

EVALUATING SMALL BUSINESS WEB SITES – UNDERSTANDING USERS

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ABSTRACT

The cost of developing a website can be considerable and there is ample literature describing how to build effective websites. However, despite this many small businesses embark on the development of a website without any real understanding of what they are trying to achieve, who their audience is and the impact poor design will have on usability and user satisfaction. This paper discusses the results of a study that examined user reactions to a number of small business web sites. In particular it explored the interaction of different design factors on users. The study found that in many cases the websites are not meeting the needs of their audience. Specifically users become frustrated when attention is not paid to the design and quality of the information, the quality of the interface impacts on task completion and sites users find uninteresting are usually those they also had difficulty navigating and interacting with. Whilst none of this should be surprising, what is surprising is the continuing lack of attention paid to website usability.

1. INTRODUCTION

The web, when used effectively, can be a powerful marketing and sales tool. Electronic commerce systems have the potential to reach a much larger audience than the traditional shop front. The literature on e-commerce and web site design covers a range of issues; many are similar to those issues that relate to the design of any system. However, there are other issues in particular designing for a broad and in many cases, an unknown audience that are specific to designing web sites. Shneiderman (Shneiderman 2000, 85) makes the very pertinent point in relation to the web that "Designing for experienced frequent users is difficult enough, but designing for a broad audience of unskilled users is a far greater challenge". Furthermore he reports that there is high level of frustration amongst users of computing systems and concludes that "interface and information design breakthroughs are necessary to achieve higher levels of success" (Shneiderman, 2000, 85).

A number of studies have investigated the importance of the different elements that constitute effective web site design (Lederer, Maupin, Sena and Zhuang 2000; Shneiderman 2000; Zhang and von Dran 2000). Studies have involved users assessing the different elements of sites, however few studies have sought to examine the impact these factors have on how satisfied the users were with their experience. The primary aim of the research therefore, was to explore in more detail the main factors that constitute effective web site design from the perspective of Australian users.

From the literature review key elements in web site design were identified. Two usability evaluations were conducted using a total of 16 web sites. Users were asked questions about the sites based on the literature findings. More specifically the research aimed to answer the following questions:

- Which design elements specifically impact on usability most?
- Which design elements result in a higher level of user frustration?

3. IMPORTANCE OF WEB SITE DESIGN

There are two key reasons why many small business owners decide to go online; the apparent low cost involved in launching a web site and the concern that if they don't, they will be left behind (Reynolds 1997). However the effectiveness of any web site will depend on the designer's understanding of key design issues. If designers are unaware of what constitutes an effective web site then businesses are unlikely to reap the anticipated benefits. The literature proposes a number of reasons why good design is important. These include:

- Users are likely to visit the site again if they have had a good experience the first time and have found the information they want (Salam, Rao and Pegels 1998; Shang and Dran 1999).
- Users will be more likely to make a transaction if the design is effective (Tilson, Dong, Martin and Kieke 1998; White and Manning 1998).
- Users complete more transactions successfully (Tilson et al. 1998; White and Manning 1998).
- White and Manning (White and Manning 1998) found that users' reactions to a web site had a direct impact on whether they were prepared to purchase goods from that site.
- Users will make more use of the site and more information will be distributed, if it is easily navigated (Silker and Gurak 1996).
- Users are more satisfied with their experience. Kirakowski, Claridge and Whitehand (1998) found that "Web sites which are developed using human factors input do actually produce higher user satisfaction levels than sites which, however well crafted technically, have not benefited from this kind of input". (published electronically)
- Web sites that take into account a range of the user skills including those with disabilities will encourage greater use (Shneiderman 2000).
- Users spend more time at the site (Shang and Dran 1999).
- Users are more likely to recommend the site to someone else (Shang and Dran 1999).

3.1. What constitutes good design?

There is substantial literature to suggest that users response to a site will be determined more by how quickly they were able to complete the task or obtain the information they required from that site rather than how exciting a site is (Eighmey and McCord 1998; Gefen and Straub 2000). An examination of the literature aimed to identify the key issues raised in relation to effective web site design. Many of the books and articles describing how to design effective web sites also focused on

these factors. The main design issues were further refined and three key factors were extracted. These are described in Table 1 with the component parts identified.

