VARIABLES OF SEARCH INTERVIEW TECHNIQUES AS ANTECEDENTS OF USER SATISFACTION WITH ONLINE BIBLIOGRAPHIC RETRIEVAL*

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ABSTRACT

This paper presents the findings of a three-year research study that systematically investigated the impact of different interview techniques on the satisfaction of users with the results of online bibliographic searches. Two controlled experiments were conducted: the first involved the conscious use of "open" and "closed" questions; the second the use of pauses of different lengths by the search analyst during the online negotiation interview. Each experiment involved two search analysts, each located in a special library serving a faculty of education. Data were collected on various aspects of the user's need for information, the value he/she placed upon new knowledge, and the consequences of inadequate information. A framework drawn from the field of the economics of information was used to guide the selection of variables. Analysis of variance was the technique used to analyze the data.

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VARIABLES RELATIVES AUX TECHNIQUES D'ENTREVUE: ANTECEDENTS A LA SATISFACTION DE L'USAGER AVEC SA RECHERCHE BIBLIOGRAPHIQUE EN-LIGNE.*

RESUME

On présente les résultats d'un projet de recherche de trois ans qui a étudié systématiquement l'impact de de diverses techniques d'entrevue sur la satisfaction des usagers avec le résultat de leurs recherches bibliographiques en-ligne. Deux expériences contrôlées furent menées: la première avait trait à l'utilisation consciente de questions "ouvertes" et "fermées"; la seconde consistait dans l'utilisation de pauses de longueurs variables, par l'analyste de recherche, durant les entrevues de négociation de la recherche. Chaque expérience impliquait deux analystes de recherche dans une bibliothèque spécialisée desservant une faculté d'éducation. Des données furent colligées sur divers aspects des besoins d'information de l'usager, la valeur qu'il/elle attribue à la connaissance et les conséquences d'une mauvaise information. Une infrastructure basée sur l'économie générale de l'information fut utilisée comme guide pour le choix des variables. L'analyse de variance fut utilisée pour analyser les données.

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VARIABLES OF INTERVIEW TECHNIQUES

The purpose of this paper is to briefly highlight some of the findings of a three-year investigation into the relationship among techniques used by searchers in the negotiation interviews preceding online bibliographic retrieval; the amount of new information gained by the user as a result of the search; and the ultimate satisfaction of the user with the quality of the items retrieved. Detailed descriptions of the methods used for data collection and analysis as well as a complete report of the results are available elsewhere (Auster, Lawton, & Currie, 1982; Auster and Lawton, 1982).

It will be recalled a series of controlled experiments were conducted to explore the effects of two interview techniques: the conscious use of "open" and "closed" questions and the use of pauses of different lengths by the search analyst during the online negotiation interview. In addition, we hypothesized that user satisfaction would be greatest when both the amount learned and the importance of the information were both high and lowest when both of these factors were low. Where a little information was of high value - based on an economics of information framework - or an extensive amount of little value, one would expect middle levels of satisfaction. This hypothesis is illustrated in Figure 1 below.

		Amount Learned	
		High	Low
Importance	High	1	2
	Low	3	4

Figure 1. Hypothesized rank ordering of satisfaction scores in relation to the amount and importance of information obtained.

Interview Techniques

Results of the experiments to answer the first research question concerning the effects of types of questions and lengths of pauses on the amount a user learns as a result of a search and his or her overall satisfaction are presented in tables 1 and 2. Two-way analysis of variance was used, with ANALYST as a control variable. (A control variable -- as distinct from the control group -- is one which holds some variable constant so that the effects of other variables can be seen.) By controlling for analyst, one also controls for other variables correlated with analyst; in this case, variables such as the sex, experience and style of the search analysts, the different ages of their users and so forth. It is apparent from the tables that the users of one analyst, Analyst B, reported learning more and being more satisfied than those of the other analyst. It is not our purpose to explain this fact and we would note that the differences may reflect as much differences in the users as in

the analysts.

