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Criteria for Reviewing Children's Books

Margo Wilson and Kay Bishop

More than 5,000 juvenile books are published each year. For this reason school and children's librarians depend on reviews to assist them with their selection responsibilities. Through a review of professional literature, we identified 10 criteria that librarians, authors, editors, and publishers thought were important to include in a book review. Using content analysis, we applied the criteria to 152 reviews of 1996 Notable Books for Children in four journals commonly used by school and children's librarians. We found that although the journals include several of the criteria for quality book reviews, no single journal stood out as consistently providing all the criteria. The findings can be used by children's books reviewers, librarians with the responsibility of selecting reviewing journals and children's books, and researchers interested in further studies to help determine the criteria needed for quality book reviews.

Children's librarians are faced with the important job of selecting quality books for their readers. However, with approximately 5,000 juvenile books published each year (*The Bowker Annual* 1997), it is impossible for a librarian to examine all of these books. Consequently, school and children's librarians rely on published book reviews as a selection tool when choosing books to purchase. Several current journals provide reviews of children's books. With tight budgets, libraries are not able to subscribe to all such journals, so it would be beneficial to know which journals provide the most useful reviews of children's books.

When writing a book review, novice reviewers might assume that they have the right to include or exclude anything they wish. However, those familiar with the field are well aware that book reviews are a highly disciplined type of writing that requires the guidance of specific criteria.

One of the major purposes of a review is to serve as a selection instrument for librarians and educators who might be considering the purchase of the book. While it is noted that librarians can use a variety of methods to determine the books they acquire (for example, looking at publishers' catalogs, visiting bookstores and conference exhibits, or talking with publishers' representatives), reviews remain the basic way in which librarians build their collection and acquire knowledge about children's books (England and Fasick 1987). Of the 510 librarians responding to a *Library Journal* survey, 96% cited

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reviews as essential tools for purchasing materials and 83% ranked them as their first choice (Fialkoff 1998). At a two-day conference devoted to the topic of evaluating children's books, Schomberg (1993) spoke of the importance of reviews to school librarians, pointing out that they are essential tools of collection building. Horning (1997, 178) comments about the selection process of school and public librarians:

> While some decisions can be made quickly based on popular demand or professional wisdom, most selections are made with a great deal of care and deliberation based, in whole or in part, on reviews. The reviewer, then, owes it to her audience to use care and deliberation in preparing a review.

Because librarians rely heavily on book reviews, reviewers have a responsibility to include all the information that will help librarians make informed purchase decisions. The purposes of the current study were to identify the criteria that should be included in reviewing juvenile books and to determine which journals provide the most coverage of those criteria.

Several researchers have studied how journals differ in reviews of children's books (e.g., Weber 1979; Stewig 1980; Witucke 1980, 1982; Dodson 1983; Kennemer 1984; Burchette 1992; Bishop and Van Orden 1998). Length of reviews, promptness, total coverage, and content of the reviews were among the factors that were analyzed. Common criteria were not always examined, but the researchers generally concluded that no single journal adequately provided all the information that librarians need to make informed selection decisions. In the research literature, no study was found in which researchers had attempted to determine which reviewing criteria were the most essential. In her summary of the research studies that deal with the reviewing of children's books, Doll (1990, 150) indicated the importance of such a study in stating that: "[i]t is time to develop checklists for content analysis, study reviews of nonbook materials, design studies based on hypothesis testing, and begin to build a common knowledge about reviews and reviewing journals." In a recent article, Bishop and Van Orden (1998) called for studies to be made on the quality of children's book reviews and the elements that constitute a good book review.

Review of Related Literature

A review of the related literature revealed that reviews of children's books found in journals are an essential tool in the book selection process. Researchers further demonstrated that while such reviews are widely used by school and public librarians, there is a lack of uniformity in the content of the reviews. We found no researchers who had attempted to determine the criteria that should be included in a quality book review. Given this lack in the literature, we turned to professional writing, concentrating on accessible periodicals and books devoted solely to the reviewing of books for children and young adults. Authors of children's literature textbooks, journal editors, library science educators, and library practitioners have written about the essential criteria for a book review. Several of these writers shared similar opinions about what should be included in a quality review. At other times, only one or two of the writers thought a particular criterion was imperative.

Interest in the topic was high during the late 1970s. Hearne (1978) noted that speed, brevity, and currency were considered the essence of good book reviewing. She stated that by nature, book reviews are "fast, judgmental, descriptive rather than analytical, and in the case of children's books, monopolized" (46).

Editors of ALA's *Top of the News* were so interested in the topic of book reviews, reviewing, and review media that they devoted the winter 1979 issue of their journal to the topic. For one of the articles, they solicited the opinions of ten experts regarding the qualities that make a good book review (What makes a good review? 1979). The people whose opinions were presented in the article came from a variety of backgrounds, including educators, librarians, editors, and authors.

Many of the experts in this article had particular criteria for a good review. Pollack (146) stated, "A good review is no more or less than an honest personal reaction to a book." Wells and Young both responded that it was important for book reviewers to comment on the appropriateness of any artwork to the text. Young also mentioned that a comparison to other similar works was essential. Heylman stated she thought a good review should contain a very brief description of the content, followed by a comparison with the author's other works, the intended reading level, judgment of literary quality, and information about any controversial issues. Broderick expressed the opinion that in addition to a summary of the content, a book review should comment on the attractiveness of the cover illustration, make suggestions for the use of the material, and tell who else should know about the existence of the book, including persons such as counselors or youth workers. Myers thought every review should contain a clear-cut commitment to recommendation or nonrecommendation.

Another expert, Starr, felt that good reviews would describe the scope and level of interest in the subject of the book and convey the style, depth, and flavor of the work. Rudin noted that she appreciated book reviews that tell specifically for whom the book is intended, the uses of the book, how the illustrations relate to the book, information about the jacket or cover of the book, and the author's opinion of the book. Abel listed the following as essentials of a quality book review: timeliness (within a year of the publication of the work), an emphasis on the tone of the book, an indication of the book's strengths and weaknesses, a definition of its audience, an assessment of its potential, and the author's opinion of the book (What makes a good review? 1979).

In the same *Top of the News* issue, other authors expressed their opinions regarding the quality of children's book reviews. Sullivan (1979) thought a quality book review should contain a brief summary of the content, mention of the expected readership, and an indication of the most effective elements of the book, as well as the weaknesses. Campbell (1979) stated that the best reviews were brief (150–200 words) and contained an assessment of the literary quality of the book and comparison with the author's other works.

Gerhardt (1986, 70) stated that, "All good library reviewing . . . should have definite critical quality. It should not just tell what a novel is about, but it should give some valid indication of merit or demerit, of excellence or crudity in expression, of triviality or significance, of values that it holds for library use."

DeCoster (1988), although not dealing specifically with reviewing children's books but rather with the broader review of educational materials in general, thought that a book reviewer should cover the content, identify the target audience, evaluate the book's contribution to existing literature, and comment on its use for practitioners.

The interest in book reviewing continued into the 1990s. Hearne and Sutton (1993) present the proceedings of a two-day conference on reviewing children's books. The book is a watershed work on evaluating children's books and contains 10 essays dealing with reviews and their influence on collection development. Although none of the authors specifically outline the criteria that should be in a good review, they do discuss various important aspects of reviewing and evaluating books, including such topics as philosophies of reviewing, criteria for evaluating picture books, and problematic reviews.

Fialkoff (1992, 1994) believes reviews should be brief (125–175 words), describe the content of the book, indicate the usefulness of the book for different types of libraries, and compare the book to similar works. She also notes that reviews should contain an evaluation of the significance of the book, as well as the popular appeal; information about the book's style and level of treatment; and the reviewer's personal opinion of the book.

Horning (1997) believes that a quality book review should contain a description of the content, an evaluation of style and scope, an assessment of literary quality, and an indication of the potential audience.

According to Horning, it should also tell whether the illustrations support the text.

It would appear that there are a number of opinions expressed by authors, librarians, and journal editors about the criteria needed in a good book review. The authors examined here mentioned a total of 14 criteria for a quality book review, which are listed in table 1. In his assessment of the review process Weinrach (1988, 178–79) wrote, "The profession needs concrete criteria that will be imposed evenly and systematically across materials. In the absence of explicit criteria, reviewers have no alternative but to create and impose their own."

Evans (1995) discusses two types of professional reviews: those designed to promote and those designed to evaluate. Most of the criteria included in table 1, with perhaps the exception of the last, "Information Concerning the Attractiveness of the Jacket or Cover Design," would be in professional reviews that are designed to evaluate. Evans goes on to comment that evaluative reviews are extremely important to public and school librarians. Normally such reviews contain both descriptive and evaluative, and occasionally comparative, criteria. The criteria mentioned in table 1 as being important to a good children's book would apply similarly to any book being purchased by a public or school librarian, regardless of the age level of the material. One exception might be criterion number 5, which might be emphasized more in the selection of children's books where illustrations are generally regarded as equally important as the text. Although criterion number 14, which relates to the controversial issues surrounding the subject of the book, might also be important for reviews of all kinds of materials, some might tend to think this would be more important to include in reviews of children's books.

Research Questions

The current study was based on the following research questions:

1. What are the criteria that experts consider essential in a quality children's book review?
2. Which of the most commonly used journals for reviewing children's books contain the criteria that experts consider essential in a quality children's book review?

TABLE 1
Criteria Mentioned in the Professional Literature

1. Description of the Content
2. Definition of the Audience
3. Information Regarding: Scope, Tone, Style, Point of View
4. Comparison with Author's Other Works or Similar Works
5. Appropriateness of the Art to the Text
6. Reviewer's Personal Opinion
7. Strengths and Weaknesses
8. Uses of the Work
9. Brevity
10. Judgment of Literary Quality
11. Currency of the Review
12. Judgment Regarding Reader Appeal
13. Information Concerning the Attractiveness of the Jacket or Cover Design
14. Comments Relating to Controversial Issues Surrounding the Subject of the Book

METHOD

A content analysis of book reviews using the criteria stated by the panel of experts was undertaken. Five major steps were involved. In the first step, the experts were identified by reading the articles and textbooks written by people in children's literature or in the area of book reviewing. After reviewing the professional literature, we found a total of 16 persons who commented on the criteria for book reviews. We concluded that these could constitute a pool of "experts" who expressed their opinions on the criteria needed for a quality book review. Several of these persons were identified in "What makes a good review?" (1979). The opinions expressed by all 16 persons were selected as the content base for this study.

"Experts" were defined in this study as persons whose opinions about the reviewing of children's books had appeared in professional periodical literature and in books solely devoted to the book reviewing of children's books. The literature examined covered a fairly long period of time, from 1979 to 1997. The selected experts represented different professional areas and had different roles in relationship to children's book reviews. Two experts were children's book authors, four were librarians, seven wrote for or edited six different journals, two worked for publishing companies, and one was a public library consultant. Each professional group might have had a different viewpoint, but one that was also a valid perspective on what is important about a book and thus should be included in a good book review. No attempt was made to compare the credentials of these experts. In some instances it was difficult to assign one job title because some of the experts' jobs fit into more than one job category.

The second step was to list all the criteria that the experts considered essential to a quality book review. The third step was to identify the criteria that were most frequently mentioned by the experts. Only criteria identified by three or more experts were included in the content analysis used to answer the second research question. Three or more of the experts mentioned 10 criteria. Those 10 criteria and their rankings as determined by the number of experts who mentioned them are listed in table 2. The criterion most frequently listed by experts as being essential for a quality book review was the description of content. Surprisingly, only 8 of the experts indicated that a description of content was essential, but it is possible that the others assumed that a review would contain such a description and therefore may have felt it was not necessary to mention this particular criterion. It is acknowledged that the criteria

TABLE 2
LIST OF CRITERIA USED IN THE STUDY

Rank	Criterion	Frequency
1	Description of the Content	8
2	Definition of the Audience	7
3	Info Re: Scope, Tone, Style, Point of View	6
4	Comparison with Author's Other Works or Similar Works	5
5	Appropriateness of the Art to the Text	4
6	Reviewer's Personal Opinion	4
7	Strengths and Weaknesses	4
8	Uses of the Work	4
9	Brevity	3
10	Judgment of Literary Quality	3

considered essential to an excellent book review may vary because of the professional backgrounds of the experts.

The fourth step was the selection of review journals to be used in the study. The journals included here were four that had been frequently used in previous studies (Weber 1979; Stewig 1980; Witucke 1980, 1982; Dodson 1983; Kennemer 1984; Burchette 1992; Bishop and Van Orden 1998): *Booklist (BL)*, *Bulletin of the Center for Children's Books (BCCB)*, *The Horn Book Magazine (HBM)*, and *School Library Journal (SLJ)*.

In the fifth step, book reviews of the 1996 Notable Children's Books in the journals were analyzed. In some of the previous studies (Witucke 1980, 1982; Burchette 1992; Bishop and Van Orden 1998) researchers also analyzed the reviews of Notable Books for Children. We read the reviews of the 1996 Notable Books for Children that appeared in all four journals. Of the 74 titles chosen as 1996 Notable Books for Children, only 38 were reviewed by all four journals and were used in the current study (see table 3). The criteria that each review contained were tallied and totalled by journal. These totals are displayed in table 4.

One limitation of the study is the analysis of only the 1996 Notable Books. Also, both *HBM* and *BCCB* changed editors during the course of the study, which could affect the book reviewing policies and consequently the criteria included in reviews.

Findings

Table 5 provides the total and average numbers of the criteria by the four journals in the study. Although reviews in all four journals described the content of the book, very often different aspects of the book were highlighted in each journal. Some reviews contained a very detailed description of the content and more evaluative comments than did the other reviews.

One criterion that 7 experts agreed upon was that the review should contain a definition of the audience. Of the four journals studied, *BL*, *BCCB*, and *SLJ* contain that information as a standard part of their bibliographic data. *BL* indicates the appropriate ages, while *BCCB* and *SLJ* indicate the grade levels for which the book will be appropriate. Additionally, sometimes the individual reviewers gave information about the target audience in the content of the audience, such as "good for reluctant readers," or "good for those who love to do puzzles."

Of the four journals only *HBM* failed to give a good indication of the target audience in the review itself. This journal gives broad descriptions of the audience, such as "younger" or "intermediate." The reviews are grouped together under those broad audience labels, with headings that say, "For Younger Readers: Ages 5 to 8," or "For Intermediate Readers: Ages 8 to 12." This might not be a helpful method for readers who look at an index to locate the page number of the book review they wish to examine and then go directly to that page, and miss the target audience information.

Six experts also thought a quality book review should contain information concerning the scope, tone, style, and point of view of the work. This criterion was present in the majority of the reviews. Interestingly, this information could be found in sentences that provided other criteria, such as uses of the book, strengths and weaknesses, appropriateness of the art to the text, and the reviewer's opinion. This information might make it possible for a reader to get a feel for the mood of the book.

Five experts thought comparisons with the author's work or with similar works was a necessary ingredient of a quality book review, although not many reviews included this information. Of the four journals, the reviews in *SLJ* included 17 comments on this topic, which was the most of any of the journals in the study.

On the other hand, although only 4 experts felt that a reviewer should comment on the appropriateness of the art to the text, a large number of reviews contained that information. Twenty-five of the reviews in *SLJ*, 22 of the reviews in *BL*, 21 of the reviews in *BCCB*, and 19 of the reviews in *HBM* contained statements

TABLE 3
TITLES REVIEWED BY JOURNALS

Adoff, Arnold. *Street Music: City Poems*. New York: HarperCollins, 1995.
Avi. *Poppy*. New York: Orchard, 1995.
Bradby, Marie. *More Than Anything Else*. New York: Orchard, 1995.
Bruchac, Joseph. *A Boy Called Slow*. New York: Philomel, 1995.
Colman, Penny. *Rosie the Riveter*. New York: Crown, 1995.
Coman, Carolyn. *What Jamie Saw*. Arden, North Carolina: Front Street, 1995.
Conly, Jane L. *Trout Summer*. New York: Holt, 1995.
Cummings, Pat. *Talking with the Artist, Volume 2*. New York: Simon & Schuster, 1995.
Curtis, Christopher P. *The Watsons Go to Birmingham*. New York: Delacorte, 1995.
Cushman, Karen. *The Midwife's Apprentice*. Boston: Clarion, 1995.
Engel, Dean. *Ezra Jack Keats: A Biography*. New York: Silver Moon, 1995.
Feelings, Tom. *Middle Passage*. New York: Dial, 1995.
Fritz, Jean. *You Want Women to Vote, Lizzie Stanton?* New York: Putnam, 1995.
Froehlich, Margaret W. *That Kookery!* San Diego: Browndeer/Harcourt, 1995.
Giblin, James. *When Plague Strikes: The Black Death, Smallpox, Aids*. New York: HarperCollins, 1995.
Gray, Luli. *Falcon's Egg*. Boston: Houghton, 1995.
Griffith, Helen V. *Grandaddy's Stars*. New York: Greenwillow, 1995.
Hamilton, Virginia. *Herstories: African American Folktales*. New York: Blue Sky/Scholastic, 1995.
Han, Suzanne C. *The Rabbit's Escape*. New York: Holt, 1995.
Hoestlandt, Jo. *Star of Fear, Star of Hope*. New York: Walker, 1995.
Hughes, Shirley. *Rhymes for Annie Rose*. New York: Lothrop/Morrow, 1995.
Johnson, Stephen. *Alphabet City*. New York: Viking, 1995.
Macauley, David. *Shortcut*. Boston: Houghton, 1995.
McKay, Hilary. *Dog Friday*. New York: Simon & Schuster, 1995.
McMillan, Bruce. *Night of the Pufflings*. Boston: Houghton, 1995.
Moore, Martha. *Under the Mermaid Angel*. New York: Delacorte, 1995.
Murphy, Jim. *The Great Fire*. New York: Scholastic, 1995.
Orlev, Uri. *The Lady with the Hat*. Boston: Houghton, 1995.
Rathmann, Peggy. *Officer Buckle and Gloria*. New York: Putnam, 1995.
Reef, Catherine. *Walt Whitman*. Boston: Clarion, 1995.
San Souci, Robert. *Faithful Friend*. New York: Simon & Schuster, 1995.
Sciezka, Jon. *Math Curse*. New York: Viking, 1995.
Stevens, Janet. *Tops & Bottoms*. San Diego: Harcourt, 1995.
Stevenson, James. *Sweet Corn*. New York: Greenwillow, 1995.
Taylor, Mildred. *The Well: David's Story*. New York: Dial, 1995.
Van Dijk, Lutz. *Damn Strong Love: The True Story of Willi G and Stefen K*. New York: Holt, 1995.
Wynne-Jones, Tim. *The Book of Changes*. New York: Orchard, 1995.
Zolotow, Charlotte. *When the Wind Stops*. New York: HarperCollins, 1995.

relating the illustrations to the text. It is also important to mention that 11 of the 38 titles did not contain any art or illustrations. One might infer from the findings that information regarding illustrations is being included in a large percentage of the reviews of books that contain illustrations, at least in those books that are considered notable. In the majority of the reviews where this type of information was included, criterion number 3 (comments relating to the scope, tone, style, and point of view) was also met. The reviewer often mentioned the mood set by

TABLE 4
CRITERIA BY JOURNAL

		BCCB	*Booklist*	*Horn Book*	*SLJ*
1	Description of Content	38	38	38	38
2	Definition of Audience	38	38	2	38
3	Scope, Tone, Style, and Point of View	31	27	29	33
4	Comparison with Author's Other Works or Similar Works	15	12	9	17
5	Appropriateness of Art to Text	21	22	19	25
6	Reviewer's Personal Opinion	30	31	30	36
7	Strengths and Weaknesses	8	15	1	7
8	Uses of the Work	6	3	5	9
9	Brevity	12	19	7	10
10	Judgment of Literary Quality	19	18	20	24
	Total	218	223	160	237

the illustrations, and whether that mood was consistent with the text.

