CONSUMER SEARCH OF THE WEB: AN EXPLORATORY ANALYSIS OF ANTECEDENTS OF WEB SEARCH SATISFACTION

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ABSTRACT

This article explores consumer Web-search satisfaction. It commences with a brief overview of the concepts consumer information search and consumer satisfaction. Consumer Web adoption issues are then briefly discussed and the importance of consumer search satisfaction is highlighted in relation to the adoption of the Web as an additional source of consumer information. Research hypotheses are developed and the methodology of a large scale consumer experiment to record consumer Web search behaviour is described. The hypotheses are tested and the data explored in relation to post-Web-search satisfaction. The results suggest that consumer post-Web-search satisfaction judgments may be derived from subconscious judgments of Web search *efficiency,* an empirical calculation of which is problematic in unlimited information environments such as the Web. The results are discussed and a future research agenda is briefly outlined.

INTRODUCTION

The consumer behaviour literature considers consumers to be problem solvers. Once an individual recognizes that he or she has a problem, defined as a less than optimal situation existing, they enter the problem-solving process described in many consumer behaviour models, (e.g. Nicosia 1966, Engel, Kollat and Blackwell 1968, Howard and Sheth 1969, Bettman 1979). The consumer's most available source is their memory, and he or she first performs an *internal* information search (Bettman 1979). If insufficient information is available in memory and the consumer wishes to proceed with solving the perceived problem, she or he then commences an *external* information search. Traditional written sources of consumer information include brochures, advertisements, consumer reviews, newspapers and special interest magazines. The Web is a recent addition to these consumer resources. It is not only an additional source of consumer information, but also a commercial transaction medium, and in some cases also a delivery channel (Strauss and Frost 1999). Consumer external information search behaviour is particularly relevant to the Web because it is a *non-broadcast medium* in which consumers must *actively search* for information. Consequently, Web consumer search behavior is worthy of investigation for both academic and commercial reasons. Despite the widespread consumer use of the Web, relatively little is known regarding consumer Web search behavior, although academics such as Floridi (1995), Hoffman and Novak (1995, 1996a, b), and Tan (1999) have recognised the need for such research.

Australians have a high level of Web accessibility as 52% of Australian homes are on line and 57% of Australians over 16 years have Web access at home or at work with the average Australian Web user spending 6.5 hours on line per month. Despite such ready access to Web-based information, B2C Web sales account for only 0.172% of GDP, 0.4% of total

Australian sales or 0.6% of Australian retail turnover (ANOIE 2003). It therefore appears that Churbuck's (1994) characterization of the Web as having many browsing consumers but few buyers is still true. This may not be surprising in view of Wind and Mahajan's (2002) assertion that new technologies 'live side by side with the old'. Indeed Kau, Tang and Ghose (2003) have identified a hybrid consumer segment which specifically searches the Web for information but only buys in store (i.e. bricks and mortar) from trusted retailers. The Web is already a popular consumer information source and it is a service in the traditional marketing sense. There is a substantial body of literature showing that the intention to re-consume a good or a service is in part dependent upon the consumer's satisfaction with the previous consumption experience (e.g. Oliver 1980, Richins and Bloch 1991, Bolton 1998). Thus in relation to consumer adoption of the Web it is important to understand the factors that promote consumer post-Web-search satisfaction.

HYPOTHESIS DEVELOPMENT

In the case of the Web, being an 'open' information environment there are no absolute measures of Web performance. In addition, its performance across a range of consumers' problems may vary. As a service the Web is high in 'experience' or 'credence' qualities (Nelson 1970). Thus, Web user's satisfaction judgements tend to be based on the outcome of the specific information search activity, that is the relevance and utility of the information discovered. Consequently **H1**: *Post Web search satisfaction will positively correlate with the (post-search) perceived usefulness of the Web search activity*. In turn the perceived usefulness of a Web search may depend on the relative efficiency with which problem-relevant Web data is acquired. Web search actions such as backtracking or querying a search engine do not directly yield new information, whereas visiting a Web site and taking links forward within a Web site are actions that *do* yield data. The capture of Web search actions allows a calculation to be made of the percentage of Web search actions that yield information, thus **H2**: *The level of Web search satisfaction will correlate with the percentage of Web search actions yielding data*. Conversely, **H3**: *The level of post Web search satisfaction will negatively correlate with Web search actions that do not deliver information*. Given the difficulty of judging Web and Web site performance and the widespread acceptance of Oliver's (1980) expectation-disconfirmation paradigm, the role of pre-Web-search expectations is unclear hence the exploratory null hypothesis **H4**: *There is no relationship between pre-Web-search expectations and the level of Web search satisfaction*.

