The Current State of Online Supermarket Usability in Australia

Mark Freeman

School of Information Technology and Computer Science
University of Wollongong
Wollongong
New South Wales
e-mail: mbf02@uow.edu.au

Abstract

The prediction of a dramatic increase in online grocery shopping over the next five years is only likely to be fulfilled if online supermarkets present a more efficient and logical shopping experience. Therefore, usability testing is playing an increasingly important role in the development of e-commerce websites. To date, e-commerce usability research has only focused on the ordering of singular items and the issue of multiple item ordering has not been researched. This study aims to start to fill this gap in usability research. Based on the results gathered, a set of ten usability criteria were established, with a focus on the ordering systems for sites selling multiple items and quantities

Keywords

Usability, World Wide Web, Electronic Commerce, Web Site Design, Internet Retail Store Design, Shopping.

INTRODUCTION

The Problem Context

The issue of usability plays a vital role in the success of an online store. However, to date there has been no published research into this issue as it relates to multiple item ordering. In the field of grocery shopping there is much competition between the two major physical supermarket chains in Australia, Woolworths and Coles, both in traditional stores and online. Online, the major competitor is ShopFast, which does not have a traditional supermarket storefront to complement its online operations. The purpose of this study was to conduct a comparative analysis into the usability of ordering systems of online supermarkets that supply to Australian consumers in 2002, focusing specifically on the web sites belonging to Coles, Woolworths and ShopFast. This issue has been identified as a major problem by such companies, with one of these companies revealing in an interview that they had in excess of 200,000 clients registered, but only 100,000 had ever made a purchase. Of these customers, 30,000 had only made one purchase. With figures as shown above it is understandable that these businesses would be interested in ways to increase the usability of their sites, potentially leading to an increased number of sales. Although numerous studies have been conducted on usability (Tilson, 1998), no research has been done on multiple item ordering, which is of prime importance to online supermarkets. The field of multiple quantity and item ordering has been shown to be of significance in previous studies (Heikkila, 1998).

Background to the Research

With e-commerce becoming an integral process of many traditional businesses, and with an increasing number of e-commerce businesses, it is important for customers to feel comfortable using the online ordering systems provided if the businesses are to be successful. Despite most online ordering systems requiring similar facilities and information, no standard for creating such a system has yet been found. The inherent differences of such systems affect the usability of these ordering systems. To date, there appears to be a lack of scientific research into this issue.

This study aimed to evaluate the usability of the ordering systems implemented by the three main online supermarkets available for use by Australian Internet consumers: ShopFast, Woolworths and Coles. The interfaces of these online businesses were assessed using mechanisms from published studies and the perceptions of users, exploring issues of familiarity, navigation, aesthetics, the perception of trust and security, and whether each site was designed to be used intuitively. For a supermarket to become successful, an interface which is simple to use and navigate is of high importance, with shoppers commonly purchasing multiple items from online supermarkets. Therefore, frustration experienced when locating a single item is likely to be

Freeman (Paper #226)

multiplied in situations where the user repeatedly experiences difficulty. It is probable that poor navigation is a contributing factor in a high percentage of incomplete transactions.

Interfaces were assessed on criteria such as the layout, the ability to navigate through the product selection and ordering system, the visual appeal and general aesthetics, and the time taken for order placement. The impact of these usability aspects on the purchasing patterns and the recurrent use of the online supermarket was assessed to determine the most effective types of layout and ordering, including appropriate content and organisation.

Usability testing is an extremely important process which is often neglected during the implementation of a web site. Its ultimate goal is to test the effectiveness of the web site (CCH, 2001).

LITERATURE REVIEW

Usability

If something is said to have usability it has: ease of use, is easy to learn, is efficient, is visually pleasing, and is quick and effective (Bara et al., 2002; Mandel, 1997; Preece, 2001). When this interpretation of usability is applied to the Internet, James (2001) argues that if a site is usable, casual Internet shoppers are likely to be converted into e-shoppers. Most online purchases are made by users who have had over two years Internet experience, and have therefore adapted to the medium and the related purchasing arrangements. New Internet users are unfamiliar with the technology, making usability a more important issue when encouraging them to complete purchase transactions online.

Usability Testing

The term 'usability testing' refers to "a process that employs participants who are representative of the target population to evaluate the degree to which a product meets specific usability criteria" (Rubin, 1994). Its use as a research tool is based on traditional experimental methodology, and allows tests to be conducted under a generic title, rather than being required to specify the particular method to be used. It encompasses a range of methods.

Developers are able to gain greater understanding about their site by conducting usability testing, and observing how users interact with the site. This user interaction is often different to the designer's planned flow of interaction and usability testing is therefore an important tool to master, as it can provide valuable feedback on unplanned use and areas requiring improvement.

