

**CHRISTIAN SERVICE UNIVERSITY COLLEGE
KUMASI**

DEPARTMENT OF COMPUTER SCIENCE



ONLINE GROCERY SHOPPING

HENRY NII OTO DODOO

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DECLARATION

I, HENR NII OTO DODOO, confirm that this dissertation and the work presented in it are my own achievement.

1. Where I have consulted the published work of others this is always clearly attributed.
2. Where I have quoted from the work of others the source is always given. With the exception of such quotations this dissertation is entirely my own work.
3. I have acknowledged all main sources of help.
4. If my research follows on from previous work or is part of a larger collaborative research project I have made clear exactly what was done by others and what I have contributed myself.
5. I have read the university's regulations relating to plagiarism and certify that this report is all my work.

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ABSTRACT

The Internet has become an essential part of our daily life, and companies realize that the Internet can be a shopping avenue to reach existing and potential consumers of any business. With this consensus Online Shopping as a whole has rapidly grown. The biggest surprise is that groceries are one of the categories purchased online. Although online grocery shopping continues to grow, there are problems why consumers hesitate to shop for them online.

In this project, the main aim is to demonstrate that with better interaction features in grocery websites could improve sales over the internet in Ghana.

This dissertation includes a literature review giving background information of Online Grocery Shopping. Producing information of the modern E-shopper. Investigating and choosing a suitable lifecycle model and developing a website prototype. Furthermore, evaluating the finished product can be integrated in the Ghanaian financial system.

DEDICATION

I dedicate this work to my

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CHAPTER ONE

INTRODUCTION

Online Grocery Market is a form of ecommerce that allows consumers to directly buy fresh food staffs or produce from a seller over the internet. An online grocery shop evokes the physical analogy of buying produce like it is done in a local market. The largest online retailing corporations are e-Bay and Amazon.com, both of which are based in the US. These giant online shops have with time been able to add to their sales the ability to sell fresh food and other home products through the internet.

Online markets have been a thing that has come to stay with the society of today since most financial transactions can be attained online. Internet access has vastly grown across the world today and has given rise to interconnectivity even to the remotest areas in the world. This generally means it is possible to be at any location and reach any other location in the world without stepping a foot out of your premises. This takes multi-tasking to another level since you can be in a meeting and visit a market located several kilometers away at the same time. This has made businesses to grow without spending as much as they would have if they had to build another branch of their business in another location.

However this phenomenon has not caught in the Ghanaian business society, hence it has given rise to the topic of this project. An online grocery market is a website that will be used to sell and buy produce that can be commonly found in any local market. In our markets, sellers reach out to their customers who are present in the market at a particular time.

When a customer walks up to buy a bunch of bananas from a fruit seller, the customer is asked how much she wants to buy, she is served and then the customer walks away. The seller at this point has no record of the customer and this means no way of getting feedback from the customer which goes a long way to grow business. This website will be designed to increase profits by extending services and produce to a different customer base by means of online advertisement which cuts across many borders of our world.

This website will hold a lot information that will increase the profits of business at a little cost. In reaching out to various customers over the internet, the concept is aimed at penetrating a fractions of our Ghanaian population who are generally pre-occupied with activities which makes it impossible for them to step out of their daily activities to purchase their needs. It is also aimed to provide a source of income to many job seekers who may be interested in setting up their own business over the internet.

The Website will have these basic functions:

- Customer Information.
- Catalogue of items sold or available in the shop.
- Hold client shopping preference in a database.
- Interface for customer support or relations.
- Delivery capabilities.

1.1 Background to study

Sellers in local markets currently have a traditional system of shopping where customers are expected to walk to the displayed items to make purchases at that particular time. This leaves these sellers at the mercy of undecided customers who are normally moved by the competitive pricing of other shops.

Customers who are loyal to the particular sellers are the ones who tend to stay for years with unwavering attachment to such sellers. Most sellers in the marketplaces do not have a database of customers who visit. Customers basically walk-ins just buy what they need and they are gone.

There is a simple work flow of acquiring various products from the wholesalers, working out prices, displaying produce on the shelves, receiving money, bagging bought items and finally watch the customer walk away without out any interaction. This leaves no room for feedback from the customer on the shopping experience. Whether it was good or bad it will never be known until an unhappy customer willingly comes out to complain.

With popular trends and demands the concept of the Internet as the way forward to increase profit margins, companies new and old are creating websites here and there. The significance for retailers to having a website is that a website is informational and transactional in nature. As the website can be used for advertising and direct marketing; sales; customer support and public relations.

With seasonal events and holidays, the Internet has become a tool for a quick and stress free method of shopping. Allowing retailers to cash in the profit from another useful shopping channel. Jupiter Research expects 2003's online holiday sales to be led by new shoppers, resulting in a 21 percent increase over 2002 figures (Greenspan, 2003). The growth in holiday sales is driven by factors such as, online bargains; time saving; avoiding holiday crowds and much more.

1.2 Problem Statement

Most markets in Ghana are so crowded and disorganized so much that is it hard for customers to locate items want. Before one even arriving at the market, the hustle of queuing in traffic

causes so much stress that when a customer reaches the market, there is little or no energy to roam the lengths and breadth of the market for items.

Aside this, sellers in the market can but sell what they have in the market rather than sell what customers actually want. This usually leaves customers unsatisfied with produce they find. There is no way to announce to the public that there are shortages of produce at particular times and so price hikes are expected or price reduction in order to clear excess in the market.