The majority of reviews in all four journals met criterion number 6, which is the reviewer's personal opinion. Clearly, those reading the reviews would like to know what a person actually thought of the book, rather than just factual information about it. *SLJ* met the criterion the most times, with 36 comments relating to this subject. Only 2 of its reviewers did not clearly indicate their opinion of the books they reviewed.

An indication of strengths and weaknesses was another criterion that 4 experts thought should be in a good book review. *BL* contained the criterion in 15 of the 38 reviews, the most of any of the journals surveyed. No consistency was revealed in what reviewers considered strengths or weaknesses. In one case, a reviewer noted as a weakness that the book looked "babyish," while another reviewer pointed out factual inaccuracies as a weakness.

Another criterion mentioned by 4 experts was an indication of the uses of the book. This was done rarely in the reviews studied. *SLJ* had the most reviews that met this criterion, with 9 reviewers indicating the uses of books. When this criterion was included, the reviewer usually mentioned that the book is good for story time, reading aloud, or science projects or reports.

Three experts thought a good review should be brief, but only 2 defined brevity. One expert indicated 125 to 175 words per review as brief, and another stated that 150 to 200 words would be consid-

TABLE 5
TOTALS AND AVERAGES OF CRITERIA

Journal	Total No. of Criteria Met by Journal	Average No. of Criteria Met per Review Article
BCCB	218	5.74
Booklist	223	5.87
Horn Book	160	4.21
SLJ	237	6.24

ered brief. For this study, brevity was defined as 150 to 175 words per review. Many reviews examined did not meet this criterion, but it might be asking too much to expect a review to meet 9 essential criteria in less than 175 words. However, *BL* contained brief reviews over half the time, and it ranked second in total overall criteria met, so perhaps it is possible to be brief and inclusive at the same time.

Judgment of the literary quality was the most difficult to identify. Very often it was difficult to tell whether the reviewer thought the book contained literary merit, or whether the book contained a number of things that the reviewer judged as strengths.

Because of the small size and uneven job background distribution of the experts, it is difficult to draw any valid conclusions as to how the background of the experts might have affected the results of this study. Mainly, the practicing librarians and journal editors noted the importance of criterion number 1, "Description of the Content" and criterion number 10, "Judgment of Literary Quality," both of which occurred frequently in the reviews. The journal editors and publishers were the only experts mentioning criterion number 6, "Reviewer's Personal Opinion," which also appeared frequently in the reviews. The other criteria were fairly well represented by all of the background groups and no further patterns could be observed.

Discussion of Findings and Further Research

In the current study, *SLJ* contained the most criteria identified by the experts as essential for a quality book review. However, *SLJ*, *BL*, and *BCCB* were quite close in the total number of criteria met by each journal. Those totals were 237, 223, and 218, respectively. Thus, it is not possible to identify one journal that provides the best quality book review of juvenile books. Only *HBM* fell much shorter in meeting the criteria, with a total of 160 criteria for the 38 titles. It should be noted that *HBM* only reviews books it recommends; some readers might be content to know that the book is being recommended without being told specifically why.

It is also helpful to look at table 4, which breaks down the criteria by journal and shows that some journals contain strengths in certain areas and weaknesses in others. For instance, *BL* is clearly superior when it comes to identifying strengths and weaknesses of the books examined here, but it is not as successful as the other journals when it comes to identifying the uses of a book. *SLJ* leads the other journals in giving the reviewer's personal opinion, but only slightly so. It is, however, clearly superior to the others in identifying uses of the work. *BCCB*, on the other hand, although meeting only 218 total criteria, fell in between *SLJ* and *BL* in the breakdown of each individual criterion.

These results support the findings of previous researchers (Weber 1979; Kennemer 1984; Witucke 1980, 1982; Meacham 1989; Burchette 1992; Bishop and Van Orden 1998) who were unable to identify one single journal as being adequate to provide the information needed by librarians to make informed selection decisions regarding children's books.

Four criteria mentioned by the experts did not qualify for this study because they were not identified at least three times: (1) currency of the review, (2) judgment of reader appeal, (3) information concerning the attractiveness of the jacket or cover design, and (4) comments relating to controversial issues surrounding the subject of the book. It would be worthwhile to do another study with more experts to see whether these criteria would also be considered essential. It would be interesting to determine whether the professional background of the experts makes a difference in whether these criteria are considered important. For instance, one might speculate that school librarians would be most interested in comments relating to controversial issues, while publishers might want to include information concerning the attractiveness of the jacket or cover design.

It would also be helpful for the experts to qualify their criteria whenever possible. For instance, if an expert thinks a

book review should be brief, a definition of brevity should be given.

All of the journals in this study indicate their recommended titles by some type of symbol (stars in *SLJ, BL,* and *HBM* and asterisks in *BCCB*). Most of the books in this study received recommendation symbols (stars or asterisks) in their reviews. The focus of the current study was on the content of the review. Recommendation symbols might indicate quality of the book, but not necessarily of the review. A study in which the effect of recommendation symbols on selection is examined, in addition to the content of the reviews, would be beneficial.

None of the journals in the study had selection policies that indicate the criteria that are applied in the book reviews. *SLJ* and *BCCB* publish annual policies that are descriptive in nature, but do not discuss individual criteria. *BL* does not include a policy statement, but does note in the table of contents that all the books reviewed in each issue are recommended to libraries. *HBM* states at the beginning of its review section that most of the books are recommended. Inclusion of selection policies that address the criteria for book reviews would be helpful to librarians so they can be aware of the basis upon which reviewing decisions are made.

Additional studies are needed to determine the criteria that are essential to a good book review. A survey that uses a large number of respondents from a variety of backgrounds (school and public librarians, library school educators, journal editors, authors of children's literature textbooks, authors of collection development textbooks, and authors and illustrators of children's books) as the sample would be helpful to establish a ranked checklist of criteria stratified by background category of the experts. Some analysis of the ranking of the criteria in relation to the backgrounds of the respondents would indicate whether there are differences in the criteria correlating with the backgrounds of the respondents. A Delphi study using experts in the field of book reviewing might be beneficial for the same purpose.

Conclusion

Although the current study cannot stand alone in presenting final conclusions regarding the essentials of a quality book review or the journals providing such reviews, it can provide benefits to the profession. Reviewers of children's books can use the criteria identified here as a guide when writing book reviews. School and children's librarians can utilize our findings when making journal and book selections. It is hoped that other researchers will use the findings and recommendations of this exploratory study to investigate further the criteria that are needed to provide quality reviews of juvenile books and to identify the journals that provide those reviews.

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An Analysis of Tables of Contents in Recent English-Language Books

R. Conrad Winke

A sample of 648 current English-language book publications with Library of Congress cataloging was examined to determine how many have tables of contents suitable for inclusion in bibliographic records. They were also examined to determine the number whose bibliographic records already contain contents notes (MARC field 505) supplied by the Library of Congress, the overall average length of their tables of contents, the levels of complexity or hierarchy of tables of contents, whether the tables of contents were subject-based or author/title based, how many new author names would be added to a bibliographic record that contained an analytic tables of contents note, whether books on certain subjects are more likely than others to include tables of contents, and to determine the proportion of books with usable tables of contents that also have subject indexes which might be usable for enhancing keyword access. Finally, I examined all current bibliographic records produced by the Library of Congress in order to determine how many books in general include subject indexes and how many bibliographic records contain contents notes. It was found that 92.75% of the books examined had tables of contents that could be included in catalog records, with an average length of 67.75 words. Most tables of contents contain one or two levels of hierarchy. Author/title based tables of contents account for 25.62% of the sample pool, with each table containing an average of 15.58 names. Finally, 1.12% of the bibliographic records currently produced by the Library of Congress include contents notes and 53.96% indicate the presence of an index.

As more people gain the ability to access library collections from remote locations, the luxury of obtaining a minimal citation from a catalog and then browsing the shelves diminishes. Today's user needs more complete information online so that bibliographic selection accurately can be made remotely and document delivery can follow. However, while the needs and expectations of library users continue to grow, it is already acknowledged that the present generation of online catalogs, and even those catalogs with full Boolean retrieval options, is too lim-

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ited in its searching and retrieval capabilities (Mandel 1992). As a reflection of these trends, during the spring of 1992, the Bibliographic Services Study Committee of the Council on Library Resources (CLR) met with representatives from the Library of Congress (LC), experts in Internet access techniques, and online catalog developers. A central theme of that meeting, as defined by Hildreth (1992), was an online catalog (called the E3) that was:

- enhanced with post-Boolean retrieval techniques and improved interface design;
- expanded to include indexing, tables of contents, etc.; and
- extended to serve as a gateway to other collections and resources.

Preliminary investigations showed that retrieval abilities increase when subject-rich information such as transcriptions of tables of contents (TOCs) were added to records and free-text searching was made available. In the present cataloging environment, however, it is more the exception than the rule to include such data. LC greatly restricts the inclusion of contents notes in its cataloging records via its rule interpretations. Furthermore, the "core level" record, currently being touted as the new universally accepted basic cataloging standard, eliminates nearly all notes, including contents notes describing TOCs, with the exception of multipart items with separate titles. Certainly, there are drawbacks to adding such data, such as increased staff workloads and the requirement of more computer storage space, but these drawbacks must be weighed against the benefits. Questions that might be posed include:

- Exactly how much extra effort would be required to enhance more bibliographic records through the addition of contents notes?
- How much extra storage would be required by doing so?
- How much staff time would be needed to accomplish such a task?

It would, of course, be possible simply to implement such a program at a given library and later determine the costs and storage implications. However, it would be more prudent first to attempt to determine the general nature of TOCs, their length, and the subject areas most suitable for these types of enhancements. In this study, the latter approach is taken in order to provide a foundation for further exploration of this topic.

Literature Review

Previous research done on contents notes can be divided into two distinct categories: research conducted to prove the benefits of adding contents information to catalog records, and research into the nature and structure of TOCs themselves. This literature review covers both of these categories.

Dwyer (1987, 132) stated that "our clients are requesting not just more and better subject access, but a deeper analysis of the contents of library materials." Matthews, Lawrence, and Ferguson (1983) reported that the ability to search a book's TOC or index is among the special features desired most by respondents to a CLR Online Catalog Evaluation Project questionnaire. Mandel (1983, 6) reviewed proposals for enhancing subject access and noted that "suggestions for adding keywords or uncontrolled terms to the record have included adding words from the table of contents or index." Building on this, Diodato (1986) determined that tables of contents and indexes in books contained terms that patrons used to describe those books. These subject devices could complement traditional library subject headings in providing subject access to books because the additional terms would increase the likelihood that the patron's search term would match information in the bibliographic record.

The assignment of more subject headings per book from a controlled vocabulary would also increase the reader's chance of linking their terms with relevant citations. One frequent justification for adding contents notes to MAchine Readable Cataloging (MARC) records is the limited number of subject headings attached to records. O'Neill and Aluri

(1981) found about 1.4 subject headings on the average bibliographic record in OCLC, although this number varied somewhat by subject categories and has increased in recent years. Knutson (1991) found an average of 2.6 subject headings per record for social science. He notes (67) that "the very real economic consideration of a known cost [of adding more subject headings] and the not well-known benefits of increasing the level of subject analysis prevents libraries from making a sharp break with tradition in subject cataloging." Despite this, he believes that subject analysis at the chapter level would improve retrieval and increase the likelihood of circulation. However, it is not LC practice or the practice of most libraries to provide chapter level subject access to most books.

Markey and Calhoun (1987) investigated, in part, whether contents notes contributed "subject-rich words" to catalog records. They found that, on average, contents notes added 15.5 unique subject-rich words per record, although they found that only 5% of the more than 35,000 records used in their study actually contained either contents or summary notes.

While no comprehensive study of TOCs has been undertaken until now, there have been a number of partial investigations in the past. Settel and Cochrane (1982) reported on the landmark Subject Access Project (SAP), which provided one of the earliest investigations of the usefulness of adding book tables of contents to library catalogs. Nearly 2,000 books in a number of subject categories in the humanities and social sciences were selected from the University of Toronto Library. The investigators developed rules for selecting subject-rich terms from the TOCs and indexes of books, which were then incorporated into the corresponding bibliographic records. A quota served to restrict the number of terms to be added to each record, resulting in an average of 40. Two separate databases were then set up, one containing the TOCs and index entries, the other containing standard bibliographic records with subject headings. It was found that twice as many of the relevant items for social science and three times as many relevant items for the humanities were retrieved using the enhanced database. In an earlier article reporting on the SAP, Atherton (1978) reported that of the selected pool of books, only half had usable contents pages, and of these, only some could be deemed to have informative contents pages.

Byrne and Micco (1988) conducted the Enhanced Subject Project (ESP), which was subsequently undertaken by the Australian Defence Force Academy (ADFA). Using the same rules for selecting supplementary terms from the contents and index pages as used in the SAP, librarians at ADFA added terms from the chapter-level headings of contents pages into 653 fields in the bibliographic record for each book. Within six months of application, more than 6,000 books had been processed with enhanced subject access terms.

Both the SAP and the ESP demonstrated that the use of contents terms proved a viable and cost-effective technique for increasing the number of subject access points to the contents of books in library catalogs without seriously compromising precision. The authors also concluded that current cataloging practice, which results in an average of one to two subject headings per record, limits subject access. Both projects showed that recall and user satisfaction were increased when keyword access was provided by adding between 30 to 50 access points per record, paralleling the access provided in online periodical article indexes. The researchers also felt that the controlled vocabulary headings helped provide a grouping function not achieved by keyword terms, and should also continue to be provided in records.

Knutson (1991), however, was unable to link record enhancement to either higher retrieval or to higher circulation, although he felt that enhancing the records with contents notes was a convenient method of increasing the number of terms available for keyword searching, and could increase retrieval potential. In his study, in which 291 col-

lections of essays in the social sciences were enhanced with contents notes and chapter-level subject headings, he found that only 34 of the records (11.7%) originally contained contents notes. One cause for the small gain that Knutson found might be that during the study period, keyword searches accounted for only 2.04% of all searches done in the library's online catalog.

In a similar study, Dillon and Wenzel (1989) constructed a database of nearly 5,000 computer science or electrical engineering book records with abstracts and tables of contents. They found that at all levels of recall the addition of contents information resulted in an improvement of at least 10%, which they considered to be substantial. Concurrently, Dillon and Wenzel found that precision suffered as more content-bearing information was added to records. While the difference in retrieval effectiveness between abstract and TOC information was minimal, the best results were achieved when both were added to the records.

Sellers (1994) looked at whether contents note information would duplicate *Library of Congress Subject Headings (LCSH)* in enhanced records. A sample of 60 records with tables of contents notes from subclasses QP, QE, RC, and SF of LC *Classification* numbers (LCC) were selected. All were found to have terms in their contents notes or titles that duplicated at least 50% of the words in *LCSH* (ignoring differences such as plural or singular form, with form subheadings excluded). For almost half of the records, all of the *LCSH* words were duplicated in the title and contents notes. Sellers was generally discouraged by her results, which were possibly due either to technological restraints or to the search engine in place on the local system. Nevertheless, it was shown that subject access was improved for at least half of this small, topically narrow sample through the inclusion of contents notes.

Michalak (1990) conducted a limited enhancement project at Carnegie Mellon University using both TOCs and abstracts. From a pool of over 1,200 books, 189 (15.2%) were selected as candidates for enhancement. To be a candidate for enhancement, books had to contain "citable" references in the table of contents, such as those found in anthologies of plays, collections of critical essays written by different authors, and in books with separately-authored chapter titles. Exhibition catalogs with 25 or fewer artists, and books with chapter headings that contained useful contents information otherwise not available in the record, were also enhanced. Eliminated were proceedings of scientific and technical conferences, books for which appropriate keyword access is already provided for in the normal course of description, and books without useful chapter headings (as determined by the cataloger). A retrospective enhancement of more than 3,300 English language collected plays was also undertaken. Of these, 631 records (19%) were deemed eligible and enhanced. Michalak's preliminary results suggested that contents enhancement increased the number of records retrieved by 20% to 30%.

