

PRE-PURCHASE ONLINE INFORMATION SEEKING: SEARCH VERSUS BROWSE

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ABSTRACT

Recognizing the need to support both goal-directed and experiential behaviour in online shopping environments as a means of facilitating flow, this paper reports results from an exploratory study that investigates consumer preferences for Web-based product information display across browsing and searching tasks. Thirty-one participants performed two online shopping tasks (one searching and one browsing in nature) on predetermined e-tailing sites and were asked to evaluate the display of product information on these sites in helping them carry out these tasks. Results suggest three things: 1) information such as pricing, product description, retailer selection, retailer advice, and a good interface design are required in both tasks; 2) searching requires more detailed product information; and 3) browsing places greater emphasis on information about the retailer. Based on these findings, a theoretical framework for Web-based product information display is presented. With respect to the design of Web retailing sites, the study's results imply the need to focus not only on goal-directed search, but also on non-directed browsing tasks as well. It is argued that adapting the design of e-tailing sites to the unique information display requirements of search and browse tasks could help promote more compelling online shopping experiences for consumers.

1. Introduction

Product information seeking often is portrayed as a critical early stage in the consumer buying process (Shim *et al.* 2001; Hodgkinson *et al.* 2000; Haubl and Trifts 2000; Maes *et al.* 1999; Zellweger 1997; Moorthy *et al.* 1997). In online shopping environments, as well as in traditional purchasing situations, consumers looking for pre-purchase information can be engaged in two modes of seeking activity: browsing and directed search (Rowley 2000).

Browsing pertains to instances when consumers are not sure how, or if, their shopping requirements can be met. It is "an activity in which one gathers information while scanning an information space without an explicit objective" (Toms 2000, p. 424). In these cases, users have a less precise view of the product information that might be needed, available, or used, and thus seek out information in more of an exploratory fashion. Seeking in this case relates closely to experiential shopping behaviour (Wolfenbarger and Gilly 2001).

In contrast, directed search refers to occurrences when consumers actively seek out product information with a view to make a decision. Shopping in this sense is more goal-oriented or utilitarian in nature (Wolfenbarger and Gilly 2001). Here, consumers know what they are looking for and usually possess some information about the product being sought, such as its brand or manufacturer's name, that can be used as the basis of a specific search (Berthon *et al.* 1999).

Complicating this scenario is the fact that consumers do not remain in one particular seeking mode. Rather, consumers may, and often do, refine their strategies, approaches, and information requirements as they reflect upon and consider the information they collect along the way during the initial stages of the buying process (Hodgkinson *et al.* 2000; Rowley 2000). Some studies suggest that consumers usually start in an exploratory seeking mode and then gradually move towards goal-directed search with a progressively narrow focus (Foss and Bower 1986, Shim *et al.* 2001). Such strategies and amalgamations of seeking modes may lower transaction and cognitive costs for online shoppers (Liang and Huang 1998). Other studies suggest that browsing and searching can lead to consumer disorientation in the online context (Bryan and Gershman 1999). For instance, with goal-directed search, users may never be afforded a view of the entire shopping space; rather, they jump from subset to subset of an e-tailing site via

a local search engine. In terms of browsing, online consumers may experience sudden changes in page design and formats.

In today's Web-enabled world, issues such as these are increasingly important. Due to the convenience and accessibility of the Internet, broad consumer segments now frequently utilize the World Wide Web to obtain pre-purchase product information (Haubl and Trifts 2000; Phau and Poon 2000; Alba *et al.* 1997). As such, the need to understand and support browsing and search behaviour in online shopping environments is becoming more critical in attracting and retaining customers in online stores.

2. Purpose

Recognizing the need to support both browsing and directed search in pre-purchase product information seeking activity in online shopping environments, the purpose of this paper is to explore consumer preferences for Web-based product information display across these two types of tasks within single commercial Web site designs.

The rationale for this objective is that if electronic shopping Web sites better support these two predominant modes of product information seeking behaviour, then consumers visiting these sites would be more satisfied with their online shopping experience and thus more likely to purchase a product, or at least revisit such Web sites in the future.

3. Research Motivation

The theoretical motivation for launching this research investigation is based on a conceptual model of flow in consumer hypermedia computer-mediated environments or CMEs (Novak *et al.* 2000; Hoffman and Novak 1996).

Borrowing from Csikszentmihalyi's (1990, 1977) description of the flow construct, flow on the Web is portrayed as a cognitive state experienced by consumers during navigation characterized by a seamless sequence of responses facilitated by machine interactivity that is intrinsically enjoyable, accompanied by a loss of self-consciousness, and self-reinforcing. Creating such compelling and engaging online shopping environments for consumers offers "numerous positive consequences for commercial Web providers" (Novak *et al.* 2000, p. 22), such as extended visit durations, repeat visits, and ultimately more purchases.

