ONLINE NEGOTIATION TECHNIQUES AND USER SATISFACTION: IMPLICATIONS FOR TRAINING SEARCH ANALYSIS

LES TECHNIQUES D'ENTREVUE PREALABLE A UNE RECHERCHE SUR ORDINATEUR ET LA SATISFACTION DE L'USAGER: LES INCIDENCES SUR LA FORMATION DES ANALYSTES DE RECHERCHE

Ethel Auster
University of Wisconsin Library School
4251 Helen C. White Hall
Madison, WI   53706

A. Blaine Currie
The Ontario Institute for Studies in Education
252 Bloor Street West
Toronto, Ontario   M5S 1V6

ABSTRACT

Previsous research has suggested that in the interaction between
the user with his/her knowledge and understanding of his/her
information needs, and the search analyst, with his/her
understanding of the retrieval system and data bases, lies the
key to understanding why some searches are more successful than
others. In our research, we have conducted a series of
experiments in order to determine the relationship between
interview techniques, knowledge gain, and user satisfaction with
the references retrieved. This paper is a preliminary
exploraiton of 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.

RESUME

Diverses études suggèrent que la clef du succès ou de l'échec de
certaines recherches réside dans l'interaction entre l'usager,
avec son bagage de connaissances et sa compréhension de ses
besoins d'information, et l'analyste de recherche, avec sa
connaissance du système et des banques d'information. Notre
recherche nous a amené à mener une série d'expériences pour
déterminer une relation entre les techniques d'entrevue, les
connaissances acquises et la satisfaction de l'usager quant aux
références reperées. Cet exposé est une première analyse sur les
effets de deux techniques d'entrevue: l'utilisation de façon
pré-déterminée de questions "ouvertes" et "fermées" pendant
l'interrogation du client, et l'utilisation de certaines pauses
de longueur variable par l'analyste de recherche.

INTRODUCTION

The development of online bibliographic search services, which provide the possibility of conducting automated library searches, is one of the most important revolutions which has occurred in library science in the past decade (Wanger, et al., 1976). These automated search services provide an alternative to the labor-intensive process of manually locating bibliographic citations in indexes such as Psychological Abstracts, ERIC, and Social Sciences Citation Index. But, unlike other innovations in library automation that have effected mainly technical services (e.g., computerized cataloguing, circulation systems, etc.), online bibliographic services affect the relationship existing between the library user and the library materials. Instead of direct access to the indexes, the user of an online bibliographic service typically has intermediaries between him/herself and the materials: a search analyst (usually a specially trained reference librarian), and the computer system itself. The analyst must comprehend the search request and devise an appropriate search strategy, keeping in mind the needs of the user, the capabilities of the system, and the constraints of the service. The system largely determines the type of information that may ultimately be retrieved, the limits within which the search may be made, the format of the bibliography retrieved and printed, and the cost of the search.

In this paper, we are concerned with the first of these intermediaries, namely the search analyst, with special attention given to how various interview techniques used by the analyst can affect search results and user satisfaction. Obviously, inadequate communication between the user and the search analyst can result in the development of an inadequate search strategy which fails to retrieve bibliographic citations relevant to the user's concern (Atherton and Christian, 1977). Hence, the ability of the search analyst to elicit pertinent information from the user and to convert this information into an appropriate search strategy must be viewed as an extremely important skill.

METHOD

In the research reported here, we undertook a series of experiments that looked closely at the role and behaviour of the search analyst in order to determine the relationship between the interview techniques that were utilized and the user's level of satisfaction with the quality of references retrieved. To do so, we obtained the assistance of two volunteer search analysts at different Canadian university libraries who expressed an interest in participating in the study. They underwent a one-day training session to become familiar with the interview techniques that we wished to explore before beginning the controlled experimental interviews.

Because of the difficulty of trying to employ several techniques in the same interview, the search analysts were asked to experiment with one technique at a time. Specific techniques to be investigated included: "open" vs. "closed" questions, and the use of pauses of different lengths to stimulate the client to elucidate his information need. Open questions refer to those open-ended questions which require more than a few words for an adequate response, whereas closed questions can be adequately answered in a few words (identification of person, place, number, etc., or a yes-no response). Pauses refer to those periods during which the interviewer waits without speaking for the user to begin speaking or continue speaking. Both question type and length of pause have been identified by Richardson (1965) as being related to the quality of interviewee response, and were also noted in exploratory studies of negotiation interviews undertaken by Auster and Lawton (1979).

Open questions were expected to stimulate responses which had greater breadth and depth than those for closed questions. It was believed that these extensive responses to the open questions would tend to provide a more valid map of the user's problem area than would responses to the closed (identification, selection, yes-no) question. In other research, it was found that the use of pauses in the interview tended to have an effect on the user's participation in the interview process, with shorter pauses (under 10 seconds) stimulating deeper participation by the user, and longer pauses (over 10 seconds) inhibiting greater participation (Richardson, 1965). We expected the same results in the research being reported here.