Weintraub and Shimoguchi (1993) examined 375 books in the San Diego State University Library to determine the extent to which information in these books had subject or analytical applications. Books were selected from LCC ranges P-PT, Q-QR, RA-RC, and T-TK. No restrictions were placed on place of publication, date of publication, or language of the work. Books were considered eligible for enhancement if they contained citable works or subject-revealing chapter titles. Books with parts whose titles had little meaning outside the context of the whole, or for which appropriate and sufficient keyword, subject, or name access would be provided routinely, were considered ineligible. Eligible books were divided into two categories that highlighted the type of enhancement that might be used (either citation-based or subject-based). They found that 23% of the books contained discrete content information not already represented in the catalog records. Of those, 52% would call for citation-based enhancements (such as single-author treatises, or multi-author books whose separate chapters were not attrib-

uted to any one contributor) and 48% would call for subject-based enhancements. Nearly 65% required fewer than 25 enhancements, with an average of 8.03 enhancements per book.

Citation-based (or composite) TOCs were also examined by Poulsen (1996). Using sample pools from the collections of two Danish libraries, Poulsen sought to "illustrate the degree to which the proportion of composite works is dependent on library holdings in terms of broad universal holdings versus specialized holdings, subject field, publication language, and the age of the holdings" (136–37). Poulsen, who compared his own results with those of other studies, found that regardless of the various research designs or methods used in examining the sample pools of books, the proportion of books containing composite works fell between 10% and 20%, with the number of articles in the composite works varying from 20 to 30 per book. He also found that books on scientific subjects tended to have more citations than those on the social sciences, and that English-language publications tended to have more citations than publications in other languages.

DeHart and Matthews (1990) explored briefly the structure of TOCs. From a pool of 36 books on information and computer science, they found 14 to have tables of contents with "part" headings in addition to chapter headings. All 36 had chapter titles, with 32 having one chapter sublevel, 15 having two chapter sublevels, 3 having three chapter sublevels, and only 1 having four chapter sublevels. The authors felt that the levels appearing in the TOCs could serve as a weighting device to indicate the importance of various topics within a book.

DeHart and Reitsma (1989) provide a more in-depth investigation into the structure of TOCs, involving a pool of 31 single-work titles on the history of taxation in Great Britain. Publication dates for these books ranged from 1670 to 1981, with over half being from the latter half of the 20th century. Of these, 26 contained TOCs. The authors identified 603 content-indicative terms in the TOCs from these books (an average of 19.5 per book), although 86% of the chapter titles were deemed meaningless or ambiguous unless understood in conjunction with subject headings or title terminology. Of the 603 content-indicative words, 18 were found to be misleading because they had meanings outside the subject scope of the project. As with the DeHart and Matthews study, levels within the TOCs were identified. Of the 26 books with TOCs, 1 had four chapter sublevels, 3 had three chapter sublevels, 4 had two chapter sublevels, and the remainder had only one sublevel. The authors concluded that a functional relationship exists for enhancing catalogs with contents notes, although they acknowledged that their sample pool was small, narrow in scope, and covered a wide span of publication dates.

Dwyer (1991) also looked into the possibility of enhancing records by selecting 124 titles with LC copy from an approval book shipment. The books were examined to determine the extent of contents notes, especially the number and complexity of "sections" (defined to be primary parts, chapters, essays, or stories with significant title or author/title information excluding prefatory material, bibliographies, indexes, and the like). Dwyer found that the books averaged between 7.5 and 8.5 sections per TOC. Subsections were included in 69 of the books, and sub-subsections in 21 of the books. The TOCs in books with sub-subsections were found to resemble extensive indexes. More detailed TOCs were generally limited to science and technology books. The 55 books with only primary sections averaged a slightly higher 10.9 sections per title, and 19 of these had author/title information on the contents page. Online records for 20 of the 55 books in this final group were enhanced with 505 fields. Dwyer found that this task added approximately nine minutes per title to the cataloging time.

Literature Synthesis

A synthesis of the above-cited literature reveals several points. First, users prefer more complete bibliographic records and

desire better access to these records. One way of providing this is through the inclusion of TOCs, which offer not only a deeper analysis of the original material, but also more subject rich keywords per record. Second, recall increases when such vocabulary is added to bibliographic records. However, investigations into the structure and composition of TOCs themselves has been relatively scant, leaving an incomplete and inadequate understanding of TOCs. Sample pools in these studies have been relatively small, ranging in size from 31 to 124 books.

In some cases, only books on certain subjects were investigated. Only one researcher included year of publication as a criterion for inclusion in the sample pool. Furthermore, in none of these papers were TOCs in currently published literature examined to any depth or extent. While some authors had looked at the physical structure of TOCs, none had determined their overall lengths, nor had any investigated materials on a broad range of topics to try to discern whether some subject areas were more likely to include TOCs than others. Finally, none had determined the number of author names that might be added to bibliographic records that include TOCs. These lacunae formed the genesis of the present investigation.

Objectives

The goal of this study was to take a detailed snapshot of TOCs as they appear in current English-language book publications. Specifically, the objectives of this study were:

1. To examine current English-language book publications with LC cataloging to determine the percentage of these materials with TOCs suitable for inclusion in bibliographic records
2. To determine the portion of the bibliographic records that are supplied by LC with usable TOCs and already contain contents notes (MARC field 505)
3. To determine the overall average length of TOCs in these books
4. To determine hierarchical complexity of TOCs
5. To determine the proportion of books with usable TOCs that contain subject-based tables and the portion that contain author/title-based tables
6. To determine how many new author names would be added to a record that contained an author/title TOC
7. To determine whether books on certain subjects were more likely than others to include or exclude TOCs
8. To determine the proportion of books with usable TOCs that also have subject indexes that could be potentially mined for further enrichment of keyword access
9. To examine all bibliographic records for books published from 1995 to 1997 with LC cataloging in order to determine: how many indicate the presence of indexes; how many records already contain contents notes; the overall average length of records with and without contents notes; and the average number of words contained in the contents notes themselves

Study Population

For a variety of reasons discussed below, the following limiting guidelines were placed on the study population:

1. Because increased subject retrieval through keyword searching is one of the benefits to be gained from the inclusion of TOCs in cataloging records, this study was limited to English-language books, the assumption being that most North American libraries would be primarily interested in enhancing their keyword indexes with English language words.
2. Books included in the study were limited to those having full-level LC bibliographic records because it was felt that such materials would better mirror the offerings of mainstream presses and thereby most likely be found in the greatest number of North American library collections. Books with LC copy cataloging were also included, as these are materials that LC has collected. Using materials with full LC records

also automatically provided a convenient breakdown by subject via the LCC numbers, which are included in each fully cataloged record. This permitted me to determine whether books on certain subjects were more likely to include usable TOCs than others.

3. Because only recently published books were to be investigated for this study, books with imprint dates earlier than 1995 were excluded from the sample.
4. For practical purposes, the study population was further limited to books collected by the main library of Northwestern University Library (NUL).
5. For obvious reasons, books without a usable TOC were excluded from the study population.

Points 4 and 5 are further elaborated upon below.

Method

The study took place at NUL during August and September 1997. The main library's collection totaled 3,840,439 volumes as of August 31, 1996 and grew by an average of 27,093 new titles each year between 1992 and 1996. During those same years, NUL processed an annual average of 17,693 titles with LC copy. Being a large research library, its collections are broad and general in nature.

No individual library can truly be regarded as an accurate reflection of the current English-language book publishing industry. LC, being the largest library in the English-speaking world, might be a reasonable approximation, and certainly it catalogs the greatest number of such books. It is assumed that because of its size and the number of titles added each year, NUL's collection might therefore also be used as some indication of the type of monographs currently being published in English and cataloged by LC. However, some limitations to this assumption must be stated.

The Catalog Department in the Main Library at NUL catalogs for the general collection. Separate branch libraries, each with its own cataloging unit, exist for Law, Medicine, Music, and Transportation. It was expected that these subject areas (LC classifications K, R, M, HE, and parts of T) would be underrepresented in the survey sample. As is the case with any library, NUL's collections are strong in some areas and weak in others. One area of particular strength is Africana. However, NUL also collects heavily in history, the social sciences, and political science (LC classifications C, D, E, F, G (partial), H, and J). Other subject areas, such as agriculture (LC classification S) are almost entirely ignored. Being a research library, NUL also collects more heavily in books issued by university presses than in those from commercial publishers, and in books of an academic nature instead of those of a popular nature. Juvenile materials, while collected, were not included in this investigation.

The aim of the study was to create a minimum pool of 600 books with usable TOCs. Books were first sorted by LC classification. Next it was determined whether these books had TOCs that could be analyzed. This two-step process was carried out in order to determine which disciplines (if any) tended to have usable TOCs and which did not. Some examples of books that were determined to not have analyzable TOCs were biographies that did not present subject-like chapter headings, single works of fiction or drama, and some belleletristic anthologies (such as poetry) in which the table of contents listed each work as an author-title entry and contained more than 2,500 words, which was assumed to be too lengthy to be included in bibliographic records.

The final candidate pool did not represent a random sample of books received for cataloging in a specified time frame, but rather were the first 601 books received after the study began that met the criteria of having a usable TOC.

Once the final candidate pool had been identified, the bibliographic records for each book were reviewed to determine whether contents notes (MARC field 505) were included. This was done to obtain an idea of how frequently TOCs

were already included in bibliographic records.

Next, a word count for each TOC was determined and the number of levels of hierarchy was recorded. A word was defined as anything with spaces around it. The number of characters in the counted words was not recorded. In accordance with current cataloging practices, chapter numbers, words such as "chapter" and "part" (but see below), and subtitles of chapters or article titles were routinely included in the word counts. Personal author names were also counted, as long as they did not already appear in statements of responsibility elsewhere in the bibliographic record. However, in the spirit of the *Anglo-American Cataloguing Rules*, 2d ed., chapters or articles written by more than three authors were subjected to the rule of three, meaning that only the first author's name was included in the word count. The ignored authors' names were tallied as two words, representing the "[et al.]" that would appear in the contents note in the bibliographic record. Each separate word in an author's name was counted separately (e.g., "A. A. Milne" was counted as three words).

Word counts deeper than chapter level were not carried out. Typically, TOCs with three or more levels of hierarchy included subchapter level analysis. Levels of hierarchy were also ignored unless they contained meaningful words. For example, if a book was divided into parts and chapters, in order for "Part I" to be included in the total word and hierarchy counts, it would have to have a specific name, such as "Part I: Childhood." Other words routinely ignored in the total word counts were chapter names such as "Biography," "Filmography," "Notes," "Acknowledgments," "Contributors," and "Index." Conversely, words such as "Introduction," "Prologue," "Appendix," and "Sources" were included in the total word count if they included more specific titles or if they were integrally built into chapter numbering (e.g. "Chapter 1: Introduction," "Chapter 2: The Early Years," etc.). Finally, in some books that consisted essentially of reprints of previously published articles, the chapter information contained not only author and title statements, but bibliographic citations as well. These citations were excluded from the final word counts.

It should be noted at this point that there was no attempt to identify the number of "subject-rich" words that might be added to keyword indexes from each TOC. While such information would certainly be useful, such a task would consume more time than was available, due to a number of factors. First, there is the large number of books reviewed in this study and the limited staff available for the project. Second, there is the intellectual problem of determining which words should be regarded as subject-rich, and which should not. Third, in order to obtain an accurate or useful word count, multiple occurrences of a word within the contents note itself, as well as occurrences of that word in other parts of the bibliographic record, would have to be eliminated from a TOC's total final word count. Finally, these subject-rich terms would by their very nature be taken from an uncontrolled vocabulary (that is, the words in the TOCs themselves), and some sort of control would have needed to be established to grapple with the tallying of synonyms or different grammatical manifestations (e.g. singular or plural) of a word occurring in a given record. For all these reasons, it was decided that no effort would be made to tabulate the percentage of the total word count that consisted of potentially subject-rich words.

Each TOC was then reviewed to see whether it was subject-based or author-based. Generally, author-based TOCs are books produced under editorial direction in which a different author writes each chapter, and the names of these authors appear with the chapter title. Subject-based TOCs are generally found in books in which a person or persons is responsible for the intellectual content of the whole book. For author-based TOCs, the total number of new authors' names that the contents note would bring to the catalog record was tallied. Finally, the books were also checked to see whether subject indexes were present, in the hopes of determining whether a correla-

TABLE 1
DISTRIBUTION OF BOOK SAMPLE BY LC CLASS NUMBER

LC Class	Survey Total	% of Survey Total	Unusable
A	0	0.00	–
B	48	7.41	1
C	5	0.77	1
D	72	11.11	1
E	36	5.56	3
F	12	1.85	–
G	25	3.86	–
H	175	27.01	1
J	46	7.10	–
K	3	0.46	–
L	9	1.39	1
M	1	0.15	–
N	15	2.31	4
P	126	19.44	29
Q	26	4.01	3
R	15	2.31	1
S	2	0.31	–
T	10	1.54	1
U	12	1.85	–
V	0	0.00	–
Z	10	1.54	1
Total	648	99.98	47

tion existed between the presence of a TOC and the presence of an index with potentially usable keywords.

STUDY POPULATION COMPARED TO LC

At the same time that books and bibliographic records were being examined, a snapshot was taken of the LC bibliographic records for English-language monographs published in the years 1995 through 1997, for comparison with the survey sample. This was possible because NUL purchases the LC MARC Books Service on tape and mounts the current three to four years' worth of records as a discrete resource file on its local system. All records with usable LC call numbers and with the language code "eng" were tabulated by class number for comparison with the sample pool. Records with call numbers such as "IN PROCESS" and "MLC" were ignored. This snapshot allowed for an analysis of book cataloging currently being performed at LC by classification number. In addition, the LC records were scanned for the presence or absence of 505 fields and the presence or absence of indexes as determined by the fixed-field index code.

FINDINGS

A total of 648 books was examined to produce a pool of 601 titles that included usable TOCs. The distribution by LC

TABLE 2
LEVELS OF HIERARCHY EXHIBITED IN SAMPLE TOCS

Levels of Hierarchy	No. of Books	%
1	280	46.59
2	258	42.93
3	47	7.82
4	14	2.33
5	1	0.17
6	1	0.17

class number of the books examined, including those deemed unusable, is shown in table 1. (Due to rounding, percentages in the tables do not add to exactly 100%.) None of the 648 books was assigned class A or V. Of those books that were deemed to be lacking in usable TOCs, 29 (61.7%) were in class P. This might well be expected, as works of imagination, such as novels, typically do not contain TOCs. Another category of materials frequently found in class P, biographies of authors, often does not contain meaningful TOCs. It is interesting to note, however, that 601 (92.75%) of the books examined did contain TOCs that could conceivably be included in their corresponding bibliographic records.

Of the 601 TOCs examined, the average number of words in each was 67.75, with a range from 9 to 2,078 words and a median of 81 words. Only 32 (5%) TOCs exceeded 300 words, and in only 2 instances (0.33%) did the number of words exceed 1,000. (As stated above, some of the unusable TOCs were deemed to be so due to excessive length.) Of the 67.75 average words per TOC, not all of these might be considered "subject rich," nor would all of them be new words added to a bibliographic record. Nevertheless, some of them certainly would enhance keyword retrieval and all would give a user a better idea of the contents of a given work without first having to retrieve it from the stacks or order it through interlibrary loan.

Another aspect of TOCs that was examined was structure, or the number of levels of hierarchy. These results are shown in table 2. Nearly 90% of the TOCs in this study were relatively simple in their structure. The greatest number (46.59%) did not exhibit any hierarchical structure, which is to say that they consisted of a simple list of chapters or parts. TOCs with two levels of hierarchy comprised the next largest group (42.93%). Most of these were arranged into parts and chapters, but some were arranged into chapters and subchapters. The remaining 63 books had between three and six levels of hierarchy in their TOCs. In general, books with four or more levels of hierarchy delved into analysis below the chapter level. Due to their overall length and level of detail, it would in all likelihood be impractical to attempt to include such detailed TOCs in catalog records, which was why the subchapter level analysis portion of these TOCs was omitted from the total word tallies.

As stated above, there are two types of TOCs, subject-based and author/title-based. Of the sample pool, 154 books (25.62%) contained author/title-based TOCs. Each contained an average of 15.58 new authors per book (that is, the authors' names did not already appear in the catalog record). These additional names could provide a user with better and more complete access to the works of a given author via keyword searching, albeit without the added benefit of authority control.

These data were then compared to the snapshot of the LC database, which are presented in table 3. As expected, the NUL sample pool varied predominantly along the lines of NUL's collection

TABLE 3
SNAPSHOT OF THE LC DATABASE COMPARED WITH THE SAMPLE TAKEN AT NUL

LC Class	Total LC	%	NUL Survey Total	%	Difference
A	438	0.14	0	0.00	–0.14
B	25,515	8.24	48	7.41	–0.83
C	3,934	1.27	5	0.77	–0.50
D	13,841	4.47	72	11.11	+6.64
E	7,030	2.27	36	5.56	+3.29
F	8,375	2.71	12	1.85	–0.86
G	12,892	4.17	25	3.86	–0.31
H	44,605	14.41	175	27.01	+12.60
J	5,970	1.93	46	7.10	+5.17
K	15,161	4.90	3	0.46	–4.44
L	8,578	2.77	9	1.39	–1.38
M	4,495	1.45	1	0.15	–1.30
N	8,232	2.66	15	2.31	–0.35
P	60,152	19.44	126	19.44	0.00
Q	29,749	9.61	26	4.01	–5.60
R	21,074	6.81	15	2.31	–4.50
S	5,788	1.87	2	0.31	–1.56
T	26,832	8.67	10	1.54	–7.13
U	1,928	0.62	12	1.85	+1.23
V	785	0.25	0	0.00	–0.25
Z	4,113	1.33	10	1.54	+0.21
Total	309,487		648		

strengths and weaknesses, with the strongest variation in classes D, H, and T. Having the MARC tapes available in such a manner allowed for some simple and revealing analysis of these records, both on their own and in comparison to the sample pool.