The circulation of information is one of the best thing today's society. However information about local markets are not circulating as it should.

1.3 Proposed System

The proposed system is a website that will collect information about customers who wish to buy or check prices of items from the market. Aside this, the website is proposed to be an extension of the market to customers who find it difficult to arrive at the markets which are located in busy business districts of most cities. This system is geared at easing the shopping stress of most customers who have to hustle from shed to shed in the scorching sun just to find fresh food stuff in the crowded market.

This proposed system should be able to give analysis of customer shopping preference which will assist in predictive behavior and shopping trends of customers. Customer management is possible because a restricted access will be put on the website to force whoever is interested in shopping to registers with a valid national identification as a measure to prevent fraudsters from going unidentified.

This will be the customer database that will be secured on an encrypted server which will hold vital information like the transaction details between sellers in the markets and customers.

Customers can easily be picked out for special promotions based on their shopping history. This will also help customers to keep track of expenses made in time past. Customer satisfaction is ensured on this proposed system. Questionnaires will be provided to customers

to review services rendered to them over the online market to evaluate sellers who were up to the task of reaching or surpassing the expectations of customers.

This is will be rated and displayed against the sellers' username. This is also to put a check on sellers who are fraudsters who receive payments and never deliver, can be made available to reward their consistence. This will make the shopping experience very personal to all. Reaching further at a little cost is made possible by the implementation of this system since the website can be reached by all in any location.

For instance if a customer X, lives in Ejisu and needs a brand of oats, he can simply logon to the website, check it out if its available or not rather than driving all the way to Adum which is typically packed with traffic.

The website will function in this manner:

- Customer Account registration.
- Products and pricing display.
- Customer relation is possible.
- Draw the supermarkets closer to customers
- Elimination of long queues in shopping halls.
- Unlimited profit potentials
- It never closes down.

Above all, the proposed system should grant access to transactions over the internet using the local Ghanaian currency. This would allow a lot of business to grow beyond the borders of markets and penetrate the international market.

1.4 Aim of proposed system

The aim of this proposed system is to expand the profit making possibility of sellers in market and give customers the chance to freely buy food stuffs over the internet without stepping a foot in the market.

The primary aim of this project is to demonstrate that with better interactive features in grocery websites could improve sales for online retailers. The objectives of the project are as follows:

- To learn about the Online Grocery Shopping industry.

- To investigate potential problems with Online Grocery Shopping.
- To create a prototype website focusing on one of the many problems that arises within Online Grocery Shopping.
- To evaluate the prototype with an existing online Grocery retailer.

Also to integrate transactions into the online shopping experience in Ghana which is not fully operational in Ghana.

1.5 Objective of proposed system

The aim of this project is to give information about the content of any shopping center to anyone who so wants to check current prices of available products, order products, spend less time in the market and shopping centers to reduce the stress and hustle of shopping and finding of customers.

The Objectives of using an online grocery market are to:

- Provide accessible information about products to customers who have are cut off by distance of other constrains but need to shop or window shop.
- To minimize the difficulty of business owners from finding customers and reducing the cost of advertisement which are paid to most radio and television stations who genuinely allocate smallest of their broadcast time to such broadcast.
- Eliminate the unwanted patrol of window shoppers who take up space in various shops and markets. This goes a long way to reduce human traffic in our markets.
- Extremely minimize the losses due to shoplifting and cost associated with security.

1.6 Advantages of the proposed system

This grocery shop will be an online shop. This makes it possible for anyone to access it anywhere in the world. Below are some benefits of this;

- Incredible convenience
- Price comparisons is made possible
- It comes with the infinite choice for customers to see the best product available.

- Customer reviews are made relevant and leave comments for other shoppers to read for better shopping experience.

1.7 Scope of the proposed system

The Online Grocery market is to increase the profit margin of business owners and conveniently grant access to products available in the supermarket to the potential customers.

The online grocery market will be made up various parts which include:

- **Product catalog.** An organization of the products will be made for clear navigation of the site which will mean it will be browseable by all
- **Product attributes.** Customers need to what product they need before logging on to make a purchase. Attributes are generally accepted as a must: product name, category, description, price, and photo / image of the product.
- **Check out.** The eCommerce checkout needs to provide a way to take payment, append relevant taxes (if necessary), compute shipping and handling costs, provide a sub-total of the amount due, collect billing and shipping information from the customer.
- **Reporting & order tracking.** Some stores have a way to track the status of the order through the fulfillment and shipping stages.
- **Security is vital.** The website will be encrypted with HTTPS, at a minimum to ensure losses are not made.

1.8 Methods used in the project development

The development of this system requires the method of feasibility study together information about the existing system. The information was gathered as follows:

- A questionnaire was presented to study the existing system at A-Life Supermarket.
- Lists of some of their products were made catalogue the products available to customers in the shop.
- The payment process was also studied to mark the best means of getting money from customers.

- Customer Identity Verification is being worked on to validate the honesty of online customers.

