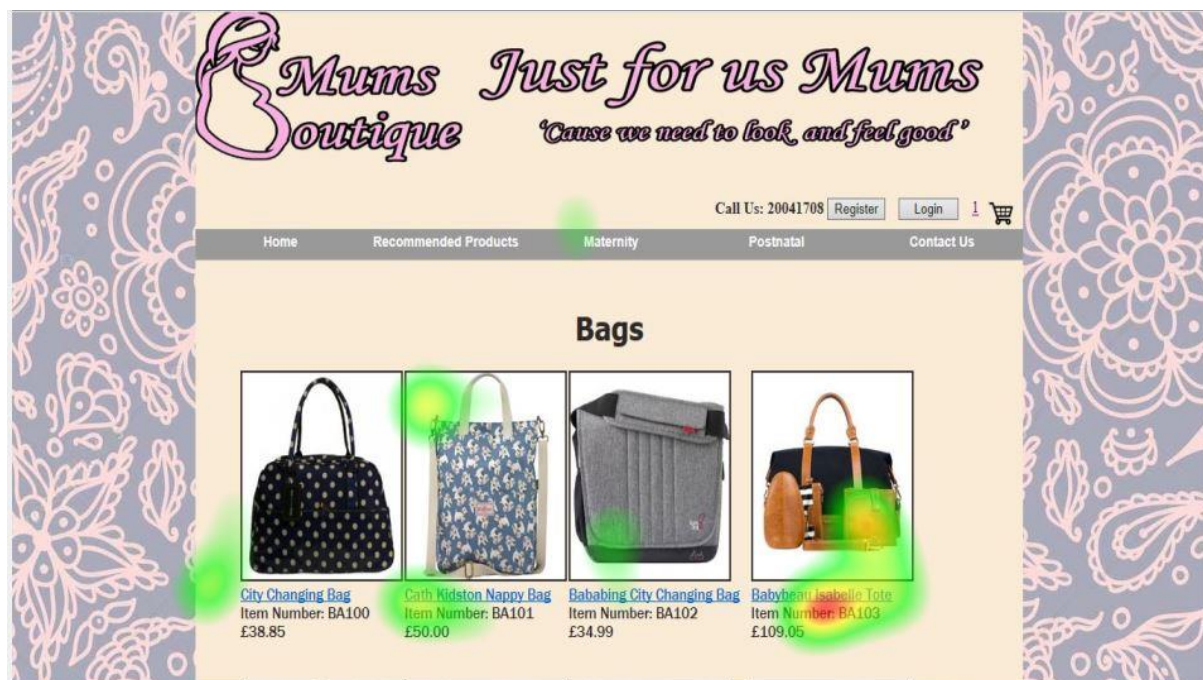
## Appendix 7.2- Heatmaps – Products Page (Majedaldeh)



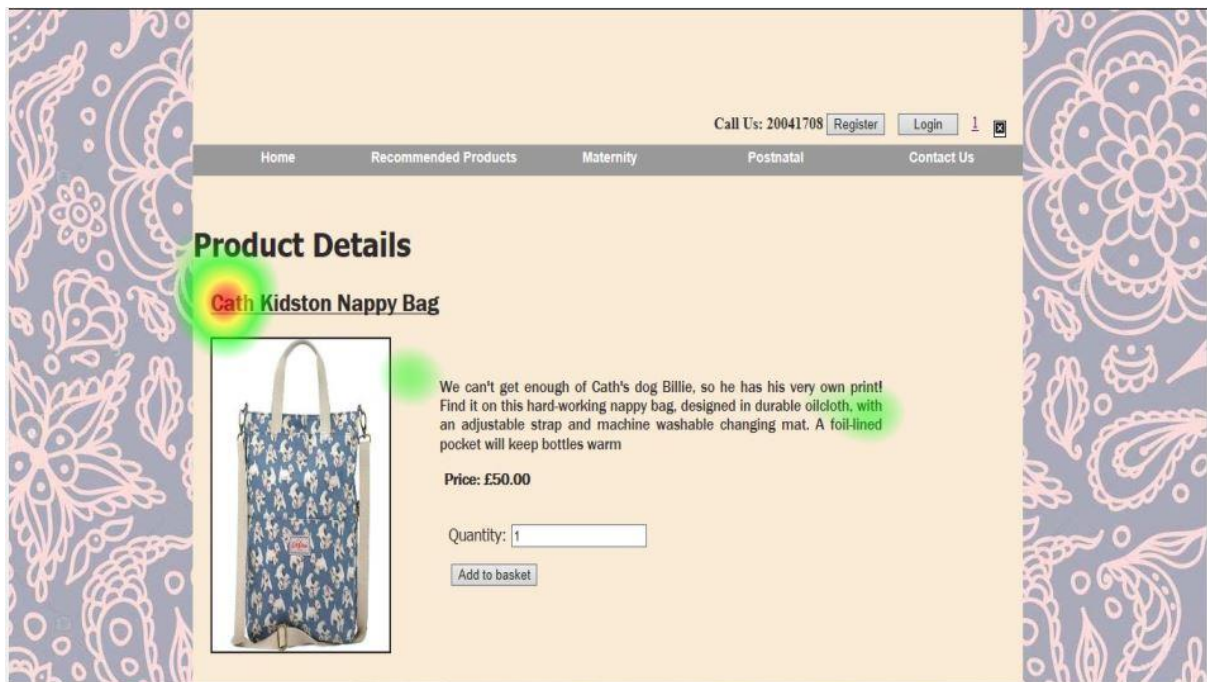
## Appendix 7.3- Heatmaps – Products Page (Harry Brynes)



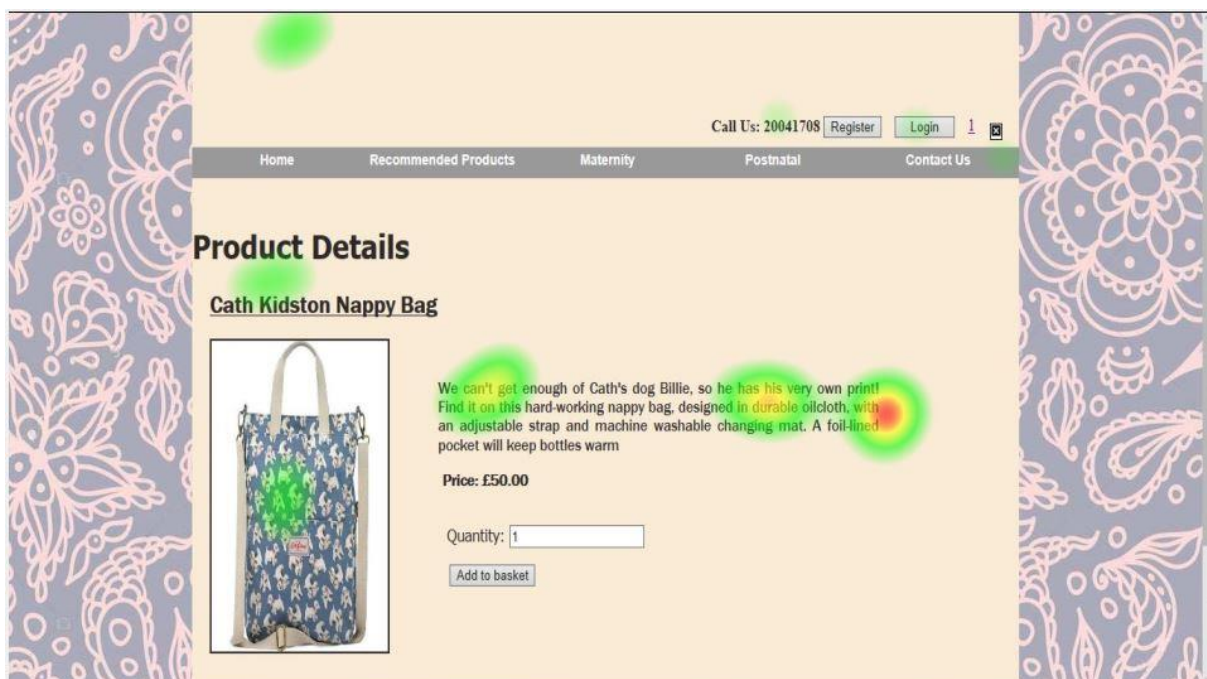
## Appendix 7.4- Heatmaps – Products Page (Giovanna Hammond)