Table 1 indicates that the asking of open and closed questions did not have a direct effect on the amount learned by users. As well, there was no significant interaction between analyst and question type; that is, asking open questions did not "work" better for one analyst while asking closed questions "worked" better for the other.

Table 1 also indicates that the tvpe of pause (moderate or no pause) did have a significant effect on the amount users learned, though not in the direction hypothesized. In particular, the interviews during which analysts tried to extend pauses to ten seconds produced users who learned significantly less than did interviews during which no pauses were used or when there was no attempt to change the natural style of interviewing.

Table 2 reports the effects of the type of question and pause on overall satisfaction. None of the differences, even between analysts, are statistically significant at the .05 level, the usual criterion used. We would note, though, that the p-values are relatively low for the main effects (i.e., for question and pause but not the interaction effects). Average satisfaction was higher when open questions were asked than in the control interviews or when closed questions were asked. As well, overall satisfaction was lower when moderate pauses were used than when no pauses were allowed or when a natural interview style was used.

One feature also evident in tables 1 and 2 are the small sample sizes in each cell, numbering as small as 5 and with a maximum of 14. All were supposed to be 15 (and if they had been we suspect all of the effects noted above would be statistically significant). Unfortunately, though all 150 searches planned were conducted, it was not possible to obtain evaluation results from all users. Further, some who did return evaluation questionnaires or who were interviewed on the topic by phone, did not answer all items included in the satisfaction scale.

Further analysis described in our final report of this study confirms, though, that the trends described above are, in fact, real.

Importance of Information

The key elements of the second research question concern relationships among the importance of information to a user (i.e., its value or worth), the amount of new knowledge that an individual gained as a result of conducting an online search, and his or her satisfaction with the information received as a result. Using a framework from the economics of information and decision theory, a rank ordering of satisfaction for different levels of importance and of information gain was hypothesized (figure 1).

Table 3 presents the average satisfaction scores for the four cells suggested by figure 1, and figure 2 presents the rank ordering of the cell means as actually observed.

		Amount Learned	
		High	Low
Importance	High	2	4
	Low	1	3

Figure 2. Actual rank ordering of satisfaction scores in relation to the amount and importance of information obtained.

The ordering is certainly not as hypothesized and, at first glance, appears to be unrelated to the original propositions. However, this is not the case. What was incorrect, apparently, was our expectation that importance would be the dominant independent variable. In fact, the amount learned dominates. Thus, those learning the most about their topic were, overall, more satisfied than those who learned less. And, within these categories, those placing high importance on the information obtained tended to be associated with lower satisfaction scores rather than higher satisfaction scores, and vice versa. Stated simply, those to whom information is very important are harder to please.

Limitations

The users whose interaction with the search analysts and whose satisfaction with the results of their search were being studied were almost all university students in faculties of education who requested searches related to the assignments they were doing. While we suspect that the effects of the experiments and of the amount learned on the users' level of satisfaction would hold true for other populations, the relative roles of "prior knowledge" and the "importance of information" might very well be different for other types of users seeking information for different purposes.

We treated as "constants" what others might have considered "variables", for example, method of contact (walk-in), type of search (retrospective) and type of library (education). While system used, topic, data base, presence of user during search could have been introduced as independent variables given a sufficiently large sample size, we chose to assume that they varied randomly.

Still, even with these limitations and that of using only two analysts, the major effects were strong enough to be readily evident. We believe therefore they would be at least as evident in a more favourable field setting.

Implications and Conclusions

It is clear that the negotiation behaviour of the search analyst during the online searching process can be altered and altered in such a way as to positively affect the quality or outcome of the search as perceived by the user. One may conclude that search analysts should become proficient in asking open questions and that if such a facility were developed it would increase the satisfaction of the user and thus affect the overall evaluation of the search service in a positive way. Further, if the use of question types used by the analysts has been shown to be maleable and to have a beneficial affect on user satisfaction it may be supposed that other factors identified in the literature on interview techniques may be taught, learned, and proved useful as well.