1.8.1 Tools used

The application tools used for the development of the website are:

- HTML
- Photoshop
- Adobe Dreamweaver
- WAMP Server
- Microsoft mySQL Server

CHAPTER TWO

LITERATURE REVIEW

2.1 – Introduction

Shopping online has never been so easy. With the flourishing numbers of online businesses, people nowadays have various choices to do their shopping. Big companies such as eBay and amazon.com have introduced many value added features to help the customers to decide what to shop for. With features such as price comparison, product photos and user reviews, consumers can shop easily and smartly without even going to the stores and having such a hard time looking for the products they want.

All they have to do are just browse for the product they want on the website and within a few mouse clicks they have them. Such simplicity is what makes online shopping appealing for consumers. The question is, why do many people still decline to shop online? Well, for most people, privacy and security issues are their concerns. Hence, here I will discuss customers'

perception of privacy and security issues, the reality of such issues and ways to avoid those issues, all based on some trustworthy sources I have found. Also in our systems transacting business online does not go so well in the country.

2.2 Privacy and security issues in shopping online

Shopping online has never been so easy. With the flourishing numbers of online businesses, people nowadays have various choices to do their shopping. Big companies such as eBay and amazon.com have introduced many value added features to help the customers to decide what to shop for. With features such as price comparison, product photos and user reviews, consumers can shop easily and smartly without even going to the stores and having such a hard time looking for the products they want.

All they have to do are just browse for the product they want in the website and within a few mouse clicks they are off. Such simplicity is what makes online shopping appealing for consumers. The question is, why do many people still deny to shop online? Well, for most people, privacy and security issues are their concerns. Hence, here I will discuss customers' perception of privacy and security issues, the reality of such issues and ways to avoid those issues, all based on some trustworthy sources I have found.

To know customers' perception of customer and security issues, I reviewed a scholarly article entitled "Consumer Perceptions of Privacy and Security Risks for Online Shopping" produced in the Journal of Consumer Affairs. In the United States, more than half of the adult population uses the Internet and from that number, approximately half have shopped online (Sefton, qtd. in Miyazaki and Fernandez 28). Previous studies had shown that Internet users as a whole agreed that privacy and security issues are vital for them to shop online (Rohm and Milne, qtd. in Miyazaki and Fernandez 29).

Most of them regard their personal information as their main concern (U.S. FTC, qtd. in Miyazaki and Fernandez 29). In the research conducted by Miyazaki and Fernandez, who are the authors of the articles themselves, privacy and security issues accounted for more than 65 percent of consumers' main concern as oppose to the other 35 for shopping inconveniences and others (35). They also concluded that more experienced Internet users tend to have more concern regarding privacy issues but less concern on security issues (38). Nevertheless, consumers still consider both as their main concern for online shopping as suggested in the survey (35).

Now, after knowing that privacy and security issues are vital for consumers in online shopping, I would like to know the emphasis in the real world. From an article titled "The Myth of Secure online shopping" published in PC World, the reality of such issue is revealed. While most consumers trust big and well established online shops such as CD Universe, Travelocity, Columbia House and Ikea, these big companies still receive frequent security threats (Kandra

29). Joseph McDonnell, a CEO of online security firm IShopSecure even confessed that all online firms must have received threats of some sorts (29).

He added by saying that hackers could easily infiltrate and get customers personal information online as online shoppers are not anonymous. Experts also discover that security measures taken by online retailers are insufficient (29). For instance, data encryption only applies in actual transfer of customer data but not in the database which is ironically the most common targets for hackers. Some other sites however, do not even have privacy and security policy posted implying that they do not protect their customers (Hairell 30).

This is what happened to BiblioFind when it was hacked hence compromising its customers' credit information (Kandra 32). Apart from the retailers themselves, credit card processing firms and third party sites also receive threats (Kandra 30). Creditcards.com once had disclosed that someone had infiltrated its site and posted more than 55000 credit card numbers on the Internet. So, from all these indications, I can see that online shopping is not totally safe.

However, customer rights and security aspects are not just the responsibility of online merchants. To uphold them, the consumers themselves need to act. According to "Ten Things Your Mother Never Told You about Online Shopping" published in Yahoo! Internet Life, to be an ace consumer, online shoppers need to prepare themselves with some basics (Halpin 61). As the prominent method of payment is credit card, consumers should be more aware in handling it (62).

They should never disclose their credit information via e-mail. Some of the credit card issuers also have some sorts of protection that consumers should apply for. Apart from that, consumers should limit themselves from releasing unnecessary personal information such as age and income to protect their privacy (Hood, qtd. in Halpin 62). Also, as Todd Richter who is the president of Girlshop (an e-commerce site) had said, consumers should always be aware of the security technology used by merchant sites (62). Technologies such as Secure Socket Layer (SSL) and VeriSign play vital part in distinguishing one site from another. Nonetheless, consumers should always be alert of the privacy and customer policy in each site they tend to buy from (Halpin 62).

Lastly, if there are still dissatisfactions, consumers could always report them to consumer-related agencies such as Better Business Bureau or Federal Trade Commission (Halpin 63).

Thus, after reviewing these three reliable sources related to the privacy and security issues of online shopping, I can see some interconnections between them. By common sense, anyone who tends to shop online will think twice before they buy anything as to consider the privacy and security issues related to it. This is proven in my first source ("Consumer Perceptions of Privacy and Security Risks for Online Shopping") through the survey. People are always conscious about their privacy and security. However, this is not the case in the real world. As

my second source (“The Myth of Secure E-Shopping”) has proposed, even though online merchants have tried their best to beef up the security, threats and attacks still prevail.