The LC records were also examined for the presence of contents notes (MARC field 505). It was impossible to determine whether these 505s were constructed from the titles of individual volumes of multivolume sets or from actual TOCs. Of the 309,487 records sampled, only 3,471, or 1.12% were found to contain contents notes. Nearly half of these (1,561) were in class P. In nearly all other classes, less than 1% contained contents notes. Given this, it can be inferred that LC only rarely includes TOCs in its catalog records. To an extent, this is not surprising, as LC's internal cataloging policies restrict the inclusion of contents notes in bibliographic records for books to six specific situations.

Of the 601 usable books in the NUL sample, 37 records, or 6.17%, included 505 fields. Nearly half fell within two classes, 11 in class H and 7 in class P. It cannot be determined with certainty why the incidence of 505s in the study population in class H population was so much higher than those items held by LC. It should be noted that there was no way to determine whether the copy in the NUL records had come directly from the LC

tapes or from OCLC, leaving open the possibility that some of NUL's records might have been enhanced with TOCs by OCLC member libraries. It should further be noted that this class exhibited the greatest variance between the sample and LC's database. Nevertheless, it would seem safe to surmise that, in general, less than 5% of the books currently cataloged by LC receive contents notes, and that a sizable portion of the records that do receive contents notes are for books assigned to class P.

Information regarding the presence or absence of indexes was also extracted from the LC file. A total of 166,996 (53.96%) records had their fixed field coded to indicate that an index was present. It was impossible to determine from the bibliographic record whether these indexes were subject indexes or name indexes. In the NUL sample, 529 of the 601 (88.17%) had subject indexes. As was the case with TOCs, it was not possible to determine with certainty why the NUL sample differed so greatly from the LC sample. Nevertheless, it is possible that more than half the bibliographic records for English-language books currently cataloged by LC could be enhanced for greater subject access through the inclusion of either keywords from their indexes or even the indexes themselves.

Finally, the overall length of the LC cataloging records and of the contents notes contained therein was tabulated. Records that did not contain contents notes averaged 813.15 characters in length. Those that did include contents notes averaged 1,130.54 characters in length. The average length of the contents notes was 254.02 characters (not 317.39 characters, because some records contained more than one 505 field, meaning that direct subtraction of the two averages of overall length does not yield accurate results), or 38.83 words (a word being defined here as a string of characters separated on either side by spaces, delimiters, or double dashes), with each word having an average length of 6.54 characters. That this word count is nearly half the total of the NUL sample might be the result of some unknown percentage of the LC-created contents notes not being created from TOCs, but created to reflect the titles of single volumes of multivolume sets, or being partial or incomplete contents.

Conclusion

It has been shown in the literature that the inclusion of TOCs in catalog records increases retrieval potential, both for topical searches and name searches (Settel and Cochrane 1982; Byrne and Micco 1988; Dillon and Wenzel 1989; Michalak 1990). TOCs are also one aspect of description that users demand (Matthews, Lawrence and Ferguson 1983; Mandel 1983). Furthermore, with the growth of the World Wide Web and the ability to access remote databases, it becomes increasingly important for users to be able to learn as much as possible about a given item before incurring interlibrary loan charges. It appears that current cataloging practices are not keeping pace with the growing demands of the times and thus do not result in records capable of serving users as fully as possible. Catalog librarians have not been successful in getting financial and administrative support for such endeavors. The examination of 648 books received in sequential order revealed that 601 had usuable TOCs, which suggests that a majority of currently published English-language books might actually include TOCs of use to users. The cataloging rules and the MARC format both provide for the inclusion of TOCs in catalog records, and yet, from the above data, it is readily apparent that TOCs routinely are not being included in current cataloging. One possible reason for this might be that the inclusion of TOCs is regarded as labor intensive and therefore cost prohibitive.

This initial examination suggests, however, that TOCs may not be either complex in structure or lengthy, because those investigated contained on average less than 300 words. A typical typist, entering information at a rate of 60 to 90 words per minute, should be capable of entering this data in no more than five minutes, even given all the formatting details entailed in entering these words into

an enhanced level 505 field in a MARC record. Using optical character recognition to digitize the TOCs and utilizing the cut-and-paste features now available in the graphical interfaces of many online library systems might speed the process further. Lower level staff could also perform these tasks. A study investigating the time required to add TOCs to bibliographic records would make for an informative and enlightening followup to this study.

Most books contain indexes laden with subject-rich vocabulary that could also benefit searching. This, however, is a thornier issue. While the majority of books do contain indexes, they are often quite lengthy. They are also riddled with information, such as page numbers, that would not be of great importance in the bibliographic record. The current MARC format also makes no provision for specifically including book indexes in the variable fields of catalog records. One possibility would be to use the 653 field to include certain subject-rich terms from a book's index. This, however, would add an intellectual element to the process that is not required for the inclusion of TOCs in catalog records, and this element could make the inclusion of book index terms cost prohibitive.

Current trends in cataloging lean toward paring down the amount of description provided in the catalog record. However, providing users with more information in the form of keywords culled from TOCs would greatly benefit users' ability to retrieve relevant materials, and, at the same time, possibly trim unnecessary interlibrary loan costs. Users have always needed both the broad data of cataloging records and the detailed data of the books' TOCs and indexes. As users increasingly do not necessarily have direct access to the books in question due to remote searching, the provision of this detailed data falls upon the librarian's shoulders. TOCs are vital. While further study of a randomly chosen study population is needed to support generalization of the findings presented here to all TOCs, this study suggests we can expect to find that TOCs are relatively straightforward and brief. If the nature of TOCs suggested here is confirmed, the next challenge remains to show whether their inclusion in the catalog records is cost effective, and if not, how to make it so.

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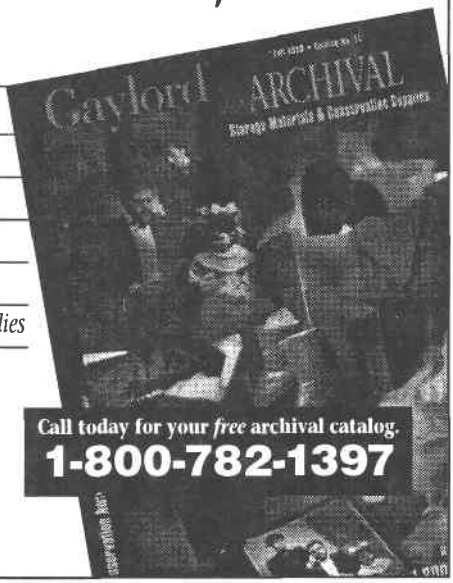

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Core Serial Titles in an Interdisciplinary Field: The Case of Environmental Geology

Louise S. Zipp

In this study core journals in environmental geology are identified and some facets of interdisciplinarity are explored to consider the visibility of this field to collection development librarians. Intercitation analysis of citing and cited patterns in 1995 articles revealed the journal network of environmental geology. The titles clustered into discrete groups with three emphases: Engineering/Materials; Geochemical; and Water/Soil. Most of the 20 core titles are usually identified with other disciplines and subfields. Research libraries supporting collections in environmental chemistry, hydrology, agronomy, and civil engineering might be effectively supporting serial collections in environmental geology. The scope of the field, however, is not inherently visible to collection development librarians whose attention is drawn to established disciplines by way of acquisition fund allocation models. Recent discussions on interdisciplinarity suggest that the characteristics of maturing disciplines, such as a unique body of publications, academic infrastructure, and professional organizations, do not apply to environmental geology. The nature of three recently started environmental geology journals might yield clues as to the direction of this field.

As fiscal pressures continue to increase on academic library collections, it becomes critical for collection development librarians to know the scope of the fields that their collections support. Collection development policies are never as current or as informative as they need to be when hard decisions must be made. The recurring nature of serials costs demands a higher level of assurance that funds are being spent wisely. Use studies frequently are employed to quantify and describe local or "normative" demand, as well as to map out the subjects covered in the collections (Kelland and Young 1994).

Citation analysis is one type of use study that often involves data derived from citation indexes produced by the Institute for Scientific Information (ISI) (Kelland and Young 1994). Journal network studies can document the scope of interdisciplinary fields and their changes over time (White and McCain 1989). McCain (1991, 1995) has combined intercitation and cocitation analysis to produce core journal lists in several inter-

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disciplinary fields, including genetics and biotechnology. To enhance the biotechnology core list, McCain (1995) made two refinements: first, she created a subject heading profile analysis for all journals indexed over a three-year period in *Biotechnology Abstracts;* and second, she analyzed the relative productivity of the candidate titles with regard to biotechnology. With these approaches, she brought into sharper focus the biotechnology aspects of the existing journal network. Although her efforts are comprehensive, McCain's work includes techniques that can be adapted by practitioners to provide different levels of information on some of the more elusive subjects in which they must build and maintain collections.

Environmental Geology

Environmental geology has its roots in the environmental movement of the 1960s. From his perspective as director of the Bureau of Economic Geology at the University of Texas, Austin, Flawn (1968) challenged environmental geologists to organize into a professional society to use their knowledge for the public good through the political process. He described environmental geologists (13) as "engineering geologists, economic geologists, hydrologists, and some marine geologists . . . who are *people* oriented." By 1970, Flawn had published the first book with a title containing the phrase "environmental geology" (Coates 1985). *Geotimes*, the newsmagazine of the American Geological Institute (AGI), has reviewed developments in geology annually since 1967. From 1970 through 1991, the review issues included reports on environmental geology as a separate focus of interest.

LaMoreaux (1992), who was the editor of *Environmental Geology,* predicted that in the near future half the new jobs in science would be created in environmental areas. He noted the new training opportunities offered for professionals in these areas by societies and universities. The creation of degree-granting programs at universities, the founding of environmental institutes, and a growing journal literature were cited as evidence of a maturing infrastructure able to train and support professional scientists in number. Instead of a new professional society with a lobbying role for environmental issues, LaMoreaux recorded the specialization of two major professional societies of geology. The Institute for Environmental Education was founded in 1991 within the Geological Society of America. The American Association of Petroleum Geologists established its Division of Environmental Geosciences in 1992. Environmental geology is still considered to be a growth area within the geosciences, and a substantial percentage of geoscientists employed in 1993 were working in environmental areas (American Geological Institute 1998).

Jackson (1997, 210) defined environmental geology as:

> a specialty of geology, concerned with Earth processes, Earth resources, and engineering properties of Earth materials and relevant to (1) the protection of human health and natural ecosystems from adverse biochemical and/or geochemical reactions to naturally occurring chemicals or to chemicals and chemical compounds released into the environment by human activities, and (2) the protection [of human] life, safety and well being . . . from natural processes . . . through land use planning.

Civil engineering, environmental chemistry, geography, regional planning, and environmental medicine, among other fields, also claim parts of these domains.

Statement of Problem

Identification of a core set of journals helps collection-development librarians build relevant collections. In interdisciplinary fields, this task is problematic but critical to providing balanced representation of growth areas. In this research, a journal network and a list of active serials in environmental geology was developed using intercitation analysis. The use of nonlocal, "normative" data should make the results useful in many academic libraries. The nature of the core titles will serve to further illuminate the scope of this field as it is perceived by librarians.

Method

To develop the journal network and identify the core titles in this interdisciplinary area, I used the intercitation analysis techniques adapted by McCain (1991, 1995) from work by Servi and Griffith (1980). McCain (1991) contains details about her adaptation and elaboration of the original algorithm, which is a valuable tool because of its flexibility and elegance. The authors demonstrated that the starting point for the analysis need not be core titles but could include titles related to the eventual core list. The algorithm contains several weighting factors that rationalize the effect of heavily cited titles, prolific titles, self-citing titles, and the repeated citing of classic papers. Z-scores are also used to standardize rankings at a critical juncture. By analyzing titles both in the citations they include and in titles in which they are cited, feedback loops can be identified to assist in grouping core journals. The full network reveals itself systematically, and refinements can be used to delineate the portion of interest. Intercitation analysis identifies the components of a journal network and the direction of significant citation flows, but it stops short of assessing the relative strength of those relationships. While McCain used intercitation analysis as one of several tools to develop a comprehensive picture, the technique is valuable to provide baseline information and an overview of the field as a whole.

Intercitation analysis measures journal-to-journal citations and thus the extent to which one title connects with the work published in another journal. I used citing and cited data compiled for 1995 source titles in the ISI database, where environmental science is a featured area of coverage (Garfield 1996). Because the database only includes full bibliometric data on its source titles (i.e., the titles indexed in ISI products), the citing and cited patterns for nonsource journals were not discernable.

Building a Core List

To find a starting point, in 1997 I queried eight colleagues who are geoscience librarians at major university libraries with large academic geology departments. They were asked to identify the five best environmental geology serials today, although I did not define what I meant by "best." Most respondents submitted more than five titles, and all titles received were included in the first analysis (see table 1). My secondary hypothesis held that the scope of interdisciplinary fields is not necessarily apparent to librarians, even to subject specialists. Thus, I was not surprised at the librarians' nominations or the lack of correlation with the core list I developed through this research. The titles nominated by the librarians were analyzed according to McCain's adaptation of the Servi and Griffith algorithm (McCain 1991, 1995).

Replicating McCain's (1991, 1995) procedure, I examined the citing-cited relationships of journals at three different levels. The nominated titles comprised the first level. A second level of titles constituted those titles that had received a substantial proportion of their overall 1995 citations from titles in the first level. The citing-cited relationships of the second level of titles were examined in the same way to reveal titles at a third level to which they were strongly linked.

At this point I was concerned about the very small potential core list that was developing, so I reviewed the *cited-citing* data in the journal citation reports (Garfield 1996) for the titles that had already revealed links. I found 30 more journals that might also have had an environmental geology focus, as per Jackson (1997). Those 30 prospective titles were put through the standard analysis, and only one was found to cumulate links. This particular digression was analogous to broadening the starting list of titles, and the results had only a minor effect on the final core list.

Use of the algorithm reveals a network, but refinements are necessary to outline clearly the core titles. McCain (1991, 1995) used cocitation analysis and a subject heading profile analysis coupled with a productivity analysis (1995). I sought a simpler method of refinement. Using McCain's criterion, I had already

TABLE 1

ENVIRONMENTAL GEOLOGY TITLES SUGGESTED BY LIBRARIANS

Title	Frequency
Environmental Geology	5
Ground Water	4
Engineering Geology	3
Environmental & Engineering Geoscience	3
Global Biogeochemical Cycles	2
Journal of Contaminant Hydrology	2
Water Resources Bulletin	2
Applied Geochemistry	1
Environmental Geochemistry and Health	1
Environmental Geosciences	1
GeoJournal	1
Geomicrobiology Journal	1
Hydrogeology Journal	1
IEEE Transactions on Geoscience and Remote Sensing	1
Natural Hazards	1
Northeastern Geology and Environmental Sciences	1
Water Science and Technology	1

Note: Nominated titles that were determined to be core are shown in bold.

developed a potential core list of 32 titles (out of 66 titles examined) that had at least two links among themselves. After comparing 1995 journal issues of the 32 titles against Jackson's (1997) definition of the field, I eliminated 12 journals in which less than 30% of articles were on environmental geology topics. The remaining titles comprise the core list for 1995 (see table 2). Only 5 of those core titles were nominated by geoscience librarians (table 1), and most core titles are primarily identified with other disciplines and specialized fields.

JOURNAL NETWORK AND CLUSTERS

As I examined the journal-to-journal links, a pattern of citing relationships emerged that did not suggest a wholly integrated field. Using Jackson's (1997) definition of environmental geology and my knowledge of the field gained as a former geology librarian, I identified groups, or clusters, of journals that represented aspects of the field. At the scale of inquiry I used in this research, the three clusters I discerned were not themselves linked by substantial citing relationships among their constituent journals.

The Engineering/Materials cluster is centered around *International Journal of Rock Mechanics and Mining Sciences & Geomechanics Abstracts*, which directly cites, or is cited by, all other titles in that cluster, except *Quarterly Journal of Engineering Geology*, which is linked only to *Engineering Geology*. This cluster primarily reflects interest in engineering aspects of the built environment (see table 3). The Geochemistry cluster is very small, with *Applied Geochemistry* linking the other two titles. While some of the mining pollution literature is published in

TABLE 2

CORE SERIAL TITLES IN ENVIRONMENTAL GEOLOGY

Applied Geochemistry
Bulletin of the Seismological Society of America
Chemical Geology
Engineering Geology
Environmental Pollution
Ground Water
International Journal for Numerical and Analytical Methods in Geomechanics
International Journal of Rock Mechanics and Mining Sciences & Geomechanics Abstracts
Journal of Contaminant Hydrology
Journal of Environmental Quality
Journal of Geochemical Exploration
Journal of Hydrology
Journal of Soil and Water Conservation
Journal of Water Resources Planning and Management
Mechanics of Materials
Quarterly Journal of Engineering Geology
Transactions of the ASAE
Water, Air, and Soil Pollution
Water Resources Bulletin (now *Journal of the American Water Resources Association*)
Water Resources Research

these titles, they carry more of the papers on geochemistry of natural systems (see table 3). The Water/Soil cluster is the largest and most variable. Two titles, *Journal of Environmental Quality* and *Water Resources Research*, are linked to most of the others in the cluster through citing and cited relationships. This cluster represents interests in ground and surface water resources as well as a pollution and remediation emphasis (Table 3).

An interesting subcluster was identified that linked titles on atmospheric science and biogeochemical cycles through *Journal of Environmental Quality*. *Biogeochemistry* and *Global Biogeochemical Cycles* are the central titles in this area, which uses the framework of natural cycles (e.g., nutrient, hydrologic) to investigate environmental changes on a broad scale. This perspective is not yet widely recognized as an area of discourse within the domain of environmental geology, and the subcluster was removed from the journal network.