Results of the pause experiment serve to temper our optimism somewhat. While we expect a positive relationship between pauses of moderate length and user satisfaction, we are reluctant to conclude that any attempt to slow the pace of questioning will reduce satisfaction. Rather, with the benefit of hindsight, we would advise search analysts simply to "count to 3" after a break in conversation to ensure the user has nothing more to say.

The utility of an economics of information framework to explain user satisfaction is ambiguous. Many of the relationships were weak, unexpected, or both suggesting perhaps that a better explanation is found elsewhere. Cognitive psychology that emphasizes the "maps" that people develop in their minds in order to account for the world they observe (Woodward, 1980) may provide one such alternative that would be consistent with the findings. In any case, the field of online searching and the roles and behaviours of those participating in it will provide a fertile if perplexing arena for researchers for years to come.

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Table 1 Summary of ANOVA Results for Assessing Affects of Question Type and Pause on New Knowledge Controlling for Analyst

Question Experiment

Cell Means and Frequencies

	Control	Open	Closed
Analyst A	7.00 (13)	6.57 (14)	7.09 (11)
Analyst B	7.64 (14)	7.91 (11)	7.31 (13)
Total	7.33 (27)	7.16 (25)	7.21 (24)

QUEST	$F(2,70) = 0.05$	$p = .948$
ANALYST	$F(1,70) = 3.66$	$p = .060$
Q x A	$F(2,70) = 1.95$	$p = .501$

Pause Experiment

Cell Means and Frequencies

	Control	Moderate	None
Analyst A	7.00 (13)	5.33 (9)	7.15 (13)
Analyst B	7.64 (14)	7.11 (9)	8.00 (11)
Total	7.33 (27)	6.22 (18)	7.54 (24)

PAUSE	$F(2,63) = 3.80$	$p = .014$
ANALYST	$F(1,63) = 3.14$	$p = .050$
P x A	$F(2,63) = 1.86$	$p = .572$

Table 2 Summary of ANOVA Results for Assessing Affects of Question Type and Pause on Overall Satisfaction Controlling for Analyst

Question Experiment

Cell Means and Frequencies

	Control	Open	Closed
Analyst A	17.8 (12)	18.8 (13)	16.6 (10)
Analyst B	18.9 (14)	20.6 (10)	18.0 (12)
Total	18.4 (26)	19.6 (23)	17.4 (22)

QUEST	$F(2,65) = 2.008$	$p = 0.143$
ANALYST	$F(1,65) = 2.301$	$p = 0.134$
Q x A	$F(2,65) = 0.818$	$p = 0.949$

Pause Experiment

Cell Means and Frequencies

	Control	Moderate	None
Analyst A	17.8 (12)	16.6 (5)	17.6 (11)
Analyst B	18.9 (14)	16.9 (8)	19.6 (11)
Total	18.4 (26)	16.8 (13)	18.6 (22)

PAUSE	$F(2,55) = 1.320$	$p = 0.276$
ANALYST	$F(1,55) = 1.728$	$p = 0.194$
P x A	$F(2,55) = 0.224$	$p = 0.800$

Table 3 Analysis of Variance Showing Relationship of Importance of Information and New Knowledge with Overall Satisfaction

Cell Means and Frequencies

		NEWKNOWL		
		High	Low	Mean (Total)
IMPORT	High	19.1 (29)	15.7 (23)	18.3 (53)
	Low	19.8 (27)	16.8 (26)	17.6 (52)
	Mean	19.4 (56)	16.3 (49)	18.0 (105)

ANOVA Table

Source of Variation	SS	df	MS	F	p-value
IMPORT	21.03	1	21.03	1.460	0.230
NEWKNOWL	261.32	1	261.32	18.132	0.000
IMPORT x NEWKNOWL	1.48	1	1.48	0.103	0.749
Explained	277.30	3	92.44		
Residual	1455.61	101	14.41		
Total	1732.91	104	16.66		