For this reason, consumer should act fast to protect their privacy when shopping online. My third source (“10 Things Your Mother Never Told You about Online Shopping”) explains many ways that consumers could do to enhance the privacy and security aspect apart from what online merchants have done for the same reason. Taking all these contents as a whole, I would say that in any situation, people can still shop online safely provided they understand the reality and take some precautions above all.

2.2 – The Online Customer

As mentioned in Chapter 1 the appealing factor of shopping online is that it is a quick and stress free method of shopping. An added bonus is that consumers are not restricted to normal store’s opening business hours. Meaning consumers can purchase items during the twilight hours of the night.

Freedman points out that there are different types of shoppers. The four types of Online Shoppers she has pointed out are as follows:

- **Online Aggressors**

The characteristics of this type of customer is that they are online daily; a technology embracer and buy most items online where and when possible.

- **Online Adopters**

This type of customer pre-plans purchases; tend to or likely be a catalogue shopper; Shop online where it fits neatly into their life. Purchases mostly commodity products online; Utilizes Web as price and product comparison engine, Embraces gift giving where tools are available from trusted merchants.

- **Online Opportunists**

This customer shops from both catalogue and stores, based on convenience. Evaluates shopping options and varies behavior by category. Typically buys in-store with limited catalogue purchasing. Normally researches product information online. May purchase online several times a year.

Reasons Shoppers Cite for Buying Online	
Save time by not going to store	70%
Can shop when stores are closed	69%
Avoid the holiday crowds	68%
Might be able to find better prices	59%
Can find products online more easily	52%
Find products not available in stores	50%
Easier to compare prices	47%
Have gifts sent directly to recipient	36%
Can avoid wrapping gifts	13%
Can earn loyalty points	13%
Purchase from wish list	10%

Table 1 Reasons Shoppers Cite for Buying Online
Source: Jupiter Research/IPSOS (Greenspan, 2003)

What Table 1 indicates is that the majority of consumers that shop online have common behaviors and attributes. The common attributes that online consumers may share are that; they are likely to be married couples that lead busy lives, have a steady income, average age of mid-twenties or over and may have children.

The common behavior that online consumers may exhibit are that; they do not spend surfing the Internet at long periods of time.

A survey carried out by Marketing Analyst Nielsen//NetRatings, indicated that married couples tend to spend more money online than their single counterparts (CyberAtlas, 2003).

The reason for this is that, “When children are worked into the equation for oft-overly extended married individuals, the convenience of online shopping can’t be beat.” Says Jason Levin from Nielsen//NetRatings (CyberAtlas, 2003).

Measurement from Nielsen//NetRatings indicated that shopping sites were amongst the most popular destinations for women Internet users, particularly for grocery websites. It can be clearly seen that the Internet shopping channel is suitable for a wide range of consumers.

2.3 – Problems with Online Grocery Shopping

The consumer ultimately makes the choice to which type of shopping channel they wish to purchase their products from. Many consumers may use multiple channels to research their purchases if that is their standard modus operandi.

In a general view most consumers are still in heavy favor to shopping in stores. With technology being both an enabler as well as an obstacle to the Internet's commerce success.

As Online Grocery is the topic, there are a number of reasons why consumers are discouraged to shop for groceries online. Table 2 highlights some of the reasons consumers are unenthusiastic of Online Grocery Shopping.

<i>Problems with Shopping for Groceries Online</i>	
Unable to taste fresh foods	81%
Unable to feel for quality of produce	45%
Concerned about return difficulties	44%
Concerned about privacy of personal information	32%
Total cost of purchasing products is more expensive than stores	25%
Difficult to browse	14%
Like to shop with friends/family	11%
Difficult to get customer service	8%

Table 2 Problems with Shopping for Grocery Online

From Table 2 the problems highlighted shows customers hesitancy to purchase groceries online was because of unsure of accurate sizing of produce; returning items could be a problem; unsure of quality; delivery cost; price; security; unsure of item's exact state; unable to access correct information and difficult to navigate through website.

Another problem with online grocery shopping is due to the online retailers themselves. The fact is that nearly two-thirds of people who begin to order something abandon the process midway. The reasons for this abandonment of the purchasing process can be simple things such as, hidden shipping charges to the computer crashing.

The most likely reason why consumers cancel a transaction is because of pure impatience. An example would be the simple process of checkout. The multiple steps that are needed to overcome before you get an email confirming your order has been received is one tedious process. It is also believes that e-commerce websites waste all kind of money and energy on

tricky graphics and overly complex registration procedures when a single most easy solution is to make the process much faster.

CHAPTER THREE

METHODOLOGY

The rate at which internet access has expanded and reach the most remotest parts of the world, it is not surprising many business have choosing to go global with the aid of websites which are accessed from any part of the world through the internet. Gathering information from various people who have to spend their days in particular locations have a general problem of utilizing their time to accomplish the numerous tasks in very little time brought out real problems. These people are namely lectures, bankers, students, parents just to mention a few, have the same challenge which is time to do other important chores like shopping.

3.1 Study Area

People (Who will use the website?)

- The main target users for this website are consumers that live busy lives. The specific type of consumer that will use this website will be.
- The specific gender and age range can vary. But mainly the consumer would be female. The age range can also vary as this depends on what the website is selling. As the first generation of Internet user become mature the general age of a typical online consumer has become older.
- Most users will have a basic computer background as the first generation have become experienced with online trend.