Those conducting testing must recognise that the aim of usability testing is to identify issues, and that to gather a statistically significant sample is unachievable and unnecessary. Small groups are able to identify issues relevant to the general user population, and a focus on these issues and their solutions should be the aim of the testing.

Schaffer's principles of efficient 'three clicks' web design were applied at the Staples Inc. web site (staples.com) (Hicks, 2001). After redesigning the Staples Inc. web site, the number of people dropping out of the registration process prior to completion was reduced by 53 percent. Reducing the number of mouse-clicks increased the customer retention rate, and therefore boosted overall profits due to a larger customer base. To achieve a more efficient registration process, Staples Inc. created an internal usability group. This group consisted of Staples Inc. staff, who were asked to use the site to register. The purpose of employing the test group was to gain feedback from site 'consumers', and use this information to create a more user-friendly site. By allowing user input, the users were seen as a co-developer of the web site, allowing the production of a site that was acceptable to both developers and users. While this method produced positive results, the price of an outside lab conducting usability testing on a complex site in America can be in excess of US$30,000. In contrast to the behaviour of Staples Inc., many companies and developers assume that they can predict the needs and desires of customers without backup by scientific research or user testing. However, Krug claims that when usability testing is implemented it is usually "too little, too late, and for all the wrong reasons" (Krug, 2000).

Usability Testing Goals

Usability testing seeks to understand the behaviour and needs of consumers, to better serve them through an appropriately designed web site.

Smith (2000) states that customers have pre-determined preferences when shopping. By identifying these preferences, and satisfying such preferences through the design of the e-commerce web site, an online store is able to create e-loyalty. The best way to gather information on user preferences and determine the most effective way to incorporate stickiness drivers (Michael 2002) to satisfy them is through customer research or customer relationship management (CRM) programs. One common tool of such CRM programs is loyalty schemes. E-loyalty is concerned with retaining previous site customers, and encouraging them to be continually purchasing from that retailer.

Smith (2000) poses ten design factors that can help create a more usable web site. These are:
- Make your first impression count
- Make it simple to solve problems
- Design for your best customers
- Create value and engender trust
- Include features that start and continue dialogue
- Seize every opportunity to build community
- Deliver all parts of the sales cycle or subject covered
- Provide the best service that you can afford
- Make it easy to recommend your site
- Create an opportunity cost for defection

The final product should aim to satisfy the end-user by creating a web site that is simple and satisfying to learn and use, while providing useful and obvious functionality that meets the needs of the target users (Rubin, 1994). Usable products increase customer satisfaction, therefore leading to greater loyalty and increased sales from repeat business. Often, web site ease of use is the deciding factor for online consumers, with this ease of use providing differentiation for consumers deciding to purchase from online supermarkets. Only 56 percent of light Internet users have attempted to make a purchase of any type online (James, 2001) with the lack of consumer purchasing being largely attributed to lack of usability.

The Background of Supermarkets

Traditionally, supermarkets have sold a wide range of products, with both depth and breadth of range. However, over recent years, consumers have become more discerning due to changing lifestyles, spending priorities and shopping patterns (Fisher, 1998). The focus of supermarket supply is now changing towards provision of fewer products from a more limited range of brand name suppliers. There is also a trend to provide a 'total solution' to customers, by including 'ready to heat' meals. The aim is to simplify the shopping process for customers.

A study of 251 CEOs across ten industries, including the grocery industry, (Janoff, 2001) revealed that 77 percent of the relevant companies will increase their I.T. expenditure in the next three years. Overall, an average of a 53 percent increase in expenditure is planned during this period. In contrast, supermarkets have traditionally been slow to adopt technological innovations. However, as the Internet adoption rate rapidly increases in Australia, supermarkets are realising the large potential audience, and are attempting to meet the changing demands of customers.

The largest supermarket chains in Australia, measured by their value share of all grocery sales, are Woolworths with 38.3 percent market share, and Coles, with 28.1 percent market share (figures for year ending 28/10/2001) (Retail Media, 2002). The third largest supermarket chain, Metcash + Campbells, (commonly trading as IGA), has a market share of 11.8 percent.

Online Supermarket Usability

Developers of online supermarkets need to understand the 'mental models' that users associate with grocery shopping in the 'real-world' environments (Barde, 2002). Users of online supermarkets are likely to have experience purchasing in a traditional supermarket, and are therefore experienced in determining the aisle locations of items. It is the categorisation of items that is important for web site designers and developers, with users commonly transferring traditional experiences to the online domain. A search method where the user enters the items they are looking for is also valid. Both methods are present on the sites tested in this research.