As a control for each of the experiments, a series of 15 'naive' interviews were conducted by each analyst before they were trained in the four techniques (i.e., open question, closed question, short pause and long pause). Fifteen interviews were then carried out for each of the two levels of the open/closed, and short pause/long pause variables. Hence, a total of 75 interviews were conducted by each of the two analysts, yielding a sample size of 150.

The order in which the interviews of each of the four types were done was chosen in a random fashion, so as to endure that any systematic trends that might develop were removed from the treatment effects. The naive control interviews were conducted prior to any training or exposure to the four experimental techniques, since it was believed that any such training would likely alter the search analysts' behaviour.

Users were screened so that only those seeking retrospective subject matter searches in the social sciences were included. Any given user was included only once in the study. It was expected that other user traits (experienced or

inexperienced; student or professional, etc.) would be randomly distributed among the sample. We recognize that these trails may in fact not be randomly distributed, but there is no practical mechanism for controlling these variables experimentally.

All search interviews were recorded on audiotape and later analyzed to ensure that the proper experimental technique had been administered. Quantitative measures of the number of open and closed questions and mean pause time were employed for use in the data analysis phase of the research. Follow-up questionnaires were also conducted after the user had received his/her computer print-out of bibliographic citations. These questionnaires were designed to determine the extent to which the user was satisfied with eight different aspects of the search process, including the helpfulness of the search analyst, the usefulness of the bibliography, the currency of the search results, and the cost. All eight factors were then combined to form an overall index of user satisfaction that was also used in the data analysis phase of the study.

Statistical analyses consisted primarily of two one-way multi-variate analysis of variance with blocking on the search analyst. Stated another way, we used a two-way analysis of variance where the second factor was "search analyst". In that way, variation in the dependent variable (user satisfaction) due to differences between the two search analysts was removed. Since there were 30 subjects per cell for each of the levels of the experimental variable, it was felt that any appreciable effects of the experiment variables would be statistically significant at the 0.05 level.

Statistically, the null hypothesis to be tested in each case was

$$Ho: \quad \begin{matrix} micro\ c1 \\ \vdots \\ \cdot \\ micro\ cj \end{matrix} \quad = \quad \begin{matrix} micro\ A1 \\ \vdots \\ \cdot \\ micro\ Aj \end{matrix} \quad = \quad \begin{matrix} micro\ B1 \\ \vdots \\ \cdot \\ micro\ Bj \end{matrix}$$

where micro c1 is the control group mean on the dependent variable i, micro A1 is the group mean on the dependent variable for the first experimental condition (e.g., open question or short pause) and micro B1 is the group mean on the second experimental condition (e.g., closed question or long pause).

At the data analysis stage, we first checked to see how accurate our measure of user satisfaction was, and also how well our search analysts completed their interviews in terms of the proper use of pauses and open and closed questions. With regard to our eight-item scale of under satisfaction, we obtained a Hoyt estimate of reliability equal to 0.79, indicating that our index of satisfaction was quite satisfactory for our intended purposes.

ONLINE NEGOTIATION TECHNIQUES

To determine the success of the search analysts in
carrying out the various expermental interview techniques we
employed analysis of variance, using mean pause time and
proportion of questions open as the dependent variables, and
analyst and experimental techniques as the independent variables.
These analyses showed that analyst B, a more experienced search
analyst, administered the open and closed question experiments
more successfully, while analyst A administered the pause
experiments more successfully. As was expected, in the case of
both analysts, a higher proportion of interview questions were
open, when the interviewers were originally classified as open,
longer pauses were evidenced when the interview was classified as
"long pause", and shorter pauses were evidenced when the
interview was classified as "short pause". This suggested to us
that, for the most part, the four required experimental
techniques were properly administered by the two search analysts,
although the actual proportion of open questions asked by the two
analysts were less than originally anticipated, and the overall
mean pause time shorter than originally expected.

FINDINGS

As you will recall, the major focus of attention in this
paper is the relationship between the four experimental research
techniques employed by the two search analysts and the level of
user satisfaction reported by the user. The results of this
analysis are reported in Tables 1 and 2 presented below. Table 1
shows the effects of the experimental sessions using open and
closed questions on user satisfaction level. Here we see that
out of a total score of 100, the overall level of satisfaction
was found to equal 76.88, with a score of 81.45 for those
searches resulting from sessions using open questions and a score
of 75.40 for those searches resulting from sessions using closed
questions. It should also be noted that the level of
satisfaction in the "control" group was lowest of all, with a
mean score of 74.73.