None of the clusters hosted the concerns of policy and planning or of environmental health that Jackson (1997) associated with environmental geology. The extent of these literatures was not investigated here. The absence of policy and planning titles is reasonable, considering the source of the data (Garfield 1996). The absence of titles devoted to environmental health (e.g., *Environmental Geochemistry and Health*) is not as easily dismissed. Several likely titles were put through the analysis, but the titles with which they were most frequently connected did not directly link to titles at or near the core. This area may have a body of knowledge of interest to environmen-

TABLE 3

CORE TITLES BY CLUSTER

Engineering/Materials Cluster
Bulletin of the Seismological Society of America
Engineering Geology
International Journal for Numerical and Analytical Methods in Geomechanics
International Journal of Rock Mechanics and Mining Sciences & Geomechanics Abstracts
Mechanics of Materials
Quarterly Journal of Engineering Geology
Geochemistry Cluster
Applied Geochemistry
Chemical Geology
Journal of Geochemical Exploration
Water/Soil Cluster
Environmental Pollution
Ground Water
Journal of Contaminant Hydrology
Journal of Environmental Quality
Journal of Hydrology
Journal of Soil and Water Conservation
Journal of Water Resources Planning and Management
Transactions of the ASAE
Water, Air, and Soil Pollution
Water Resources Bulletin
Water Resources Research

Note: Central titles in bold.

tal geologists but dominated by scholars from other disciplines, such as medicine and chemistry, whose choice of publishing outlets reflects their strongest disciplinary affiliation.

One title is conspicuously absent from the core list. Springer-Verlag's *Environmental Geology*, nominated by five librarians, was found to only cite itself to a significant degree. Nor was it a major recipient of citations by core titles. *Environmental Geology* has a bifurcated focus. Techniques and methods articles are intermixed with articles on narrow topics, often geographically set outside the United States. Thematic issues occasionally appear; in 1995, issues contained conference papers on deep karst systems, which are hydrologic systems in limestone regions identified by sinks and interspersed with abrupt ridges and protruding rocks. Because of the variety in content, citing and cited patterns for a single year might not indicate long-term relationships.

The use of this core journal network must be made in the context of the sources and time period of its development. The ISI indexes as source journals those titles meeting specific criteria; regional titles

such as *Northeastern Geology and Environmental Sciences* are excluded. New journals do not typically become source journals for several years until they are well established. While this analysis covers 1995 citations, there are three new journals associated primarily with environmental geology that do not appear on the 1995 source journal list: *Environmental & Engineering Geoscience; Environmental Geosciences;* and *Hydrogeology Journal*. Those of us generating the starting list knew about these titles, but because core lists are snapshots at specific points in time, these journals are not part of this analysis.

Problems of Scope and Funding

The nature of the core list of serials for environmental geology, as developed in this study, should be both reassuring and troublesome to collection-development librarians. The appearance of established older titles known to be core journals in other subjects suggests that the costs of supporting this literature are already at least in part covered by existing library collection investment. Libraries supporting collections in applied chemistry, hydrology, agronomy, and civil engineering are likely to be supporting good serial collections in environmental geology. Even core titles in an established discipline are subject to cancellation when institutional priorities change. Extra effort must be applied to ensure that journals serving varied readerships are not automatically cancelled when their value to one group diminishes.

A second concern involves the way acquisitions dollars are allocated in academic libraries. Funds tend to be distributed based on the internal structure of the user community. Often, funds are linked to the academic departments or programs and to the level of degrees granted (Budd 1991). Support for centers and institutes may be separate or may be folded into allocations for department support. Another common model in use links funding to an existing mode of organizing knowledge. The Library of Congress classification system and the conspectus developed by the Research Libraries Group are unable to reflect—before the fact— emerging or interdisciplinary interests of the user community because new class numbers are established only after the published literature appears. Allocation by discipline is most effective when each discipline has a commonly understood identity and scope, which is not the case for environmental geology. For these reasons, academic libraries may not be supporting environmental geology coherently even when they do support the core serial literature through the more established related disciplines.

Interdisciplinarity

The nature of an interdisciplinary area determines its visibility, and to some extent, its legitimacy to library-collection builders. Klein (1990, 1996) discussed disciplines and the growth of interdisciplinary fields. She listed a series of achievements by which (1995, 35–36) "interdisciplinary fields make marks in cultural space." They include:

- an adequate number of workers with shared interests and academic and research programs of sufficient scale;
- adequate communication infrastructure along with "economic and symbolic capital";
- formalization of research activities and their infrastructure;
- power and control in university and faculty governance matters; and
- the appearance of a scholarly body of knowledge, coupled with the ability to synthesize and generate knowledge across disciplines.

According to Klein, *environmental studies* is an interdisciplinary field that has not developed into a discipline, although it may have some of the trappings of disciplinarity. As federal funds for academic research diminished in the 1980s, environmental studies programs strengthened their affiliation with the parent departments, and the resulting identities have become quite variable among institutions. Klein (1996) argues that environmental studies has not devel-

TABLE 4

NEW ENVIRONMENTAL GEOLOGY JOURNALS

Environmental & Engineering Geoscience, from 1995, sponsored by the Association of Enginering Geologists and the Geological Society of America

Environmental Geosciences, from 1995, (1994 as *Journal*), sponsored by the Americal Association of Petroleum Geologists Division of Environmental Geosciences

Hydrogeology Journal, from 1995, (1992–94 as *Applied hydrogeology*), sponsored by the Hydrogeology Division of the Geological Society of America and the International Association of Hydrogeologists

oped a strong community, and synthesis and integration of knowledge has not yet been achieved.

Environmental geology also does not meet accepted criteria for disciplinary status. Writing about materials science, Roy (1979) stated that disciplinary recognition would require the founding of 12 to 20 university departments. The American Geological Institute (1996) reports no departments of environmental geology in United States colleges or universities, although there were 134 academic departments with Master's degrees in the environmental geosciences. Environmental geology is an identifiable specialty or segment of focus in the two major U.S. professional organizations in geology: the American Association of Petroleum Geologists and the Geological Society of America. The interests of this community are also served by other professional organizations in water resources, geochemistry, engineering, agronomy and science education. Finally, this intercitation analysis of the 1995 literature has shown that journals publishing research in environmental geology tend to be more closely associated with older, established fields.

If not as a discipline, how does environmental geology present itself to collection development librarians? Its boundaries are not always visible, although the core areas of surface and groundwater quality are easily identifiable across institutional contexts. Created to deal with specific problems at the Earth's surface that are caused or exacerbated by human action, this interdisciplinary field is perhaps better approached as a specialty within the larger field of environmental science or geology, at least in settings where those broader fields are locally defined and legitimized. Librarians must continue to depend on researchers' expressions of needs as well as their own knowledge of new journals, new courses, new faculty and their research interests, and the activities of professional societies.

The three recently started journals mentioned above may hold a primary key to how this interdisciplinary field develops in the future (see table 4). All three titles are sponsored by professional societies. If the journals serve to reinforce the existing subdisciplines of geology, there is even less evidence for the movement of environmental geology toward achievement of disciplinary status (Swoboda 1979). According to Klein (1996), interdisciplinary journals serve particular functions, including coverage of problem-focused fields and the advancement of hybrid fields and hybrid methods. These journals are particularly useful for promoting communication among a dispersed community and for offering publication opportunities for research that is radical or different. Despite these characteristics, she suggests (26–27) that a longitudinal examination of such journals would show more "shifts in orientation and interest claims" rather than "sustained lines of synthesis." One way for librarians to meet the challenge of building relevant library collections is to track changes in the body of knowledge particular to environmental geology.

Conclusion

To the extent that we can recognize the distinctions between interdisciplinary fields and disciplines, collection-development librarians can track the status of environmental geology as a formalizing, interdisciplinary field of knowledge. Klein (1996) suggested that problem-driven areas of discourse promote greater fragmentation in the community of scholars. A known set of core journals, based on nonlocal data, provides a broad-scale context for visualizing the boundaries of an interdisciplinary field. From this perspective, collection-development librarians can continue to focus on the specific problem and question areas relevant to their own library clientele. These areas will include knowledge sites where interdisciplinary boundaries are breached to create new knowledge. The discourse on biogeochemical cycles is a knowledge site where we might detect the early development of a new discipline and start building library collections to support its community.

Librarians have traditionally focused on the manifestations of disciplines as decisions are made about library collections. Identification of a set of core journals is a useful point of departure for collection development activities. An understanding of the disciplinary context can help to make even better use of scarce resources.

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Notes on Operations

Reengineering Technical Services Processes

Karen Huwald Zuidema

Reengineering is the evaluation and restructuring of the work processes of an organization. Using the experiences of an academic research library project to reengineer its technical services operations, I begin with a description of the framework in which the library conducted reengineering. The work of one reengineering team in evaluating the process for ordering notification slip books is then singled out for examination. Examination of a single process illustrates the mechanisms used to map, analyze, and redesign the process and addresses concerns of implementation. It also allows introduction of reengineering concepts and tools used during evaluation and restructuring.

Reengineering involves evaluating work processes and restructuring work flows to improve efficiency and better meet organizational goals. The roots of the reengineering movement are found in the business world. Changes in the current business environment are the driving force behind reengineering efforts. Growth of service-based enterprise, restructuring of competition, globalization of business, and the increasing importance of information have created a need for business to become more alert and responsive to trends (Morris and Brandon 1993).

Libraries are experiencing similar changes. In a study of user services reengineering at Rice University, Shapiro and Long (1994) identified concerns that the private sector and academic libraries share. They mention customer orientation, increasing competition in a changing environment, and concern for the future. In deciding to outsource cataloging at Wright State University, Hirshon (1994) cited ongoing decreases in library budgets as the motivating factor to cut expenses and redirect the savings to increase access to materials.

Change factors that motivated the reengineering project at the University of Illinois at Chicago (UIC) also reflect these concerns. Issues at the campus level included: budget allocation; the need to provide quality customer service; greater cost accountability; and the emergence of distance learning in higher education. The UIC library administration sought greater adaptability in controlling and planning for constant change in technology, to increase its ability to respond to

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the growth and use of networks for educational purposes, and to facilitate interaction with external services and suppliers. The administration also wished to prepare for the increasing importance of electronic resources in scholarly communication.

In July 1994, library administration at Stanford University (1995) began a reengineering project of its technical services processes. Three months later UIC began a similar project. Linden (1994) suggests considering two primary factors when choosing which process to reengineer. The first is the importance of the function to the customer. Although technical services activities typically occur without direct interaction with the public, its activities decide in part whether and when library materials will be available to users. The second factor is the capacity to affect performance of the organization. The potential to save time and money by accomplishing tasks electronically rather than manually, and by using new services and products also based on new technology, requires evaluation when a library is striving to optimize its performance. The positive effects on customer service and the potential to improve library performance create an environment that makes technical services a candidate for reengineering.

In this paper I begin with a general description of the framework in which UIC conducted reengineering. Following this general overview, focus shifts to the work of the Before Team, which was a team that evaluated the beginning steps of technical services work flows. This team's activities in evaluating, measuring, and redesigning the work processes that occur before the library receives an item are examined, and the results discussed.

Reengineering Methods

Recognition of the need for change, the importance of correct structuring of the reengineering effort, evaluation of existing work processes, and redesigning processes characterize all approaches to reengineering. Controversy in methods centers around evaluation of existing work processes during a reengineering project. Advice ranges from the conscious exclusion of current processes from consideration, to choosing specifically to evaluate existing work processes. On one end of the continuum are Hammer and Champy (1993), perhaps the best-known reengineering advocates. They endorse methods that strive to redesign a business without the influence of its current procedures. They avoid evaluation of existing processes because of inherent and possibly mistaken assumptions they carry. On the other end of the spectrum are those such as Manganelli and Klein (1994), who claim that consideration of existing processes is necessary to acknowledge the environment in which a process exists, to provide information about customer needs, and to provide a point of focus for team effort. In deciding which reengineering approach to apply, Harrison and Pratt (1993) claim that times exist when processes cannot be considered, usually in situations where a process is technologically obsolete or constrained by outdated thinking.

UIC staff began its reengineering effort by evaluating existing technical services operations. Analysis of existing operations provided details about customer relationships—who interacts with technical services and how interaction occurs. Library patrons are the ultimate customers of technical services production but library departments can also be considered customers of each other. Technical services is a customer of collections development, receiving its input from that department. The library circulation department and book vendors also have dealings with technical services. Each of these groups has different capabilities, and separate information and time needs that influence process redesign. Evaluation of the current process also gave the reengineering participants a starting point, a sense of direction and structure. Discussion and mapping of existing processes provided a familiar point of reference as participants began the reengineering process.

Mapping Work Processes

Network maps are specific tools of the reengineering method used to create diagrams that illustrate the process under study. The first step taken by UIC reengineering teams was to map existing work processes. Maps illustrated all technical services work flows, aided staff understanding of technical services processes and suggested changes to them. Adair and Murray (1994, 16) define a process as a "series of tasks or steps that receive inputs (materials, information, people, machines, methods) and produce an output (physical product, information, a service) designed to be used for specific purposes by the recipient for whom the output is produced."

The process analyzed in this paper's examples began when an order for a book entered the Catalog Department from the Collections Development Department. The process ended with the mailing of orders to book vendors from the Acquisitions Department or the Catalog Department. To trace work flow and gather information about a process, Adair and Murray suggest (1994, 120, 122) "[following] one unit of work as it passes through the process. The unit may be one item, one batch, a particular service, or some other increment, but it is always the smallest unit possible to follow separately." The unit of work tracked in this paper was a single order for a notification slip book.

Network map assembly used information similar to details outlined by Galloway (1994). Questions concerning process boundaries rose early in the mapping phase. Setting the boundaries of the process under study limited departments under examination and defined team responsibilities. Acquisitions and Catalog Department work flows were evaluated while collections development activities were considered external to the process. Teams also itemized requirements of the process, the essential pieces of information used to complete work activities, and outputs of the process—mailed or duplicate orders. These details decided the general content of the network map and helped define the path that the reengineering effort would follow.

The next step in network map preparation involved making choices about which pieces of information to include in the map. A network map must be concise, yet full enough to give a clear picture of the process being analyzed. Teams defined network map detail by the use the map would receive. They constructed the very detailed network maps of this paper for analysis and redesign of the process. They identified each task of a work activity separately. This amount of information was reasonable for a working map, one used in evaluating a process. A more general map was appropriate for reporting team progress. A progress report map would consolidate several work tasks into general work activities, making a process easier to understand for presentation purposes. Once the detail for a map was chosen, it remained consistent within one map or between maps that teams compared. Network map construction also involved identifying points of change. Clear delineation of libraries, departments, and sections helped in tracking work as it passed between library departments and from one person to another.

Construction tools for network maps range from manual methods to specialized computer software. ClarisDraw, a general purpose graphics software product, was a good compromise between manual drawing and more advanced and expensive automated products. Learning the software involved a reasonable expenditure of time, and online revision capabilities proved a distinct advantage over redrawing by hand. Software features allowed clear identification of departments and activities of the book order process. Each section of a library department contributing to the process received a unique background. Figure 1 shows all activities in the pre-processing unit of the Main Library Catalog Department with a dark background. White backgrounds identify Acquisitions Department order unit activities. Each separate box or circle of figure 1 identifies one distinct work task of ordering a book. Box shapes denote tasks done for each book order that

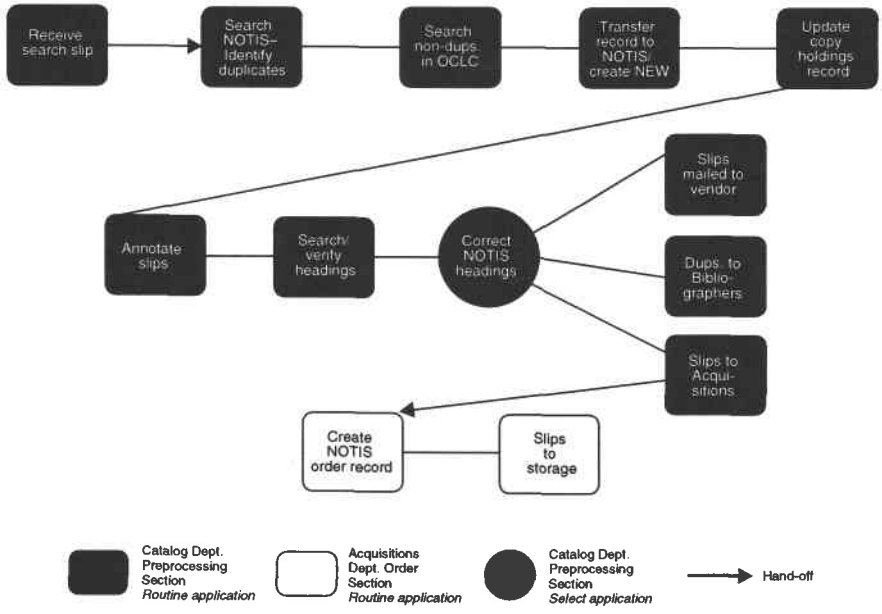

Figure 1. Network Map of Existing Process for Notification Slip Materials—Main Library.

moves through the process. Circle shapes identify tasks done selectively for certain categories of materials. Lines connect boxes to show the sequence of tasks and carry information about work hand-offs, a critical detail of reengineering analysis. A hand-off is the point when a unit of work passes from one person or department to another. Lines between task boxes with an arrow at one end identify a hand-off. Lines without arrows link different tasks done by the same individual.

Besides illustrating work flows, network maps served a critical function in gaining a common understanding of the entire process of ordering a book. The technical services departments under study are broken into acquisitions and cataloging functions. Morris and Brandon (1993) propose that such an emphasis on functions and departments results in a loss of knowledge about the complete process. Reengineering team members had fragmented and diverse job responsibilities. No team member had knowledge of all the details of the book order process. Discussing book ordering provided a great deal of information and revealed many different ideas and perceptions of what occurred and what should occur during the process. Transferring information and ideas to one or two page network maps helped resolve conflicting semantics, misunderstandings, and differences of opinion. It focused team members on common ground about what was important about the process.

Technical Services at UIC

The library system used to illustrate this study currently maintains two separate technical services operations. The Main Library houses one operation; the Library of the Health Sciences (LHS) houses the other. The two libraries are one mile apart. Main Library technical services processes materials for its own collection and for three subject oriented branch libraries. Main Library collections are those of a traditional academic research library. Acquisitions include English and

foreign language materials across the spectrum of disciplines. LHS technical services processes items for itself and three regional medical library sites. LHS collections emphasize current English language medical materials.