Navigation is a major usability issue, with web design based around linking units of content (Barde, 2002). It is the organisation and classification of this content that allows effective navigation, and promotes usability. Therefore, consistent and logical navigation, as well as content layout (Consumers union of U.S, 2000), is essential on a site that promotes ease of use. Navigation refers to locating the desired information or product, while search capabilities help users locate desired products. A study revealed that, on average, 70 percent of site users employ a web site's search engine, and 43 percent believe that the search engine is the most important feature on a site (Bannister, 2002). It is also important to provide sorting or prioritising capabilities to allow users to better meet their own needs. In the case where users choose to browse the site rather than employ the search facility, it is vital to provide meaningful labels and menu names to aid navigation (Consumers union of U.S, 2000).

It is essential for online supermarkets to note that, while the public must shop for groceries, consumers have the choice to use traditional supermarkets or their online counterparts. While, originally, many Internet users purchased goods via e-commerce, once the novelty wears off, online supermarkets must provide a strong incentive for consumers to purchase their goods online (Goldstein, 2002). To date, this incentive has been advertised as the convenience of being able to purchase from home. However, this concept of convenience must be extended to specific use of the site, not just the overall idea of online shopping. Users must also realise that the benefits provided by the convenience of shopping online come at a cost, with Woolworths claiming they will be forced to charge an extra 11 percent on a $100 order to cover the cost of picking, packing and delivering the order (CHOICE, 1998).

METHODOLOGY

Usability Testing Methodology

To gain information on the usability of the three major online supermarkets in Australia, task-based usability tests were conducted, followed by a post-test questionnaire. The concept of the usability testing methodology is taken from the classical approach for conducting a controlled experiment (Rubin, 1994).

A comparative analysis of the three supermarket sites, Woolworths, Coles and ShopFast, was undertaken. This approach of a "Comparison Test" allows judgment of a product, such as a web site, against its competitors at the end of the development lifecycle. The objective is to compare two or more different interface styles, with this information used to better understand the advantages and disadvantages of different designs (Rubin, 1994).

Purpose

The purpose of the usability testing was to gain knowledge of users' perceptions and their comparisons of the different web sites servicing the online supermarket industry. Task-based testing helped familiarise participants with the sites, and required them to complete a standard set of tasks across each site. This allowed consistent tests with identical products and tracking of the time required to complete the tasks, providing a basis for comparison. Questionnaires were used to measure those aspects of usability that are not easily measured quantitatively, but are qualitatively-based and just as significant.

Test Methods

The following section discusses in detail the three elements of the research.

Background/Screening Questionnaire

This questionnaire was issued to potential users to gain basic background information, and to act as the screening process for participants. The information obtained included the user demographics, computer/Internet experience and online shopping experience. The purpose of the questionnaire was to ascertain each user's level of experience, and ensured a representative sample of users was tested (Rubin, 1994).

Task-based Testing

Task-based testing involved supplying given tasks to users to complete (Rubin, 1994). These tests were assessed on two criteria. The first criterion was the time taken to complete the test. The second aspect of the task-based testing involved observing the user carrying out the tests. Neilsen (2001) stated that to gain information about usability the first rule is to watch the users work with the web site, not just listen to what they say.

Quantitative usability metrics were used to assess the following tasks:

- Creating a basic 'shopping trolley' of items, consisting of ten items (quantity=1)
- Creating a complex 'shopping trolley' of items, consisting of twenty-eight items (quantity=varied)

The two tests were conducted only until the point where the shopping trolley list was displayed, prior to credit card details being entered, with the time taken by each user to complete the tasks recorded. This quantitative data was then used to study the usability of the web sites via measurement of the speed of completion. The associated judgments were based on the idea that a web site with good navigation is not only highly usable but allows online shoppers to conduct their ordering in a timely manner. Previous studies have demonstrated that decreased completion time is a contributing factor to users shopping online (Tilson, 1998). Task-based tests were used to gain knowledge of how users interact with the web sites. The quantitative aspects of the testing were used to ascertain the time taken for a user to complete core web site tasks. It will allow all businesses to be assessed on a common basis, and use these findings to compare the web sites.

Post-test questionnaire

The post-test questionnaire was based around the proposed Centre for Electronic Commerce (CEC) web site evaluation framework (Elliot, 2002). This framework is broadly based, and does not narrowly focus on individual perspectives. The sections of the framework used in this questionnaire were the ease of use and the innovation in services and technology section, with a focus on the searching capabilities of each of the web sites.

The questionnaire was designed to consist of three main sections. The first section used the Lickert scale, asking questions about the user perceptions of and attitudes towards each of the web sites. The second section was designed for users who used the search facilities. Users were asked to rate the effectiveness of the search facilities using the Lickert scale, and record items they had difficulty locating. The third section asked for general comments about the usability of each of the web sites.

RESULTS

Background Questionnaire

The test population consisted of twenty participants, of which nine were female and eleven male. Most of the test subjects were in the 18-25 age group, with this age bracket representing the group most likely to adopt online grocery shopping in the future. All of the participants were regular computer users. Internet use statistics were similar to computer use, with ten using the Internet at least once a day, nine using the Internet once a day and one user using the Internet at least once a week.