METHODOLOGY

Data was obtained from an experiment in which subjects were exposed to two pre-tested consumer problem scenarios in which they were asked to use the Web to assist them, in whatever way they saw fit. One goods-related and one service-related topic were included selected because goods and services have been found to engender differences in search behaviour (e.g. Murray 1991, Murray and Schlacter 1991). The chosen good was a replacement hard drive for an existing PC. This item was selected because Web users are computer-literate and information about hard drives is readily available on the Web. The second information search task was a service. The subjects were asked to search for a one-week holiday with a total budget of $4000. Since the subjects' levels of involvement with any nominated Web search topic will vary, due to personal interest and experience, it is important to note that the level of involvement experienced by an individual generally does not influence satisfaction-dissatisfaction judgements (Mano and Oliver 1993).

A computer laboratory with open Web access was used, hence the subjects had normal Web access to typical Websites. Thus, a normal distribution of Web site functionality and features was present. Because of this, and for practical reasons, the visited Web sites were not audited. Each PC in the laboratory was loaded with Lotus ScreenCam software to unobtrusively visually record all Web search activity. The order of search task administration was controlled and randomized and Web search and satisfaction data were gathered for each subject's two Web searches. Upon completion of the sessions a total of 143 complete responses (i.e. 286 Web searches) were available for analysis. Coding commenced using rules established during a previous pilot study. Inter-coder reliability exceeded the standard suggested by Miles and Huberman (1994) of R > 0.8 (p. 64 1994). Each coded search history was then scanned and verified by comparison with a dictionary of valid coding terms, before being counted to arrive at the variable scores for each search. The resultant database which comprised some 6,825 recorded Web search actions was then analysed.

Since the focus of the research was on the Web search process, the coding was based on information search *actions* rather than the actual information acquired. Four types of variables were used to code the Web search behaviour. They were: (1) six Web browser actions namely using the "forward" and "back" (i.e. backtrack) buttons, URL entry, placing a book-mark, using a book-mark, and using the URL history facilities; (2), four actions relating to Web-wide search engines namely using a search engine's directory of links, querying a Web-wide search engine, successfully producing a search engine output from a query, and refining a search; (3) three actions relating to the use of search engines internal to Web sites namely, querying an internal search engine, successfully producing internal search engine output from a query, and refining an internal search engine search, and; (4) and three search measurements afforded by the commercial Web environment: the number of (distinct) Web sites visited, making a Web site visit, and taking a link within a Web site. A number of quantities were also calculated including the total number of search actions and the percentage of data yielding search actions. Data on the subjects' levels of satisfaction with their Web information search were also gathered via Oliver's (1980) expectation-disconfirmation paradigm. Pre-search (i.e. anticipated) and post-search (actual) Web search "usefulness" and post-search satisfaction were measured. All three constructs were measured using a five-point semantic differential scale. These global measures were designed to reflect both the information content of the range of sites visited and the respondent's Web search performance. Thus they reflected the combined bases of real life Web use satisfaction.

A convenience sample was used, which consisted of 82 male and 61 female second year and above undergraduate university students. Demographic and Web use experience data were gathered from each subject. No statistically significant differences were found in the sample between the genders in terms of real-life Web purchase although males had greater Web use experience and had higher mean Web-use hours per month. The predominance of males among the sample broadly matched that of earlier Web surveys of users (eg Gupta 1995). However, the age profile of the sample matched recent Web user surveys such as that of ANOIE (2001). The sample overall felt more involvement with holidays (74.1%) than with hard drives (17.5%). Males were more frequently involved with hard drives (p= 0.000), and females were more involved with holidays (p=0.026). Similarly, more of the subjects had previously searched the Web for holiday information (35.0%) than for hard drive information (14.7%). Three times as many males as females had searched the Web for hard drive information (p=0.018), whereas approximately equal percentages of male and female subjects had previously sought holiday information on the Web (p=0.907). It was clear from this that

the hard drive Web search task, which had been chosen for its apparent synergy with Web literacy, had exposed gender differences in relation to previous Web use.

RESULTS

The data are displayed in Table 1. Hypothesis **H1** was supported as satisfaction positively correlated with the perceived usefulness of the Web search activity for both tasks. **H2** was partially supported as satisfaction correlated with the percentage of Web search actions yielding data but only for the hard drive task. **H3**: was supported for both tasks as satisfaction was found to negatively correlate with non information productive Web search actions of backtracking and taking links internal to Web-wide search engines. However, **H4** was rejected because satisfaction was found to *positively* correlate with pre-Web-search expectations of the usefulness of the Web search.

