Influence of Query-Based Decision Aids on Consumer Decision Making in Electronic Commerce

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This research investigates the influence of computerized search engines on consumer decision making in the electronic commerce environment. The results indicate that by providing well-designed decision aids to consumers, it is possible to significantly increase consumer confidence, satisfaction, and decision quality. Consumers who have access to query-based decision aids perceive increased cost savings and lower cognitive decision effort associated with the purchase decision. The future challenge in developing consumer-oriented computerized decision aids does not reside in technological advances, but rather in developing systems that are useful and appealing to the intended consumer. This is necessary to avoid consumer perceptions of non-utility, and ultimately non-use of the computerized decision aids. The challenge for marketing managers is to provide consumers with information systems that change over time such that they fulfill the consumers' short-term needs without sacrificing the consumers' long-term interests.

INTRODUCTION

The phenomenon of consumers purchasing products on the World Wide Web is relatively new. In this business model, consumers select items to purchase from electronic shopping malls by making queries to databases using software tools such as software smart agents. A large proportion of the purchase transaction is conducted via computers without the consumer ever having face-to-face contact with the sales personnel. This has raised a host of interesting research issues which need to be investigated. Research that should shed light on such issues is already underway (e.g. Degeratu, Rangaswamy, and Wu's (1998) study of electronic commerce for grocery items, Lynch and Ariely's (1998) study of electronic commerce for wines, and Shankar and Rangaswamy's (1998) study of electronic commerce in the travel industry).

Cognitive effort and perceived decision accuracy are important determinants of how the query-based decision aids (QBDA) are used. While designers of Web sites can use this knowledge to their advantage, ignoring it may lead to the tools being used in unanticipated and undesirable ways. Designers of web sites who take a non-directive approach to the design of their Web sites risk foregoing the improved decision quality benefits and are instead more likely to see

efficiency benefits. Only by designing Web sites efficiently, using the reduction of cognitive effort as a key lever, will the use of the decision aids for the purpose of electronic commerce result in increased decision-making effectiveness. Documenting the performance of these computerized decision aids in varied environments should help identify the conditions under which they can be used to a decision maker's advantage and when they might create system-induced errors. Understanding when problematic interactions are likely to occur should focus research attention on corrective mechanisms to mitigate the potential for error.

One of the main objectives of marketing managers is to present consumers with information on which to base their decisions. Since there is an abundance of potentially relevant information and since consumers have limited cognitive resources available to process this information, there is a need for marketing managers to choose wisely what information to present, and how to present it. The issue of information overload has occupied marketing managers for some time now, as it relates to all forms of marketing communications. The relevance and scope of this problem has increased tremendously with the prevalence of electronic information, computers, and computer networks (Alba, Lynch, Weitz, Janiszewski, Lutz, Sawyer, and Wood, 1997; Hoffman and Novak, 1996a; Gupta, 1995; Hoffman, Novak and Chatterjee,

1995). Rapid advancements in Web technology have offered a solution to this dilemma in the form of computerized decision aids which use software smart agents to provide an intelligent interface to the consumer.

The objective of this research is to understand how query-based decision aids (QBDA) influence consumer decision making. The term "query-based decision aids" (QBDA) refers to the search and decision-making tools available on the World Wide Web such as those provided by Personal Logic (http://www.personalogic.com), Microsoft Carpoint (http://carpoint.msn.com), and Auto-by-Tel (http://www.autobytel.com). These tools support the decision making process of consumers who are shopping on the World Wide Web.

DESCRIPTION OF TREATMENT CONDITIONS

To investigate the relationship between the presence of the computerized decision aid and the dependent variables, two versions of an interactive, computer-driven decision aid were developed. Each version contained a database of attribute-value information for 400 car models which are currently available in the USA. Beyond the common database, the versions varied by whether or not the subjects had access to a query-based decision aid (QBDA) which enabled them to specify their preferences and provided them with information which indicated the extent to which each alternative matched their preferences. This resulted in two distinct types of decision environments.

Treatment Condition #1: Subject has access to the query-based decision aid

The design of the decision support system for subjects who had access to the QBDA was identical to the system designed by Personal Logic (http://www.personalogic.com) which is currently being used to sell cars on the World Wide Web. The initial screens of the decision making task are used to elicit a preference structure from the subject about the specific product he/she would like to purchase. The subject is asked to assign weights to each of the attributes which he/she considers important in the purchase of that product. The subject is then asked to specify values or ranges for some or all of the attributes which he/she would like in the specific brand he/she purchases. Based on this information, the system computes a preference matching score for each of the alternatives in the database. The preference matching score provides an indicator of how closely each of the alternatives in the choice set matches the preferences expressed by the subject.

The preference matching score is computed by taking into account the preference values for the attributes expressed by the subject, the weights assigned to each of these attributes in the decision task by the subject, and the attributes values for each alternative in the choice set. A linear weighted average model is used to combine these values to obtain the preference matching score. This preference matching score is measured on a scale of 0 (completely different) to 100 (completely similar). A score of 0 indicates that the alternative does not match the preferences expressed on any attribute. A score of 100 indicates that the alternative matches the preferences expressed on all the attributes specified. The method of establishing ratings for each attribute of each alternative in the choice set is illustrated in Table 1.

From the next screen the subject begins the selection process. If the subject is in the treatment group which has access to the QBDA, the next screen lists all the alternatives in the database sorted in descending order of the preference matching score for each alternative. The preference matching score is indicated on the screen. The subject is asked to browse through the list. If the subject clicks on any alternative, he/she is taken to the web site which contains detailed information about that alternative, including a photograph. The subject is told to select the alternative currently being evaluated for further processing in his/her decision process if he/she would seriously consider purchasing the alternative. Otherwise the subject can reject this alternative from further consideration in his/her decision process. Either way the subject is returned to the screen which lists all the alternatives except the alternatives the subject has already evaluated. The subject can browse this list and view the detailed information about as many alternatives as he/she wishes.

When the subject indicates that he/she has evaluated a sufficient number of alternatives, the next screen displays the list of alternatives which the subject has selected for further processing in his/her decision process. The process of sequential elimination of alternatives from the consideration set is followed iteratively, and the subject is allowed to narrow the consideration set in stages at his/her own pace without any restrictions being placed on his/her decision making by the system. After several stages of phased narrowing of the consideration set, the subject arrives at his/her final decision with regard to which alternative he/she would like to purchase.

Treatment Condition #2: Subject does not have access to the query based decision aid

The second treatment condition in which the subject does not have access to the QBDA is identical to the previous treatment condition except that the screen lists all the alternatives in the database sorted randomly without providing any information with regard to the extent to which each alternative matches the subject's expressed preferences. The process of phased narrowing of the alternatives in the consideration set proceeds similarly to the previous treatment condition except that the subject is not provided with information which indicates the extent to which the alternatives in the consideration set match his/her preferences.

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