Activities (What will it be used for?)

- The Online shoppers would be using the website to purchase groceries at any opportune time. The Online Adopters may purchase online but would only purchase if item required. Online Opportunists will use the website as a source of information for in depth detail of products.
- The consumer will have a more interactive experience whilst browsing for groceries.
- The assumption is that the website is an extension for an existing grocery market that has several stores located in most major markets.

Contexts (The context of interaction)

- The website will be accessible to any PC as long as it has Internet connection. But in general the surrounding environment where the PC is being used would be quiet.
- The objective of the website is to increase the consumer base by reaching a wider geographical area. Using the website as a shelf-extender or to use the website as another source of information of specific products.
- Designing the website will require some careful thought, as the objectives for this website is to be user friendly as possible, yet still be informative and transactional as

possible. Simple and clear navigation and tidy layout of images with clear description could ease the user problems.

Technology

- Any computer that is connected to the internet can access the website. The minimum requirement to run the web page is that the user has flash plug-ins.
- The optimum connection speed to access the website would be a broadband connection, as this will help images or small flash movies to be downloaded quickly. Any mobile phone is still very sufficient to run the flash movies but may take longer to download.
- Users' computers must have a keyboard and a mouse connected, as this website is very reliant to using those peripherals to navigate and purchase from the website. Speakers are not essential, as the website does not have any music or voice-overs.

3.2 – Population

The website is aim at making business owners gain access to various aspects of the general population without any heavy investment. It is aimed at given business opportunities to anyone who wants to join the money making train to enhance the livelihood of traders by creating jobs online.

3.3 – Sample size and sampling procedure

In sampling for data a face-to-face interview was conducted to draw conclusion on the target group this project is aimed at. Market women were interviewed to determine their technical knowhow with regards to the use of the mobile phone as a means of communication.

3.4 - Design

In the process of developing a website from scratch, several web development lifecycle were looked at and compared to which one was suitable. Most lifecycle models are closely based on the traditional model of system development, though with steps that define different objectives.

The first lifecycle model looked at was the Lynch and Horton Model. This model has the following steps:

- Site definition and planning
- Information Architecture
- Site Design
- Site Construction
- Site Marketing
- Tracking, evaluation and maintenance

The next lifecycle model that was compared to the above was Lazar's User-Centred Web Development Model. The model has the following steps:

- Define mission of website and user population
- Collect the user requirements for the website
- Create the conceptual design of the website
- Create the physical design of the website
- Perform usability testing for website
- Implement and market the website
- Evaluate and improve website

From the two life cycle models, it can be clearly seen that there is a slight difference. Lazar's model mentions usability testing where the Lynch and Horton Model does not.

From the analysis carried out earlier in this chapter the Lynch and Horton Model is more suitable for the website prototype to use. In argument Lazar's model should be more suitable because usability testing has a major importance whether a user will be able to use the product. However it was felt that accessibility was a more important issue for this prototype website, as it will contain many images and graphics.

The reason why Lynch and Horton's Model is chosen, is because this model stresses the importance of accessibility. It is important that the website, throughout development process ensure pages are accessible to all users.

Another reason this method was selected, is the author strongly advises building small prototypes. As mentioned, this model does not point out about usability issues, this does not mean that it should be ignored, as usability is too important to be ignored when the end product is going to be used extensively by different type of users.

A slight changes are made so usability can be incorporated within the model. As usability can directly affect the overall look and feel of the website it was felt that usability issues should be raised in stage 2 – Information Architecture. The reason for this is at this stage the aim is to focusing on the content and organization of the website. An in depth explanation of each stage will be detailed further. After reaching to a conclusion to which life cycle will be used the next stage is implementing this model to aid the development of the website.

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CHAPTER FOUR

Chapter 4 – Implementation

4.1 - Introduction

Since this is a prototype the fifth step, Site Marketing, does not really come into use and will not be within the scope of this project. The site will be evaluated to verify if the main objective has been achieved. In this chapter the main focus of the implementation is the design and authoring of the website.

Step 1 - Site Definition and Planning

For any web development project, the site must have some sort of planning and a definition of what should the website should achieve. The purpose of this prototype website is to mimic an online grocery site, were people can buy groceries from. It is also set to demonstrate that with better interactions features in grocery websites may improve sales over the net.

The plan is to have at least one section working for users to evaluate the prototype.

Step 2 - Information Architecture

In this stage the main objective is focusing on content and organization for the website. Usability issues will be discussed in this part of the lifecycle model, as this stage decides content and the organizational structure of the website (Lynch and Horton).

Lynch and Horton suggest that, once the content architecture has been sketched out, the next step should be building a small paper prototype. The two reasons for prototyping is, first, they are the best way to test site navigation and develop user interface and second, creating a prototype allows the designers to develop relations between how the site looks and how navigation will support information design (Lynch and Horton).

Taking this advice, mini storyboards were sketched out, displaying possible layouts for each web page.

In producing a preliminary paper prototype of the website, usability issues that was taken under considerations are as follows:

- Ease of learning – How fast can a user quickly learn the website layout and sufficiently accomplish basic tasks.
- Ease of use – How quickly tasks are accomplished.
- Memorability – A returning user remembers how to perform basic tasks without re-learning the website again.
- Error Frequency and Severity – How often do users make will using the system.
- Subjective Satisfaction – How much does the user like using the website.