The organizational structures are similar at Main Library and LHS but the departments have evolved independently, resulting in different work flows. Similarities include separate acquisitions and catalog departments. Acquisitions, serials, and binding tasks occur in the acquisitions departments. Preorder searching, cataloging, and file maintenance are responsibilities of the catalog departments. Main Library Acquisitions consists of an ordering unit, a serials unit, and shelf preparation. Staff totals 17, led by a department head, and assisted by a second professional librarian. An operations assistant oversees technical services functions at LHS. Nine staff members make up serials and acquisitions with serials supervised by a professional. An additional 5 support staff and a half-time professional work in cataloging. Main Library Catalog Department is broken into an original cataloging unit of 5.5 professionals, a copy cataloging unit and a preprocessing and maintenance unit, for a total of 20.5 cataloging staff. Staffing levels at LHS are lower in reflection of a smaller volume of materials processed. Staffing levels fluctuated slightly during the reengineering project, with normal movement of staff within and outside the library. UIC uses OCLC Online Computer Library Center, Inc., NOTIS, and vendor specific databases to accomplish technical services tasks.

The Before Team Project

The UIC library administration chose to evaluate and restructure the steps taken by its technical services departments in acquiring and processing monograph and serial materials. Major changes in work processes were limited to acquisitions and cataloging departments but adjoining library functions also received scrutiny as teams analyzed work flow practices. The overriding goal in evaluation was to streamline processes, and improve the time and efficiency of procedures without unduly sacrificing quality. Part of the streamlining included evaluating automated solutions to current processing methods. Staff downsizing was not a goal of the reengineering project. Library administration anticipated that emerging electronic initiatives would create new roles for staff.

The Before Team, one of the two reengineering teams that undertook detailed evaluation and restructuring of technical services work processes, had the charge of examining technical services processes before the library receives an item. This involved gathering and analyzing information and developing new, more efficient processing. The team created maps of work flows to define and illustrate the processes they were studying. They also measured the time involved in carrying out a process and predicted the impact of changes to processes. Analysis involved detailed evaluation of individual work tasks. Redesign brought together preceding changes and consolidated the flow of work into a new process.

Reengineering Group Structures at UIC

Evaluation and restructuring of work processes involved more than just the work of reengineering teams. Reengineering activities required the participation of 24 employees (approximately 10% of total library staff). The central structure of the initial 18-month analysis and redesign phase of the UIC reengineering project consisted of four types of working groups: a Steering Committee, consultants, task forces, and reengineering teams.

Guha, Kettinger, and Teng (1993) maintain that reengineering group membership as a whole should include staff from all functional departments of an organization, including those who are seemingly less obvious candidates for inclusion because they are not directly involved in a process being reengineered. Acquisitions and cataloging departments were the most heavily represented with 14 people participating. The other 10

members of the reengineering group membership were from outside technical services. Membership included two members each from both collections development and circulation departments, four administrators, and one librarian each from a branch and a remote site library. This representation from throughout the library brought diverse perspectives to the effort. Some members could supply insight into customer needs and others could realistically assess the feasibility of suggested changes because of their involvement with daily processing.

The UIC reengineering effort included representation from multiple levels throughout the library. Total reengineering membership included 15 professional staff from various departments and 9 technical services support staff. The broad representation provided the knowledge base that fueled the reengineering effort. Professional staff provided broad perspectives in library knowledge, administration, management, and professional concerns. Technical services support staff provided detailed information about the types of work moving through their departments. They knew what information was needed to accomplish tasks, and the reasons for when or why they carried out activities. The knowledge and abilities of the members of each group enabled the four groups to fulfill unique roles in the project.

The Steering Committee consisted of the university librarian, library department heads, a coordinator for the reengineering project, and two team champions. Team champions served as liaisons between the committee and the two reengineering teams evaluating work processes. The champions facilitated administration of the project and communication between groups. They exchanged information on project progress, reported on problems needing resolution, and proposed work flow changes for approval. The Steering Committee focused on determining environmental factors and reengineering issues affecting the entire library. In fulfilling its charge, the Steering Committee arranged visits to peer libraries and book providers, interviewed various university focus groups to learn about library users and their needs, and conducted an availability study of library materials. Beyond its administrative role of providing direction and support for the projects described in this paper, the committee improved work processes that fell beyond the scope of the reengineering teams and developed electronic collections.

Consultants assisted in the reengineering process. An outside reengineering consulting firm provided two consultants. At least one consultant attended weekly reengineering meetings in the mapping, analysis, and redesign phases of the project. Consultants provided knowledge of reengineering principles and leadership in navigating various steps of the reengineering process. They also introduced the working groups to the tools needed to gather information and helped in analysis of that information and in the redesign process.

The Steering Committee also appointed separate task forces to examine specific concerns in detail. A common characteristic of task force members was knowledge of a specific process or area of research that enabled them to judge the topic being studied. For example, an ongoing task force studies transaction logs of the library catalog and makes recommendations for user interface displays. Task forces also studied outsourcing options, which resulted in a project that tested the OCLC PromptCat service. A task force visited another university library to gather information about its newly redesigned technical services work flows. Task forces also studied expanding existing approval plans and implementing electronic data interchange.

Two reengineering teams were designated to explore technical services processes in depth: the Before Team and the After Team. The Before Team charge called for evaluating processes occurring before the library receives an item; the After Team with processes after an item enters the building. Teams studied work flows for firm order, approval plan, standing order, serial, and notification slip books. Membership consisted of nine people on each team, including the team

champion and the reengineering project coordinator from the Steering Committee. Support staff and professional staff served on the teams in almost equal numbers with most support staff participants involved in performing or supervising actual technical services processes. As process evaluation and restructuring progressed, teams resolved most questions immediately by relying on the knowledge of members present.

Having described the overall framework in which reengineering took place at UIC, focus will now return to the work of the Before Team.

The Before Team Activities

The Before Team focused most of its work on firm order and notification slip book work flows. They simplified firm order and rush order work flows by eliminating points of review. A redesigned, but not yet implemented, process for firm order books suggests changing in-print searching tasks. It is also proposed that information gathering and vendor assignment tasks be shifted from acquisitions and cataloging departments to the Collections Development Department. The redesigned process for notification slip books standardized and streamlined work tasks, and allowed consolidation of the process so that one person could carry it out. The Before Team also initiated exploration of sending orders to vendors using electronic data interchange and considered sending notification slips directly to vendors without technical services processing. Electronic claiming of serial issues also resulted from team effort.

Initial activities of the team centered on mapping the work flow of orders at both LHS and Main Library. Teams traced orders as they moved into the pre-processing unit of the Catalog Department from collections development and then moved on to the acquisitions department. Team members shared knowledge among themselves and interviewed other technical services staff on existing procedures and policy. They brought back information to group meetings where team members collectively identified work tasks and the order in which they occurred as book orders to be placed moved through the departments. From this they created a visual network map of the process, beginning with preorder searching, moving through the creation of local catalog records, and ending with the printing and mailing of book orders.

In tandem with mapping a process, the team developed procedures to measure the cycle time for completing a process. Cycle time measures the time it takes to carry out a process from beginning to end. Measurement involved identifying beginning and ending points and major activities of the process. At these points, the team defined what data existed to allow an assessment of cycle time. The resulting measure required collecting and analyzing a series of dates stamped on paper order slips as they moved through the work flow. Procedures were set in place for systematic sampling and analysis of the results. Measurement eventually allowed a comparison between the process as it existed before redesign and the new process after implementation.

Once mapping and cycle time measurement were underway, process analysis was used to evaluate the contributions of each work task. In team meetings members discussed and judged the value of individual tasks based on the cost of performance, and the frequency and impact of errors. Team members reached a consensus on task value or ran a pilot test to measure the results of a proposed change. Pilot tests were used to assist in developing and implementing new procedures, and in measuring rates of error, processing times, and the effect of changes. Test results allowed team members to weigh savings in processing times against errors and their impact to decide whether the benefits of a change outweighed its drawbacks.

Later changes involved redesign of the entire work process. Team members redesigned the process by eliminating or curtailing work tasks previously judged as having limited value. They also consolidated the process by eliminating work hand-offs whenever possible. During im-

plementation of the new process, the team created automated alternatives to simplify or replace existing manual tasks and processes.

Therefore, the accounting of improvements made during the reengineering process focuses on reducing process cycle times by decreasing the number of work tasks and the number of hand-offs in a process. Elimination of two or three tasks and one or two hand-offs from a process would not seem to have measurable impact on processing times. However, cycle times measured before and after implementation of the redesigned book order process show the benefit of making these changes.

As defined earlier, network maps illustrate the process under study. Measurement of process cycle time produces data from the existing process that serve as a basis for comparison with future changes. With these underlying mechanisms in place the Before Team moved to evaluate individual ordering processes. In this paper I examine reengineering the process of ordering notification slip books. Examination of the single process illustrates the mechanisms used to analyze and redesign the old process and addresses concerns of implementation of the new process.

Process Analysis and Redesign

With completed network maps, team members could begin the step of judging component tasks of the notification slip book ordering process. The goal of analysis and redesign was to streamline the process by eliminating unnecessary work tasks and hand-offs without compromising quality. Some tasks became candidates for total elimination or limited application. The team evaluated tasks in the order process using the reengineering concepts of value- and nonvalue-added activities.

Adair and Murray (1994, 116) identify tasks that add value as those "that physically change the work and affect the work output in a way that makes it more valuable to the customer." The Before Team evaluated all work tasks in notification slip book order processes at both libraries. Value was easily recognized in necessary tasks like record creation and slip annotation that documented and conveyed information needed in later cataloging procedures. Value was also found in duplicate detection that prevented the library from spending funds for books already owned and saved staff time in receiving and then returning duplicate titles. Searching tasks were necessary for completing the process but redundant searching of the same database, as staff carried out different tasks on an order in multiple departments, was considered nonvalue-added. Nonvalue-added steps do not substantially change the status or content of a piece of work but seem primarily to slow work down.

Assigning nonvalue-added status to a task was straightforward in the case of redundant activities such as searching the in-house database multiple times to enter different pieces of information. Assigning value to other tasks, especially those where the focus was on improving the accuracy or completeness of data, was more problematic. Historically, the technical services departments at UIC have had the goal of achieving error-free processing. Striving for this level of quality incorporated tasks into the work process that reviewed and verified work for accuracy. Any increase in accuracy, such as additional correct orders received, or improved online catalog content, justified performance of a task. Reengineering introduced new criteria for evaluating tasks that challenged these quality standards. In addition, technical services team members were working with team members from other areas of the library who had different experience and perspectives on acceptable levels of error in processing.

Three criteria contributed to determining the value of these tasks: time or staff costs of performing the task, the frequency of errors found while doing the task, and the impact that errors would have on the quality of the output or end result of the task. The team moved from the technical services assumption that all tasks improving quality had some value, to balancing the productivity of each

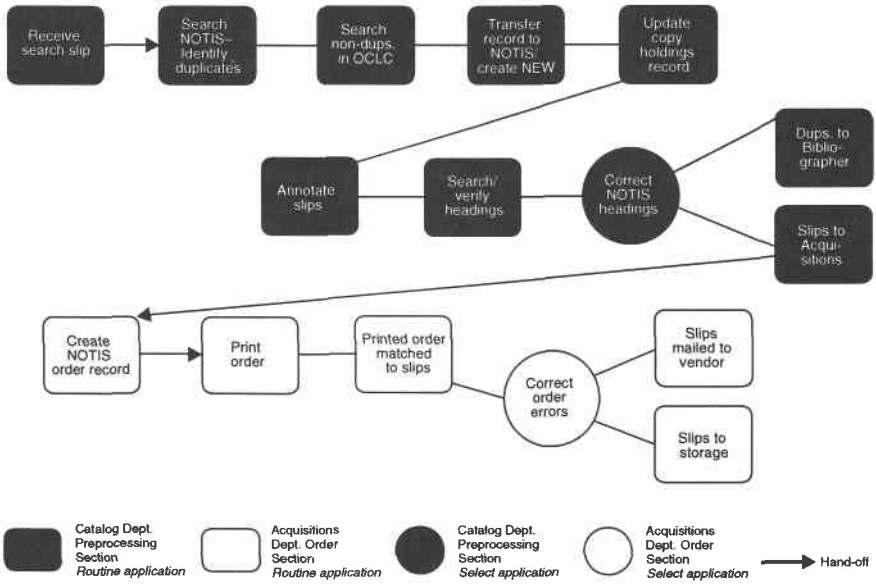

Figure 2. Network Map of Existing Process for Notification Slip Materials—Library of the Health Sciences.

work task with its cost. If a task had high costs, such as adding a half day or a day of processing time, or required attention of supervisory personnel, high levels of error frequency, or critical impact on the quality of the end result would have to exist in order to warrant continuation of that task.

At times the team was satisfied with informal assessments of costs and benefits gathered at team meetings. For example, a set of review tasks in the process at LHS involved supervisory staff printing orders that had already been processed on the local system, checking the printed order against its paper notification slip and correcting any errors that would result in incorrect receipts (see figure 2). Discussions between the LHS acquisitions supervisor, the technical services operations supervisor, and a bibliographer led to the conclusion that the errors found during this review did not identify enough incorrect receipts to merit its continuation. These three individuals concluded that the low frequency of errors, which in this specific situation was based on the shared observation not a measurement, did not affect total order quality enough to warrant the cost of supervisory personnel completing the task.

When discussion within the team was not on its own sufficient to result in consensus on the value of the task, the team set acceptable rates of error, measured error occurrence, and assessed the effect on the output of the task. Determining the value of the task that verified headings in records newly added to the local catalog was especially sensitive because of the longstanding belief of its impact on catalog quality. The team decided that 3% was an acceptable rate of error in the catalog. In a pilot test, 449 OCLC records containing 813 headings were searched in the local catalog and 22 (approximately 2.7%) conflicted with established local catalog forms. Besides frequency of the occurrence of error, members were also concerned with how long the errors would

exist in the database. By measuring movement through technical services, the team found that for Library of Congress and National Library of Medicine titles, conflicts would exist for the one to eight weeks that it takes to receive and catalog the books. Fast processing further lessened the impact on catalog quality. Acceptable error frequency, combined with the short time that errors would exist in the catalog, resulted in a nonvalue-added status for this category of orders.

Besides evaluating process tasks, team members worked to eliminate hand-offs, the point where a unit of work passes from one person or department to another. Hand-offs can have a nonvalue-added status in the same way that work tasks can. However, hand-offs are different in that they are not a work activity but a transition point in the work flow of a process. Prabha (1989) found that the time to catalog material lengthens when greater numbers of people handle an item. This corresponds with the nonvalue-added status of hand-offs because of the idle time that occurs between one person completing their work on an order and the next person beginning it. In the LHS process, after creation of the local system order, the work moved from one person to another for review (designated on the network map in figure 2 by an arrow connecting task boxes). The time orders spent waiting for that review added processing time without adding anything of value to the order. The Before Team had already judged the review to be a nonvalue-added task. Now it eliminated the task and the hand-off, resulting in less work for the supervisor, no perceptible decrease in the quality of orders received, and faster processing times.

The team detected a second, less evident but potentially significant source of hand-off delay as work moved between collections development and cataloging departments at the Main Library. In initial measurements of processing time, the preprocessing unit in cataloging was pinpointed as a source of processing lag time. Further investigation revealed that transfer of book orders to the unit did not always occur immediately after a bibliographer decided to order an item. Practice varied by bibliographer and type of order, but questioning bibliographers on their methods identified two submission patterns. Some orders were submitted daily in small numbers, but sometimes batching occurred for notification slip orders, resulting in packages of 50 to 100 slips together. Other orders were submitted less frequently, but also in large numbers. This created potential for the convergence of many orders in the Catalog Department at once. Batching and holding orders was practical for collection development order receipt patterns and fund management. Yet the point of the hand-off, when the Catalog Department contended with orders in unpredictable volume, led to processing delays.

Phase One Results

The next step of analysis and redesign became the first phase of results as team members looked for parts of the process that they could change quickly. Making changes quickly to realize some improvements was desirable, especially when a consensus existed about clear positive benefits to the process. An opportunity to decrease processing time was found in revising the application of the heading verification task because the team had judged it to be partially nonvalue-added. Because both catalog departments carried out this task, both processes would benefit from the change. The team eliminated searching personal, corporate, conference, and series names for orders with Library of Congress and National Library of Medicine bibliographic records. Eliminating the task affected 60% to 80% of records searched during the pre-order process. It also reduced cycle time about two minutes per record and saved up to 55 work days per year.

The final step of the reengineering project involved redesigning the entire notification slip book ordering process. Figure 3 shows a redesign of the book order processes depicted in figures 1 and 2. This redesign results in identical work flows for notification slip books for LHS

TABLE 1
WORK STEPS* FOR NOTIFICATION SLIP ORDER PROCESS

	Work Steps Prior to Reengineering	Work Steps Following Reengineering	Net Reduction in Number of Steps
LHS Process	19	13**	6
Main Library Process	15	13**	2

*Tasks and hand-offs involved in the entire process.
**Two tasks applied on a selective basis.

and Main Library. The team eliminated hand-offs whenever possible, including one from the Main Library process and two from LHS. The hand-off between cataloging and acquisitions departments and its time delays are gone, as are tasks duplicated in each department, such as online searching. Only one hand-off remains in the new process, when orders come into technical services from the Collections Development Department. Also eliminated were tasks previously given nonvalue-added status. Tasks decreased to 12 (from 13 at Main Library and 16 at LHS), with two applied selectively. The redesign eliminated nonvalue-added review tasks of completed orders from the LHS process. Heading verification for Library of Congress and National Library of Medicine records was discontinued at both libraries. Table 1 summarizes the reduction of hand-offs and tasks in the reengineered process.