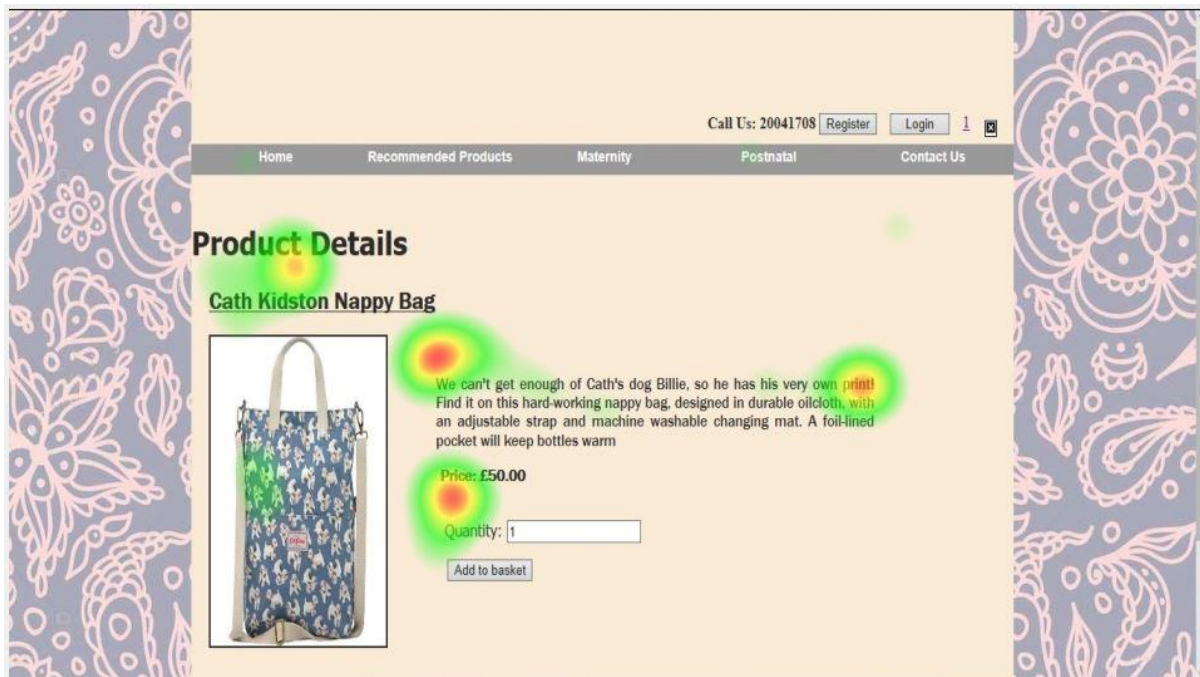
## Appendix 8- Heatmaps – Product Details (Amy Vivian)



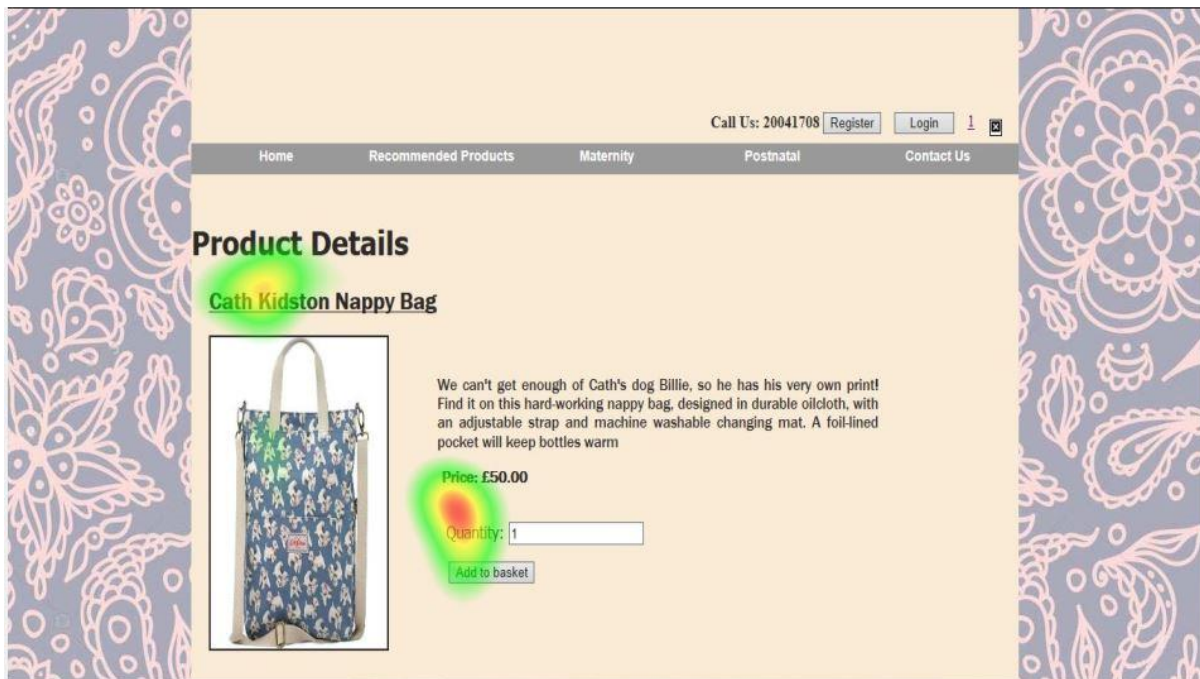
## Appendix 8.1- Heatmaps – Product Details (Jordan Maurp Buhagiar)



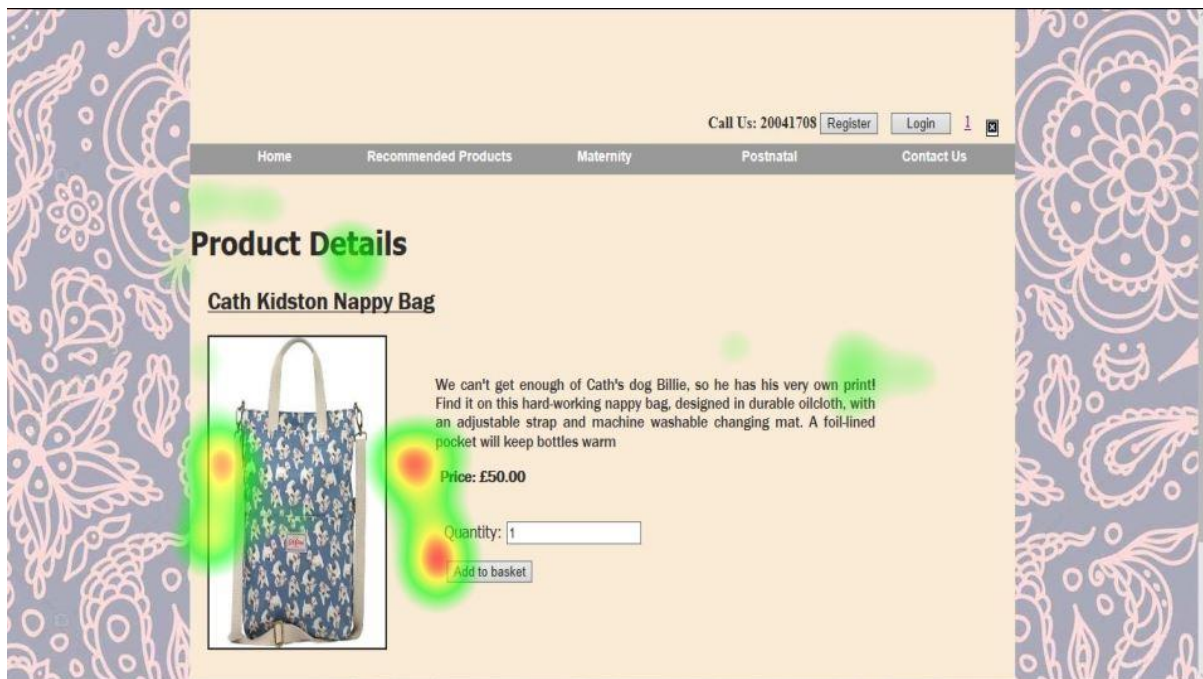
## Appendix 8.2- Heatmaps – Product Details (Majedaldeh)



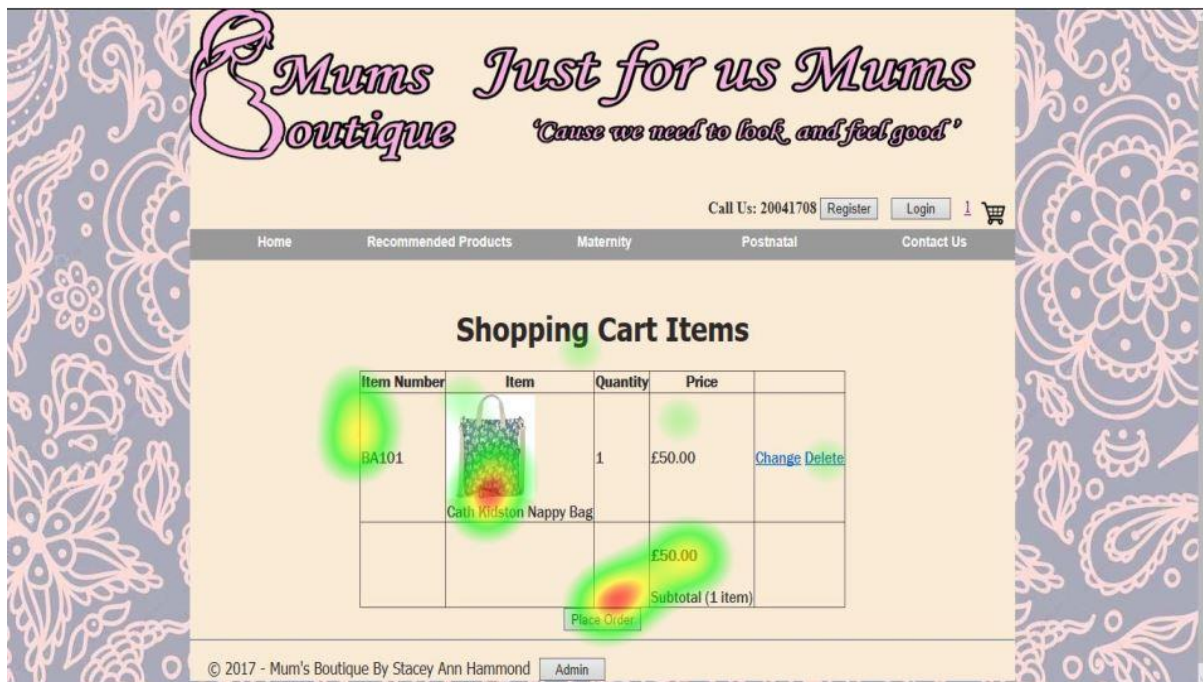
## Appendix 8.3- Heatmaps – Product Details (Harry Brynes)