There are three important aspects of this model of 'flow on the Web' that are relevant to this paper. First, the theory recognizes that online consumers engage in both goal-directed and experiential behaviours. Goal-directed behaviours are characterized by CME users who have pre-purchase deliberations about a product and are involved in situations which have specific task-completion goals. Experiential behaviours are characterized by CME users with an enduring involvement in building a knowledge base about a product and in engaging in non-directed search for recreational purposes. Second, flow in CMEs may occur with both types of behaviours. Third, and most importantly, "the optimal design of a CME site differs according to whether the behavior is goal-directed or experiential" (Hoffman and Novak 1996, p. 62). As a result, online marketers "should take care to focus not only on goal-directed behaviors in a CME (e.g., product purchase), but also on nondirected experiential behaviors (e.g., net surfing), which are strategically important as well" (Hoffman and Novak 1996, pp. 62-63).

Though Novak *et al.* (2000) empirically validate the workings of their conceptual model in terms of the general components that make for compelling online shopping experiences across many Web sites, they caution that their research does not "consider the specific elements of commercial Web site design that facilitate a compelling consumer experience, nor how this experience is likely to vary across the wide range of commercial sites found on the Web today" (p. 40). This paper attempts to bridge this gap by conducting an investigation that explicitly examines the aspects of commercial Web site design that consumers prefer when they are placed specifically in browse and search online shopping tasks.

The idea to design shopping Web sites to support specific pre-purchase information seeking tasks is also supported by Task Fit Theory (TFT). Task Fit Theory proposes that information systems have a positive impact on user performance with the system only when there is correspondence between the functionality of the system and the task requirements of users (Goodhue 1998, 1995, 1988; Goodhue and Thompson 1995). Extending TFT to 'flow on the Web' theory, it follows that an e-retailing site would only have a positive impact on users in terms of creating a compelling shopping experience if the Web site offered a design which 'fits' both user goal-directed and experiential behaviours.

In line with the theoretical underpinnings of TFT, Te'eni and Feldman (2001) state there is an intuitive need for adapting Web site designs to fit tasks, specifically a need to support varying types of information seeking behaviours ranging from exact search queries to wayward exploration (Byrne *et al.* 1999; Choo *et al.* 2000, 1999). To test this proposition, Te'eni and Feldman conducted a research investigation which experimented with providing users with simulated adaptive Web site designs that matched specific user search tasks. The results from their study indicate an improvement in task performance in terms of accuracy and time, but not in user satisfaction. Te'eni and Feldman

acknowledge their results may have been constrained by the adaptation of Web site designs which simplified the task problem, but made the actual seeking experience less fun and enjoyable in terms of flow (Hoffman and Novak 1996). Regardless, their work points to the benefits of adapting Web site designs to information seeking tasks, acknowledges the difficulty in actually doing this, and calls for more research in this area.

In addition to TFT and ‘flow on the Web’ theory in offering support for this paper’s research investigation, there is a need for more research in the area of pre-purchase online information seeking in general. First, the role of information seeking is significantly heightened in the context of Internet shopping and may be the single most important functional element leading to Web-based purchases (Shim *et al.* 2001). This is primarily because of the low perceived costs of providing and accessing objective data over the Web (Klein 1998), and the increased likelihood of consumers who shop over the Web to seek pre-purchase information over the same medium (Bryan and Gershman 1999; Alba *et al.* 1997). Second, there is a lack of research in consumer pre-purchase information seeking over online environments (Haubl and Trifts 2000). Last, the consumer research literature “has virtually ignored exploratory search [browsing] and has focused primarily on the volitional activities associated with goal-directed search” (Janiszewski 1998, p. 290). This is worrisome since the organization of product information displays can have a major impact on consumer purchasing choices (Bettman *et al.* 1998; Klein 1998).

4. Methodology

In terms of specific research questions, this paper addresses three:

1. What information is the online consumer expecting to find, and how does this differ across searching and browsing tasks?
2. What information does the online consumer find useful, and how does this differ across searching and browsing tasks?
3. How do online consumers use navigational tools and site features during pre-purchase behaviour, and how does this differ across searching and browsing tasks?

To answer these questions, an exploratory study was conducted with a group of thirty-one undergraduate business students who were given two online shopping tasks for common products on five well-known Web retailing sites. The browse task instructed participants to find a gift for a friend. The search task required that participants search for a particular product, namely a digital camera, as a gift. The order of tasks and Web sites were counterbalanced. Participants were not required to make an actual purchase and were told to assume they would be making a purchase at some later point in time, either online or offline.