The most evident change in the redesign is the consolidation of the book ordering process. Rather than a process carried out in two departments by two or three people, the redesign resulted in a process combined and simplified through automation so that one person working in one department could perform it. Preorder searching, which includes bibliographic and holdings record creation, and occurred in the Catalog Department, was consolidated with order record creation, which took place in the Acquisitions Department. The team anticipated that this redesigned work flow would result in a reduced cycle time that would be measured after implementation.

IMPLEMENTATION OF NEW WORK FLOWS

Reengineering groups redefined and reformed to execute initiatives approved during process redesign. The implementation stage for the reengineered notification slip order process took an additional nine months of work for a reconfigured team of eight people. The implementation team was responsible for evaluating the proposed redesign and setting up a pilot test of the initiative, which included developing procedures for the process and training staff. Team members were chosen for their direct involvement in supervising and carrying out the book order process. The implementation team included staff that would be conducting the pilot test, so training began immediately with exposure to the new design and continued as implementation developed.

Consolidation of the process for ordering notification slip books meets reengineering streamlining goals and has potential for job enrichment goals. According to Hirshon (1994, 14, 16), "A key re-engineering notion is the discarding of the division of labor in favor of combining jobs, empowering the worker, and making jobs more multi-dimensional." However, a key concern during implementation was whether the consolidated process would be too complex and result in work overload for one employee. Required of one person are searching skills and manipulation of OCLC and NOTIS systems, knowledge of MARC bibliographic fields and NOTIS fields in bibliographic, holdings, and order records, and finally mailing tasks. Maintenance of acceptable levels of accuracy

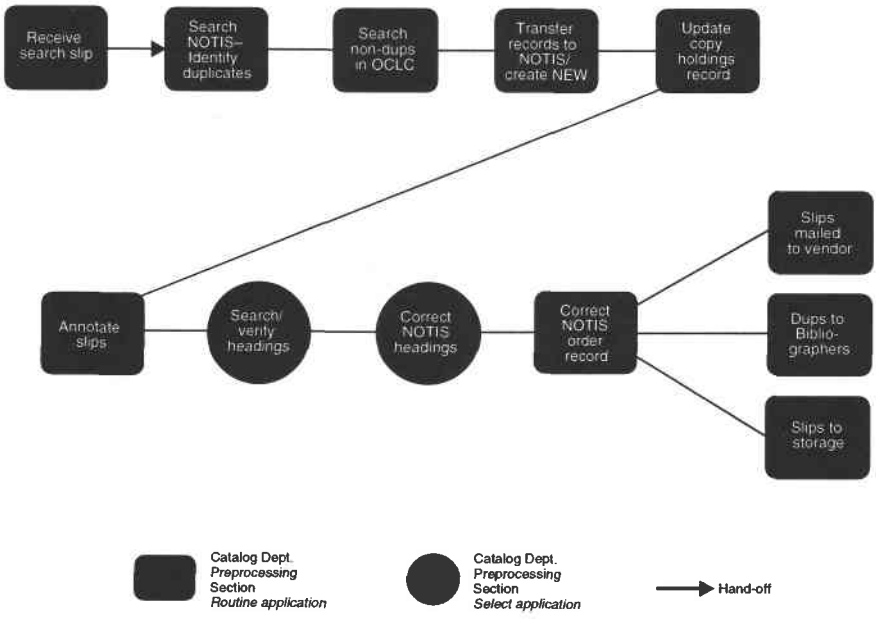

Figure 3. Network Map of Redesigned Process for Notification Slip Materials.

remained critical in spite of the additional tasks assigned. Hackman and Oldham (1980) propose that such job redesign might not be suitable for all workers. A combination of knowledge, skills, personal growth needs, and job environment contribute to the abilities of each worker to accept and succeed in such a challenge.

To answer the problem of overload, implementation team members from the acquisitions and cataloging departments developed computer macros to record commands that would automatically perform creation of the order record. They recorded keystrokes to fill the order record fields in a macro so that pressing one function key accomplished order record creation. Automation of this part of the process also determined who would take responsibility for the redesigned process in technical services. Staff in the preprocessing unit of the cataloging department had the knowledge of OCLC, MARC, and NOTIS required for the rest of the ordering process. Rather than require acquisitions staff to learn this skill set, creating orders became the responsibility of the pre-processing unit in cataloging for the immediate future.

Phase Two Results

The implementation team successfully tested the redesigned process that consolidated notification slip ordering. Task overload did not turn out to be a problem for one person carrying out the process. Verification of the benefits of the redesigned process can be found in a comparison of cycle times before and after process redesign. At the onset of the reengineering project the Before Team began measuring the cycle time of the process. Cycle time measurement continued in the implementation phase of the project. This allowed comparison of the process as it existed before reengineering with the redesigned process. A comparison of cycle times shows anticipated reductions in the average time to process an order.

Measurement of cycle time involved

TABLE 2
CYCLE TIMES FOR NOTIFICATION SLIP ORDERS (IN DAYS)

	Cycle Time Prior to Reengineering	Cycle Time Following Reengineering	Net Reduction
LHS Notification Slip Orders	10	2	8
Main Library Notification Slip Orders	42	18.5	23.5

gathering a series of dates as the order moved through the process. The first date showed when a bibliographer decided to order an item (denoted by the date entered on the notification slip by the bibliographer). The measurement procedure used a second date when staff created bibliographic and holdings records in NOTIS in the preprocessing section of the Catalog Department. The last date recorded occurred when staff created the order record in NOTIS (in the Acquisitions Department for the old process and the Catalog Department for the redesigned process). Team members combined dates to find the cycle time it took an order to move through cataloging and acquisitions processing with the understanding that delays in order submission possibly extended cycle time and that some cycle time was not accounted for because mailing tasks, considered part of the ordering process, were not represented in the statistics. Table 2 shows a summary of notification slip cycle times prior to and following reengineering the process. Baseline samples taken four months after beginning the reengineering project show an average 42-day cycle time for ordering Main Library notification slip materials and an average cycle time of 10 days for ordering LHS notification slip materials. Latest figures, taken 43 months after the beginning of the reengineering project and 15 months after implementation of the redesign, show an average cycle time of 18.5 days for Main Library and 2 days for LHS notification slip materials. This decreases the cycle time for book ordering at Main Library by 23.5 days (56%) and at LHS by 8 days (80%).

EVALUATION OF REENGINEERING PROCESS AND RESULTS AT UIC

Though reengineering has its origins in business applications, its framework and tools proved valuable in the assessment and redesign of technical services work processes. Evaluating existing processes provided focus. Teams successfully questioned assumptions and redesigned processes, policy, and procedures. The Steering Committee provided direction and handled broad concerns while teams researched processes in-depth and task forces dealt with special topics that would otherwise have diverted team effort. Diverse group membership promoted a balance of perspectives that encouraged questioning of processes and generated creative suggestions for improvement.

Network map construction demanded that the Before Team determine the boundaries and components of ordering a book and in doing so broke down barriers of functional departments that prevented viewing book ordering as a single process. Map construction also facilitated greater agreement about and understanding of the process. Network maps encouraged analysis and redesign by allowing systematic evaluation of work flows. Cycle time provided tangible information regarding the time involved in book order processing and showed improvements brought to the process through redesign.

Reengineering concepts of task value and hand-off were applicable to evaluating library processes. Assigning value to work tasks identified problem areas

within technical processing work flows. The team easily identified value in the creation of NOTIS records and duplicate detection tasks. Though nonvalue-added tasks were sometimes not so easy to judge, the team nonetheless identified and eliminated these tasks. Assigning value to tasks resulted in a reevaluation of traditional technical services quality standards. A degree of tolerable error replaced the goal of error-free processing in some instances, once the team evaluated the frequency of errors, the cost of performing a task, and the impact of errors together. In sensitive situations, quantifying acceptable error rates, task costs, and effects of the change, coupled with final review and approval by library administration via the Steering Committee, signaled a change in expectations and eased acceptance of new standards by staff.

The evaluation of hand-offs was especially enlightening in understanding the fits and starts of how work progresses through a process. Reengineering conflicts with older organizational theory in which a division of labor develops specialized functions to increase processing speed through a set of small, well-defined work tasks. In functionally designed technical services work flows, acquisitions staff concentrated on the details of order records while cataloging specialized in bibliographic and holdings records. Each department operated with well-developed knowledge and skills within its area of expertise that supposedly maximized production. Segmentation of work, however, does not account for the idle time built into the hand-off between people and departments. The time that orders spend in an out basket waiting for transportation to the next stage of the process, or on a desk waiting for work tasks actually to begin, was a revelation when teams analyzed work processes.

The potential pitfalls of undertaking a project to reengineer work processes are many. Following on the heels of the initial promotion of reengineering as an organizational design tool there seemed to come the recounting of its failures more than its successes. Even proponents such as Hammer and Champy (1993) give pause by listing a large set of factors on which success hinges. The project under discussion fell prey to a few reengineering traps on that list. Some slowed progress of the project but others were less problematic.

Hammer and Champy claim (1993, 212) that 12 months is the optimum time for progression from "articulation of a case for action to the first field release of a reengineered process." The reengineering project under discussion began three years ago. During this time the initial mapping, analysis, and redesign phase of the notification slip order process took 18 months. Implementation took an additional nine months. Part of the reason for this was the time that library staff could contribute to the effort. Reengineering progressed along with the usual work load of an academic library. Consultants suggested longer or more frequent meetings. Participants felt that the demands of the library limited their ability to divert more attention to reengineering. The choice to maintain rather than increase time committed no doubt lengthened the reengineering project.

A second reason for the length of the project was the complexity of technical services processes. While the library had only one reengineering project, so as not to "dissipate energy across a great many reengineering projects" (Hammer and Champy 1993, 210), it was difficult to anticipate the time it took to study work processes. The number of processes within the acquisitions and cataloging departments is large. The seemingly simple process of ordering a book quickly acquires complexity when one considers the different order streams and their accompanying work flows. Initial efforts of the Before Team concentrated on notification slips and firm order work flows. Mapping, measurement, and analysis of these processes occurred practically concurrently. During redesign, the evaluation of tasks for quick changes and redesign of the entire process also progressed together. Attention shifted from one issue and sometimes from one process to another during and between meetings, leading to confusion and slow progress.

This situation escalated as the project progressed and the team considered alternative options and services. The Before Team made its greatest progress once it focused on the simplest process available to it—notification slip book orders. Now, after initial success with notification slips, movement to consolidate firm orders into a one-person process can be more focused, should it occur.

A warning against "trying to fix a process instead of changing it" (Hammer and Champy 1993, 201) did not prove problematic at UIC. Fixing a process refers to modifying an existing process in contrast to starting over to develop a completely new process. There might be advantages to starting over but the team had success in making incremental modifications to the notification slip order process. It eliminated single tasks or applied them selectively. While these modifications were individually minor in nature, the collective result was a substantial reduction in cycle times and overall decreases in time for the order process of 56% and 80%.

During the project, the library has realized significant benefits beyond changing technical services work processes. The library administration has made a survey of its environment. In exploring automated alternatives to current work flows, it has brought itself up-to-date about current options, and positioned itself to use newly emerging capabilities offered by technology. The project has offered opportunity for staff development. Professional and support staff have worked together developing skills to generate new ideas and evaluate what works best among a broad range of options. Team responsibilities required support staff to work in new roles and develop written and oral communication skills. Library staff, especially those from different locations, have gotten to know each other better, which eases future contact and interaction to accomplish library activities. Finally, and perhaps most important, the library administration and its staff have become more accustomed to change, making the task of managing change, if not comfortable, at least more routine.

Conclusion

Technical services do affect the level of customer service a library can provide and the reengineering project was intended to increase the level of service through faster ordering and thus more timely receipt of new materials. This reengineering project involved mapping work flows, analysis, redesign, and implementation of a notification slip book ordering process. Mapping produced clear, concise illustrations of work flows used throughout the reengineering project. Process analysis eliminated work tasks that did not show adequate contributions to the work process, such as review tasks that verified headings occurring on Library of Congress bibliographic records. Standards defining higher allowable levels of inaccuracies have not resulted in discernable harm to the ordering process or the quality of the catalog. The redesigned process for ordering notification slip books eliminated the hand-off between acquisitions and cataloging, and consolidated ordering into a single set of steps performed by one person in one department. Together, task and hand-off elimination resulted in decreased cycle times for book orders.

Reengineering of technical services processes is an ambitious undertaking motivated by changing times. Through reengineering, UIC staff sought flexibility in controlling and planning for changing technology. Participation in the reengineering project has resulted in a survey of the surrounding environment. Teams have evaluated and implemented new practices, products, and services available to technical services. Reengineering also has allowed the library to know itself better. Reengineering participants have come through a daunting change process successfully. They have developed new knowledge and new skills and are better equipped to respond to additional change, which realizes for the library part of the adaptability it seeks for the future.

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Creating Better Subject Access with Multiple Vocabularies: Upgrading the Subject Heading List for the Alzheimer's Association

Marilyn J. Smith and Pauline Atherton Cochrane

Although the Alzheimer's Association's Green-Field Library's catalog has been available to local chapters and interested people for some time through modem access, placing the catalog on the World Wide Web would make it available to casual browsers as well as determined searchers. When a review of the subject list revealed numerous inconsistencies and duplications, a new list was generated, giving preference to Medical Subject Headings (MeSH) *where possible. The result was a mix of* MeSH *and* Library of Congress Subject Headings (LCSH), *augmented by a few local- and reviewer-supplied terms. The new subject authority list gives the Green-Field Library an authoritative list of terms to use when performing original and copy cataloging. It can also be placed with the library's catalog on the Web to aid users in performing searches.*

The Green-Field Library, housed at the Chicago headquarters of the Alzheimer's Association, is a comprehensive repository of materials dealing with Alzheimer's Disease. The collection includes about 110 periodicals and nearly 3,800 books and videos. The library, which opened in November 1991, answers 7,000 to 8,000 reference questions per year. This collection has been available, through modem access, to interested persons and Alzheimer's Association chapters throughout the nation. But Patricia Pinkowski, director of the library, wanted to reach casual browsers as well as determined searchers, and decided to place the catalog on the World Wide Web.

A review of the list of subject headings revealed a confusing sprawl. Knowing that searchers must have quick and fruitful access, Pinkowski suggested a revision of the list of subject headings in the library catalog and contacted Pauline Cochrane to consider the situation. The

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ensuing discussion resulted in several projects:

1. To provide a subject authority list for the library to use when the cataloger accepts or creates catalog records using *Library of Congress Subject Headings (LCSH)* or the National Library of Medicine's *Medical Subject Headings (MeSH),*
2. To provide a list of approved subheadings, and
3. To review all class numbers, with the aim of making suggestions for their use as access routes.

We report here on projects 1 and 2. The review of class numbers has not yet been completed.

The Problem

In a local library catalog, bibliographic records either have or are assigned subject headings from multiple sources. These headings are from *LCSH, MeSH,* another specialized or locally developed thesaurus. Universities often have two primary cataloging units, one in a health sciences library and one in the general university library, respectively assigning *MeSH* and *LCSH* headings. Weintraub (1992) describes one such system at the University of California at San Diego (UCSD) library, where the different subject headings are indexed separately based on the MAchine Readable Cataloging (MARC) tag. In contrast, the Green-Field Library had only one index that contained subject headings from all sources.

Multiple vocabulary catalogs can cause difficulties for searchers. Limiting the search to one subject heading system at a time can result in a failure to retrieve all relevant materials, and even sequential searching of each system won't necessarily lead to full recall because of inconsistencies and unknowns in how the terms were used for the items cataloged. On the other hand, as Olson and Strawn (1997) point out, a universal search of a mixed-system vocabulary can result in duplication of headings, incomplete or partial retrieval, conflicts between headings of one system and "search under" references in the other, and confusion of terms that have one meaning in one system and quite another in the second.

Possible Solutions

Chaplan (1995) has suggested some ways of coping with this problem of multiple indexing languages. One is to map—or link—terms. Chaplan (1995, 41) states that: "In a map, the terms in one vocabulary are listed, with an indication of what the equivalent terms are in the other vocabulary. There may also be an indication of whether the term is identical, is a synonym, or holds some other relationship to the term in the second vocabulary."

Another strategy for coping with multiple languages that Chaplan characterizes is merging, which she describes (1995, 40) as ". . . simply combining terms in their original form, with their accompanying cross references and term relationships, from two or more vocabularies into a single alphabetical list, with indications of which vocabulary contains the term." Chaplan (1995) and Olson and Strawn (1997) both used the mapping technique. Chaplan mapped Laborline Thesaurus terms to *LCSH*, while Olson and Strawn mapped *MeSH* and *LCSH*. Our work conformed more closely to the merging technique.

Our objective was to produce a single authority list that gave preference to one system *(MeSH)*, while borrowing from others when it appeared necessary. We chose *MeSH* as the preferred system because the collection contained many works addressing the medical aspects of Alzheimer's Disease and we expected the user groups to be familiar with these headings. Because of this objective, and time and financial constraints, our revision of the subject list of the Alzheimer's Association was not as broad-based as those of Chaplan or Olson and Strawn.

Review of the Green-Field List

The list of subject headings and subheadings furnished by the library consisted of a computer printout of the topical subject fields (tags 65x) in the MARC records that formed the catalog. It consisted of approximately 3,600 different terms, including *MeSH, LCSH,* locally produced headings, and headings of unknown origin. A few

headings were proper names. There had been no apparent preference given to either *MeSH* or *LCSH* headings, and there had been no attempt to resolve any inconsistencies between them. Some of the library's resources need medical subject headings to provide for diagnosis and treatment, while others require nonmedical terms to describe the social aspects of the disease. We decided to review the current list and derive from it a unique subject heading list using *MeSH* terms, supplemented by *LCSH* and local terms only when *MeSH* headings proved inadequate to describe the content of a given resource.

Non-English terms in the catalog were also listed using their English equivalents, and were therefore left to stand. Proper names were not searched in the national authority file, as we assumed that their form had already been established. We suggest adding this step when similar projects are undertaken.

