Florence E. DeHart
Emporia State University, Emporia, KS, USA

Topic Relevance and BSO Switching Effectiveness

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A report of a case study which attempted to obtain further insight into topic relevance, a concern of indexers, searches, and those who construct thesauri and ordering schemes. "Topic relevance" is distinguished here from "relevance to a user's need." Utilizing one search topic and two groups of searchers, the experiment aimed to determine whether statistically significant differences existed in the proportion of matches against fifty articles on the topic and present in three information sources. Each group had a different set of strategies and used specified combinations of search techniques and fields of the Basic Index. This report emphasizes the second group of searches. Reasons behind retrieval performance are analyzed for the resultant sixteen statistically significant differences. The study also set out to examine potential usefulness of the Broad System of Ordering (BSO) as a switching mechanism on the Section Heading level relative to the topic. The Section Headings available in two computerized databases used in the study arc examined in light of the BSO number assigned to the topic. Possible consequences of subsequent use of certain relevant Section Headings in searching on a more specific level are also explored. Topic relevance may be a more serious problem in switching effectiveness than suspected. (Author)

1. Overall purpose

Two quite different meanings of relevance have been defined by Swanson: 1. A creative, subjective mental act by the requester, expressing whether a document fulfills whatever information need prompted the request; and 2. A reflection of a requester's judgment that a document is "on the same topic" as the stated request, but not necessarily whether that document fulfills the underlying information need (1). Although there is likely to be greater potential for common agreement in framework two than in the first, Swanson does not imply that relevance in the second framework is an objective property of a document and a request, any more than it is in the first framework.

Topic relevance of documents is important for its role in providing useful intermediary direction in a quest. Terminology problems are compounded when searching across the growing number of information sources through a switching mechanism. According to Coates, "the essential task of a switching language is to facilitate the conversion of subject index information, originally given in a particular indexing language, into entries employing the subject indication forms of a second indexing language" (2). Vickery sees the choice of appropriate databases for an inquiry as the most immediately needed type of switching (3).

Through a case-study approach on one search problem, this experiment aimed to obtain further insight into topic relevance, a concern of indexers, searchers, and those who construct thesauri and ordering schemes. Two groups of searches run on the Lockheed DIALOG system involving three information sources are detailed below. The study also explored potentialities as a switching device of the Broad System of Ordering (BSO) in relation to the case. BSO is a Unesco-sponsored "coarse" switching mechanism between information systems and services using diverse indexing/retrieval languages (4, 5).

A need for concentrated study on terminological problems has received recognition by Unesco through INTERCONCEPT, a project which could aid in sharpening the focus of indexing. Objectives include collecting, storing, processing, and disseminating information on the concepts attached to key social science terms; describing and explaining these concepts and their significance to various schools of thought and disciplines; and monitoring the changes that ideas undergo (6).

As part of a pilot project to facilitate the establishment of INTERCONCEPT, forty abstracts were coded to show how terms related to "development" were used by the authors. In a study somewhat similar to the present one, Riggs compared the indexing of the abstracts with the coding results. Only nine out of twenty abstracts coded under "social development" were also indexed under "social development." Nine were coded under but not indexed under "social development," and four of those indexed under "social development" were not thus coded (7).

Various approaches have been designed in an effort to achieve systematic interconversion of thesauri in multiple databases. On the term level, computer search vendors offer cross-database search capability with postings for single terms or logical combinations of terms. Williams's database selector model rank orders a list that not only indicates the distance between databases but also accounts for certain variable factors (8). The Vocabulary Switching System, under development and evaluation with energy vocabularies at Battelle Columbus Laboratories, translates user requests into useful search queries across target databases without further user intervention (9). Smith's mapping of a portion of *Medical Subject Headings* to three other controlled vocabularies and testing of effectiveness indicated that mapping may be more effective as a tool used in the suggestive mode for improving controlled vocabularies and for exploring other vocabularies for possibly related terms when searching (10).