Design aspect	Design issue
Information	<ul style="list-style-type: none"> • Quality of the information and content (Abels, White and Hahn 1998; Salam et al. 1998); • Quantity of information (Abels et al. 1998; White and Manning 1998); • Accessibility, easy to read (Moeller 1997; Murphy 1999); • Understanding of the audience (Reynolds 1997; Nel 1999). • Appropriateness (Bevan 1998)
Display	<ul style="list-style-type: none"> • Quality of the display (White and Manning 1998; Murphy 1999); • The design of the text (White and Manning 1998; Nielsen 1999); • The colours and graphics presented (Abels et al. 1998; White and Manning 1998; Murphy 1999; Nielsen 1999; Simeon 1999).
Ease of use	<ul style="list-style-type: none"> • Usability of the site (Hackos and Redish 1998, 433; Gefen and Straub 2000; Lederer et al. 2000); • Quality and effectiveness of links (Moeller 1997; Abels et al. 1998); • Ease of navigation (Silker, 1996; Nel, 1999; Abels, 1998); • Ability to complete the task effectively (Silker and Gurak 1996; Tilson et al. 1998; Bellman, Lohse and Johnson 1999); • Time taken to complete task including down load time (Bellman et al. 1999).

Table 1 Key elements in effective web design

4. RESEARCH DESIGN

Sixteen web sites were selected belonging to small businesses in Melbourne, Australia. All the web sites were small in size allowing users to explore as much of the site as possible in a relatively short time. All businesses were local to the University, which enabled the researchers to pursue other web design issues with the owners who were also interviewed. The interviews with the business owners explored who was responsible for developing the site, how the design decisions were made and whether usability testing was conducted. The results of those interviews however are not discussed in detail in this paper (see: Fisher, Craig and Bentley 2000). All but one of the businesses had a physical site as well as the web site, most had limited involvement in the development of the site and most left design decisions to the web site developer. The businesses varied in their type. Using the AltaVista search engine the names of 12 suburbs were entered, for each suburb a list of business names was generated. Each business was then assessed against the following criteria:

- Small business likely to employ less than 20 people
- Whether the business had a web site and at most only one physical location.
- The business would be of interest to the users participating in the test.

Thirty four users participated in evaluating the chosen sites. The users were all tertiary students of different age groups although the majority were under 25 years of age. The users were experienced in using the internet, when asked to rate their experience on a scale of 1 to 5 where 1 was little or no experience and 5 was very experienced. The mean for the male users was 3.19 and 3.28 for the female users. The first usability test involved 14 users and eight web sites, with each user investigating four sites. The second group involved 20 users and another eight sites, with each user investigating three sites. (It was found after the first test that when users investigated four sites that by the fourth site the users had lost interest and did not comment in as much detail on the last site. For the second test only three sites were allocated to each user.) Although the two tests were conducted some months apart

the computer equipment and the environment for both groups was the same. The two tests resulted in 116 usable web site evaluations.

The users were provided with a scenario and asked to complete a series of tasks for each site after which they completed a questionnaire. The questionnaire explored the user's experience and views of that site. The user then moved on to the tasks for the next site. Each site was explored by at least six users. This is in line with usability testing where it is suggested that between five and eight users will generate useful results (Nielsen, 1993 pg 156). The three researchers observed and made notes during both usability tests. It should be noted that only two of the sites had the facility to purchase on line. The nature of the businesses included a reception centre, bicycle shop, florist, motel, aids for the disabled, jewellers, green groceries, pharmacy, leisure centre, electrical repair shop, audio sales, food seller, bus company, personal products and a tree stump removalist. A full description of each site and the tasks set is provided in Appendix A.

The study design and size is in line with other similar studies, for example Tilson et al. (1998) had 16 users investigating four web sites. A study of web use by Eighmey & McCord (1998) involved 31 users and five web sites, Zhang and Drans' (2000) research involved 39 students and research undertaken by Nel, van Niekerk, J and Davies (1999) had 36 students investigating 20 web sites.