Details of computer and Internet use indicate that all users fit into the average profile of an Internet shopper (James, 2001). Fourteen of the users that were selected had previously purchased goods and services from the Internet. Of these fourteen Internet shoppers, most had purchased over ten items online, which is regarded as a significant number of purchases. Three users had previously purchased from an online supermarket: two users had made two or less purchases, and the other user purchased regularly.

Test Script Results

The purpose of requiring users to complete two tests was twofold:

- To provide users with the chance to become familiar with each site, prior to completing rigorous testing
- To provide a comparison between the two tests; with the Advanced Test requiring users to purchase a greater number of items in varying quantities, after gaining experience with the site, to determine whether users are able to increase their speed and whether the use of the site is intuitive.

Basic Test

The basic test was conducted by all test subjects. This test involved the user purchasing ten items. The boxplot below shows the results from the short test script. Tests undertaken at Coles (mean 6min33sec) were the quickest to finish followed by Woolworths (mean 8min20sec) then ShopFast (mean 10min06sec).
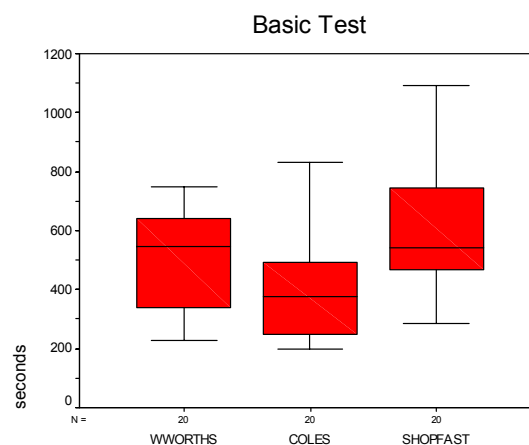

Figure 1: Basic Test Boxplot

As can be seen from the boxplot above, ShopFast experienced the greatest range of test script times taken by users. Woolworths had the smallest time range, with searches returning consistent numbers of results under similar headings, despite different keywords. This led to greater consistency in time across all users.

Advanced Test

The results obtained for the advanced test were quite similar to those obtained from the basic test. The store that took the shortest time was Coles (mean 15min35sec), followed by Woolworths (mean 17min44sec) and ShopFast (mean 20min27sec).
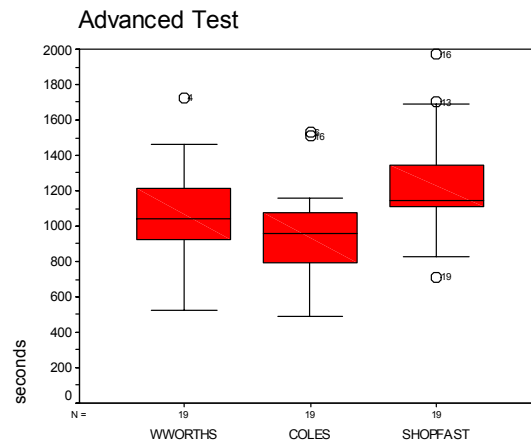

Figure 2: Advanced Test Boxplot

As can be seen above, the range of resulting times from Woolworths and ShopFast was greater than Coles. However, all sites experienced cases where users took notably longer than the average. This was commonly due to difficulty locating one or two items, with this searching increasing the time taken by several minutes.

Summary of Findings

The findings from the testing procedure clearly indicated that Coles was the fastest site to use, therefore increasing user confidence and satisfaction. Coles was closely followed by Woolworths, with ShopFast's slow test script times reflecting the low user satisfaction. Possible reasons for the differences in timing and user responses are reviewed in the discussion, with guidelines provided to help designers increase usability and therefore improve the time required to use each site. The following graphs below are on a scale with 1 being poorly rated by the testers and 5 being of a nature that was deemed to be exceptional.

What are your perceptions of the overall layout?

As shown on the graph below, testers found the overall layout at Coles to be the most usable. ShopFast was rated as the least usable, with testers experiencing difficulty finding the search facilities, which were located in the top left hand corner of the screen. Those testers who found the search box commented on its illogical placement. Testers appreciated being able to view trolley contents while shopping at ShopFast, however the placement of the trolley contents made them difficult to read. Testers had few complaints about the layout of the Woolworths site, but also did not note any features which made it especially user-friendly. The placement of the search box and trolley at Coles was preferred by testers, because they were able to see at a glance what they were looking for.
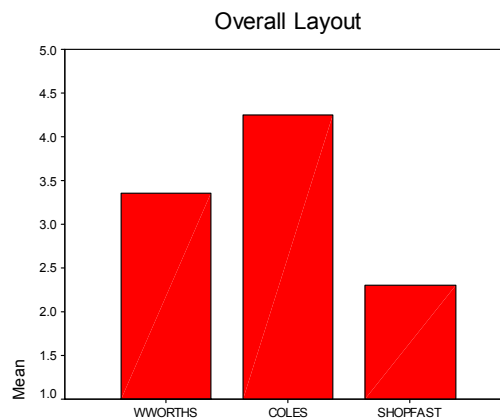

Figure : Overall Layout

What are your perceptions of the ordering page layout?