A single reviewer determined whether each term in the subject list was derived from *MeSH, LCSH,* or was a locally produced term. The reviewer first checked the subject terms in the 1996 edition of *MeSH*. If the term was located there, the checking process was terminated. If the term was not found in *MeSH*, however, the reviewer searched for the *LCSH* term in ILLINET, the online union catalog of the research institutions of Illinois. If this search did not locate the term, the reviewer continued the search in the 1996 edition of *LCSH*. Exact matches of terms found in *MeSH* were retained; those found in *LCSH* were retained only if a suitable *MeSH* term was not available.

Terms that were near-matches revealed four types of problems:

1. Instances of subject headings with similar meaning that differed in: (a) word order or phrasing; (b) punctuation or capitalization; or (c) spelling (figure 1)
2. Instances where several headings were used when one would have been sufficient (figure 2)
3. Instances where there were long strings of main headings (usually in *LCSH* form) with subheadings appended in various ways (figure 3), and
4. Instances where terms differed somewhat in meaning (figure 4)

Production of the New Subject List

After each term in the existing subject heading list had been reviewed, a new subject list was produced. Word order for all headings was standardized according to *MeSH* style and variants were all cross-referenced. Spelling differences were resolved and appropriately cross-referenced. Because *MeSH* headings were given preference over *LCSH*, the existing *LCSH* or local terms found in the list taken from the catalog records were all referenced so that the validation program of the catalog maintenance system could change the 65x fields automatically. The word order of *MeSH* was the standard, and all variants were cross-referenced. We went beyond the "use for" or "see" reference structure found in either *MeSH* or *LCSH* and considered any heading already constructed to be a valid access point even if it were no longer an authorized heading (figure 5). Previously used *MeSH* terms that were found in the MARC bibliographic records were also cross-referenced so that the validation program would change those records during an update of the file or provide the searcher with clues and links between records (figure 6). Possibly-related terms that were noticed in *MeSH* and *LCSH* were inserted as "see also" references to related topics (figure 7).

MeSH proved quite capable of handling specific medical topics and *LCSH* handled most concepts related to the social aspects of disease, but they did not provide equivalent terms. For example, in problem area number 4, above, *MeSH* has a "Chronic Disease" heading for a specific disease syndrome, while *LCSH* has a "Chronically ill" heading applicable to a set of persons. Though the terms are surely related, they are not interchangeable, so both were kept in the new list, with cross references in both directions: "Chronic Disease – see also Chronically ill" and "Chronically ill – see also Chronic Disease."

(a) Word Order or Phrasing
Adaptation, Psychological (*MeSH*)
Adjustment (Psychology) (*LCSH*)

Age factors in disease (*LCSH*)
Age Factors (*MeSH*)

Dementia, Presenile (*MeSH*)
Presenile dementia (*LCSH*)

American Indians (unknown source)
Indians of North America (*LCSH*)

(b) Punctuation or Capitalization
Memory disorders in old age (*LCSH*)
Memory Disorders--in old age (unknown source)

Down Syndrome (*MeSH*)
Down's syndrome (*LCSH*)

Language disorders in old age (*LCSH*)
Language disorders--in old age (unknown source)

Terminal care (*LCSH*)
Terminal Care (*MeSH*)

(c) Spelling
Data Base Management Systems (*MeSH*)
Database management (*LCSH*)

After care (unknown source)
Aftercare (*MeSH*)

Language disorders in old age (*LCSH*)
Language disorders--in old age (unknown source)

Long-term care
Long term care

Figure 1. Terms Similar in Meaning but Differing in: (a) Word Order or Phrasing; (b) Punctua-

Record 1:
Aged--Housing (unknown source)
Housing for the Elderly (*MeSH*)
Homes for the aged (*MeSH*)
Old age homes (*LCSH*)

Record 2:
Hospice Care (*MeSH*)
Hospices (Terminal care) (*LCSH*)

Record 3.
Parent and child (*LCSH*)
Parent-Child Relations (*MeSH*)
Parent-Child Relationships (unknown source)

Figure 2. Instances Where Several Headings Were Used When One Would Have Been Sufficient.

Headings were properly capitalized. For *MeSH* headings all significant words in the headings are capitalized; for *LCSH*, only the first word in the heading. Local headings, comprising mostly names of persons or institutions, were retained. Foreign language headings were retained.

Inexplicably, neither *MeSH* nor *LCSH* authorizes the term "care" of the person, yet professionals and lay people alike

```
Aged, Physically handicapped--Care--United States
Aged--Dwellings--Public Opinion
Alzheimer's Disease--Patients--Care--Handbooks, manuals, etc.
Cerebrovascular disease--Patients--Care--Handbooks, manuals, etc.
Charitable uses, trusts, and foundations--United States--Political
  activity
Consumer protection--United States--Information
  services--Directories
Dementia--Patients--Home care
Portable data bases--Catalogs--Periodicals
Rural aged--United States--Economic conditions--Statistics
Sick children--Respite care--United States--States
```

Figure 3. Instances with Long Strings of Main Headings and Subdivisions in Variant Order.

```
Chronic Disease (MeSH)
Chronically ill (LCSH)
```

Figure 4. Instances Where Terms Differed Somewhat in Meaning.

```
Dementia, Presenile (MeSH)
Presenile dementia (LCSH)--see Dementia, Presenile

Accidental Falls (MeSH)
Falls (Accidental) (LCSH)--see Accidental Falls

Elder Abuse (MeSH)
Abused aged (LCSH)--see Elder Abuse
Aged--Abuse of (LCSH)--see Elder Abuse

Homes for the Aged (MeSH)
Housing for the Elderly (MeSH)--see Homes for the Aged
Aged--Housing (unknown source)--see Homes for the Aged
Old age homes (LCSH)--see Homes for the Aged
```

Figure 5. Examples of Older Headings with Variant Word Order, or Spelling Variations Used as References.

make heavy use of the term, sometimes as part of a combination of terms such as "respite care," " caregivers," and "long-term care." Such terms cover the set of behaviors involving physical and emotional support of patients. We found 75 different headings for the concept "long term care." This was caused by the variation in spelling between *LCSH* and *MeSH* (see figure 1), and by the variations in subdivisions and subheadings used by the two lists. Such an important concept was thus scattered in the list; we normalized these headings by following the procedures described here. We also added the access term "care" to the list as a local term and provided cross references to related terms in the list.

A New List Is Formed

In place of the old subject list of 3,600 headings, the new subject list presented 1,220 main headings; of these, 775 (64%) were *MeSH*, 285 (23%) were *LCSH*, and 160 (13%) were local terms or proper names. In addition, 125 "see" and "see also" references were added. Lists of approved *MeSH* topical subheadings (with allowable *MeSH* Tree Structure categories), form subheadings, and geographic subheadings were provided in an appendix to the list.

Results

Because neither author was or is on the staff of the Green-Field Library, this was

```
Tranquilizing Agents, Major--see Antipsychotic Agents

Tranquilizing Agents, Minor--see Anti-Anxiety Agents
```

Figure 6. Previously Used *MeSH* Terms as References.

```
Medicare (MeSH)
--see also Medical Indigency (MeSH)
--see also Social Security (MeSH)


Minority groups (LCSH)
--see also Blacks (MeSH)
--see also Hispanic Americans (MeSH)
--see also Pacific Islander Americans (MeSH)
```

Figure 7. "See Also" References for Possibly Related Terms.

a limited project. We hope that our work will form the basis for an ongoing maintenance of the subject list. When we had to stop work on the project, we felt we had provided the Alzheimer's Association with a better tool to:

1. revise the existing subject headings in their catalog,
2. select appropriate headings as new resources are being cataloged,
3. consult a syndetic structure whenever their catalog had an authority/verification system and a search system that provided automatic links between old access terms, references, and established headings, and
4. showcase the holdings of the library on the Web with some consistency in subject access.

As part of a continuous subject access improvement project, we would suggest relating class numbers and subject headings. The captions for class numbers provide the broad term access so often missing in subject heading lists. In small special libraries the size of the Green-Field Library, this work could form the basis for special signage near the open shelving and on the Web page for the library, as well as cross references in the catalog file itself.

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Book Reviews

Margaret Rohdy, Editor

Understanding Subject Headings in Library Catalogs. Karen M. Drabenstott, with the research assistance of Schelle Simcox and Eileen G. Fenton. Ann Arbor, Mich.: School of Information, University of Michigan, 1998. 227p. $14. Also available by anonymous ftp at ftp.si.umich.edu.

The 1991 Subject Subdivisions Conference was convened at Airlie House by the Library of Congress (LC) to get input from the American library community on directions in which to proceed with improvements in the *Library of Congress Subject Headings (LCSH)*. Conway (1992) provides a detailed report of the conference, which is part of the legacy of innovation and cooperation from Lucia Rather's 1976–1991 term as LC director for cataloging. Many of the suggestions considered at Airlie House have been implemented by LC, and the conference also gave rise to a body of research, much of it echoing Cochrane's (1986) pragmatic ingenuity about *LCSH* in the online environment. Conference participants have published valuable studies of issues explored at Airlie House, most recently in Chan and Vizine-Goetz (1998).

Perhaps the most conspicuous contributor, both as a researcher and an educator, has been Karen M. Drabenstott. *Understanding Subject Headings in Library Catalogs* is the most recent of these publications. Its impetus was an Airlie House conference recommendation to simplify subject cataloging by standardizing the subject subdivisions in a fixed order of topical, geographic, chronological, and form. Existing LC subject headings employ a complex variety of conflicting patterns. A concern raised at the conference was that rearranging the order of subdivisions would alter the meaning of some headings; however there was, in fact, little knowledge of how subject headings are understood by library users. Drabenstott's study seeks to answer just that question: "What does a subject heading mean?"

Subject indexing is the Jello-nailing part of bibliographic control: the inherently subjective, nebulous nature of the process presents an obstacle to empirical study. The design and execution of a rigorous method of study, one capable of replication, may be the most enduring contribution of this project.

Drabenstott generated lists of frequently occurring subdivided subject headings and of randomly selected subdivided subject headings from the OCLC Online Union Catalog. She selected 24 subdivided subject headings likely to change in meaning when their subdivisions were reordered. Examples included:

Housing -- United States -- Law and legislation

Handicapped -- Washington (State) -- Seattle metropolitan area -- Transportation

Jews -- Germany -- Berlin -- Intellectual life -- Congresses

Organ music -- 17th century -- Interpretation (phrasing, dynamics, etc.)

Drabenstott then prepared questionnaires corresponding to three sets of eight subject headings. Within the sets, questionnaires varied the context in which subject headings were presented (i.e., alone, in bibliographic records, or in alphabetical browsing lists) and the order of subdivisions (i.e., original or recommended order). An expert librarian gave meanings to the subject headings in the different contexts and orders. Her meanings agreed with those of a second librarian with comparable experience.

The questionnaires were then distributed to children and adults at three public libraries in southeastern Michigan. The participants formulated meanings for the listed subject headings, designating on a scale of 1 to 7 their certainty of each meaning. The same three sets of questionnaires were also distributed to professional reference and technical services librarians around the country. The responses were compared to the expert's meanings and each judged correct or incorrect. Specific codes identifying differences in syntax, language, and leaving out or reading in concepts were also assigned to describe why the meaning was correct or incorrect.

Percentage of correct meanings by respondent group were as follows: children, 32%; adults, 40%; reference librarians, 53%; and technical services librarians, 56%. Percentages were a little lower for headings in the standardized order than in the original order of subdivisions. Overall, the lowest percentages came from children, but there were exceptions to this pattern. In one example, children did better than technical services librarians! All were less certain of their incorrect meanings than their correct meanings; however, none formulated meanings that favored a specific incorrect meaning code.

The narrowest research question was answered clearly: "Statistical and failure analyses failed to demonstrate that subdivision order made a difference in terms of understanding subject headings" (p. xviii). LC should standardize the order of subdivisions to simplify cataloging and save money. Staff would no longer spend time determining the order of subject subdivisions and could introduce computer-based techniques that would reduce the errors that occur in subject headings due to subdivision order (Drabenstott and Vizine-Goetz 1994, 113–20).

Broad implications for further study are presented. Various groups, including children, reference librarians, and subject experts should be involved in establishing new subject headings. Future studies could examine the characteristics that are likely to identify a difficult subject heading and the extent to which context changes the meaning of subject headings. End-user understanding of *Sears Subject Headings*, *Medical Subject Headings*, Yahoo! subject headings, and comparable systems should be investigated, adopting the codes used in this study for comparisons between different systems. Above all, this study confirms an enduring commitment to *LCSH*. It demonstrates that scientific analysis can improve its development and use.—*J. Bradford Young (jbyoung@pobox.upenn.edu), Otto E. Albrecht Music Library, University of Pennsylvania, Philadelphia*

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Improving Online Public Access Catalogs. Martha M. Yee and Sara Shatford Layne. Chicago: American Library Association, 1998. 220p. $48 (ISBN 0-8389-0730-X). LC 98-6217.

In *Improving Online Public Access Catalogs*, Yee and Layne focus on specific improvements in systems design for online catalogs. Both authors, Yee in particular, are known for their expertise in cataloging and its impact on information retrieval. After an introductory discussion of indexing and display options for current online catalogs, the authors examine and discuss how system design affects retrieval, offering suggestions on how to improve design to better assist all

catalog users. They emphasize the public access component of online catalogs and do not discuss integrated library systems in detail. They discuss the characteristics of both novice and experienced searchers in relation to system design and the availability of search options. Yee and Layne recommend using default searches, with which they believe most users are familiar. Backup search strategies are suggested for use when default searches fail.

The text is divided into three main sections on objectives of the catalog and interfaces, authors and works, and subjects. Three appendixes are included for further reference: "User Studies Consulted," "Cataloging Classics for the Inquiring System Designer," and "Searching Catalogs on the Internet." An index is also included for easy reference to names and terminology.

This book is clearly intended for library professionals, yet part I is too basic in much of its explanation of USMARC (MAchine Readable Cataloging) records. This type of explanation is more appropriate for library school students; it would be expected that those with the responsibility to implement or upgrade a library's online catalog would have basic knowledge of bibliographic and authority records. Yee and Layne are inconsistent in their explanation of terminology. For example, they include a detailed explanation of authority records and the fields they contain. However, when the *Anglo-American Cataloguing Rules*, 2d ed., 1988 revision is first cited (p. 118), no explanation or description is provided. In contrast to part I, "Objectives, Interfaces, and Building Blocks," parts II and III, "Demonstration of Relationships—Authors and Works" and "Demonstration of Relationships—Subjects" are more interesting and provide more substance.

Sometimes the authors provide contradictory information. In their introduction to authority records (pp. 25–26), Yee and Layne suggest making available to users the 667 note field, which provides further information about the person represented in the authority record. This raises the question of how such information would be displayed. The authors note in previous chapters that users lack knowledge of effective searching techniques and are often unable to interpret search results. If this is the case, it seems contradictory for them to advocate displaying the 667 field. Many users have difficulty identifying the information they need in bibliographic records, and they often have problems using classification systems or locating materials in a library. Only sophisticated users would be able to recognize and appreciate information in a 667 note.

Yee and Layne provide an in-depth discussion of the role of authority control and the relationship between authority and bibliographic records. While this is helpful, it might have been strengthened with a discussion of the problems of a catalog that lacks authority control because this is often a concern of libraries seeking to improve system design.

In their discussion of system design and indexing, the authors compare and contrast the benefits and drawbacks of card and online catalogs. They outline the capabilities lost plus new capabilities that have been gained, noting how users had fewer and less sophisticated information-seeking strategies when using the card catalog. This discussion is interesting and helps to provide a historical perspective for search strategies and results.

The text is easy to read and the layout is well-organized. Yee and Layne use many excellent examples, which include accompanying explanations, to illustrate the text. The authors' thorough research is evident. They cite numerous user studies that support their arguments for default searching and for improvements in system design. Their book is timely and very much needed as libraries strive to serve both local and remote users. The authors conclude by reasserting their argument for improving the design of online catalogs: "The records currently available for use in OPACs are rich with content and structure that have not yet been tapped by means of effective system design" (p. 206).—*Mary Beth Weber (mbfecko@rci.rutgers.edu) Rutgers University Libraries, New Brunswick, New Jersey*

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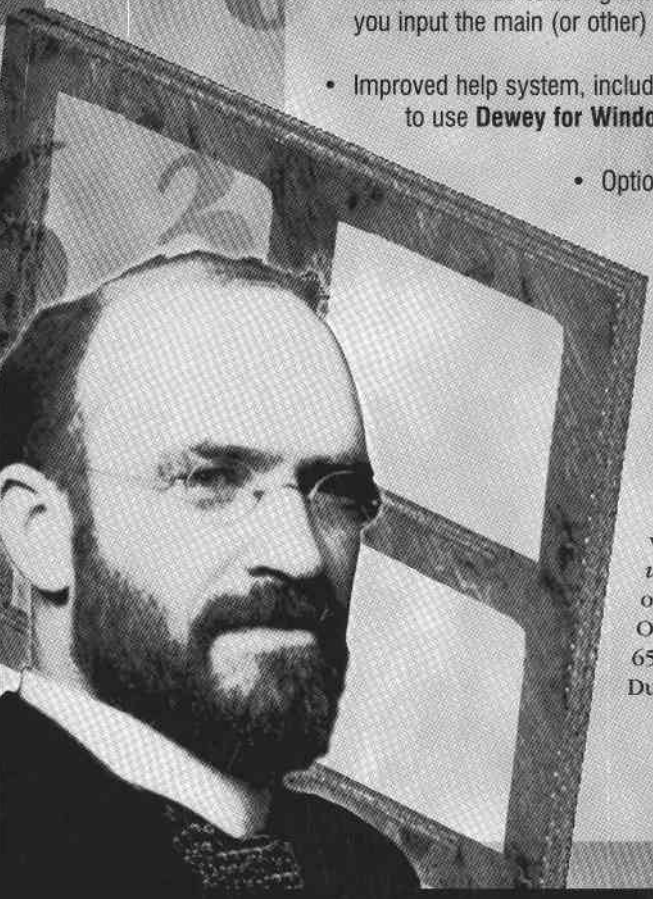

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