The category and subcategory levels of database subject organization, rather than the term level, equate more appropriately with BSO classification structure. The scheme aims primarily at a preliminary clustering of related terms from thesauri that would provide a framework for the higher organization of the formed clusters. A broad view of the overall subject-structure of the thesauri is thereby available in the earliest stage of the project. Further breakdown by human intelligence can take place in subsequent searching.

2. Specific objectives and basic assumption

In light of the overall problem stated above concerning topic relevance in multiple source searches, specific objectives of the study were as follows: 1. Utilizing one search topic and two groups of searches, to determine

whether statistically significant differences existed in the proportion of matches against a fifty-article Control Bibliography on the topic and present in three information sources, each group with a different set of strategies and using specified combinations of search techniques and fields of the Basic Index. This report emphasizes the second group of searches; 2. To examine potential usefulness of BSO as a switching mechanism on the Section Heading level relative to the topic. Although the user does not ordinarily approach a search specialist with a list of articles in mind to be retrieved, the study utilized a Control Bibliography in order to identify the reasons behind success and failure in retrieving the target items. Figure 1 lists the sources utilized and their computerized database abbreviations.

Figure 1: Sources and database abbreviations

Sources	Database abbreviations
Current Index to Journals in Education	ERIC/CIJE
Language and Language Behavior Abstracts	LLBA/Online
Psychological Abstracts	PsycINFO

A basic assumption was that an appropriate performance measure for a retrieval system is the retrievability of items on a specified topic when searching on that topic, regardless of whether or not a patron desires one hundred percent recall. The possibility of retrieving excessive output is an entirely different problem, not to be dealt with by acquiescence to sloppiness in the system. The study did not treat time and cost factors, nor did it analyze data concerning the items retrieved but not on the Control Bibliography.

3. Materials and methods

The topic of the Control Bibliography which constitutes the search problem is: "Psycholinguistics Applied to the Child's (Through Age 13) Acquisition and Development of Language and Reading Skills: Background Reading for the Elementary and Nursery School Teacher." "Psycholinguistics" might be defined briefly as "the science that investigates the mental processes that underlie language use" (11). The scope excludes articles whose major thrust was special groups, such as ethnic groups, the disabled, or the disadvantaged. Related areas of "pragmatics" and "sociolinguistics" are also excluded. Eight different journals, dated 1973 through 1979, are represented among the fifty items, all of which are in the English language. The journal articles selected, which selection excluded book review articles, convey research findings, largely from classroom experiments, that contribute to the body of knowledge in psycholinguistics. Teachers could use the acquired background knowledge in their own subsequent application of it to the teaching of language and reading. This stance reflects a view from the literature that individual application of psycholinguistic knowledge may be preferable to the use of packaged, so-called "psycholinguistic" teaching materials and guides that may take an unsound approach (12).

Construction of the Control Bibliography involved these steps: 1. A preliminary study of approximately fifty chapters of books and articles on the topic and its boundaries as background preparation for selecting articles, which study did not constitute the preparation of the Bibliography. The topic as originally formulated was further refined at this point, but no changes in wording were made thereafter; 2. The perusal of journals included on a full and selective basis in all three information sources for relevant articles; 3. The selection of three hundred articles as candidates for the Control Bibliography; 4. The narrowing of the three hundred articles to sixty on the basis of direct pertinence to the topic and of inclusion in all three information sources. Checking of sources involved use of author access to avoid contact with subject areas assigned to the articles; 5. A language/ reading specialist's evaluation of the sixty items through study of the citations and abstracts, which surrogates corresponded with the possible basis of selection during an actual search. The specialist chose those items that he considered to be directly on the topic as presented. The result numbered fifty. Evaluation of the abstracts was not an objective of the study.

Group 1 included computer and manual searches. The computer searches were conducted in the ERIC/CIJE, LLBA/Online, and PsycINFO databases in what will be referred to as search patterns and abbreviated as follows: 1. Descriptor terms used to search the controlled vocabulary field (DE in CV); 2. Natural language terms used to search the controlled vocabulary field with free text techniques (NL in CV); and 3. Free text (FT). Comparison will be shown by "$\bar{c}$" in this paper; for example, NL in CV $\bar{c}$ FT. The NL in CV and FT strategies were each identical for the three information sources within each Group. The DE in CV and NL in CV strategies were used as a basis for the manual searches.