Prior to each task, participants filled out a questionnaire that asked them to identify and rank the types of information they expected to access on the Web site to help them carry out their tasks. To prevent the possibility of influencing participant response with suggested information items, no information items were listed on the questionnaire. Rather, participants had to self-identify particular information items they felt were important. After each task, participants completed another questionnaire, which required participants to identify and rank information they found useful during their tasks. Again, no prompts for potential information items were suggested.

The experiment was also designed to capture free-form textual responses. This was done in two ways. The first was by asking open-ended questions in the post task questionnaire which polled participants’ perceptions on the information displayed and presented on the Web sites, as well as the efficiency and effectiveness of conducting the task on these sites. The second was via the provision of scratch sheets during the execution of participants’ shopping tasks. With these, participants were instructed to jot down their ideas, perceptions, and thoughts as they carried out their online information seeking activities.

To analyse both information items identified by participants and free-form textual responses, a code book was developed. The coding of participant responses was necessary since participants utilized different words to describe the same information construct. For example, the responses ‘price’, ‘cost’, ‘\$', and ‘dollar value’ were all coded with the same information category (namely, ‘price’). Standardizing responses in this way facilitated comparison of information items identified across participants.

Producing the code book involved several rounds of iterations and verifications amongst the three researchers. Initially, one researcher was responsible for devising a preliminary coding structure. This was accomplished by manually going through the collected data (both the information items and free-form textual responses) and coding the content to a three-level category schema of information categories, with the higher levels loosely adapted from Mowen and Minor (1998) and Garvin (1988). Next, a different researcher independently took this preliminary coding structure and used it in conjunction with concepts from Rayport and Jaworski’s (2002) 7Cs framework for Web-based customer interface design to perform a classical content analysis (Ryan and Bernard 2000) on just the free-form textual responses portion of the collected data. Here *a priori* categories identified in the preliminary code book were adapted and expanded as the coding progressed. This is a valid technique used by qualitative researchers

(Miles and Huberman 1994), though strictly refrained from by advocates of classical content analysis (Krippendorff 1980). The resulting codebook was an elaborate coding structure comprising three hierarchical levels (see Tables 1, 2, and 3). The first level of coding comprised three broad categories: product-related, retailer-related, and interface-related. The second and third levels successively segmented these categories into specific areas of interest. There were 17 and 60 categories generated for the second and third levels respectively.

Table 1: Product-Related Coding Categories

Level 1	Level 2	Level 3	Description
PRODUCT			Pertains to information displayed about a product
	AESTHETICS	PICTURE COLOUR SIZE OTHER	Information about what the product looks like About seeing pictures/images of the product About viewing products in its various colours About the physical size of the product Other Aesthetics
	DESCRIPTION	GOOD POOR NAME OTHER	A written description of the product +ve aspects about the product description -ve aspects about the product description Brand or product names explicitly mentioned Other Description
	MANUFACTURER	NAME REPUTATION OTHER	Information about who makes the product Mention of the manufacturer's name About the manufacturer's reputation Other Manufacturer information
	PRICE	AMOUNT RANGE COMPLETE DISCOUNT REBATE GOOD POOR OTHER	Any mention of product price, discounts, rebates A specific dollar amount displayed for a product A dollar value range displayed for a product About seeing all or complete product pricing info About product discount or sale information About product rebate information About the price being good (cheap, reasonable) About the price being poor (high, expensive) Other Price
	QUALITY	GOOD POOR OTHER	Information about product quality +ve aspects of product quality -ve aspects of product quality Other Quality
	RELIABILITY	GOOD POOR OTHER	Information about product reliability & warranties +ve aspects about product warranty -ve aspects about product warranty Other Reliability
	SPECS	SPECS	Product specifications (features & performance)

Table 2: Retailer-Related Coding Categories

Level 1	Level 2	Level 3	Description
RETAILER			Pertains to information displayed about a retailer
	ADVICE	GUIDES REVIEWS FAQS HELP COMPARISONS RECOMMENDATIONS OTHER	About info the retailer to assist decision-making Buying guides (wizards) Consumer or expert reviews/ratings Frequently-asked questions About needing help or explanations of terminology Product comparisons Includes gift ideas, suggestions, recommendations Other Advice
	AVAILABILITY	AVAILABILITY	About the retailer having the product in stock
	DELIVERY	COST TIME METHOD OTHER	Information about the delivery of online purchases About costs pertaining to shipping/delivery About time delivery windows for product shipping About how shipping process works Other Delivery
	POLICY	POLICY	About the retailer's policies (returns, privacy, etc.)
	REPUTATION	REPUTATION	About the retailer's reputation.
	SELECTION	CANNOT-FIND OFFERS GOOD POOR OTHER	Information about the variety of products available Cannot find the specific product desired Offers or does not offer the desired product +ve aspects of the variety or # of products to choose -ve aspects of the variety or # of products to choose Other Selection
	SERVICES	GIFTWRAP CUSTOMER OTHER	Info about the services offered by the retailer Gift wrap Customer service/support or technical support Other Service