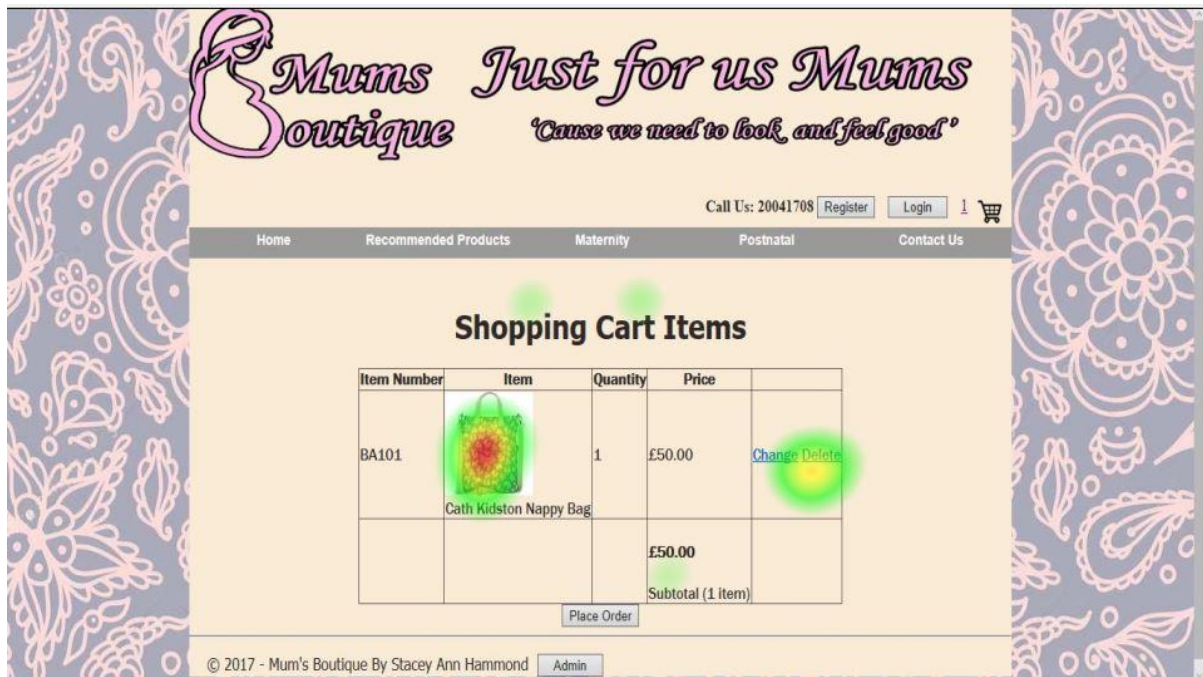
## Appendix 8.4- Heatmaps – Product Details (Giovanna Hammond)



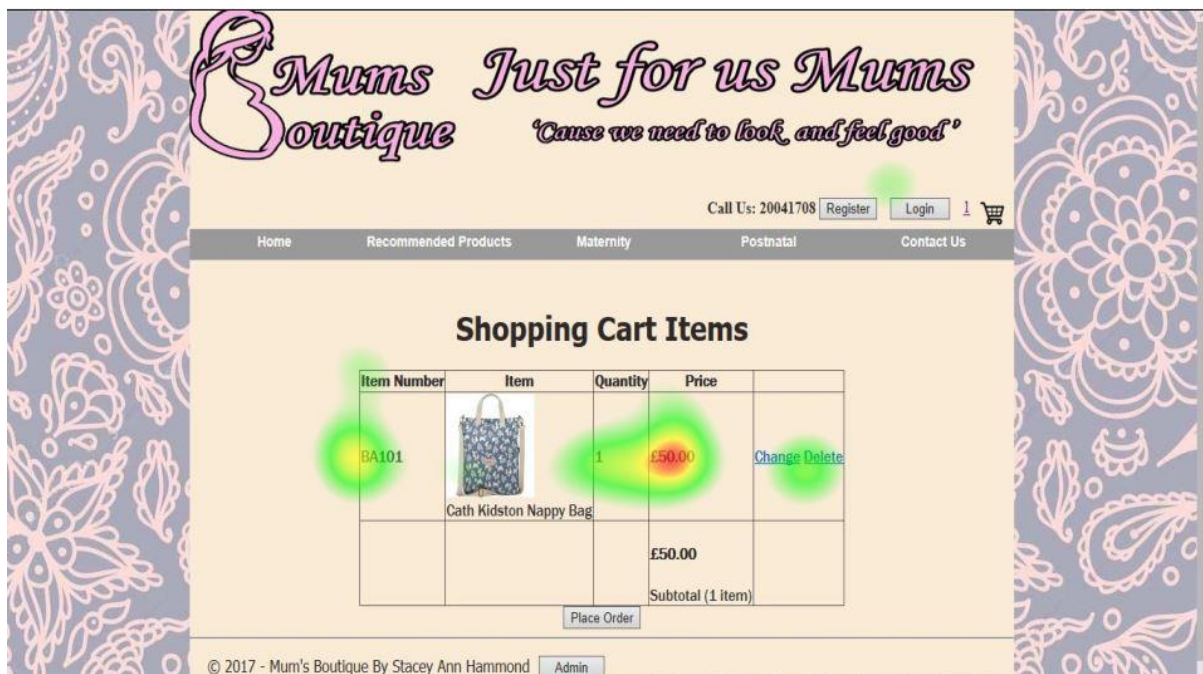
## Appendix 9- Heatmaps – Shopping Cart (Amy Vivian)



## Appendix 9.1- Heatmaps – Shopping Cart (Jordan Mauro Buhagiar)



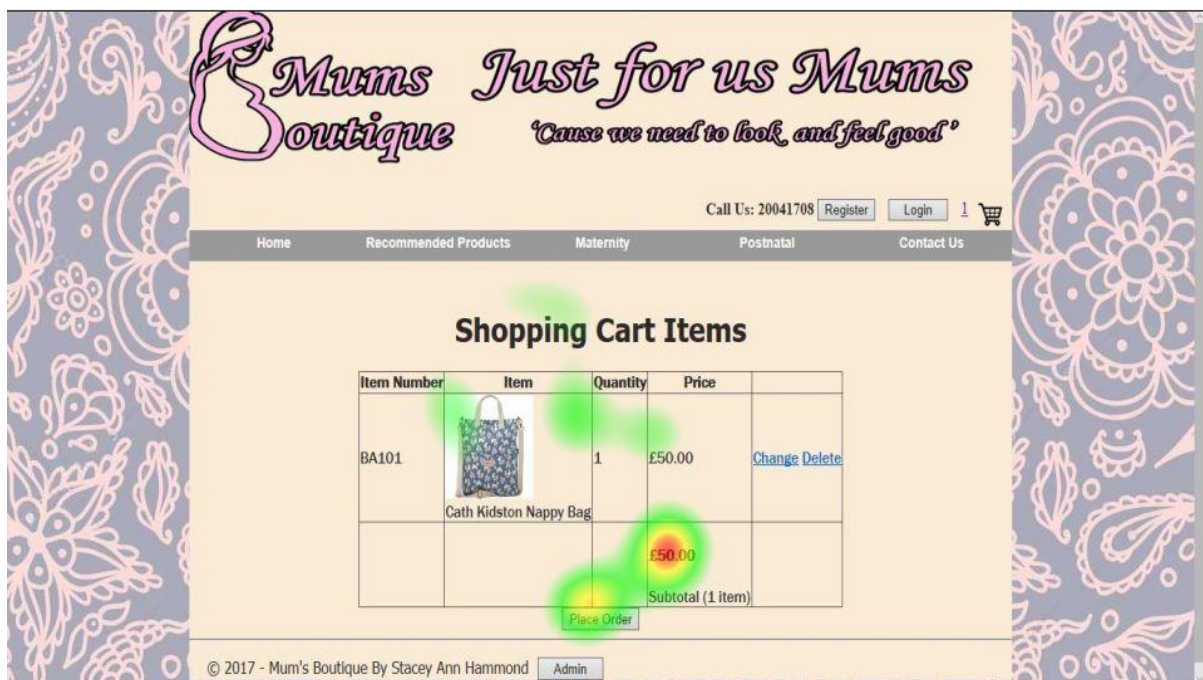
## Appendix 9.2- Heatmaps – Shopping Cart (Majedaldeh)