The strategy consisted of three sets of terms: 1. The term "Psycholinguistics" alone; 2. Terms to associate "Psycholinguistics" specifically with the acquisition of language and reading skills; and 3. Terms to designate "children" as subjects experimented on in reported research. A set of NOT terms was included to rule out special groups, in accordance with the established scope of the topic. These terms had almost no effect on retrieval. The computer searcher, chosen by reputation for excellence, followed the usual practice of refining the suggested search terminology.

Receiving emphasis in the present report, Group 2 searches were designed to explore consequences of broad switching to aid in choice of databases and category headings for subsequent searches of greater specificity. They were conducted on the same databases and according to the same patterns as those in Group 1. Group 2 contained two additional searches involving Section Headings, one in the LLBA/Online database and the other in PsycINFO. The manual mode was dropped as not a feasible approach. Nearly two weeks of full-time work were spent on the Group 1 manual searches.

Strategy in all Group 2 searches resembled that of searches that might be undertaken after the switching operation to determine suitable databases has been accomplished. These searches could include Section Headings. Sets in the Group 2 searches included "cognitive" (psychological element), "language/reading" (linguistic element), and "subject" (educational/age level). "Psycholinguistics" was not used as a search term. Analysis of the assignment of general and specific descriptors

to the same record and the implications are not pursued in the present study, however. The "cognitive" set was replaced by relevant Section Headings in the two searches involving their use. On the descriptor level, it had been responsible for certain failures to retrieve in Group 1. In practice, it was difficult in LLBA/Online to distinguish between the "cognitive" and "language/reading" Section Headings. Core storage overflow presented a problem, and special search techniques had to be utilized to deal with it. No NOT terms were used in Group 2.

The BSO number that corresponds to the topic is 911, 23 Psycholinguistics. The scheme is designed for switching at the category level. Both unretrieved and retrieved items in the Group 2 searches were checked as to whether they had been assigned Section Headings applicable to this number, whether or not they happened to fall in the strategy of the two searches involving Section Headings. BSO is not designed for switching at the term level. "Psycholinguistics," an example in this case study, could not feasibly be searched alone. Topics like "spoonerisms," "Freudian theory of laughter," and "definition of readability" were found listed in printed volumes under the term. As a descriptor, it showed 774 postings in PsycINFO, 2771 in ERIC/CIJE, and 3098 in LLBA/Online at the start of the Group 1 searches.

The BSO number 911, 23, 0, 10-460 stands exclusively for "how to exploit psycholinguistic concepts during teaching of language and reading" (13), which topic is not that of the Control Bibliography. The scheme does not contain a separate bias phase mechanism to express the target at which a document is aimed, such as the elementary or nursery school teacher. The database thesauri used in the study include specific terms and Section Headings for exploitation during teaching, none of which were used in Group 1 and 2 searches. Had the expanded BSO number applied, two entries terminating in -462,40 and -462,60, preschool education and primary education respectively, could have been added to form a combined notation.

4. Analysis of results

The retrieval performance, defined operationally as the number of matches with items on the Control Bibliography, was recorded item-by-item for each search in the two Groups. Figure 2 gives the number and percent of the fifty articles retrieved. Statistically significant differences involving Group 2 are numbered in pairs. As noted earlier, the present study emphasized Group 2. Significant differences were identified between two independent proportions as computed within databases and between databases in Group 2, as well as between Group 2 and Group 1, both computer and manual (14). In addition, the two Section Heading searches were compared with each other and with the other search patterns within the databases involved, LLBA/Online and PsycINFO. The entire Basic Index was checked for the presence of terms in all FT strategies.