Table 3: Interface-Related Coding Categories

Level 1	Level 2	Level 3	Description
INTERFACE			How information on the Web site is displayed
	CONTEXT	ORGANIZATION NAVIGATION SPEED AESTHETICS OTHER	Refers to a site's general functionality and form Organization of information and product offerings About navigation of the Web site Speed at which the Web site loads Site aesthetics (e.g., colour scheme, clutter, font) Other Context
	CONTENT	CONTENT	About the quality of information displayed
	COMMERCE	SECURITY PRIVACY PAYMENTS ORDER-FULFILLMENT TRUST OTHER	Ability of the site to handle aspects of eCommerce Security Privacy Credit card transactions Order fulfillment Trust Other Commerce

To perform the classical content analysis, participants' free-form textual responses were broken down into individual recording units. In total, 962 recording units were identified. Each unit represented one discrete thought, statement, or comment. To code participants' textual responses, each recording unit was assigned a single category code from level three of the codebook that best described the recording unit's content. Coding at level three automatically coded the recording unit at levels one and two as well.

To test the reliability of this coding, a third researcher independently classified the 962 recording units. Before doing this, this third researcher was familiarized with the code book and the coding procedure through a training session on sample recording units. Inter-coder reliability was tested using Krippendorff's (1980) agreement coefficient. For the second level, the agreement coefficient was 0.93; for the third level, it was 0.82. These are acceptable inter-coder reliability measures as suggested by other academics. For example, Krippendorff (1980) advocates agreement of at least 0.70 and notes that some scholars (e.g., Brouwer *et al.* 1969) use a cut-off of 0.80. Wimmer and Dominick (1991) suggest that 0.75 or greater is normally acceptable for qualitative studies.

Discrepancies between the two sets of coding were resolved yielding a final data set of coded recording units. This final data set was then divided into two independent segments: those that originated from the browse task and those that originated from the search task. Final analysis was done by comparing frequency counts of recording units from these two segments across levels one, two, and three of the code book.

Having generated and tested the reliability of the code book, the first researcher utilized the code book to code the information items identified by participants as expected and found to be useful. Once this was done, a ten-point distribution scale was utilized to identify the relative importance of each information category across participants. That is, for each participant's response, categories rated as most important (rank 1) were given 10 points; rank 2 items were given 9 points etc. These points were summed for each information category across all participants to give a final summary score per information category. These final scores were then ranked from highest (rank of 1) to lowest to identify the more salient information categories expected and found useful by the participants across the two shopping tasks.

Steps were taken to ensure that participants were indeed in the appropriate search or browse mode when conducting their online tasks. The researchers felt confident that the search mode task facilitated this since it explicitly instructed participants to search for a particular gift. The browse task was a little trickier. Even though participants were not told to shop for a particular gift item for this task, there was some concern whether participants would self-select a specific product item or category prior to beginning their task – thus putting them more in a search mode than a true browse mode situation. To address this concern, a question was posed in the post-task questionnaire for the browse task which asked if participants had identified a specific product item or category prior to their online browsing. Fourteen participants answered affirmatively to this question. This yielded a subset of 17 participants who performed a "pure browse" task. Within-subject analyses of satisfaction and use of navigational tools were determined for both the total population and for this smaller sample.

Note that the study was inductive in nature. Rather than deductively proving the validity and appropriateness of pre-defined theory, the research focused on theory generation. This approach is valid in circumstances, such as the problem area under investigation, where few previous studies have been carried out and where insights are needed to identify and understand new theoretical constructs and their relationships to one another.

5. Findings

For the free-form textual responses, Figure 1 shows the overall breakdown of product-related, retailer-related, and interface-related recording units across the two shopping tasks. Top categories across the browse task were those pertaining to the Web site and the retailer, whereas the top category across the search task was product-related.

Table 4 outlines the percentage breakdown of recording units across level 2 of the code book. Utilizing a cut-off value of 8% as being meaningful, certain trends were evident from the table. First, certain types of information were important across both the browse and search tasks: product price; advisory information from the retailer to assist consumers in their decision-making process; product description; information about the variety of products available; and the functions and format of the retailer's Web interface. Second, in terms of the search task, participants preferred information pertaining to the searched product's specifications and manufacturer. Third, with respect to the browse task, participants showed a much larger concern for product selection information, placed greater emphasis on information pertaining to the retailer's reputation and delivery process, and were more concerned with the Web site's functionality and form.