TABLE 1

THE EFFECTS OF OPEN AND CLOSED QUESTIONS
ON USER SATISFACTION

	Mean Satisfaction Level (Total = 100)	Standard Deviation
CONTROL		
Analyst A	70.78	13.78
Analyst B	78.40	14.23
Mean	74.73	14.28
OPEN QUESTION		
Analyst A	78.90	11.53

Analyst B	83.75	9.88
Mean	81.45	10.68
CLOSED QUESTION		
Analyst A	76.43	14.63
Analyst B	74.80	10.03
Mean	75.40	11.55
OVERALL MEAN	76.88	12.70

TABLE 2

THE EFFECTS OF SHORT AND LONG PAUSES
ON USER SATISFACTION

	Mean195 Satisfaction Level (Total = 100)	Standard Deviation
CONTROL		
Analyst A	70.78	13.78
Analyst B	78.40	14.23
Mean	74.73	14.28
LONG PAUSE		
Analyst A	70.50	15.95
Analyst B	70.83	13.52
Mean	70.73	13.83
SHORT PAUSE		
Analyst A	76.68	10.23
Analyst B	75.68	12.80
Mean	76.13	11.43
OVERALL MEAN	74.25	13.25

These findings are in agreement with our model outlined above.
In other words, it was found that sessions using more open-ended
questions in which the user was required to give more detailed
and lengthy responses to the analysts' queries resulted in a
higher level of satisfaction with the search results.

When one is actually involved in the search process in
this manner, it is not surprising that the user feels that she/he
has provided as much information as possible for the analyst, so
that the analyst can recover relevant citations from the computer
system.

A closer examination of Table 1 also shows that in the
case of the open question experiments, the level of satisfaction
for Analyst B (83.75) was higher than that expressed for Analyst
A (78.90). In the case of the closed question sessions, however,
the reverse is true, with a higher level of satisfaction evidence
for Analyst A (76.43) than for Analyst B (74.80). A possible
conclusion that we can make here is that Analyst B may have used
open-ended questions more effectively than Analyst A for

eliciting information, while Analyst A may have employed closed
questions in a more advantageous manner than Analyst B. However,
for both analysts, the total level of satisfaction expressed by
the user was higher when open questions were being employed.
However, it should be noted that the standard deviations are
relatively large in Table 1, showing a considerable deviation
from the mean in the case of both open and closed questions.

Table 2 shows the effect of short and long pauses on
overall user satisfaction. Here, we see that the overall level
of satisfaction is 74.25 out of 100, with user satisfaction being
higher when short pauses were employed (76.13) than when longer
pauses were employed (70.73). The control sessions yielded an
overall satisfaction level of 74.73, in between the other scores.
These findings are also in agreement with the model that we
outlined above. You will remember that we hypothesized that the
user satisfaction would be higher when shorter pauses were
employed and that lower satisfaction would be evidenced when
longer pauses were employed, since shorter pauses were expected
to cause the user to volunteer more information, whereas pauses
of longer duration would cause a feeling of awkwardness and
discomfort in the user.

The difference in levels of satisfaction expressed for
each analyst was very slight in the course of the pause
experiments, with Analyst A receiving a slightly higher score for
short pauses (76.68 as opposed to 75.68 for Analyst B), and
Analyst B receiving a higher score for long pause sessions (70.83
as opposed to 70.50 for Analyst A). Table 2 shows relatively
large standard deviations from the mean in the case of both long
and short pauses, and this should be considered when interpreting
the mean scores given in the table.

IMPLICATIONS AND CONCLUSION

While these findings reflect only a preliminary analysis
of the data collected over the two year period of this study,
they do suggest some directions to be considered in the training
of online search analysts in negotiation techniques related to
the areas we examined. With regard to the use of open questions
in the interview process, there seems to be a reluctance on the
part of analysts to employ this mode, even after they have been
urged to do so. Since there seems to be a significant
relationship between user satisfaction and the use of open
questions, it would seem reasonable to suggest that training in
the use of this technique would be advisable to increase user
satisfaction. Further, since a one-day training session
increased the use of this mode only moderately, it would appear
that more prolonged, concentrated, intensive training
opportunities would be desirable. Methods of training might
include role playing and analysis of audio tapes and video-tapes

of interview sessions to help the analyst learn more effective interview behaviour patterns.

With regard to the long and short pauses, some related and additional implications for training might be drawn. Analysts might be made aware of the positive relationship between shorter pauses and ultimate user satisfaction. Since there seems to be a natural tendency toward the use of shorter pauses, it would appear that intensive training to employ this technique is not warranted. However, practice in using this technique in conjunction with open questions might prove to be beneficial in producing a more satisfied user.

Finally, we urge readers to exercise caution in interpreting and applying these findings since this paper is the first report of the preliminary analysis of data. Also, we do not advocate the abandonment of traditional training methods but rather a modification of these to include techniques that have been found to be positively related to user satisfaction.

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