Despite the Coles ordering page being rated as the most usable, one common complaint from testers was the illogical and inconvenient placement of the buy button. At Coles, the buy button was placed to the left of the item description, while ShopFast and Woolworths located the button to the right. Testers also found the ability to change item quantities important to their overall shopping experience. Woolworths was the most usable in this respect, with testers able to enter the quantity when placing the item in the basket. Coles and ShopFast both required testers to place the item in the basket, then subsequently edit the quantity, either by going to the trolley contents list or by clicking the buy button repeatedly. While testers appreciated this facility at Woolworths, many were unaware that by placing a tick in the 'add to trolley' box, the quantity defaulted to one (1). Instead, many testers placed a one (1) in the quantity box, then ticked the 'add to trolley' box, leading to complaints about this excessive effort to purchase a single item.

The other area of contention with testers was the layout of the search results. Some testers appreciated the format at Woolworths, where items were returned under category headings. This made it faster for testers to scan the results list. None of the users tested preferred the format of the ShopFast results, which consisted of an extensive list of unsorted items that matched the search criterion. The format of item details was also problematic, with ShopFast using the fewest number of columns to divide information. The entire description (including size) was in one column, making it difficult to quickly scan the results list. The preferred method was the one used at Coles, where item information was formatted into clearly labelled columns, and results were ordered alphabetically by default.
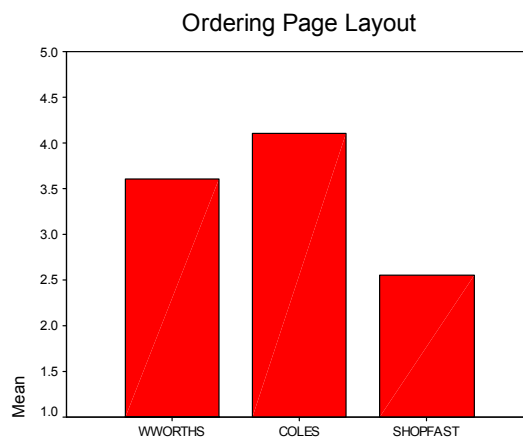

Figure 4.7: Ordering Page Layout

How was the navigation to access the items?

The navigation on the Coles site was rated as the most usable, as shown in the graph below. Testers had little difficulty locating the search facilities available, with the search box visible and the aisles clearly labelled and logically arranged. The aisles at Woolworths were also described as logically arranged. ShopFast was the least usable by far. The search facility was difficult to locate, with some testers purchasing all items through the aisles because they were unable to find the search box.
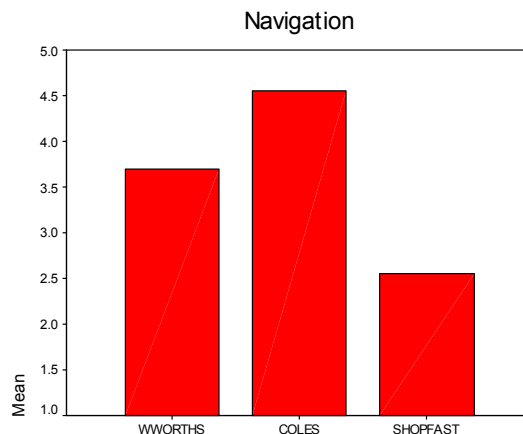
How was the colour scheme?

Testers found both Woolworths and Coles to have pleasant colour schemes, with many testers indicating that their confidence was increased through the use of company colours. Bright colours, such as those on the ShopFast site, offended some testers. ShopFast may have been disadvantaged by its lack of traditional storefronts, with testers having much less exposure to ShopFast's branding offline.
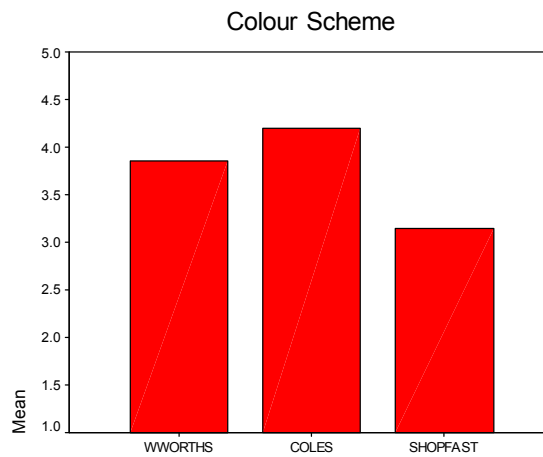

Figure 4.9: Colour Scheme

What are your perceptions of the overall process of ordering items?