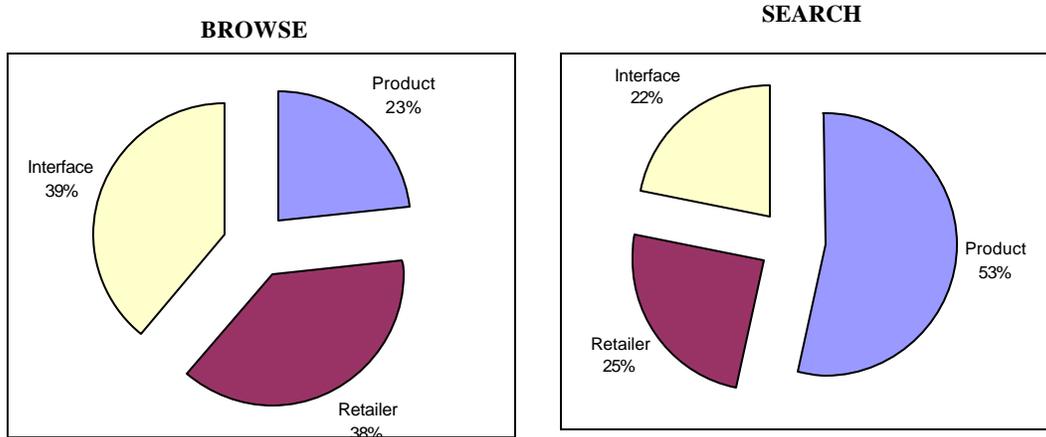


Figure 1: Level 1 Category Breakdown across Browse and Search Tasks

Table 4: Breakdown of Recording Units across Level 2 of the Code Book

Level 2 Code	Browse (n=330)	Search (n=632)
Product-Aesthetics	2 %	2%
Product-Description	8%	13%
Product-Manufacturer	1%	8%
Product-Price	10%	12%
Product-Quality	0%	1%
Product-Reliability	1%	1%
Product-Specs	2%	16%
Sub-total	23%	53%
Retailer-Advice	8%	9%
Retailer-Delivery	4%	1%
Retailer-Policy	0%	1%
Retailer-Product	2%	1%
Retailer-Reputation	3%	1%
Retailer-Selection	20%	12%
Retailer-Service	3%	0%
Sub-total	39%	25%
Interface-Commerce	2%	1%
Interface-Content	3%	2%
Interface-Context	33%	19%
Sub-total	38%	22%
TOTAL	100%	100%

Examination of the recording units at level 3 of the code book further reinforced the above findings. Table 5 lists the top ten information categories for both browse and search tasks at this level. Of interest is that these ten information categories account for 63% of browsing-related recording units and 69% of search-related recording units. Stated differently, about 20% of the information categories from the code book at level 3 account for roughly two-thirds of the recording units, working in a similar fashion to the *Pareto Principle* (i.e., the 80/20 rule). The table illustrates how participants in a browse mode were more concerned with the worthiness of the retailing Web site, specifically in terms of its navigation and organization, and of the retailer, especially in terms of the selection of goods offered at the site. In contrast, participants in a search mode placed greater emphasis on information about the product being searched, mainly in terms of detailed product specification information.

Table 5: The Top Ten Information Categories at Level 3 of the Code Book

Level 3 Code	Browse (n=330)		Search (n=632)	
	%	Rank	%	Rank
Product-Description-Name	4%	6/7/8	8%	3/4/5
Product-Manufacturer-Name			8%	3/4/5
Product-Price-Amount	4%	6/7/8	8%	3/4/5
Product-Specs			16%	1
Sub-total	8%		40%	
Retailer-Advice-Recommendations	3%	9/10	4%	7/8
Retailer-Advice-Reviews			3%	10
Retailer-Selection-Offers	7%	3		
Retailer-Selection-Good	6%	4	3%	9
Retailer-Selection-Poor	5%	5	4%	7/8
Retailer-Reputation	3%	9/10		
Sub-total	24%		14%	
Interface-Context -Aesthetics	4%	6/7/8		
Interface-Context -Navigation	14%	1	9%	2
Interface-Context -Organization	13%	2	6%	6
Sub-total	31%		15%	
TOTAL	63%		69%	

Recall that participants were asked several open-ended questions in the questionnaires to poll their perceptions on the information displayed and presented on the Web sites, as well as the efficiency and effectiveness of conducting the task on these sites. One such question asked participants to identify the most helpful site in each task, and to explain why they found this site helpful. In the browse task, 52% percent of participants cited criteria related to the interface context, 35% cited advice features such as recommendations or reviews, and 26% cited good product descriptions. In the search task, the same three criteria were found at the top of the list, cited by 42%, 58% and 65% respectively. Participants were also asked which site they found the least helpful. In the browse task, poor interface context (48%) and poor product selection (42%) were the most commonly cited criteria. These same two criteria were again the most often cited for the search task, at 45% and 58% respectively. Table 6 provides an overall ranking of items found most and least helpful across the two tasks in terms of the percentage of participants who cited these items, yielding findings which are again consistent with those mentioned above.

