



THE IMPORTANCE OF INFORMATION DESIGN FOR SMALL BUSINESS WEB SITES

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John Bentley

Victoria University, School of Information Systems, PO Box 14468, MC,
Melbourne City, 8001, Australia
Telephone: +61 3 92168277, fax +61 392168117
john.bentley@vu.edu.au

Julie Fisher

Monash University, School of Information Management and Systems,
PO Box 197, Caulfield East, 3145, Australia
Telephone +61 399032621, fax +61 399032005
julie.fisher@infotech.monash.edu.au

Annemieke Craig

Deakin University, School of Information Systems,
Deakin University
Geelong, 3175, Australia
Telephone: +61 3 52272152, fax: +61 3 52272151
acraig@deakin.edu.au

ABSTRACT

Designing and maintaining websites can be costly for small business, therefore the decision to embark on a Web strategy should not be taken lightly. Critical to the success of a web site is its design. Most small business web sites focus on information provision yet for many it would appear there is a lack of understanding of how to design a web site that delivers information effectively to users. This paper presents research that examined the effectiveness of small business web sites from the perspective of users. Findings indicate that: users found many sites contained too much irrelevant information; users were critical of sites where not enough information was provided; how the text is organised is important; and, the quality and quantity of information provided on the websites and the display and size of the text influenced the ability of users to complete the task and not be frustrated.

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1. INTRODUCTION

Web site design is growing as a research area as the understanding of the importance of design and the impact on users increases. Although many of the design issues relating to any system are also important for web sites there are other issues, in particular designing for a broad and in many cases, an unknown audience that are specific to web site design. Shneiderman (2000, 85) argues 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 a 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).

Although there have been many studies focusing on the importance of various web site and design elements (Lederer, Maupin, Sena and Zhuang 2000; Shneiderman 2000; Zhang and von Dran 2000), there have been few studies that 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. This paper presents one aspect of that research, the design and presentation of information.

2. IMPORTANCE OF WEB SITE DESIGN

Among the reasons why many small business owners decide to go online is the apparent low cost of developing and maintaining a web site and the concern that if they don't, the business will be left behind (Reynolds 1997). The effectiveness of web sites and in particular how they deliver information, depend on the designer's understanding of design and the intended users. Failure to understand what constitutes an effective web site will result in dissatisfaction from both the business and user perspective. The literature provides numerous reasons why web site design is important and presented here are those aspects that relate specifically to information.

- Users are likely to visit the site again if they 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, which includes providing sufficient information (Tilson, Dong, Martin and Kieke 1998; White and Manning 1998).
- White and Manning (1998) found that users' reactions to a web site, including information quality, 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 and is well organised (Ceaparu 2003; Hargittai 2003).
- Users spend more time at the site (Shang and Dran 1999).

Constituents of good information design

There is substantial literature to suggest that the user's response to a site will be determined more by how quickly they are 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 identified the key issues raised in relation to information and effective web site design. Many of the books and articles describing how to design effective web sites also

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

Information Design Issue	Literature
<ul style="list-style-type: none"> • Quality of the information and content • Quantity of information • Accessibility, easy to read • Understanding of the audience • Appropriateness • Topography, design of the text • Locating information 	<p>Abels, White and Hahn 1998; Salam et al. 1998</p> <p>Abels et al. 1998; White and Manning 1998</p> <p>Murphy 1999; Ceaparu 2003</p> <p>Reynolds 1997; Nel et al. 1999</p> <p>Bevan 1998, Cukier 2003</p> <p>White and Manning 1998; Nielsen 1999</p> <p>Jenkins et al, 2003; Ceaparu 2003; Hargittai 2003</p>

Table 1 Key elements in the design of information for web sites

4. RESEARCH DESIGN

Sixteen web sites were selected belonging to small businesses located in Melbourne or Ballarat. All the web sites were small in size allowing users to explore as much of the site as possible in a relatively short time. Most businesses were in the University region, 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: Anonymous 2000). All but one of the businesses had a physical site as well as the web site. 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 only one physical location
- The business would be of interest to the users participating in the test

One hundred and ten 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 vast majority of users had experience 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, less than 2% described themselves as inexperienced and 7% described themselves as having limited experience. 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). A third testing round was conducted involving around 80 users concentrating on sites 1, 2, 5, 6, 13, 14 and 15 (some sites were no longer valid). The total number of evaluators is 110 with 50.7% male and 49.7% female. Although the tests were conducted some months apart the computer equipment and the environment for both groups was the same. The tests resulted in 322 usable web site evaluations.

The users were provided with a scenario and asked to complete a task(s) for a site then complete the questionnaire. The questionnaire explored the user's experience and views of that site. The user then

moved onto the tasks for the next site. Each site was explored by at least six users through to a maximum of 43 users. A low number of evaluators is acceptable as it is in line with usability testing where it is suggested that between five and eight users will generate useful results (Nielsen, 1993, 156). The researchers observed and made notes during 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 task set is provided in Appendix A.