In no case did a search involving Section Headings attain a statistically significant difference over any other search pattern. In one case, discussed later, the opposite occured. Only twenty-seven of the fifty items on the Control Bibliography, or fifty-four percent, were assigned to an LLBA/Online Section Heading regarded as

relevant to the topic. LLBA/Online groups seventy-five Sections into thirty general subject Areas to comprise a location code, one to an abstract (15). A truncation of the Area of "Psycholinguistics" was searched to include its Sections, along with eight pre-1977 three-digit correlated codes. All but nine of the twenty-seven potentially-matched items were eliminated in the Section Heading search by the required presence of the other two sets in the strategy. Five of the nine were assigned the descriptor "Psycholinguistics." Only nine of the nineteen articles (forty-seven percent) found in one or more of the three patterns of Group 2 searches were assigned a Section Heading considered applicable to the topic. Two of the nine were assigned the descriptor "Psycholinguistics."

Only twenty-three of the fifty items on the Control Bibliography, or forty-six percent, were assigned to a PsycINFO Section Heading regarded as relevant to the topic. PsycINFO groups sixty-four subcategories into sixteen broad categories to comprise a location code, with at least one classification code for each Area, and two for those articles with equal stress in two Areas (16). Only two items were assigned both one Section Heading that was searched and one not searched.

Four Section Headings in the category "Experimental Psychology (Human)" and one in "Development Psychology" were searched, including the converted pre-1976 entries, as the "cognitive" set. Five articles were assigned a language Section Heading rearded as belonging to the second set. It included a range of subjects from language to information processing and mass media, some of which are spread over various Section Headings in LLBA/Online. Four matches would have resulted, but the significance of resultant differences was not affected.

Eleven of the eighteen potential matches to Section Headings used in the Group 2 strategy were hits, the rest having been eliminated by the required presence of the other two sets in the strategy. Only twelve of the twenty-nine articles (forty-one percent) found in one or more of the three patterns of Group 2 searches were assigned a Section Heading considered applicable to the topic.

Some Section Heading phrases are also descriptor phrases, although not necessarily assigned to the same record. In PsycINFO, unless designated by suffix /DE or SH=, a search on any multiword phrase retrieves from both the Descriptor and Section Heading fields (17). No items on the Control Bibliography were affected, however. Had the practice been in operation for LLBA/Online, nine items could have been affected.

A computer search could not be run involving any of the nine categories in the forty-one ERIC Descriptor Groups. These are meant only to assist those using the Thesaurus for indexing, searching, and the structuring of new descriptors (18).

Comparison of search patterns DE in CV, NL in CV, and FT showed six statistically significant differences. In LLBA/Online, FT retrieved significantly more articles at the five percent confidence level than did DE in CV (1 in Fig. 2). Capabilities afforded by free text techniques and access to the full Basic Index were responsible. The other five instances favored NL in CV over both DE in CV and FT in both the ERIC/CIJE and PsycINFO databases, all at the one percent confidence level, and over SH (Section Heading search) in PsycINFO at the five percent level (2 through 6 in Fig. 2). ERIC/CIJE annotations, not man-

dated prior to 1977 and shorter than those for the other two bases, were lacking for eleven articles. Core storage overflow eliminated one term in the FT PsycINFO search. Had it not, the significant difference of NL in CV over FT would not have existed. PsycINFO lacked an abstract for one item and Identifier terms for three items.

Figure 2: Number and percent of 50 articles retrieved. Pairs of numbers indicate statistically significant differences involving Group 2.

Searches	ERIC/CIJE	LLBA/Online	PsycINFO
Group 1: **Computer**			
DE in CV:	2(4%)[14]	3(6%)	0
NL in CV:	17(34%)[16]	8(16%)[15]	0
FT:	17(34%)[16]	5(10%)[15]	0
Group 1: **Manual**			
With Thesaurus	16(32%)	22(44%)[12]	27(54%)[11]
Without Thesaurus	25(50%)	23(46%)[13]	23(46%)
Group 2: **Computer**			
DE in CV:	9(18%)[2,14]	5(10%)[1,12]	10(20%)[3,11]
NL in CV:	24(48%)[2,4,9]	12(24%)[9,10,13]	23(46%)[3,5,6,10]
FT:	3(6%)[4,7,8,16]	13(26%)[1,7,15]	10(20%)[5,8]
SH:		9(18%)	11(22%)[6]

Of parenthetical interest in this particular comparison is the total number of NL in CV prints received: ERIC/CIJE yielded 2416 (NL in CV); 793 (FT); and 842 (DE in CV). PsycINFO yielded 2375 (NLin CV); 1162 (FT); and 561 (DE in CV). The NL in CV searches benefited from the utilization of free text techniques which, if applied to the same degree in the FT searches, would have resulted in an even greater problem in manageability of output.