Taking the above pointers a basic navigational structure was thought of. The result from the brainstorming session was to employ a top-down approach navigational structure. With this

method, users have more freedom of how they navigate through the website. If users are lost then they can always go back to the home page and start again.

In Figure 1, will show the top levels of the website.

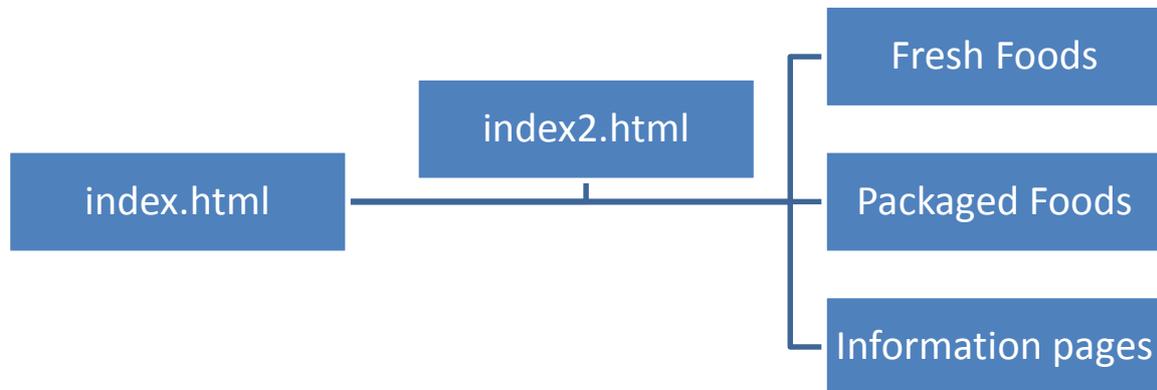
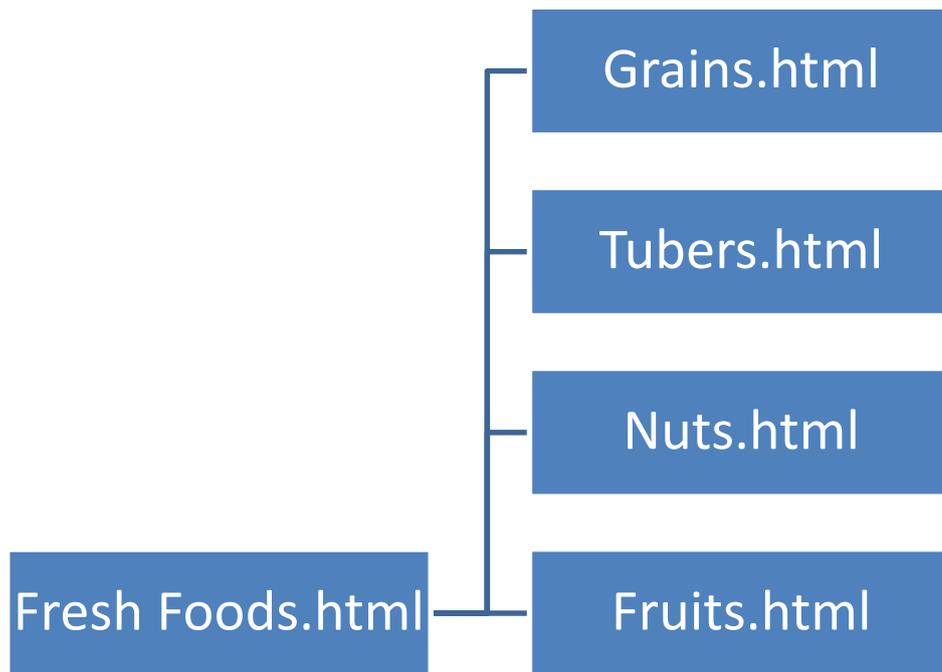


Figure 1 Navigational Structure of the website.

Expanding on the Fresh Foods Department section the navigational structure of the Fresh Food section is shown in Figure 2. This shows the links that are in the Fresh Food.html page. All pages within the Fresh Foods section are linked together so that the user can navigate through any page without any problems. For example, if the user is at tops.html page then they can easily click to the sizechart.html page directly without going back one level, to Fresh Food.html page.

Figure 2 Navigational Links in Fresh Foods Department.



A more detailed Navigational Map with all the expanded entities.

Step 3 Site Design

From the previous step, a basic navigation was employed, for this step the goal is to produce all the functional components ready for the site construction step. Typical deliverables at the end of this step should include the following:

- Text - edited and proofread
- Graphics – Images, pictures, buttons etc.
- Finished examples of pages
- Interface design
- Functional and logic components
- Accessibility

The paper prototypes, in the form of storyboards, help to visually plan where components of the website should be placed. The storyboards also helped in deciding what components would need to be developed for website.

The chosen web authoring tool to create the website was Macromedia Dreamweaver. Still images and pictures were created using Fireworks and the fresh food animation was compiled using Flash.

Before designing the website, several design consideration pointers were applied in designing the page layouts. This information was provided by Usability.gov website. The main pointers are as follows:

- Be consistent throughout the website. This includes logos, buttons and graphics. This helps the user to quickly evaluate categories.

