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ONLINE DATABASES

BY CAROL TENOPIR

What Makes a Good Online Searcher?

EVERY ONLINE intermediary, online services manager, and online educator has an intuitive feel for what traits distinguish a good online searcher. By observing good (and poor) intermediary searchers in action, it is clear that not everyone is able to search with equal ease or success. Why is it some people seem to take to searching naturally, while for others it is always difficult? In the last few years, several researchers have attempted to supplement intuition with data in answering this. Although the research is not definitive, coupled with observation and intuition, it may eventually help to let us draw a profile of a good online searcher.

Intuition

Many people have expressed their opinions on what they believe are the traits of a good searcher:

- enthusiasm for the job and for the process of online searching;
- good verbal communication skills and patience with people (important in the reference interview);
- self-esteem (confidence in his/her ability to interact with equipment, to make decisions on whether or not a search is appropriate);
- creativity (the ability to see and try different approaches to a problem);
- courage and the ability to make quick decisions (to change strategies while online);
- logical and analytical way of thinking (the ability to separate concepts, look at problems by their component parts, and proceed in a step-wise fashion);
- memory for details (of command languages, database structure, formats, etc.);
- intelligence;
- spelling, grammar, and typing skills;



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• subject-area knowledge (particularly important in highly specialized or complex subject areas);

• an organized mind (the ability to gather all information required and go through the many steps required in the search process);

• willingness to grow (to keep up with system enhancements, learn details of databases, and refine strategy skills);

• willingness to share knowledge with others; and

• experience with online systems and printed indexes.

One could argue that a person who possesses all of these traits should be good at anything! Certainly an argument can be made that a good reference librarian possesses most of these characteristics, whether or not he/she uses online tools. Do these characteristics stand up to systematic testing?

What is "good"?

The first question to ask is what makes a searcher good, or at least better than another? To answer this in a controlled setting, most studies rely on comparing results of a series of searches by several searchers. In order to compare searchers' success, researchers have had to set some definitions of good search results, defining good in several ways.

One way is to test the results of each search by the standard measurements of *recall* and *precision*. Precision measures what percentage of the citations retrieved in a search are relevant to the request. (It assumes, of course, that the requester or searcher can judge that an article will be relevant to their request.)

Recall attempts to measure what percentage of the citations in a database that are relevant to a given query were actually retrieved in a given search. Recall is more difficult to measure because, unless the researcher examines every single citation in a database, they can never be sure they have identified all relevant documents. In experimental situations, researchers often settle for "relative recall"; that is, after several searchers conduct the same online search, the

pool of all the citations retrieved is used to form the 100 percent recall set. Each individual's results can then be compared to the total set.

Other objective measures commonly used to define good searching:

• the number of search statements entered for a given query (to measure efficiency);

• the cost of the search, including online time and citation printing charges (to measure unit cost per relevant document, also called cost effectiveness); and

• error rate (e.g., errors in Boolean logic, command syntax, etc.).

These objective measures are assumed to reflect the less obvious components of searcher quality such as a searcher's reference interview technique or database knowledge. They are considered easier to control and more accurate than subjective measures such as asking patrons if they are satisfied with a completed search or having expert searchers judge quality of search strategies.

These various objective and subjective measures have been used in studies to attempt to see if good searchers possess certain identifiable characteristics: experience with online systems and databases; scholastic aptitude; personality traits and creativity; and cognitive style.

Experience

Intermediaries would like to think that the more experience searchers have, the better they will search. Research has not completely born this out.

Fenichel¹ used DIALOG's ON-TAP ERIC database to study searchers with different levels of experience on both the online system and the database. Her results showed that experience contributed only to some success factors and that "compared to the experienced subjects, the novices performed surprisingly well. Although, as a group, they searched more slowly than the experienced subjects, made more errors, and scored lower on most (but not all) outcome measures, the differences were not as great as might be expected."

Moderately experienced searchers, with ERIC experience, on the average performed the most cost-effective searches (perhaps because most of them are academic librarians from libraries that charge for searches). The most experienced searchers on an average achieved highest recall, but precision was no better than novice scores. Other studies have found similar results. Fenichel found considerable differences in search strategy among individuals, regardless of search experience: a wide variety in the number of commands entered, terms used, and time connected. Fenichel concluded that "this individual variability may be the overriding factor in online searching behavior."

Scholastic aptitude

Intelligence is difficult to measure, but there are some factors that can be used as indirect measures of intelligence as it relates to academic success. GRE scores of library school student subjects were used by Bellardo², while Borgman³ looked at the high school GPA and SAT scores of her undergraduate subjects.

Bellardo found that GRE scores can be used to a limited extent to predict online search performance. She cautions however, that "although it was the general tendency for better searchers to have higher GRE scores . . . there were some students with low GRE scores who performed quite well. Individuals with low GREs who are especially motivated or interested in searching therefore should not necessarily be discouraged from pursuing training. They . . . are more likely to experience difficulty in the learning process."

Borgman found that science/engineering majors generally were more successful in their early encounters with an online system than were humanities/social science majors. In a latter study, Borgman found that engineering majors also score higher in certain measures of scholastic aptitude such as high school GPA and SAT scores.

Creativity and personality

Both creativity and personality traits are difficult to judge objectively. Standardized tests have been developed which, although sometimes criticized, are generally accepted as broad measures of a person's creative tendencies and personality traits. Bellardo used the *Khatena-*

Torrance Creative Perception Inventory to measure creativity. She used the *Interpersonal Disposition Inventory*, which measures traits associated with masculinity and femininity, to assess personality.

Bellardo found no traits that were conclusively associated with good searching. Clusters of traits such as assertiveness, self-confidence, dominance, risk taking, etc., and another including openness, warmth, sensitivity, compassion, etc., were not found to predict search performance within the limitations of the study. Artistry (especially literary) and traits of preferring to work alone, analytical and critical thinking, and liking to deal with theoretical and complex concerns had a slight association with recall scores.

Cognitive style

Standard tests of cognitive style have been used by several online searchers. If good searchers share cognitive styles, such tests might be useful for predicting who will be successful. Cognitive style research, though ongoing, is as yet inconclusive.

The "Learning Styles Inventory" (LSI) measures individual preferences for different styles of learning. Woelfl⁴ found that experienced MEDLINE searchers are most often convergers (those who focus on specific problems, use hypothetico-deductive reasoning, and do best when there is a single correct answer).

The second most frequent type are assimilators (those who are strong in inductive reasoning, theoretical models, and logic). Borgman found that engineering majors tend to be convergers, while a majority of English majors fall at the opposite end of the spectrum (divergers, or those whose primary strengths are imagination, creativity, and open-ended questions). A later study by Logan and Woelfl⁵ found that novice library school student searchers tended to be divergers.

Another study⁶ found that items retrieved by searchers who favored an abstract-conceptualization learning style had the greatest chance of being relevant, while items retrieved by concrete-experience learners had the least chance. This study also found that searchers with higher language abilities, as demonstrated by the "Remote Associates Test," are better searchers, regardless of the topic of the search. People who scored higher on a "Symbolic Rea-

soning Test" and had higher mathematical scores are poorer searchers.

Conclusion

Any conclusions must be taken cautiously. This research is at the beginning stages; much of it is done with a small number of subjects or searches and uses small databases. Broad conclusions are based on averaging individual searchers' results. There will always be individual exceptions to any generalization.

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