Comparison of databases, ERIC/CIJE, LLBA/Online, and PsycINFO, showed two statistically significant differences with identical search strategies in the FT search pattern. These involved LLBA/Online (one percent) and PsycINFO (five percent) over ERIC/CIJE (7 and 8 in Fig. 2). Two more statistically significant differences involved the NL in CV pattern with ERIC/CIJE and PsycINFO superior to LLBA/Online (9 and 10 in Fig. 2).

The FT pattern in ERIC/CIJE c̄ LLBA/Online and PsycINFO did not retrieve ten and six articles respectively through failure to match in the "subject" set of the strategy. This occurred in spite of the fact that ERIC/CIJE assigns on a mandatory basis as of February 1975 an educational level preferably or an age level minor descriptor with reference to the population discussed in the document (19). The FT search terminology did not match against that of the descriptors. Lack of representation of the "cognitive" set was the next most important factor responsible for retrieval failure.

By contrast, although the NL in CV pattern in LLBA/Online c̄ ERIC/CIJE and PsycINFO (both five percent) failed to retrieve four and seven articles respectively through lack of a match in the "subject" set, the reason involved instead no representation of "subject" terminology. Lack of the "cognitive" set was an even greater factor responsible for failure to retrieve eleven articles in each of the two LLBA/Online comparisons.

In spite of the less flexible "set" structure in Group 1, Group 1 manual c̄ Group 2 computer search modes showed three statistically significant differences in favor of the manual mode with its advantage of ready browsing (11 through 13 in Fig. 2). These involved the "With thesaurus" pattern (manual equivalent of DE in CV) in *Psychological Abstracts* at the one percent confidence level, and both the "With" and "Without thesaurus" (manual equivalent of NL in CV) patterns in *Language and Language Behavior Abstracts* at the one and five percent levels respectively. Details concerning the manual mode are outside the scope of this report.

The required presence of "Psycholinguistics" as a "set" in the Group 1 computer search strategy was almost entirely responsible as at least one factor for the superior performance in Group 2 at five percent with ERIC/CIJE in the DE in CV pattern and LLBA/Online in the FT pattern (14 and 15 in Fig. 2). Among the fifty items, "Psycholinguistics" was assigned as a descriptor zero times in PsycINFO, eleven in LLBA/Online, and twenty in ERIC/CIJE, thirteen times as a Major Descriptor. The figure for LLBA/Online may be distorted by the fact that the printout reported two items as unavailable and showed no descriptors for four items. Neither LLBA/Online nor PsycINFO include descriptors in the printed volumes.

One statistically significant difference in favor of the Group 1 computer mode resulted (16 in Fig. 2). Group 1 surpassed Group 2 for the FT pattern in ERIC/CIJE at the one percent confidence level. In every instance, failure to match in the "subject" set was responsible. The strategy involved free text terminology related to educational level. For all articles involved, however, the entire Basic Index completely lacked any terms related to educational level. Had the Group 2 strategy included the term "CHILD?," deleted because of the core storage overflow problem, all but three of the sixteen items found exclusively in the Group 1 (FT) search would have matched in the Group 2 (FT) search. These three lacked the "cognitive" set. Because PsycINFO produced no matches at all in any of the Group 1 computer searches, statistical differences in comparison with Group 2 performance were not figured (ten, twenty-three, and ten in the DE in CV, NL in CV, and FT patterns respectively). No NOT terms used in the Group 1 searches were responsible for failures to retrieve in the particular comparison described here.