4.1. Method

A heuristic approach to the usability test was taken. "The term heuristic evaluation describes a method in which a small set of evaluators examine a user interface and look for problems that violate some of the general principles of good user interface design." (Dumas and Redish 1994, 65). For this research, a theoretical model describing the general principles of web site design was developed (Table 1) and the questions put to users were based on this model.

The questions were qualitative and quantitative in design, requiring some free text or verbal response, Likert scale type statements and questions and Yes/No response questions. Where questions and statements were presented requiring a response on a five-point scale, 1 was rated the lowest score and 5 the highest. The questions were similar to those involved in other studies. For example Zhang and Dran (2000) presented users with statements and questions relating to the visual appearance of the site, effectiveness of navigation and quality of information. Research by Nel et al (1999), used a five point scale ranging from strongly disagree to strongly agree to assess a number of variables. The statements put to users were similar or explored similar themes to this research. Simeon (1999) also used a five-point scale. The quantitative results were analysed using SPSS. Cross tabulations were conducted, a cross tabulation is used to demonstrate "the presence or absence of a relationship." (Bryman and Cramer 1992, 153). A chi-squared test was applied to determine the significance of the results. A list of the key quantitative questions asked of users is presented in Table 2 in the next section.

Each user was given the same scenario and tasks to complete for that site. The questionnaire was the same for all sites. Sites were evenly allocated to male and female participants. The order in which sites were tested was organised so that no one site was accessed by users exclusively either first or last. The tasks were selected based on the expectations of what could be accomplished through the sites. The tasks were designed to be gender neutral, for example, the task for the jewellery site was to investigate purchasing a watch, rather than an item of jewellery which may appeal more to one gender than the other.

5. RESULTS

Table 2 lists the questions / statements put to users and the element the question or statement was designed to explore. For the statements users were asked to provide a response on a five point scale from Strongly Agree to Strongly Disagree, this was coded as 5 Strongly Agree to 1 Strongly Disagree. Three questions required a response on a five-point scale and one question required a Yes/No

response. Table 2 also provides the Mean and Standard deviation for each of the questions and statements. Note percentages for the question requiring a Yes/No response is provided in place of standard deviation.

Factor: Information		
<i>Questions asked of users</i>	Mean	Std Dev
How much of the information on the site did you actually read? (All to None)	3.22	1.00
Generally the size of the text was easy to read		
Generally the text was displayed in a way that was easy to read	3.81	1.00
I found all the information I wanted from the web site	4.04	0.75
Sometimes there was too much information on the screen	2.93	1.37
The language used was easy to understand	2.70	1.18
	3.99	0.75
Factor: Display		
<i>Questions asked of users</i>	Mean	Std Dev
How would you describe your feelings generally about your experience using this site? (Very Interested to Very Bored)	3.22	1.00
I found the design of the interface very appealing or attractive.	3.34	1.17
Generally I found the graphics on the site appealing	3.40	1.04
I found the different parts of the interface such as the icons to be consistent	3.64	0.89
Factor: Ease of use		
<i>Questions asked of users</i>	Mean	Std Dev
How easy was it to navigate through the site and find the information? (Very easy to very difficult)	3.86	1.10
Were you able to successfully complete the task (Yes/No)	N – 42% Y – 58%	
It was easy to navigate through the site	3.79	0.95
The site was easy to use	3.77	1.05
I did not feel frustrated during my exploration of the site.	3.43	1.24

Table 2 User response statistics

The following section summarises the results of the statistically significant cross tabulations and includes some of the qualitative comments of the users.

5.1. Information

The ability of users to complete the set tasks was directly correlated with their response to the level of information provided. Information was assessed according to the quality and quantity of information, that is the amount of information provided and the amount needed by the user. As can be seen in Table 2, on two of the key measures, the amount of information provided for users to complete the set tasks and the how much information was provided rated poorly for users across the sites with mean scores of less than 3. Cross tabulations of the information read and the quality and quantity of the text, were undertaken with the other variables. Findings that were statistically significant ($P > 0.05$) were:

- It is not surprising that where the users did not find enough information they were unable to complete the task (0.000). Equally if there was too much information this also impacted on their ability to complete the task (0.045)
- How much information was read and how much was supplied was very strongly correlated at 0.000. It is not surprising that if users considered there was too much information provided they were less likely to have read it all.