- Provide Feedback to users. This is important as an indicator to the user in which section of the website they are in.
- Establish level of importance. Giving level of importance for each category. The higher the level of importance should appear at most noticeable places with in the pages.
- Use graphics wisely. Graphics should enhance content to give a better understanding.
- Use color wisely. Avoid colors clashing. Do not use colors to communicate messages.
- Provide alternatives. Giving users different options how to view the website.
- Font and size of text. Use at least 10 point for readability and use common font.

Acknowledging the above pointers, changes were made on the original storyboards. From the storyboards design the navigation menu bar is set on the left hand side of the page. Firstly the web page consists of a table 1 column and 3 rows.

For the Flash animation to run uninterrupted the page is also divided vertically into two frames shown in Figure 3. The left hand side is the main frame where the content of the page is. The right hand side frame runs the Flash animation in a continuous loop of a fresh food from four different angles.

```

<html>
<head>
<title>OFS > Womens Department > In Frames running default paperdoll</title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>

<frameset cols="1*,250" frameborder="NO" border="0" framespacing="0">
  <frame name="mainFrame" src="womens2.html">
  <frame name="rightFrame" noresize src="womens/default.html">
</frameset>
<noframes><body bgcolor="#FFFFFF">
Sorry this site only runs in frames. Please update your web browser.
</body></noframes>
</html>

```

Figure 3 HTML code from OFS website

The Flash animation changes when the user clicks on a different image. For example, in tops.html page there are several images of different tops. In order for the Flash animation to load a different types of groceries then the user needs to click on the picture and the Flash animation should change on the right hand frame.

To keep all the text font and size consistent throughout the website simple cascading style sheets and templates are used.

The graphical design of the website is drawn on storyboards. This method is used widely in industry. It can roughly show how each web page will look like.

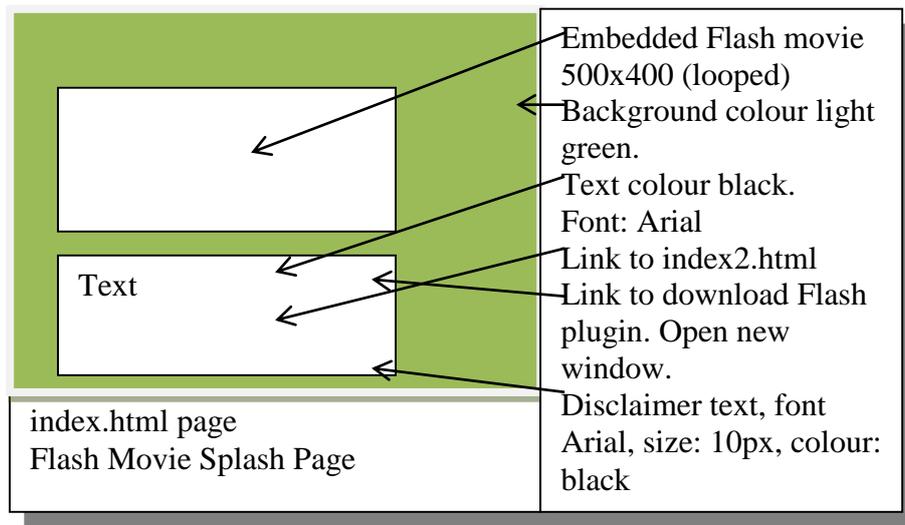


Figure 4 Example of a storyboard for the website.

The storyboard in Figure 4 is the approximate layout of the index page. This is the very first page that the user will see when the load up the website. Links are available for user to download Flash Player plugins if they do not have it in their computer.

Step 4 Site Construction

This step of the model allows the collation of the whole website. Constructed web pages filled out with content. At this point it is a good opportunity to review every component that have been created. This allows the website to be more refined from the original designs.

An example of this would be the navigational buttons on the menu bar. The original design had rollover buttons, however, this took too much time to maintain so it was altered to have plain text links.

Slight testing was carried out in this stage. The main testing areas were basically making sure all the relevant links lead to correct pages. Every component worked according to what was planned.

In this step code maintenance should also be taken into consideration. If the code needed to be edited manually it would be easier to read and understand if the HTML code was kept in a tidy format.

As this website was developed in Macromedia Dreamweaver, the HTML code produced from the tool is clear and easy to understand.

Step 5 Site Marketing

Stated earlier in this chapter, this will not be included with the scope of the project. However this is an important part for any website that is about to be launched.

The author of the Lynch and Horton Model suggests the following methods of advertisement, boosting awareness of the website.

- All marketing campaigns should include the URL of the homepage.
- Direct mail campaigns
- Poster and billboards
- Stationery
- Bills and statements
- Radio and television advertisements

Step 6 Tracking, evaluation and maintenance

Tracking is a process that companies would use to know more information about the visitors using their website. There are simple logs that can track how many people visited the website at what time. The logs can also show which web pages were the most popular within the website. Detailed logs are the key to quantifying the success of a website (Lynch and Horton).

It is also important to maintain the website. The aesthetic and functional aspects of the website constantly need updating. This is especially true when foods come every season.

4.2 – Testing

At this stage of the project, the website should be completed with the relevant components working. The next step is to test the websites for functionality and usability.

4.3 - Functionality Testing

As part of the site construction step in the Lynch and Horton Model, functionality testing is done. This included basic navigation testing, testing every component is in working order, make changes were needed, and also check for compliance with HTML Standards.