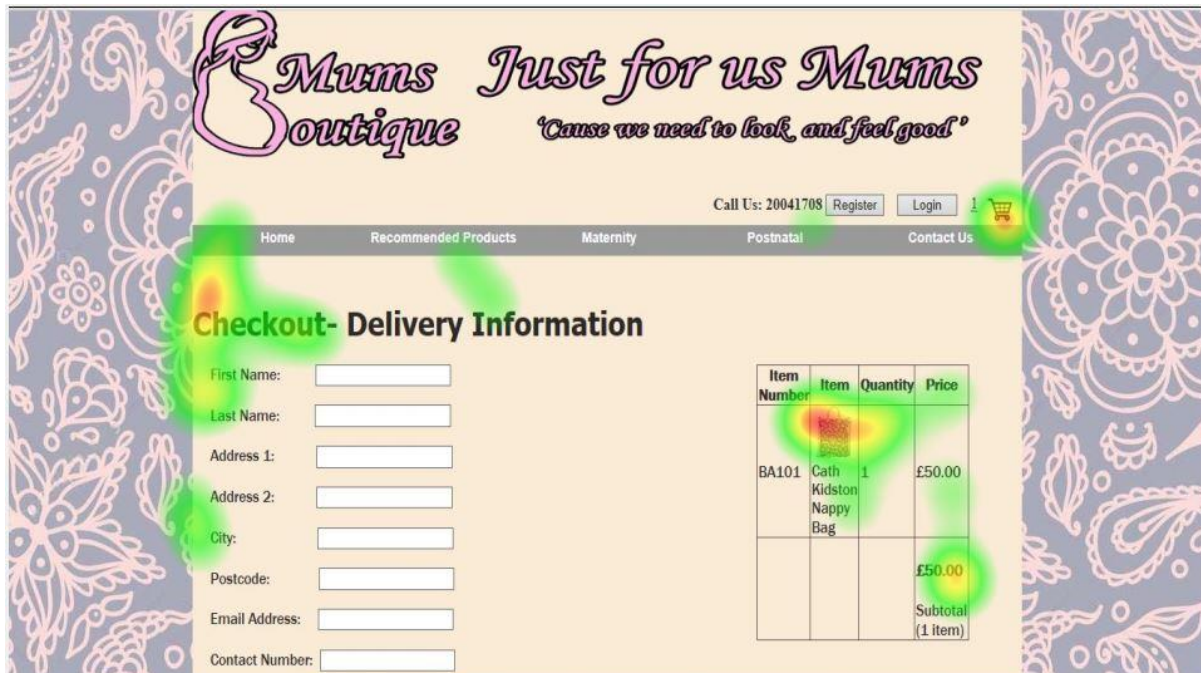
## Appendix 9.3- Heatmaps – Shopping Cart (Harry Byrnes)



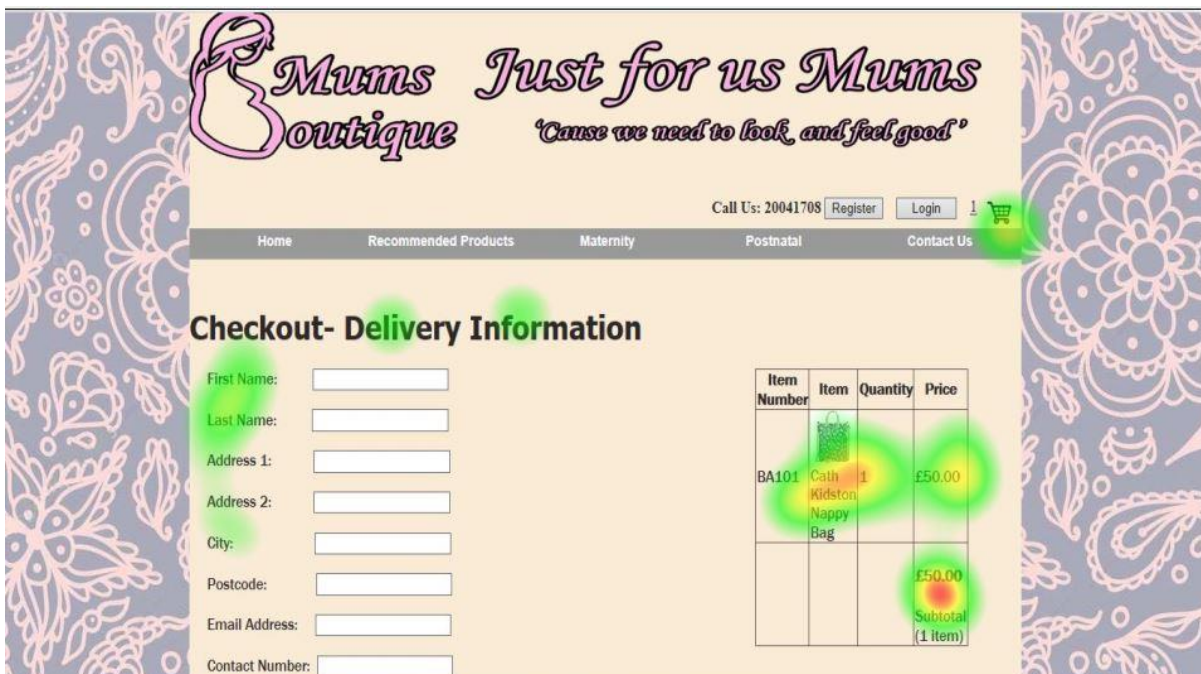
## Appendix 9.4- Heatmaps – Shopping Cart (Giovanna Hammond)



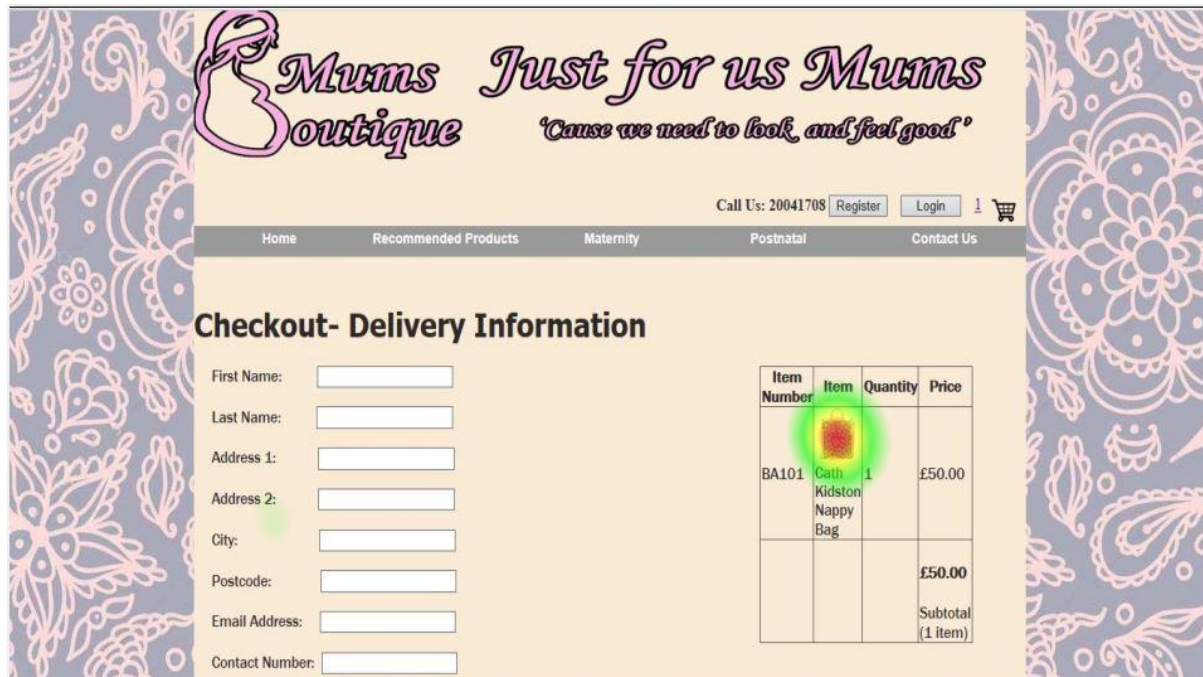
## Appendix 10- Heatmaps – Delivery Information (Amy Vivian)



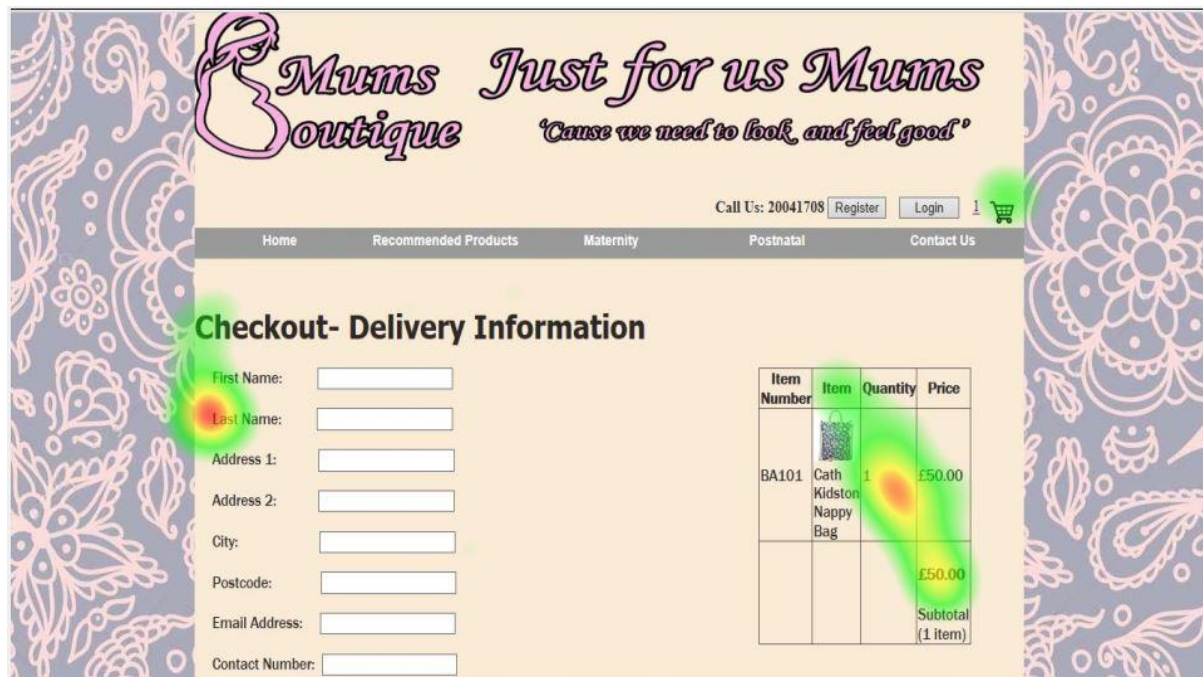
## Appendix 10.1- Heatmaps – Delivery Information (Jordan Mauro Buhagiar)



## Appendix 10.2- Heatmaps – Delivery Information (Majedaldeh)



## Appendix 10.3- Heatmaps – Delivery Information (Harry Byrnes)



## Appendix 10.4- Heatmaps – Delivery Information (Giovanna Hammond)

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### Checkout- Delivery Information

First Name:

Last Name:

Address 1:

Address 2:

City:

Postcode:

Email Address:

Contact Number:

| Item Number | Item                   | Quantity | Price             |
|-------------|------------------------|----------|-------------------|
| BA101       | Cath Kidston Nappy Bag | 1        | £50.00            |
|             |                        |          | £50.00            |
|             |                        |          | Subtotal (1 item) |

## Appendix 11- Heatmaps – Payment Information (Amy Vivian)

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### Payment Details

If you would like to pay with PayPal please click here: [Pay with PayPal](#)

Otherwise enter your card details below.