- If the users considered that all the information they needed was there then they also were more likely to have read more, this was highly statistically significant at 0.000.
- Users were more likely to say that they were interested or very interested in the site if they rated the display of the text highly (0.000). Also the larger the size of the text, the lower the level of frustration (0.026).
- Users were also more likely to be bored or very bored with sites that did not provide all the information they wanted (0.001). Insufficient information also raised the level of frustration users expressed in using sites (0.002).
- It was also not surprising that it was statistically significant (0.05) that the amount of information read correlated with the quality of the text. That is where the users rated the quality of the display of the text to be high they also read more of the information.

However if the users indicated that there was too much information on the site this did not increase user frustration. Most of the users read at least half of the information on the sites, for three sites (9, 11, 15) users indicated they read less than half of the information (Mean =>2.67). All three of these sites had very high information content, that is, more than three screens of text information. It could also be argued that this impacted on the level of interest users expressed in that site. Sites 9 and 11 were given a mean rating of less than 3 and site 15 a mean rating of 3.0 by users on the level of interest expressed in the site. This compares with the mean rating of 3.22 of the other sites.

5.2. Display

The quality of the display included the the graphics, the colours and design of the visual elements of the text and the site in general. How users rated their feelings towards the sites was strongly correlated with their ratings of the visual elements. It was found to be statistically significant that:

- It was statistically significant at 0.002 that if the users indicated that they found the interface to be appealing they were more likely to complete the task.
- If users rated the interface as consistent this increased the likelihood of them completing the task (0.043). Users were also more likely to be frustrated with sites where the interfaces were not consistent (0.013)
- Where users indicated they were interested or very interested in the site they also rated the quality of the graphics to be high (statistical significance 0.032), the interface to be appealing (statistical significance 0.000) and the interface to be consistent (statistical significance 0.002).

Generally the users agreed that the graphics on all the sites were appealing. Diagrams, graphics and photographs drew comments from most users. These comments were mostly positive as long as the pictures and diagrams were clear and meaningful to the site or task. In particular, a number of users commented positively on the photographs on Site 1. The users were however, critical of the graphics on Site 3 because they found they obscured the text.

5.3. Ease of use

Of the design aspects, ease of use is possibly the most important. Ease of use included the ability of users to navigate through sites, ability to complete the task effectively and time taken to complete tasks. The following results were found:

- Navigation and the ease of use impacted on users' ability to complete the task. These results were statistically significant with navigation impacting on ability to complete task at 0.000 and ease of use impacting on ability to complete the task at 0.002

- The level of frustration users expressed in using the sites was also strongly correlated with how easy the site was to use at 0.000, which is not surprising. How easily users were able to navigate the site also influenced their level of frustration at 0.000.
- Users rating of sites in terms of their feelings was strongly correlated with how easy they found the site to use and how easy it was to navigate, the results of both cross tabulations were highly statistically significant at 0.000.

The qualitative responses from users indicated that with a few sites users were unhappy because they could not complete the set task. Users also considered it unreasonable to have to email for more information, they thought they should be able to book online.

Not being able to purchase online was the major criticism by users for many of the sites. Site 8, which was the site where users could purchase green groceries online, received complaints from the users that the site was confusing and they found it difficult to work out how to register to be able to purchase. Generally across the sites users comments indicated that most sites were rated as easy to use with 'easy' being the operative word in describing usability aspects.