Testing is an important part of the development of the website. This is an early indicator to show potential problems before the website is launched.

Primarily users apart from the developer should conduct the testing. Outside users can supply criticism, programming bugs, and typographic errors and critique the overall effectiveness of the website.

The next step of testing is usability testing. As this influences the overall perspective of the website future use.

4.2 - Usability Testing

Usability testing focuses on whether a specific technology is easy for the user to utilize. Usability testing usually occurs near the end of the development of the product.

There are different types of usability testing, the most commonly used method usability testing in a laboratory and Work Place Testing. The recently new method is Web-Based Usability testing where the user and evaluator are not present but can communicate via the web. The user normally performs the testing via accessing the Internet.

The primary type of usability testing that was chosen to test the prototype was the Web-based Usability testing method.

The testing condition was for the users to access the website and complete an evaluation survey. Giving their opinions on the design of the website, the ideas presented and also comparing from existing websites that do not have the virtual mannequin idea. Also giving their opinions and decision if they would shop online for groceries and why they have come to that conclusion.

The advantage of using this method of usability testing is that they the testing conditions are more accurate than that of a laboratory. The users were able to do the test at their own time and place, which can give a clearer picture of the whole project.

The main disadvantage of this type of usability testing is that no observation was recorded. No user reactions could be seen, which could give subtle clues to which parts of the website the users found difficult to understand or to use.

The second type of usability testing was laboratory testing. This consisted of observing and asking the individual while they are using the website.

This technique allowed to monitor the individual's reactions to certain points when using the website.

4.3 - Evaluation

The importance of an evaluation is to measure whether the website goal has been achieved. Without evaluation it is hard to know if the users are happy to with the product.

The goal for this website was already defined in step 1 in the Lynch and Horton Model. To reiterate, the purpose of this prototype website is to mimic an online grocery site, where people can buy groceries from. It is also set to demonstrate that with better interactions features in groceries websites may improve sales over the net.

4.4 - Evaluating Prototype

From the Lynch and Horton Model, step six is Tracking, evaluate and maintenance. As this is a prototype tracking is not within this scope. The purpose of tracking shows where people, that enter the website, come from.

The evaluation of the website is to let the designer to see if the website has achieved its goal. This can be carried out by creating surveys for users to answer and at the same time test the website as well.

Users are needed to test the website because after all they are the ones that are going to use the site. Errors tend to be found from users testing the website because they tend to check every single detail of the website.

For the prototype designed, the evaluation survey is aimed to ask questions of interactivity of the web pages. Using sample questions from WebMAC surveys (Lazar, 2001:283), it is set to evaluate the motivational quality of the website.

“Motivational quality is the concept of determining which features motivates users to spend time on a website...”
(Lazar, 2001:280)

The WebMAC survey questions were used for this evaluation because the main feature of the website, the fresh food Flash movie, was to be determined if it makes the website more interactive. The questions asked varied from the look and feel of the page to the graphics used to increase visual presentation of information, as shown in Figure 5.

Place the appropriate number about this website on the line preceding each item.

3 = strongly agree

2 = some what agree

1 = some what disagree

0 = strongly disagree

NA = Not Applicable

a) The website is eye-catching and visually interesting. _____

b) The screen layout of this web site is attractive. _____

c) The screen layout makes the site easy to navigate. _____

Figure 5 Examples of WebMAC type questions asked in Evaluation Survey

The objective of this survey is to get the motivational quality of the website. The reason why this is important is because, as mentioned there are our different type of shoppers. The majority of shoppers are online adopters or online opportunists. It imperative that those shoppers are stay online longer using the website.

A different type of evaluation was also conducted. This consisted more of usability issues. The type of testing has been mention in earlier Chapter.

4.5 - Results from Evaluation Surveys

The evaluation survey was distributed to ten people via email. From the ten surveys sent only seven were received. For a website if this type, ten people is not a sufficient number for a true indication if the goal has been achieved. But the people given the survey were located in a wide area.

This was done as to take into consideration that different environment and surrounding can affect how the web site is perceived.

Most of the surveys commented that the Flash movie on the right hand side did improve the interaction of the website. They also strongly agreed that the Flash movie improved the presentation of the information that they required.

Those who had shop for groceries online before commented that they would shop for groceries online again because it saved time and was convenient, however they felt that this was not an ideal way to shop for groceries. Even with interaction improvements on the website.

Those that have not shop for groceries online before gave mixed responses. Some considered that they were very open-minded and would shop for groceries online.

But most did comment on other reasons why they would still hesitate to purchasing groceries online. The reasons were, shipping and handling, returning items, feel produce for quality and pictures were accurate enough. Those are very valid reasons as the first three reasons coincides with what PricewaterhouseCoopers reported about problems shopping for groceries online.

CONCLUSION

This chapter provides a conclusion on how the project has been directed. What has been achieved during this project and also my personal thoughts in developing the website. My personal thoughts in how present development may shape the future of online grocery shopping.

The primary aim of this project has been met. All the objectives that were set out have been completed and giving positive results in the end.

Although some users comment that they did not think shopping for groceries online was ideal, it has managed to convince them to try in the future.

When reading articles and looking at websites it was discovered that online groceries shopping websites lacked interactivity to help the consumer to imagine the quality of the foods, which made grocery websites not a popular method of shopping fresh foods.