You must fill fields marked with \*

\* Card Type:

\* Card Number:

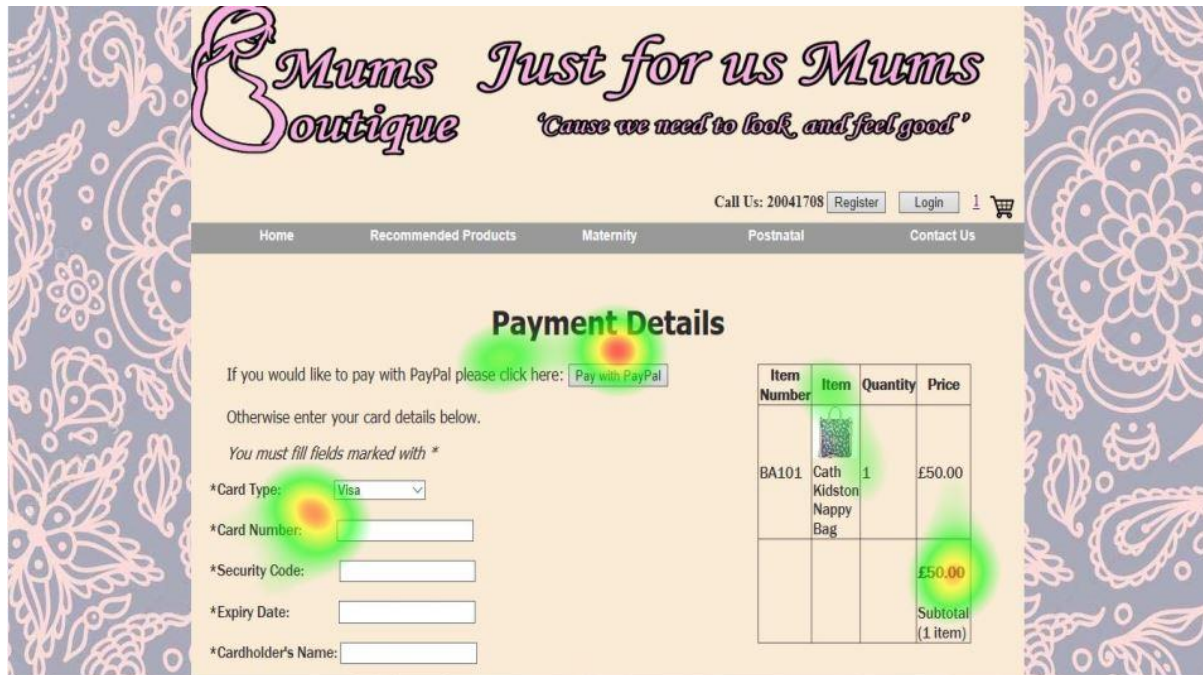
\* Security Code:

\* Expiry Date:

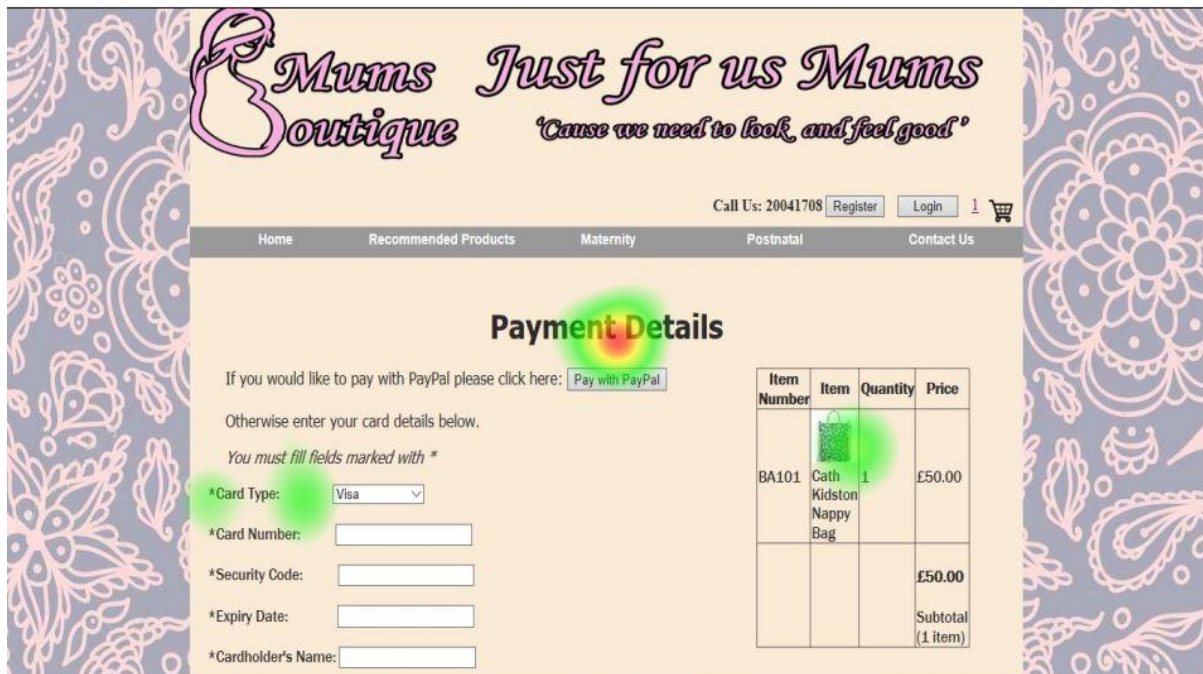
\* Cardholder's Name:

| Item Number | Item                   | Quantity | Price             |
|-------------|------------------------|----------|-------------------|
| BA101       | Cath Kidston Nappy Bag | 1        | £50.00            |
|             |                        |          | £50.00            |
|             |                        |          | Subtotal (1 item) |

## Appendix 11.1- Heatmaps – Payment Information (Jordan Mauro Buhagiar)



## Appendix 11.2- Heatmaps – Payment Information (Majedaldeh)



## Appendix 11.3- Heatmaps – Payment Information (Harry Byrnes)

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Otherwise enter your card details below.

You must fill fields marked with \*

\*Card Type:

\*Card Number:

\*Security Code:

\*Expiry Date:

\*Cardholder's Name:

| Item Number | Item                                                                                                       | Quantity | Price             |
|-------------|------------------------------------------------------------------------------------------------------------|----------|-------------------|
| BA101       |  Cath Kidston Nappy Bag | 1        | £50.00            |
|             |                                                                                                            |          | £50.00            |
|             |                                                                                                            |          | Subtotal (1 item) |

## Appendix 11.4- Heatmaps – Payment Information (Giovanna Hammond)

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### Payment Details

If you would like to pay with PayPal please click here: [Pay with PayPal](#)

Otherwise enter your card details below.

You must fill fields marked with \*

\*Card Type:

\*Card Number:

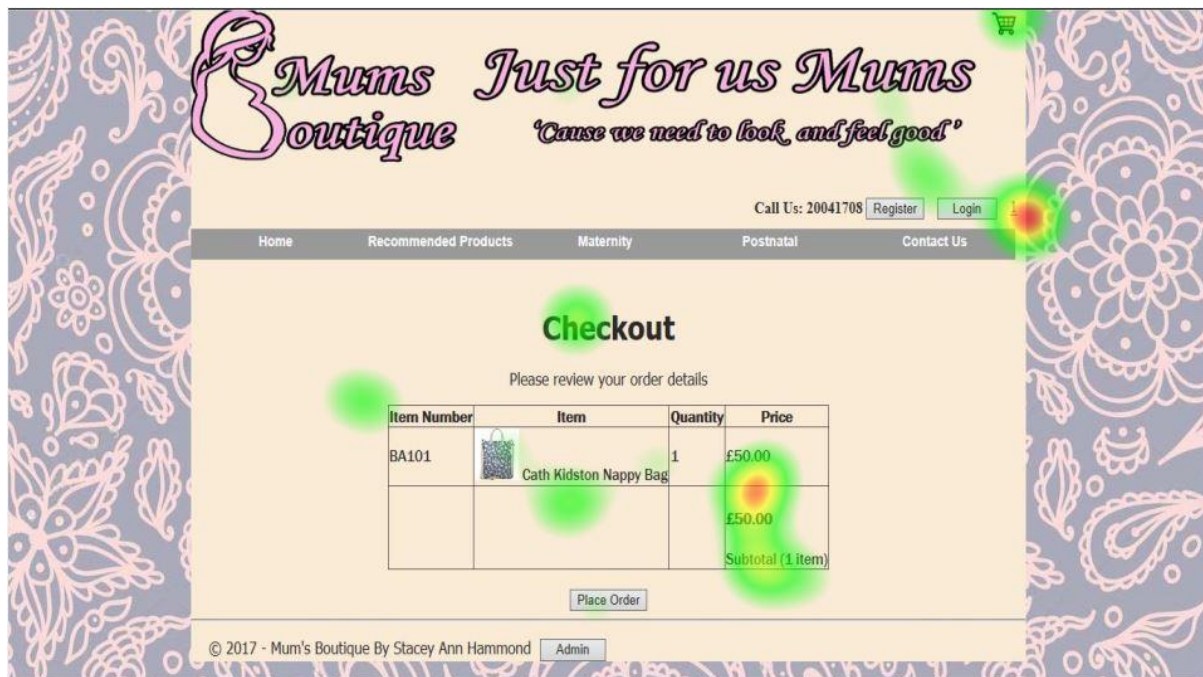
\*Security Code:

\*Expiry Date:

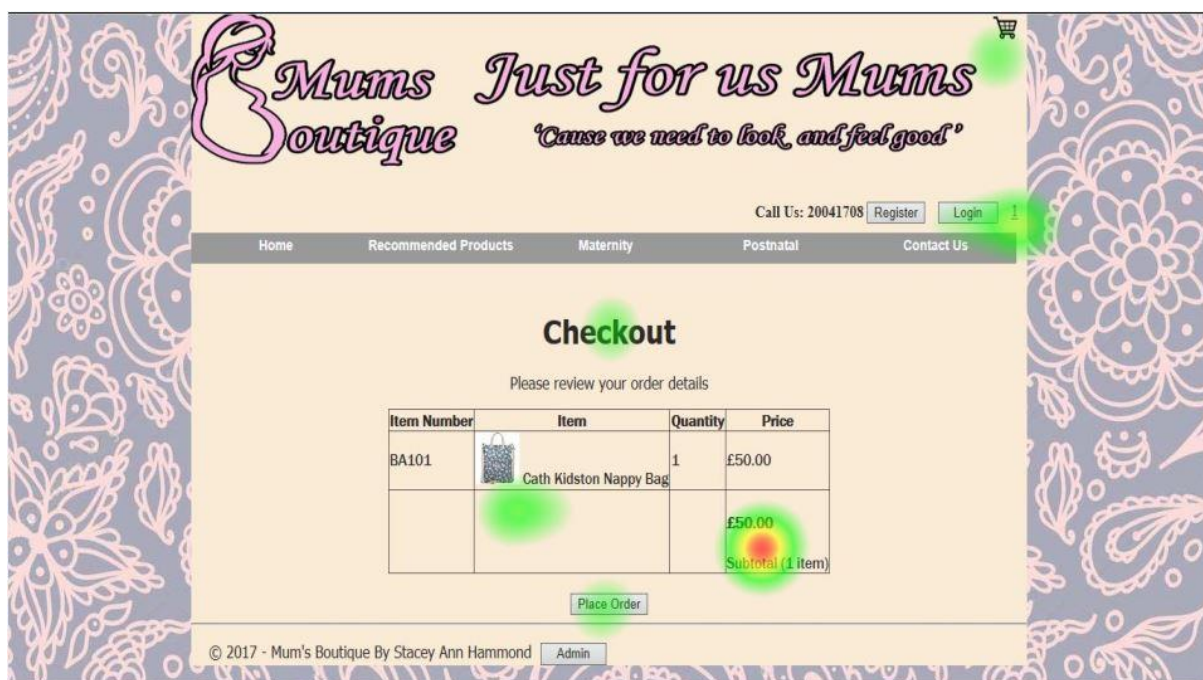
\*Cardholder's Name:

| Item Number | Item                                                                                                         | Quantity | Price             |
|-------------|--------------------------------------------------------------------------------------------------------------|----------|-------------------|
| BA101       |  Cath Kidston Nappy Bag | 1        | £50.00            |
|             |                                                                                                              |          | £50.00            |
|             |                                                                                                              |          | Subtotal (1 item) |

## Appendix 12- Heatmaps – Order Summary (Amy Vivian)



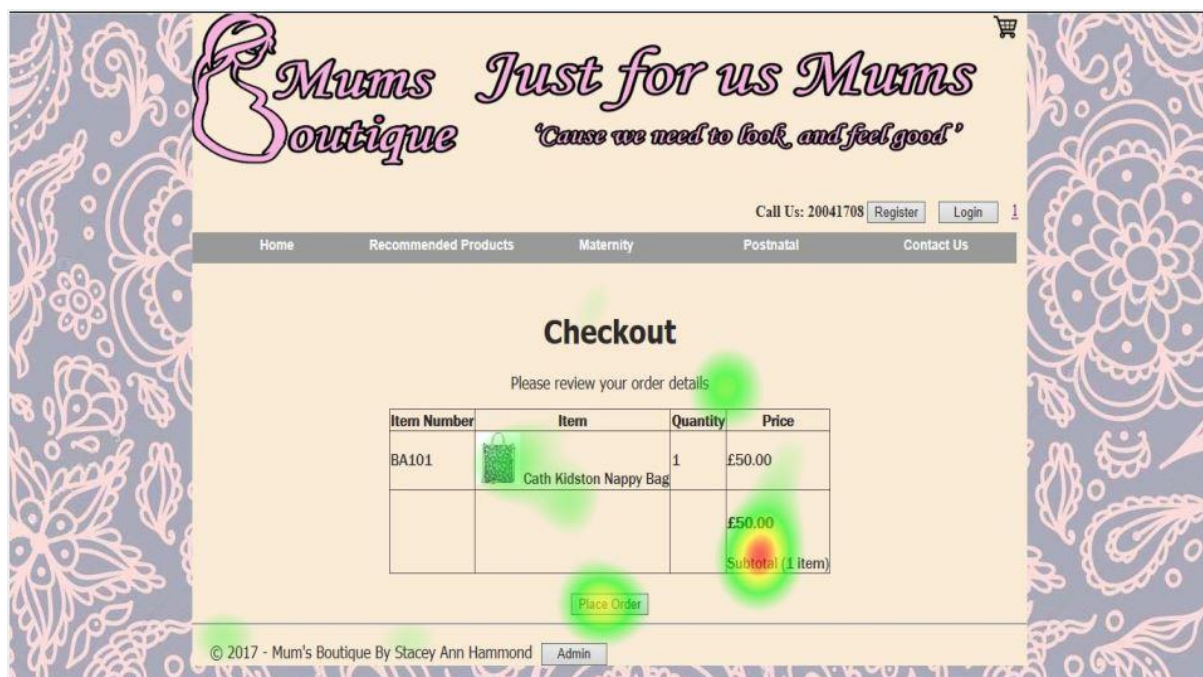
## Appendix 12.1- Heatmaps – Payment Information (Jordan Mauro Buhagiar)



## Appendix 12.2- Heatmaps – Payment Information (Majedaldeh)



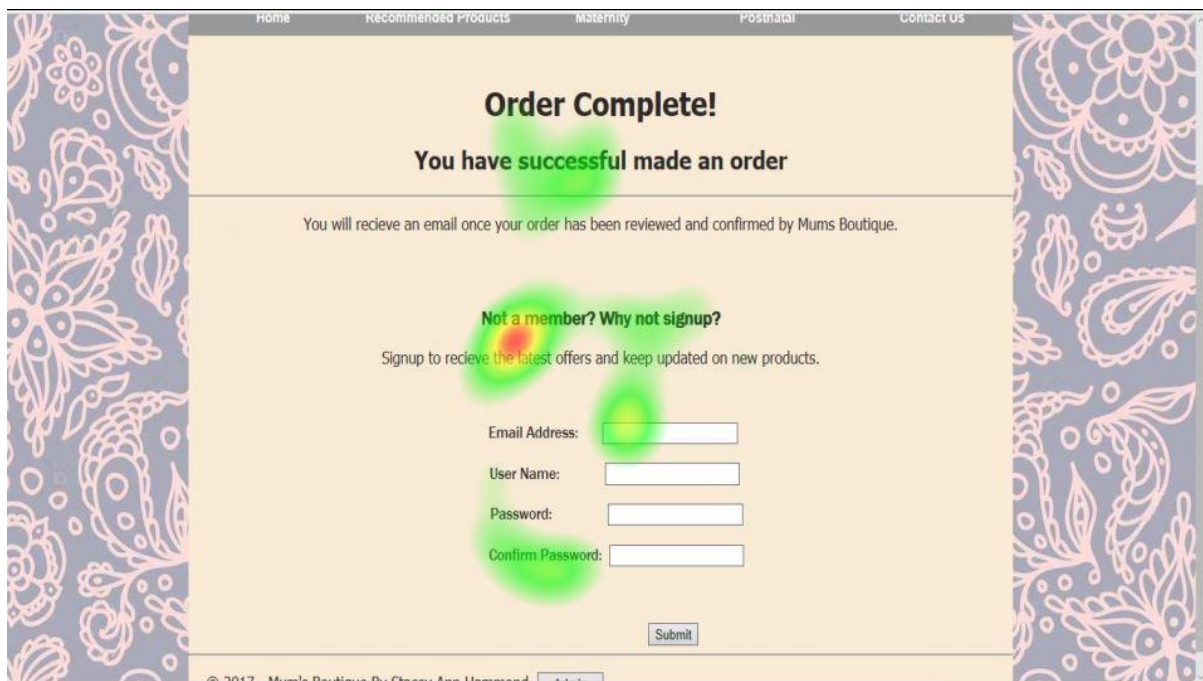
## Appendix 12.3- Heatmaps – Payment Information (Harry Byrnes)