Test subjects rated Coles as having the simplest process for ordering items. However, talking to testers after completing the post-test questionnaire indicated that these results may be reflective more of each tester's overall perceptions of the site rather than simply the ordering process. Many testers complained about the illogical placement of the buy button, and the difficulty of changing the item quantity at Coles. At Woolworths, testers who recognized the full potential of the site claimed that this was the easiest to use, however did not always rate the ordering process as the most usable. ShopFast placed the buy button in a logical position and allowed users to view the shopping trolley while shopping, which were important issues for testers. However, the ordering process at ShopFast was rated as the least usable, possibly because overall testers did not find the site simple to use.
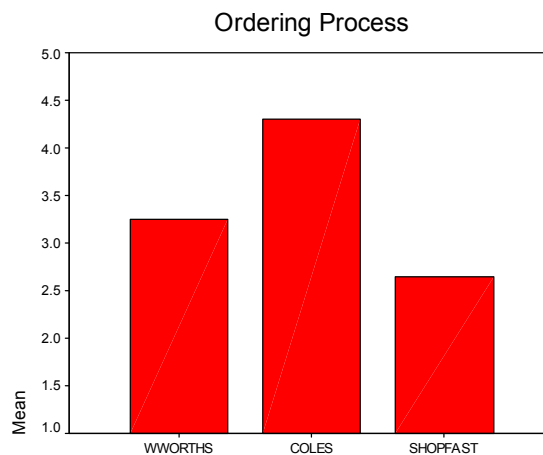

Figure 4.10: Ordering Process

Did you use any of the search features?

Search features included the basic search box on all sites, and Express Shop at both Coles and Woolworths. All testers employed the search features at some stage when locating items. A limited number of testers browsed first by aisle, then searched by keyword as a final resort. However, most testers first attempted to locate items through the search, and then browsed the aisles if a search did not return the appropriate result.

How effective did you find the search facilities?

The effectiveness of the search facilities referred to the ease of locating a product through searching. Coles was found to have the best search, with testers able to search by both brand and item description at once. This was also true at Woolworths. The ability to search through sub-categories of the results at Coles when excessive numbers of items matched the query was also considered useful. ShopFast's search was considered the least effective by far. This was largely the result of ShopFast's inability to search across brand and item description simultaneously. For example, when 'Kraft Vegemite' was entered, no results were returned. However, individual searches for 'Kraft' and 'Vegemite' both returned Kraft Vegemite. Also, the naming of ShopFast's items was inconsistent, increasing the difficulty of accurate searching.
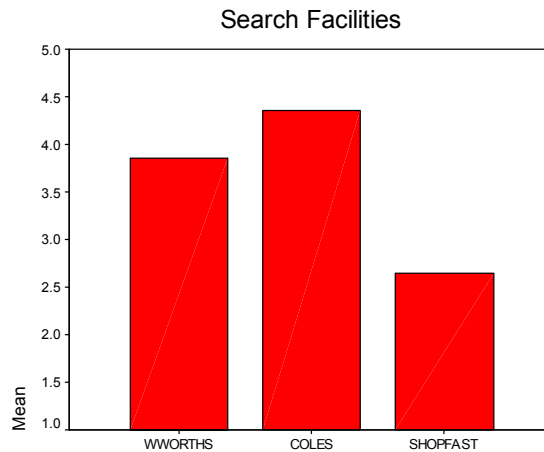

Figure 4.11: Search Facilities

Did you have any difficulties in finding any products?

A small range of items commonly appeared in this list of products. Hair conditioner often took an excessive amount of time to find, with inconsistent abbreviations and large numbers of similar results to sort through. Coffee granules were also difficult to find, largely because testers tended to copy the test script list directly, rather than identifying keywords for themselves. Spaghetti and mayonnaise caused problems due to spelling variations and mistakes, while those searching for chocolate topping through the aisles often did not recognize that it would be located in the dessert aisle.

At Woolworths, many testers had difficulty finding tissues, due to inconsistent naming. Some tissues were described as 'tiss' and some as 'tissue', with a search for 'tissues' returning only one result which was not the item required.

At Coles, White Wings cake mix products were labelled as 'W/wings'. Searches for 'white wings' returned a link to items labelled 'w/wings', however searches for 'white wings cake' returned no results. Searches for Heinz soup also caused problems for testers, returning a link to the category 'Heinz big eat', and then further down the page a link to all relevant items. Testers who automatically chose the Heinz big eat category then had to select the back button and search through all the items, which was time consuming.

ShopFast searches were generally inconsistent, with the greatest problems due to words with capitalization and apostrophes. A high percentage of testers were forced to locate Kellogg's Special K through the aisles, with problems searching for both terms. The word 'Kellogg's' returned no results, even when searched with correct capitalization and punctuation. 'Special K' also returned no results, despite attempts by testers to try all combinations of possible spacing and capitalization.