Table 6: Criteria Cited by Participants for Determining the Most and Least Helpful Retail Sites

RANK	BROWSE		SEARCH	
	Most Helpful Site	Least Helpful Site	Most Helpful Site	Least Helpful Site
1	Interface-Context (52%)	Interface-Context (48%)	Product-Description (65%)	Retailer-Selection (58%)
2	Retailer-Advice (35%)	Retailer-Selection (42%)	Retailer-Advice (58%)	Interface-Context (45%)
3	Product-Description (26%)	Retailer-Advice (6%)	Interface-Context (42%)	Product-Description (23%)
4	Retailer-Selection (23%)	Product-Description (6%)	Retailer-Selection (35%)	Product-Price (3%)
5	Retailer-Reputation (16%)	Product-Price (3%)	Retailer-Reputation (6%)	Retailer Advice (3%)

% refers to the number of participants who cited the criterion item

Table 7 ranks the top 10 information categories in each of the browse and search tasks according to the information expected prior to the task and the information found useful. Summary scores for each information category are displayed as well.

Table 7 Ranking of Information Categories for the Search and Browse Tasks

Rank	BROWSE		SEARCH	
	Expected to be Useful	Found Useful	Expected to be Useful	Found Useful
1	Product-Price (269)	Product-Price (271)	Product-Specs (357)	Product-Specs (356)
2	Retailer-Delivery (150)	Retailer-Advice (164)	Product-Price (253)	Product-Price (253)
3	Retailer-Advice (146)	Retailer-Selection (112)	Retailer-Advice (145)	Retailer-Advice (201)
4	Retailer-Selection (111)	Product-Aesthetics (97)	Product- Manufacturer (94)	Product-Manufacturer (105)
5	Retailer-Availability (86)	Retailer-Delivery (97)	Product-Reliability (84)	Product-Description (57)
6	Product-Specs (84)	Retailer-Availability (86)	Product-Description (71)	Retailer-Selection (54)
7	Product-Description (79)	Product-Description (82)	Product-Aesthetics (59)	Product-Aesthetics (53)
8	Product-Aesthetics (76)	Product-Specs (61)	Product-Quality (55)	Product-Reliability (53)
9	Retailer-Policy (64)	Retailer-Policy (54)	Retailer-Selection (44)	Product-Quality (42)
10	Retailer-Reputation (36)	Retailer-Services (47)	Retailer-Policy (42)	Retailer-Delivery (37)
11	Product-Quality (29)	Retailer-Reputation (33)	Retailer-Delivery (36)	Retailer-Availability (31)
12	Product-Manufacturer (25)	Product-Manufacturer (28)	Retailer-Reputation (35)	Retailer-Reputation (22)
13	Retailer-Services (24)	Product-Quality (16)	Retailer-Services (19)	Retailer-Services (20)
14	Product-Reliability (12)	Product-Reliability (8)	Retailer-Availability (14)	Retailer-Policy (12)

The number in brackets refers to item’s raw summary score

In terms of the rankings for information found useful across the two shopping tasks, there were some interesting patterns. First, while price was ranked number one in the browse task, product specifications was ranked number one in the search task. Second, in terms of the top five rankings, both price and information to assist decision-making, such as FAQs, recommendations, reviews etc., appeared to be important information categories in both browse and search tasks.

Differences appeared in the remaining three information categories within the top five that were found useful across the two shopping tasks. Search tasks seemed to favour specifications, description, and manufacturer information – these pertain to details about the product. Browse tasks seemed to favour selection, aesthetics, and delivery information – these pertain to looser information attributes in that they were not concerned with the actual workings of the product or the manufacturer’s reputation but rather with what products were available, how they generally looked, and the cost and time to deliver these products to the consumer.

Kendall’s W (coefficient of concordance) was used to determine the degree of association between the rankings of expected and found useful information items both between and within the two tasks. For both tasks, there was a strong association between the information expected and the information found useful within a task ($W = 0.957$ and 0.952 for the browse and search tasks respectively, $p < 0.05$). However there was a much weaker association in ranking patterns between the search and browse tasks ($W = 0.589$ for expected information and 0.686 for found useful information, $p < 0.05$).