The study design and size aligns 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.

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, which were 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 and Phi, Cramer's V and Contingency Coefficient were used to indicate the strength of the relationship. 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 not 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 AND DISCUSSION

Table 2 lists the questions/statements regarding information put to users. 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. Some questions required a Yes/No response and one question required a response on a five-point scale. Table 2 also provides the mean and standard deviation for each of the questions and statements. Percentages are given for Yes/No response questions instead of a mean.

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)	2.70	0.97
Were you able to successfully complete the task? (Yes/No)	N - 31.2% Y - 68.8%	n = 321
Did the site provide all the information you required to complete the set task? (Yes/No)	N - 32.2% Y - 67.8%	n = 317
Was there anything else you wanted to know but could not find out from the site? (Yes/No)	N - 64.6% Y - 34.8%	n = 320
Generally the size of the text was easy to read	3.58	1.09
Generally the text was displayed in a way that was easy to read	3.55	1.07
I found all the information I wanted from the web site	3.27	1.23
Sometimes there was too much information on the screen	3.00	0.72
The language used was easy to understand	3.90	1.04

Table 2 User response statistics

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

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 the two key measures of the amount of information provided for users to complete the set tasks and how much information was provided, on the whole rated poorly for users across the sites with mean scores of 3.27 and 3.00 respectively.

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 ($P \leq 0.05$) were:

- It is not surprising that where the users did not find enough information they were unable to complete the task (0.000). Likewise if there was too much information this also impacted on their ability to complete the task (0.002). However this is a weak relationship. Many user comments related to the lack of relevant information on sites. The lack of information included: pricing, product descriptions, contact details, stock availability and the range of products. When the right amount of information was present users commented positively on it being so.
- How much information was read and how much was supplied was correlated at 0.004. This suggests 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 provided then they also were more likely to have read more (0.004).
- The likelihood of reading the text has a strong relationship with both appropriate text size (0.009) and way the text is displayed (0.000). Hence users are more likely to read the information. However, this does not indicate that the information content is appropriate in order to be able to complete the task. Further the language being easy to read did not have an impact on how much is read, suggesting that skim readers will more likely continue to skim read. Hence for designers it is better to firstly concentrate on appropriate text size and display before focussing on the understandability of the language. However language cannot be dismissed as there were many user comments relating to the use of jargon, abbreviations and

too much text. Use of plain English on websites was appreciated. These particular aspects start to lead into the display characteristics of our model which is not the intention of this paper.

- There is a strong relationship where 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). Similarly the more appropriately the text was displayed for ease of reading the lower the level of frustration (0.000). Insufficient information also raised the level of frustration users expressed in using sites (0.000). If difficulty was encountered in the way the text was displayed for ease of reading the users were frustrated (0.000). As expected, if all information was present then there was little frustration (0.000) and conversely frustration was shown where information was lacking.

Most of the users read less than half of the information on the sites (mean 2.70). Sites 5, 9, 11, 14 and 15 with high information content had means of 2.15, 2.50, 2.86, 2.69 and 2.40 respectively. It could also be argued that this impacted on the level of interest users expressed in that site. Sites 5, 9 and 11 were given mean ratings of 2.92, 2.25, and 2.57 respectively by users on the level of interest expressed in the site. Level of interest is lower for these sites when compared with the mean rating of 3.07 for all the sites.

6. WEB SITE DEVELOPMENT

Interviews with the business owners discovered that in most cases they did not develop their web sites themselves Owners used web developers or people considered by the business owner as being experienced in web development. There was little attention paid to the potential audience of the site during the design process as usability testing was not part of the design process on any of the sites. Zahedi, Pelt and Song (2001) present a conceptual framework for designing web sites. They argue that the effectiveness and overall satisfaction of users with their experience of a site will be determined by how usable, reliable, comprehensible and clear a web site is. 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 information 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 information responses to the web sites investigated indicate that: 1) the quality and quantity of information provided is very important for users; 2) many sites contain too much irrelevant information; 3) irrelevant information slowed the users down increasing frustration; 4) users were critical of sites where not enough information was provided; 5) how text is organised seems to be important; and, 6) 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.

7. CONCLUSION

Understanding users and their information 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 only a click away. 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 information needs is required. Usability testing and understanding the audience are important, yet frequently overlooked, parts of the web design process. With an ever increasing importance placed on the Internet as a medium for distributing information, selling goods and promoting services it is not enough for small businesses to simply launch a web site and hope that new business will follow.

The future direction for this research is to perhaps evaluate a larger range of small of websites, consider whether industry specific small business sites should be evaluated and/or to focus on sites that are predominately information content to better understand the aspect of information in small business from the user's perspective.

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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 has a page related to medical problems.	Investigate buying a 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. Alternative medicine and therapies	An alternative medicine and therapies business. The site 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.