DISCUSSION

Post-test Questionnaire Discussion

Woolworths

Users reported that the Woolworths site was relatively pleasant to use. Both the search box and aisles were simple and effective to use, with products organized under logical aisle categories. The clear division of items within aisles was supported by grey shading to aid product distinction. Purchase and quantity selection were simple, with the clear depiction of regular and sale prices. The traditional Woolworths colour scheme increased confidence through branding.

As the purchase list was not visible, users were unsure whether the item had been added to the list. While many suggested Woolworths should present the purchase list in a side frame, most users also commented that they liked the current layout, which would be difficult to maintain if the list was always visible. The Woolworths home page frustrated users because it was consistently slow to load, with many unnecessary graphics and excess information included.

Few people used the express shop facility, located under the heading 'Product Search', largely due to a lack of clear marking. Users were confused by the inconsistent display of the search box. In numerous cases, users re-typed the same search terms due to varying presentations of the identical search facility. Searching presented problems because of inconsistent abbreviations of item and brand names. Also, it was not possible to search using abbreviations, such as 'choc' for chocolate, and 'tiss' for tissues.

Coles

Coles was rated by almost all users as the easiest site to use, with the most logical layout and colours that were attractive and confidence-boosting because they reflected traditional Coles branding.

Most users determined that it was possible to increase the quantity by repeatedly clicking 'Buy' or manually updating the quantity in the list. While trolley visibility allowed users to view item quantity and price, some users noted difficulty updating quantities, with users forced to leave the flow of shopping to move to the list at the side to change it. Editing the quantity caused a frame refresh, which users found distracting. Users also commented that they would prefer to select the quantity prior to selecting 'Buy', because the order was illogical. Many users complained that the placement of the 'Buy' button on the left-hand side was illogical. The 'add to personal list' also confused users.

When searching at Coles, users appreciated the ability to include search terms combining both brand and item description, increasing the accuracy of the results returned. Express Shop allowed users to enter search terms for all items at once. While some users enjoyed this functionality, others felt uneasy entering all search terms before retrieving any results, because they recognized that each supermarket required different terminology to retrieve similar items.

Based on the result format, which included both aisle categories and specific items, Coles designers had obviously considered user needs, so users were not forced to search through long lists of items. However, many users found this confusing and it was detrimental to the overall shopping experience in cases where the categories did not match the item that the tester was looking for.

ShopFast

ShopFast was the least popular of the sites surveyed, consistently rated the most difficult and time-consuming to use. The only popular feature was the ability to sort results. However, this facility was largely missed by users due to poor positioning. Those users that located the facility were grateful because the results were not returned in any logical order. Users preferred results to be grouped by manufacturer or type, and were unhappy when each new result list had to be re-sorted, rather than ShopFast remembering the user's default sort conditions.

The problems associated with this lack of default sorting were compounded by the lack of consistent item naming, especially unexpected abbreviations. In some cases, users noted this and attempted to search by abbreviations (such as 'choc' for 'chocolate'), but were then faced with the problem that the search did not locate fragments of words. Many searches conducted using the manufacturer's name were ineffective. Overall, user perception of the search facility was that it was flawed, returning inconsistent results and often not finding items which were available through the aisles. Some users commented on the lack of an express shop facility. Where users were forced to search via the aisle for certain items, many complained that the categories were not clearly defined and it was difficult to determine where items were located.

ShopFast's search feature gave users three options: search for all of the words entered, any word entered, or the exact phrase entered. This tool had great potential, however no users edited the default option of 'all words', therefore not harnessing the capabilities to their best advantage. One test subject, who was a regular ShopFast user, commented that she did not use the other two options because they returned too few or too many results. Despite multiple searching options, ShopFast has been unable to implement an effective search facility. Search terms spanning both brand and description received no or inappropriate results. This repeatedly caused problems when searching for many items, including Heinz tomato soup. Users commonly entered 'Heinz soup' as search terms, which returned only one inappropriate result. Often, users entered many combinations of search terms before finding the item.

A yellow box appeared at the top of each set of search results explaining that you are able to contact ShopFast to request specific items if they are not listed. On a smaller screen size resolution (eg 800 x 600), this message took

up almost the entire screen and the user assumed that the search had returned no results. To increase the usability of the ShopFast results screen, such a message should only be displayed when no results are returned.

ShopFast, like Coles, had the list of items that were currently in the trolley visible while shopping. However, this display was placed inconveniently, and when the screen resolution was at a low setting (eg 800 x 600) only the top half of the last item added was displayed. Therefore, users with low resolution screens suffered usability difficulties due to poor page design.

Guidelines for Improvement of Usability

The following ten guidelines have been established from the research conducted, as well as previous research into the topic. These guidelines have been established for the use of multiple quantity and item ordering systems.