Recall that participants rated their satisfaction with the Web sites used in the study. As the results in Figure 2 show, participants were more satisfied with the Web sites in terms of supporting product search rather than product browsing. A Wilcoxon signed ranks test on the difference in satisfaction levels produced an exact significance of 0.018 at a 90% confidence level. Using only the subset of “pure browsers”, these results were still significant at 0.021, despite the reduced sample size.

Participants in their questionnaires were also asked to indicate if they used certain navigational tools and features on the Web sites to help them perform their tasks. A McNemar test was used to determine levels of significance across browse and search tasks. Some of the more meaningful results were as follows:

- There was no significant difference found in the use of categorical menus, links to detailed product information, “more like this” links, or featured products pages.
- More participants used a search engine in the search task (74%) than in the browse task (52%) ($p < 0.10$). This result was even stronger when only pure-browsers were examined ($p < 0.05$).
- More participants used gift recommendations (by recipient and by price) in the browse task (30%) than in the search task (6%) ($p < 0.05$). This result was not significant with the smaller sample.
- More participants used product reviews in the search task (80%) than in the browse task (52%) ($p < 0.05$). This result was not significant with the smaller sample.
- More participants used product comparison tools in the search task (61%) than in the browse task (6%) ($p < 0.05$). This result was still significant with the smaller “pure-browser” sample.

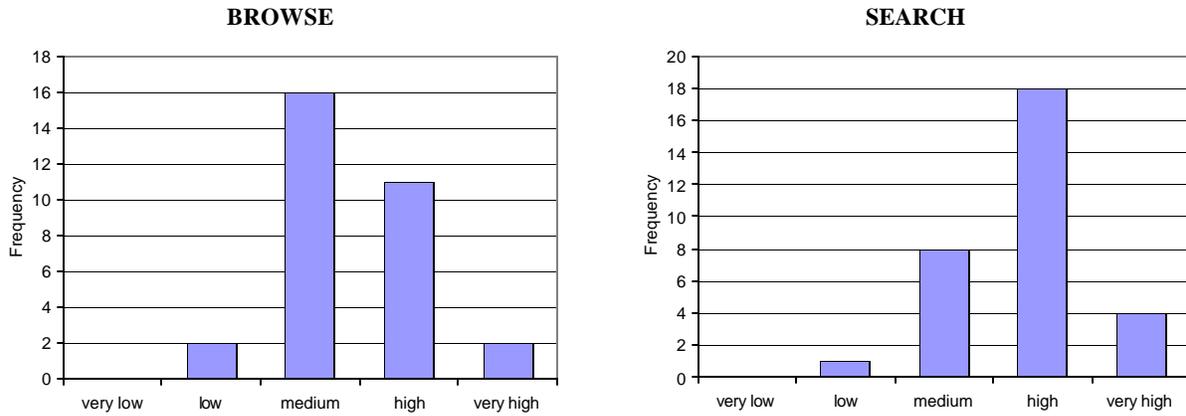


Figure 2: Satisfaction Levels across Browse and Search Tasks

6. Discussion and Conclusions

Recall the purpose of this paper was to explore consumer preferences for Web-based product information display across browse and search shopping activities. The above findings provide insight into the differences and similarities in consumer preferences for pre-purchase online information display across these two tasks.

Overall, there were several information items that were relevant in both the browse and search tasks: pricing, product description, retailer selection, and retailer advice. This suggests that online retailers need to present these particular information items on the computer interface in ways that are highly visible and easily accessible for consumers. In addition, it was found that both modes of information seeking required a good interface design, suggesting the requirement for online retailers to make their information displays navigable, organized, fast, and aesthetically pleasing across both modes of information seeking activity.

Further, there were general differences in consumer preferences across the two tasks. Online consumers who were browsing preferred information about the retailer, especially in terms of the retailer’s reputation and delivery of goods, while those in a search mode preferred detailed product information, namely in terms of product specifications and manufacturer information.

Figure 3 summarizes these findings into a theoretical framework for Web-based product information display that supports the full spectrum of consumer information seeking activity from browse to search. The figure illustrates that certain Web-based information items (i.e., those in the join of the two circles) should be displayed for both browse and search. Additionally the retailing site should be well organized and navigable for both modes. The figure also shows how different information items should be stressed in each of the browse and search modes (i.e., those information items not in the join of the two circles).