6. SUMMARY

Interviews with the business owners determined that they did not develop their web sites themselves, web developers or people considered by the business owner as being experienced in web development were used. Usability testing was not part of the design process on any of the sites, even more concerning was that little attention was paid to the potential audience of the site during the design process. Zahedi, Pelt and Song (2001) present a conceptual framework for designing web sites. They argue that how usable, reliable, comprehensible and clear a web site is, impacts on the effectiveness of a site and the overall satisfaction of users with their experience. This study confirms this from the users' perspective and further helps us understand how users respond to these particular elements and the impact this has on their ability to complete tasks. It suggests that for designers of web sites there are particular aspects of a site that need to be carefully considered if the site is to appeal to its audience. In summary the users' qualitative and quantitative responses to the web sites investigated indicate that:

- The quality and quantity of information provided is very important for users. The users found many sites contained too much irrelevant information. This slowed the users down increasing frustration. Users were critical of sites where not enough information was provided. How the text is organised also seems to be important. The ability of users to complete the task and not be frustrated was influenced by the quality and quantity of information provided on the websites and the display and size of the text.
- The quality of the interface and the level of consistency also impacts on whether or not a task is completed and the level of frustration users experience. Poor quality visual displays evoked strong negative user reactions. There were particular elements of a number of the sites the users did not like. Users are less interested in pictures and other decorative graphics than pictures that are relevant to what they are trying to do.
- Navigation and ease of use are, as to be expected are strongly correlated with a user's ability to complete the task and their level of frustration experienced with a site. The sites users did not like or found boring were also more likely to be the sites that caused an increase in their level of frustration.

7. CONCLUSION

Usability testing and understanding the audience are important, yet frequently overlooked, parts of the web design process. With an every increasing importance placed on the Internet as a medium for

distributing information and selling goods and services it is not enough for organisations to simply launch a web site and hope that business will follow. Understanding users and their needs are critical elements in the success of a website. If users are not satisfied, cannot complete a task or are frustrated by their experience, the next web site is but a click away. Much has yet to be done and a greater understanding of the user's needs is required if organisations are to reap the rewards the Internet suggests are there. Even though this is obvious and the literature strongly argues the case for good design principles for web sites, developers of small business websites are still not addressing usability issues and more work, focusing specifically on user needs is required.

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APPENDIX A

Site	Description of site	Task set
1. Reception Centre 1	The site contained detailed information and pictures on the history of the mansion in which the reception centre was run.	Investigate booking a birthday party.
2. Bicycle shop	Advertised bicycles, parts and repairs. There were several pages and links on the site.	Investigate purchasing a bike and repairs.
3. Florist	The site displayed pictures of various floral arrangements for different occasions and was arranged according to those occasions.	Investigate purchasing flowers.
4. Motel	Pictures of the rooms of the motel were displayed with information relating to facilities and location.	Investigate booking a room.
5. Disabled aids (online)	E-commerce site offering a range of products for the disabled from gifts to disabled aids.	Buy a gift for a disabled child.
6. Jewellers	Jewellers shop, the pages had pictures of watches and jewellery with some descriptions. The site also provided information relating to gem stones.	Investigate purchasing a watch.
7. Reception Centre 2	Most of this site consisted of pictures of the reception rooms.	Investigate booking a birthday party.
8. Green groceries (online)	This was also an e-commerce site offering green groceries. Users were able to select a range of fresh foods from different categories.	Buy potatoes and apples.
9. Pharmacy	This web site offered information about the business and products. It also have a page related to medical problems.	Investigate buying at present.
10. Leisure Centre	The site provided details on the facility in the centre, membership details and general information.	Find out how much it costs to join and what facilities are available.
11. Electrical repair shop	The web site contains information about the business and what equipment can be repaired.	Investigate the repair of a video recorder.
12. Audio sales	A very visual site designed to sell audio equipment.	Investigate buying a car stereo
13. Food seller	The company sells food for lunches and delivers in the local area.	Find out about having food delivered
14. Bus company	The site provided details about the bus company and timetables. It also provided maps of the bus routes.	Find out the best route and bus number to catch to a local school.
15. Mind and Body	An alternative medicine businesses. The sites details the people and qualifications of staff. It also provided details of alternative medicine types and treatments.	Find out more about kinesiology
16. Stump removalist	The company removes stumps from properties in the local area. The web site provides details of what the company does and a map of the area it serves.	Investigate having a stump removed.