Parenthetically, Social Scisearch which also contains all fifty articles was included in the computer searches. Group 1 had two matches in *Social Science Citation Index* (SSCI), the manual equivalent, through the title-based Permuterm Subject Index to the source items processed (20). The full chain of footnotes was not subsequently exploited; however, footnotes in the two retrieved articles contained no items on the Control Bibliography. Group 2 had zero matches.

5. Summary and implications

Comparisons involving Group 2 in searches on three information sources against a fifty-item Control Bibliography on the search topic resulted in sixteen statistically significant differences summarized in Figure 3. No statistically significant differences favored searches involving

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the use of Section Headings. On the contrary, one NL in CV search surpassed an SH search. In no case did any search in either Group 1 or 2 retrieve more than 27, or 54%, of the 50 articles.

Figure 3: Summary of significant differences

A. *Comparisons of search patterns*
  1. FT over DE in CV (LLBA/Online)
  2. NL in CV over DE in CV (ERIC/CIJE)
  3. NL in CV over FT (ERIC/CIJE)
  4. NL in CV over DE in CV (PsycINFO)
  5. NL in CV over FT (PsycINFO)
  6. NL in CV over SH (PsycINFO)
B. *Comparisons of databases*
  7. LLBA/Online over ERIC/CIJE (FT)
  8. PsycINFO over ERIC/CIJE (FT)
  9. ERIC/CIJE over LLBA/Online (NL in CV)
  10. PsycINFO over LLBA/Online (NL in CV)
C. *Comparisons of computer and manual modes*
  11. Manual over computer (*Psychological Abstracts*, with thesaurus; PsycINFO, DE in CV)
  12. Manual over computer (*Language and Language Behavior Abstracts*, with thesaurus; LLBA/Online, DE in CV)
  13. Manual over computer (*Language and Language Behavior Abstracts*, without thesaurus; LLBA/Online, NL in CV)
D. *Comparisons of Groups 1 and 2 (different "set" strategies)*
  14. Group 2 over Group 1 (ERIC/CIJE, DE in CV)
  15. Group 2 over Group 1 (LLBA/Online, FT)
  16. Group 1 over Group 2 (ERIC/CIJE, FT)

Following are implications based on factors influencing retrieval or failure to retrieve:

1. The use of free text techniques in the CV field warrants further study;

2. Problems in the "subject" phase mechanism (educational/age level indicators) require further attention with respect to choice of terminology or failure to include level when assigning descriptors and formulating search strategy;

3. Functioning of the human mind when browsing in manual searches deserves the joint study of information scientists and cyberneticists to identify helps and hindrances to browsing. These insights could contribute to developing ways to browse at the computer that are affordable both in time and cost;

4. Ways to reduce the extent to which a switching mechanism can avoid modifying the search topic would usefully be explored. BSO headings might be reviewed for any desirable unbinding of concepts, such as "language teaching and learning;"

5. Because of the crucial role of Section Heading categories and subcategories in switching for subsequent searching on more specific levels, renewed consideration might be given to the following: (a) Avoidance in the indexing stage of the elimination of potentially useful on-topic items when switching on Section Headings; (b) Balancing specificity, discreteness, generality, and breadth in Section Heading terminology to facilitate Section Heading searching without core storage overflow. BSO perspective on relationships may prove useful in the suggestive mode for review and evaluation of database Section Heading groupings; (c) Desirability of assigning or not assigning identical descriptors and Section Headings to a record; (d) Availability of Section Headings for computer searching in all databases. Items may appear in unexpected places. Further, full exploitation of Section Headings is necessary for valid comparative studies with

cross-database switching devices using the term level only; and

6. The INTERCONCEPT Project applied to areas other than the social sciences could result in enhancement of understanding about a topic and the terminology that physically-removed indexers, searchers, and those who construct thesauri and ordering schemes use to express it. A switching mechanism can only switch on that which is available to be switched, subject to varying results from different search patterns. A deeper problem than switching effectiveness exists. On the surface, topic relevance may seem to be clearly defined in comparison with the problems in defining relevance of material to a patron's need. The words of Whitehead may apply: "There is a danger in clarity . . . the danger of overlooking the subtleties of truth" (21).