1. Informative home page

The home page of the shopping site must be informative, with clear signage showing users how to shop. This may be in the form of aisles, like at Woolworths, or a textual description such as that presented at Coles. The Coles method requires more reading by the user, however it is more helpful for new and inexperienced users. If the site chooses to use aisles as the default display method, these aisles must have indicative titles with a sensible division of items. It is inappropriate to place a large percentage of items in an aisle called 'groceries'.

2. Pages should follow a clear left to right path

Users scan pages from left to right to complete their tasks. When this natural flow is altered, users find processes more difficult to complete. This can be seen on the Coles web site, where users became confused when the 'buy' button is placed before the quantity entry. It is essential to create pages so that the user follows the natural path of left to right, with users initially selecting what they would like to do (eg search, aisle method), select the item and the quantity, and add the item to the trolley.

3. Searching capabilities visible and usable

The methods for searching must be visible and in a convenient location. ShopFast's search box is in the top left and does not allow easy access. Coles placed their search box in the middle at the top of the screen, allowed the user to view what they had entered, and provided the ability to edit the search terms when no results were returned. This feature was helpful and allowed faster searching when errors were entered in the search box.

4. Searching available across multiple columns

At ShopFast only brand or description could be searched, with combination searches returning no results and frustrating users. Coles had the most advanced search features of all the sites. It allowed searching of both the description and brand, along with the ability to search for fragments of keywords (eg. 'choc' instead of chocolate). Cross-column searching is essential to effective searching.

5. Logical ordering of results, with consistent naming

Results must be presented in logical manner, sorted by brand then description. Users should be able to sort results using the method of their choice, such as brand, description, size, or price. Items must be named in a standardized manner, so that after sorting, identical items in different sizes are grouped together.

6. A separate column for each part of the description

By dividing the description into columns – such as brand, description and size – users are able to scan items quickly and sorts are more effective.

7. Each row differentiated by different colours

Alternating background colours for each result allows users to quickly scan the line to purchase the product. The colour scheme chosen should be inoffensive, preferably using pale colours as opposed to ShopFast's bright yellow.

8. Clear method for item and quantity selection

Many users felt unsure of the method for changing the quantity of an item. A clear and logical layout showing the quantity to be purchased and the 'buy' button is essential, with the process for one click shopping being obvious. If, when one click shopping is used, it is not visible that the item was added to the cart, it is important that instructions are provided to explain the process to the user.

9. Buttons differentiated from text and graphics

Users were largely unable to quickly determine which graphics were buttons and which were not. Sites must make navigation systems obvious and logical, with buttons clearly differentiated, either by colour or style, to increase user confidence.

10. Simple instructions

One of the most important features of the site is the inclusion of clear and definite instructions that are easy to locate, access and follow. If users are uncertain about how to purchase or what they are paying for, they are unlikely to commit money and complete the purchase online.

CONCLUSION

Findings from this Research

From the user perceptions expressed in the post-test questionnaire, it was established that the Coles web site was the easiest to use. This was principally due to the success of searching facilities and the ability to find items. Woolworths followed Coles closely as the second easiest site to use. The key feature mentioned by users was the format used to display search results, specifically the location of category headings and alphabetical listing of relevant items within each category. ShopFast was the third site tested, and was found to be much less usable than the other sites. The reasons for this low usability, as perceived by users, included the inability to search by both brand and description simultaneously, and the lack of default sort with items returned in no particular order from each search.

These features of usability combine to impact on the speed of the users to complete the test scripts. This was reflected with both the basic and advanced tests. In each case, the average times calculated revealed that Coles was the fastest site to use, followed by Woolworths and then ShopFast. Neilsen's statements of usability metrics have been confirmed by this research, with the perceptions recorded in the post-test questionnaire supporting the findings obtained from the test scripts.

The factors which increased web site usability, as determined by users, were used to establish the set of usability guidelines designed by this research. These guidelines are applicable to all online ordering systems, but are specifically designed to address the complex requirements of the ordering of multiple items in varying quantities.

Conclusions of this Research

As previously discussed, the field of usability testing is in its infancy, with little formal research completed regarding the most appropriate method for implementation. Previous applications of usability testing have resulted in benefits to business, with users often discovering basic fundamental flaws in web site design prior to site launches. Usability is especially important on the Internet, because users are not limited by physical locations. Therefore, users are able to easily and rapidly change suppliers if they are not provided with a satisfying experience, giving online users greater power.

It is essential that the ordering systems assessed in this study are usable when it is considered that frustration experienced when locating a single item is likely to be multiplied in multiple item and multiple quantity transactions. The results from this study included both statements made by users, and the observations made by the observer during completion of the test scripts. These results were used to establish a set of guidelines, designed to be used as a checklist when creating or modifying a web site that deals with the ordering of multiple items in varying quantities.

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