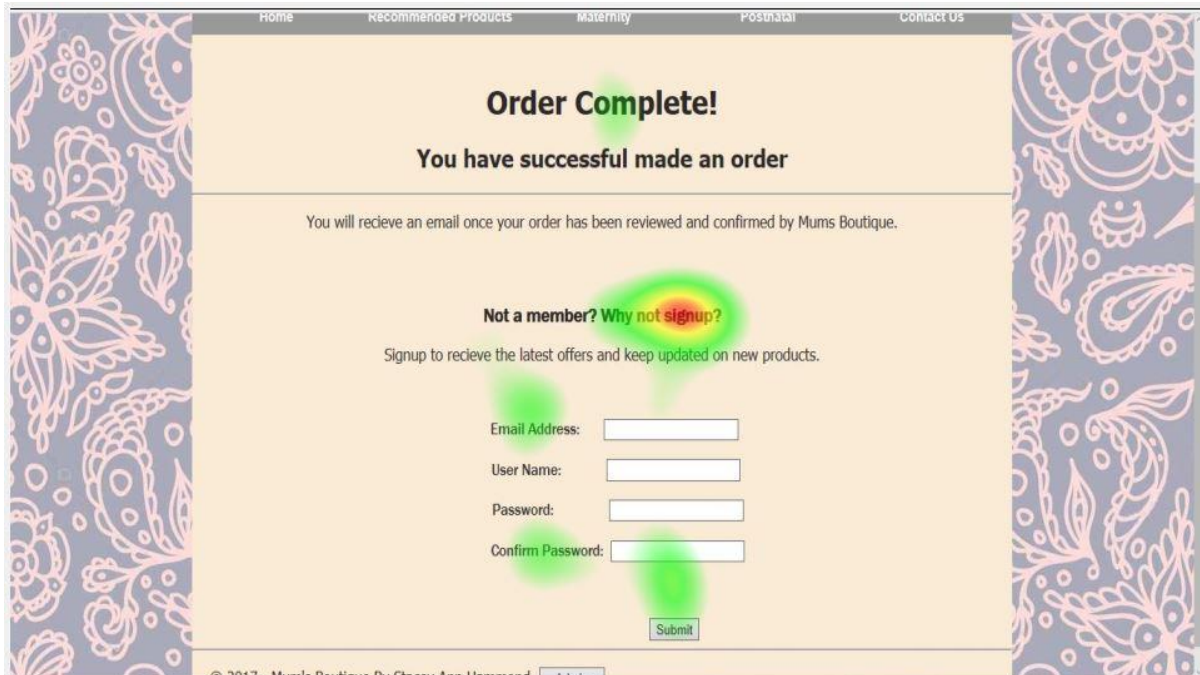
## Appendix 12.4- Heatmaps – Payment Information (Giovanna Hammond)



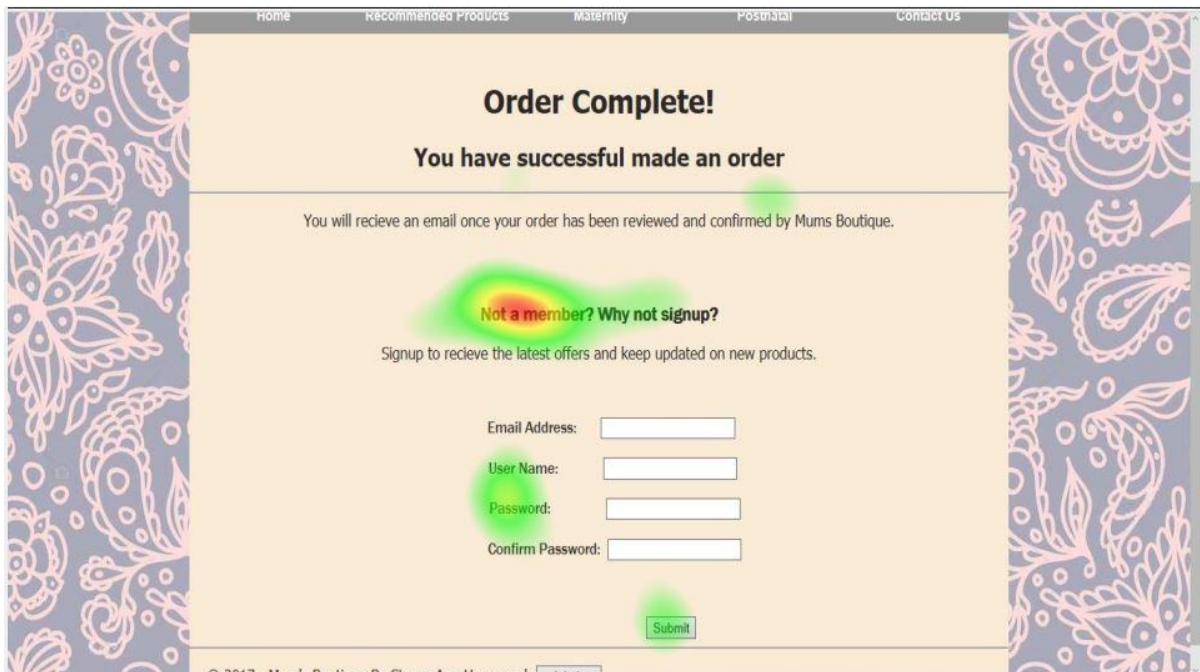
## Appendix 13- Heatmaps – Order Confirmation/ Register (Amy Vivian)



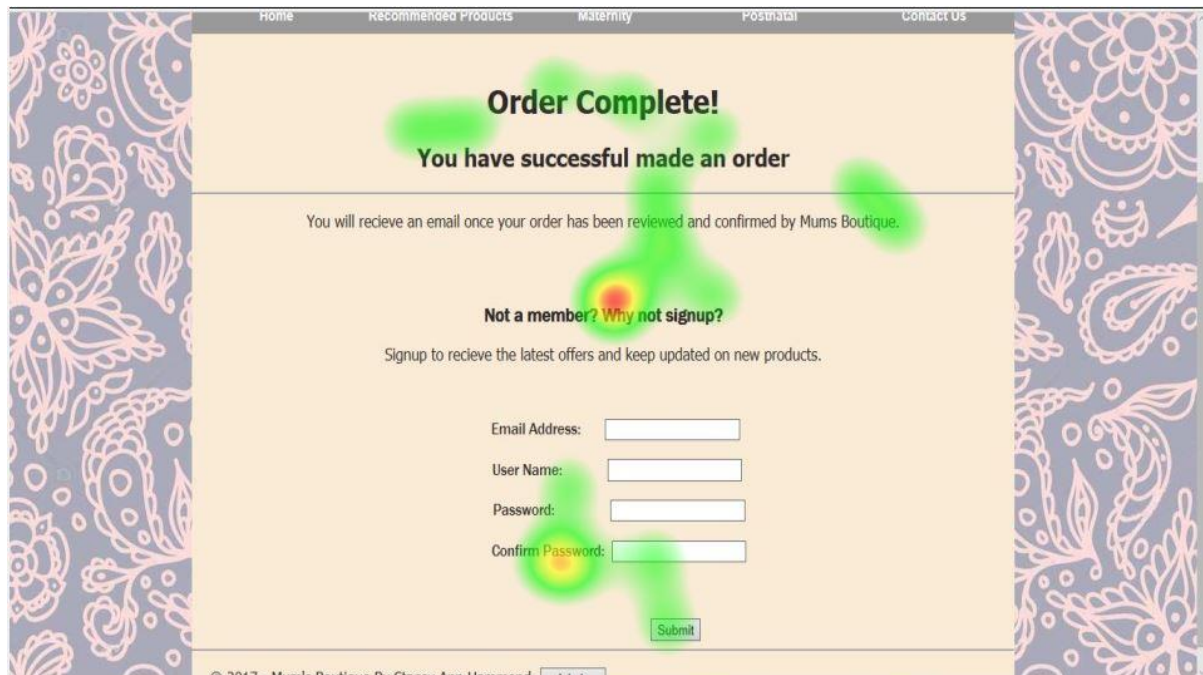
## **Appendix 13.1- Heatmaps – Order Confirmation/ Register (Jordan Mauro Buhagiar)**



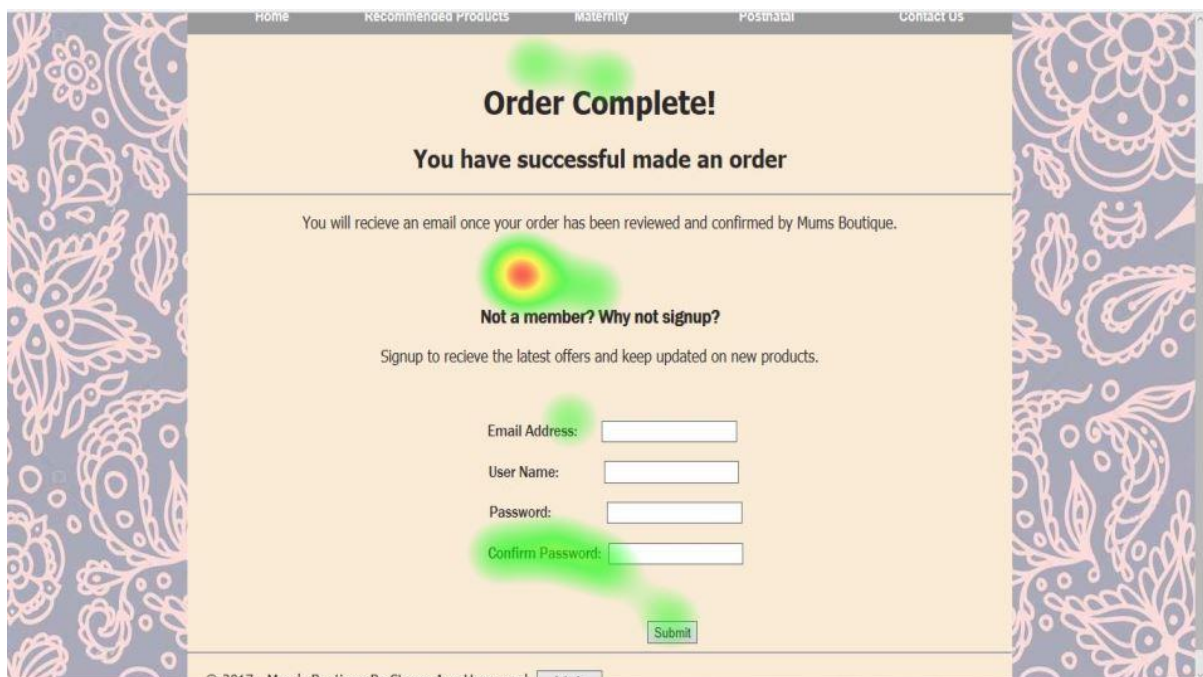
## **Appendix 13.2- Heatmaps – Order Confirmation/ Register (Majedaldeh)**