References:

(1) Swanson, D.R.: Information retrieval as a trial-and-error process. In: Libr. Q. 47 (1977) No. 2, p. 129.
(2) Coates, E.J.: Switching languages for indexing. In: J. Doc. 26 (1970) No. 2, p. 103.
(3) Vickery, B., McIlwaine, I.C.: Structuring and switching: a discussion of the Broad System of Ordering. In: Int. Forum Inf. Doc. 4 (1979) No. 3, p. 15.
(4) International Federation for Documentation: BSO: Broad System of Ordering: schedule and index. Third revision. Prepared by the FID/BSO Panel by Eric Coates, Geoffrey Lloyd, and Dusan Simandl. The Hague: Fédération Internationale de Documentation, United Nations Educational, Scientific and Cultural Organization 1978. p. 37.
(5) International Federation for Documentation: The BSO manual: the development, rationale and use of the Broad System of Ordering. The Hague: Fédération Internationale de Documentation 1979. p. 36--37.
(6) Vasarhelyi, P.: The relevance of INTERCONCEPT for classification and indexing. In: Intern. Classificat. 7 (1980) No. 1, p. 6.
(7) Riggs, F.W.: Final report to Unesco on the INTERCONCEPT Pilot Project. Honolulu: University of Hawaii 1978. p. 11.
(8) Williams, M.E.: Future directions for machine-readable data bases and their use. In: Clinic on Library Applications of Data Processing, University of Illinois at Urbana-Champaign, 1979: The role of the library in an electronic society, F.W. Lancaster (Ed.). Urbana-Champaign: University of Illinois, Graduate School of Library Science 1980. p. 91.
(9) Niehoff, R., Kwasny, S., Wessels, M.: Overcoming the database vocabulary barrier – a solution. In: Online 3 (1979) No. 4, p. 43.
(10) Smith, L.C.: Systematic searching of abstracts and indexes in interdisciplinary areas. In: J. Amer. Soc. Inform. Sci. 25 (1974) No. 6, p. 351.

(11) Hittleman, D.R.: Developmental reading: a psycholinguistic perspective. Chicago: Rand McNally College Publishing Company 1978. p. 32.

(12) Smith, F.: Psycholinguistics and reading. New York: Holt, Rinehart and Winston 1973. p. 181.

(13) Coates, E.J.: Letter received, dated 28th Juli 1981.

(14) Ferguson, G.A.: Statistical analysis in psychology and education. Fifth edition. New York: McGraw-Hill 1981. p. 186.

(15) Language and Language Behavior Abstracts: LLBA: language and language behavior abstracts: user's reference manual, by Diane Wurzel with Miriam Chall. San Diego, Cal.: Sociological Abstracts, Inc. 1977. p. 4.4–4.33.

(16) American Psychological Association: PsycINFO: Psychological Abstracts information services: users reference manual. Arlington, Va.: American Psychological Association 1981. p. III-4-III-6.

(17) Lockheed DIALOG Information Retrieval Service: Guide to DIALOG searching. Palo Alto, Cal.: Lockheed DIALOG

Information Retrieval Service 1979. p. 11–12 (Revised April 1981).

(18) Educational Resources Information Center: Thesaurus of ERIC descriptors. Completely revised. Phoenix, Ariz.: Oryx Press 1980. p. xix-xx.

(19) Educational Resources Information Center: Thesaurus of ERIC descriptors. Completely revised. Phoenix, Ariz.: Oryx Press 1980. p. xii-xiii.

(20) SSCI: Social Sciences citation index: part 5: Permuterm subject index, A to Z. Philadelphia: ISI Institute for Scientific Information 1981.

(21) Brennan, J.G.: "Alfred North Whitehead: Plato's Lost Dialogue." In: Epstein, J. (Ed.): Masters: portraits of great teachers. New York: Basic Books 1981. p. 49.

Address:
Dr. Florence E. DeHart,
School of Library Science,
Emporia State University,
Emporia, KS 66801, USA