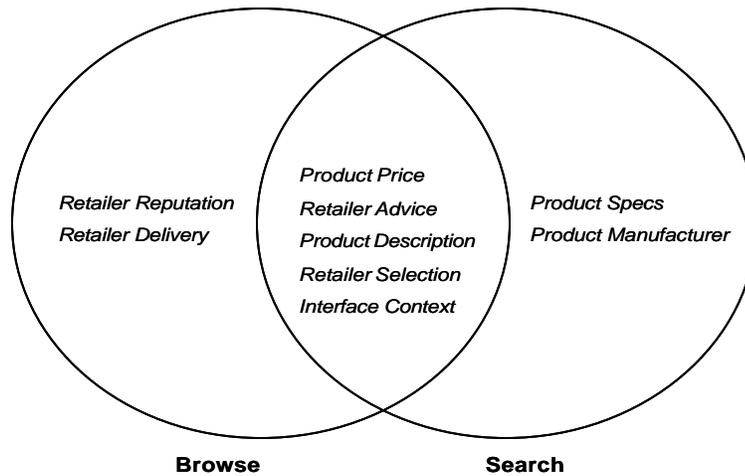


Figure 3: A Framework for Web-Based Product Information Display

The proposed theoretical framework has implications for the design of online shopping sites. First, online sites need to support both modes of information seeking. Evidence from this study indicates that Web retailing sites currently favour goal-directed search over browsing, since more participants were satisfied with the Web site designs for the search task. Second, Web retailing sites need to tailor their information displays based on the consumer information seeking mode. The results above indicate differences in the use of navigational and site features across the two shopping tasks. Browsers want “starting tools” such as gift recommendations; searchers want “differentiating tools” such as products reviews and comparisons, as well as access to site search engines (Choo *et al.* 1999). Web retailing sites need to be aware of this difference when personalizing Web site designs to consumers across browsing and searching tasks.

One promising technology that potentially offers Web retailers a means to facilitate shoppers’ Web-based information seeking behaviour is intelligent agents. These are software entities that perform specific tasks continuously and autonomously in a particular environment often inhabited by other agents and processes (Shoham 1997). The use of agents has been well-documented in the electronic commerce domain (Maes 2001; Maes *et al.* 1999; Jennings and Wooldridge 1998). Of particular interest is a recent study by Choo *et al.* (2000, 1999) who devise and empirically validate an integrated model of Web-based browsing and searching that relates search and browse modes of information seeking with specific Web browser-based actions (e.g., page forward, page back, print, stop, selecting a hypertext link, using a local search engine etc.). The results of their study suggest the feasibility of developing interface agents on Web retailing sites that monitor consumer browser-based actions and to use that knowledge to deduce a shopper’s information seeking mode. Once deduced, the interface agent could react by tailoring the display of information as per the guidelines suggested in Figure 3. For example, if a consumer were engaged in product browsing, the agent could present more information about the retailer’s reputation and the selection of products the retailer offers. Likewise, if the consumer exhibited searching behaviour, the agent could quickly present detailed product information about the product’s manufacturer and specifications. The hope of building such agents is that it will increase the usability of the online shopping interface and create a more effective and amenable environment for consumers to purchase goods.

Admittedly, the results of this study are constrained by certain limitations, namely the use of a student sample and the artificial nature of the shopping exercise. Results would be more generalizable had a more representative test population been used, had participants undergone a real-life purchase, or if a variety of product categories had been used in the search task other than one specific product (i.e., a digital camera).

However, despite these limitations, the study’s results have merit. First, the study offers initial evidence of the need to support both goal-directed and experiential behaviour in online shopping environments, as proposed by Hoffman and Novak (1996). The study’s results show that online shoppers do behave differently in these two tasks and that there is a need for some difference in the display of information on Web shopping sites to support these two shopping modes.

Second, the paper presents a framework for Web-based product information display that Web designers can follow to present information in ways that better ‘fit’ these two shopping tasks. The framework is an attempt to address Novak *et al.*’s (2000) call to identify and consider the specific elements in commercial Web site design that would facilitate a compelling consumer experience, and Goodhue’s (1998) call to match the functionality of information systems with the task requirements of users.

Third, the study opens up avenues for further research. The primary motivation for this study was ‘flow on the Web’ theory. This theory suggests the need to create compelling online shopping environments that facilitate flow and calls for the design of CMEs to support both goal-directed and experiential behaviour as a means of doing this. Though this paper offers insights into how to support browse and search tasks in e-tailing sites, more research is required to nail down the exact requirements. For example, experiments are needed which test various potential layouts of information and features on electronic shopping sites across scenarios of browse and search activities in order to determine the best layouts of Web design for shopping and the more salient mediating variables affecting consumer satisfaction with such designs.

In conclusion, the goal of this study was not to pursue generalizations but rather to obtain insights on the different ways information should be displayed across pre-purchase browsing and searching behaviour – a problem area which is novel and where research and theory are in their early formative stages. As such, the goal was to learn something new. In this respect, the study was successful. The results of this study hint at the possibility of tailoring the display of Web-based product information based on the wider range of modes in which consumers seek pre-purchase information. Doing so may help Web retailers build better, more compelling online shopping environments that facilitate flow and lead to increased online product purchases.

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