### **Appendix 13.3- Heatmaps – Order Confirmation/ Register (Harry Byrnes)**



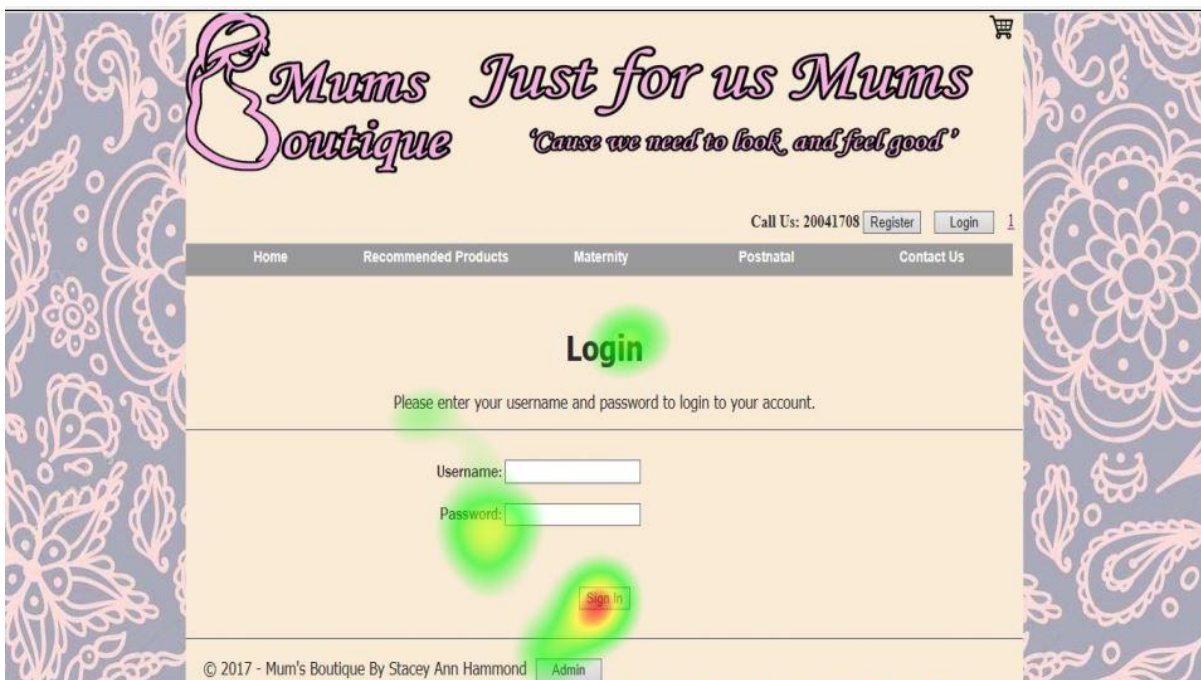
### **Appendix 13.4- Heatmaps – Order Confirmation/ Register (Giovanna Hammond)**



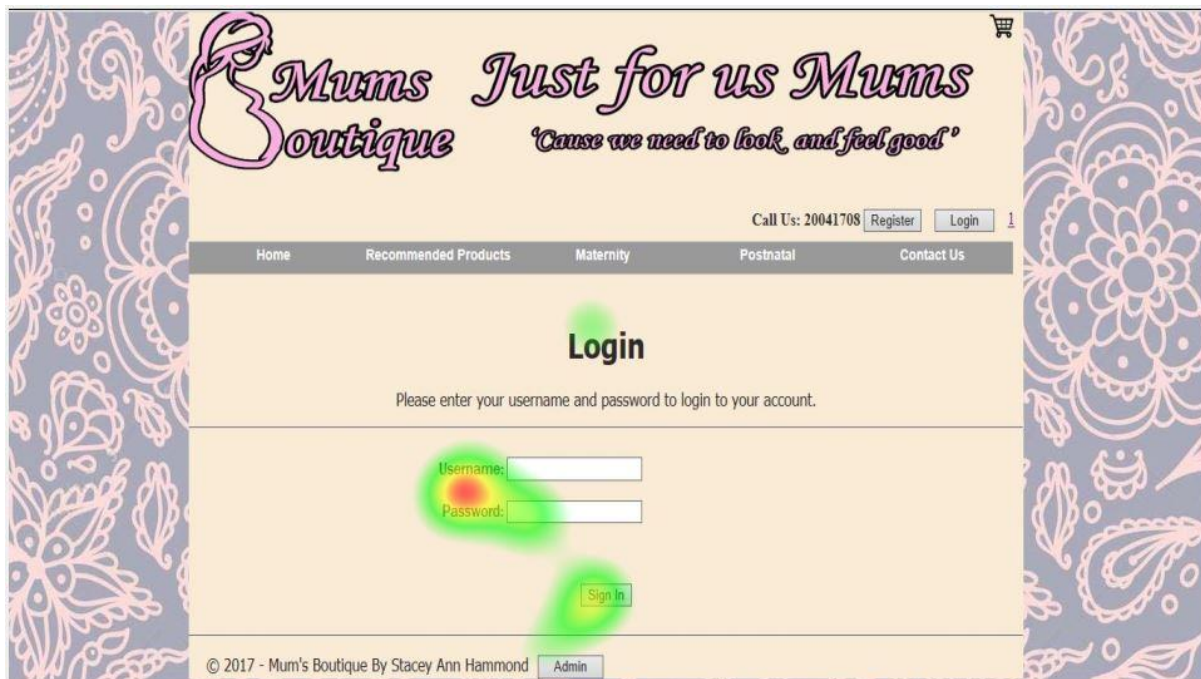
## **Appendix 14- Heatmaps – Login (Amy Vivian)**



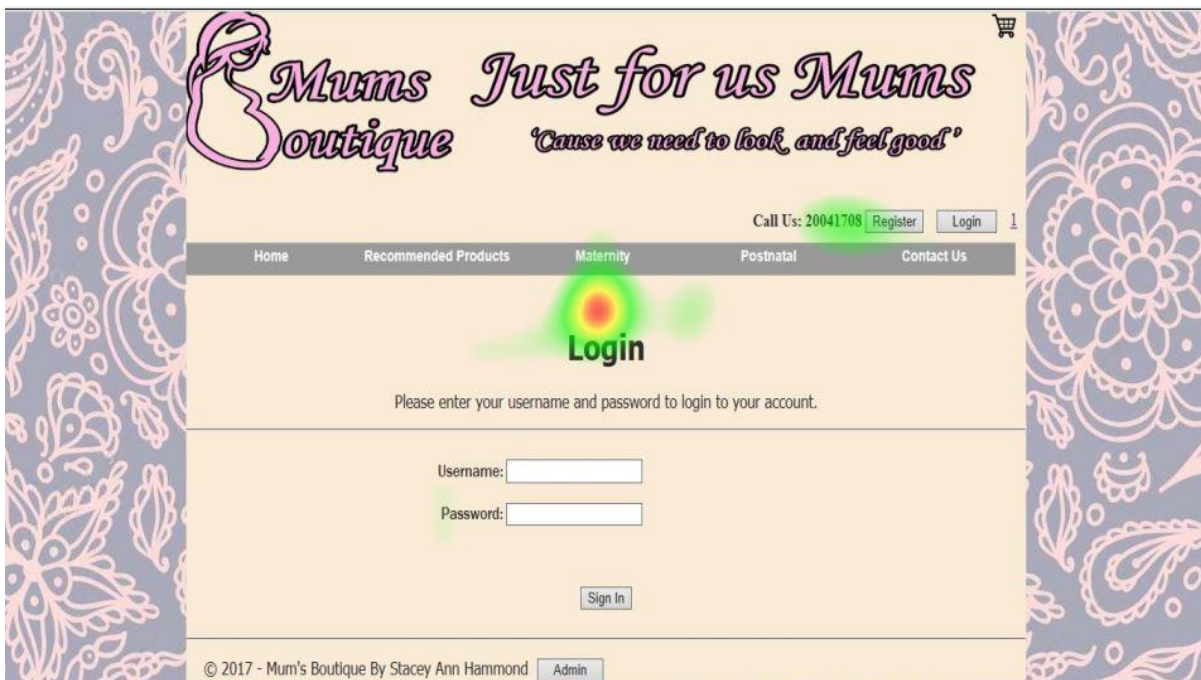
## **Appendix 14.1- Heatmaps – Login (Jordan Mauro Buhagiar)**



## Appendix 14.2- Heatmaps – Login (Majedaldeh)



## Appendix 14.3- Heatmaps – Login (Harry Byrnes)



## Appendix 14.4- Heatmaps – Login (Giovanna Hammond)