Table 1 Correlations – Search Activities and Post-Search Judgements by Task

Variable	Hard drive				Holiday			
	Actual usefulness of Web search		Satisfaction with the Web search activity		Actual usefulness of Web search		Satisfaction with the Web search activity	
	Pearson Correl. Coeff.	Stat. Sig.	Pearson Correl. Coeff.	Stat. Sig.	Pearson Correl. Coeff.	Stat. Sig.	Pearson Correl. Coeff.	Stat. Sig.
No. of links taken within search engines	-0.123	0.145	-0.168	0.045*	-0.066	0.431	-0.172	0.040*
No. of backtrack moves made	-0.201	0.016*	-0.191	0.023*	-0.187	0.025*	-0.212	0.011**
Total number of search actions	-0.171	0.041*	-0.149	0.076	-0.185	0.027*	-0.219	0.009**
Percentage of data yielding actions	-	-	0.192	0.022*	-	-	0.090	0.288
Anticipated usefulness of Web search	0.037	0.664	0.176	0.035*	0.121	0.151	0.223	0.007**
Actual usefulness of Web search	-	-	0.696	0.000**	-	-	0.698	0.000**

Note: * Significant at the level 0.05
    ** Significant at the level 0.01

DISCUSSION

From the results it was evident that post-search satisfaction was positively correlated with post-search judgements of the actual usefulness of a Web search. This was not

unexpected due to the synergy of the two concepts. However, post-search satisfaction also positively correlated with pre-search expectations regarding the usefulness of the Web search. The reason for the task-specific positive (hard drive) result with respect to the percentage of data yielding actions is unclear. However, it could relate to the specific nature of the consumer topic, for example, there may be differences in the typical Web site structure for a particular product category (e.g. holiday Vs PC equipment retailers) and the type of information displayed within them. Holiday sites are generally extensive and have both text and photographs within them. Whereas PC equipment sites are more often tabular and tend to contain fewer photographs. However, the variables that were negatively correlated with post-search satisfaction were similar across the two tasks. The negative correlations with the use of search engine links and backtrack moves suggests that perceived usefulness is negatively related to overall measures of Web search activity (refer to the "Total number of search actions" also included in Table 1). Collectively this suggests that the location of information with a minimum of search actions was an underlying factor affecting post-search estimates of Web search usefulness. Thus, post-search usefulness judgements appear based on some internal and *subconscious* cognitive mechanism that estimates search effectiveness or efficiency. The empirical calculation of consumer search *efficiency* is problematic in an open information environment such as the Web. It has traditionally only been calculated in 'closed' Information Display Board experiments such as those of Jacoby, Chestnut and Fisher (1978) and Bettman and Kakkar (1977)

The level of expected usefulness of the Web search was a measure of the subjects' expectation with regard to their forthcoming Web search task. According to expectation-disconfirmation theory, the positive disconfirmation of expectations *raises* the level of post-purchase satisfaction. However, in this study, the individuals expectations tended to be fulfilled, that is, were rarely disconfirmed, for example, if the subject had *low* expectations of the usefulness of the forthcoming Web search, then they were usually found to have a correspondingly *low* level of satisfaction. This result was unexpected as it appears to contradict the expectation/disconfirmation paradigm as subjects with a *lower* expectation of the usefulness of the upcoming Web search would tend to have their expectations positively disconfirmed more frequently than would subjects with higher expectations. Thus, a *negative* correlation would normally be expected between the two variables. However, the correlation was *positive* and was thus in the *opposite* direction to that proposed. That is, subjects with high expectations tended to have higher post-search satisfaction and vice versa. The reasons for this are unclear but it could relate to the experience or credence nature of the Web as a service. Thus it appears that in this research the measure of "anticipated usefulness" may have captured relatively fixed subject attitudes which were not modified by the subsequent Web search experience. This may have implications for Web use rather than Web adoption, as individuals who develop negative attitudes to the Web (even though they are very familiar with it, as many of the subjects were) may maintain those views *despite* the information discovered or acquired during a Web search activity.

Overall the results show that perceived Web search usefulness leads to satisfaction. This parallels the findings of Igbaria, Schiffman and Wieckowski (1994) in relation to the utilisation of PC's, a study which also found that satisfaction lead to repeated use of the system. It appears likely that consumer satisfaction may have similar effects on Web use. In summary, perceptions of post-search usefulness, and the factors that affect such judgements may provide both valuable data for current Web marketers and provide a fruitful agenda for future academic research.

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