We need a format which is consistent, easily maintainable without being uncontrollably disruptive, and responsive to changing needs which are likely to accelerate as we gain experience with online systems.

Rather than recommending or supporting the implementation of specific changes to the MARC format, it is essential that the library community begin to establish the framework and benchmarks necessary to maintain the MARC formats over the long term as well as to guide short-term considerations. ARL and others can play an important role in undertaking and encouraging a broader approach to this pressing problem. Such an approach will not only reduce the risk of decision making, but will also assist in the development of the cost/benefit data needed to enhance consideration of format changes.

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Comparing Fiche and Film: A Test of Speed

Terence CROWLEY: Division of Library Science, San José State University, San Jose, California.

INTRODUCTION

For more than a decade librarians have been responding to budget pressures by altering the format of their library catalogs from labor-intensive card formats to computer-produced book and micro-

formats. Studies at Bath,[1] Toronto,[2] Texas,[3] Eugene,[4] Los Angeles,[5] and Berkeley,[6] have compared the forms of catalogs in a variety of ways ranging from broad-scale user surveys to circumscribed estimates of the speed of searching and the incidence of queuing. The American Library Association published a state-of-the-art report[7] as well as a guide to commercial computer-output microfilm (COM) catalogs pragmatically subtitled *How to Choose; When to Buy.*[8]

In general, COM catalogs are shown to be more economical and faster to produce and to keep current, to require less space, and to be suitable for distribution to multiple locations. Primary disadvantages cited are hardware malfunctions, increased need for patron instruction, user resistance (particularly due to eyestrain), and some machine queuing.

The most common types of library COM catalogs today are motorized reel microfilm and microfiche, each with advantages and disadvantages. Microfilm offers file-sequence integrity and thus is less subject to user abuse, i.e., theft, misfiling, and damage; in motorized readers with "captive" reels it is said to be easier to use. Disadvantages include substantially greater initial cost for motorized readers; limits on the capacity of captive reels necessitating multiple units for large files; inexact indexing in the most widespread commercial reader, and eyestrain resulting from high speed film movement.

Microfiche offers a more nearly random retrieval, much less expensive and more versatile readers, and unlimited file size. Conversely, the file integrity of fiche is lower and the need for patron assistance in use of machines is said to be greater than for self-contained motorized film readers.

THE PROBLEM

One of the important considerations not fully researched is that of speed of searching. The Toronto study included a self-timed "look-up" test of thirty-two items "not in alphabetical order" given to thirty-six volunteers, of whom thirty finished the test. The researchers found the results "inconclusive" but noted that seven of the ten librarians found film searching the fastest method. "Average" time reported for searching in card catalogs was 37.3 min-

utes, in film catalogs 41.6 minutes, and for fiche catalogs 41.7 minutes. A reanalysis of the original data shows a stronger advantage of fiche over film (45.3 minutes versus 51.7 minutes) when all times except duplicates are totaled, but that difference is almost entirely due to one extreme score (203 minutes).[9]

The Berkeley report of fiche/film comparability addressed the issue of retrieval speed directly. By constructing a series of look-up tests composed of items selected from a large public library COM catalog, the researchers were able to compare microfiche and microfilm formats while holding other variables constant. In one test involving thirty-six paid users and 252 trials, microfilm was determined to be faster by 7.6 percent (± 2.5 percent). In a second test, forty volunteer users were timed in 240 trials and the advantage of film over fiche dropped to 5.7 percent (± 2.5 percent).[10] Although rigorous in design and execution, the Berkeley experimenters used in their look-up tests questions that naive users might misinterpret, e.g., "You want a book about Paul Robeson, written by Eloise Greenfield. Find the listing and give the call number"; and some which could be confusing, e.g., "Does the library have any joke books? If so, give the call number for one."[11] Such questions potentially pose an element of uncertainty for subjects: Should I look under Robeson or Greenfield? under joke books or humor? In addition, questions were selected by "browsing the file for target items," a procedure which could result in an uneven distribution of items which in turn could bias the results. Since the number of observations is relatively large the reliability of the results is not questioned; the validity may be.

The study reported here was executed by a class in research methods taught by the author during the same time as the Berkeley study; we used the same two formats of the same catalog, and attempted to answer the same question: Using the best available equipment, which microformat is faster to search?

ASSUMPTIONS

We assumed (1) the two forms of the catalog were identical; (2) the quality of the image was not significantly different; (3) a search for items selected randomly from the file and arranged randomly was a fair test of retrieval speed; and (4) graduate students in library science were reasonably representative users for a test of speed.

METHODOLOGY

We used a dictionary catalog from a public library system with 436,791 entries, of which 5,631 were author, 111,158 were title or added entries, and 320,002 were subject entries. Using a random number table, we selected from the catalog 16 entries which were reproduced and randomly arranged to form the test. Of the 16 items, 3 were author entries, 8 were title or added entries, 5 were subject entries. The sequence, which presumably would affect the speed of retrieval more in the film format because of the necessity to scroll from one letter to another, was A C W N S K C B W M H L P P A L. The test was then administered to thirty-seven volunteer graduate students randomly assigned to a Micro-Design 4020 fiche reader or an Information Design ROM 3 film reader. The two readers were located in the same room. The 86 fiche were held and displayed by a Ring King binder. All times were measured by a stopwatch. Questionnaires administered before and after the test established that the two groups did not differ significantly in age or in self-perceived mechanical ability. Of the film users, 64 percent used micro-formats "occasionally" or "frequently" compared with 35 percent of the fiche users. Of the total group, 73 percent wore glasses and 62 percent reported prior physical problems with both film and fiche readers used before the test.

RESULTS

Table 1 shows that the mean speed of the film users was 16.7 minutes, significantly faster than the 25.3 minutes recorded by the fiche users; the range of speed for the film users was less than ⅓ that of the fiche users. Even the slowest film user was faster than 70 percent of the fiche users. However, the fastest fiche user was faster than 70 percent of the film users. The range of fiche scores is more than 3 times that of the film scores (Figure 1). The standard statistical test shows the difference of means to be significant at the .01 level.

Table 1. Speed of Retrieval (in Minutes)

Format	Low	High	Mean	Standard Deviation
Microfilm ($n = 17$)	12.3	19.45	16.7	2.34
Microfiche($c = 20$)	14.6	38.0	25.3	7.47

$t = 4.8, p < .01$

DISCUSSION

Searching motorized microfilm appears to be significantly faster than searching microfiche, on the average, for relatively inexperienced users. Even the slowest time on the film was faster than most fiche times. The wide range of fiche scores suggests the possibility that frequent users could improve their searching times; very experienced users may be able to search fiche faster than film.* Because of the relatively small numbers of subjects and observations involved, the results should be interpreted with caution. Although the advantage of film over fiche in this study is greater than that shown in the Berkeley report, differences in design and analysis must be taken into account.

ACKNOWLEDGMENTS

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*The author, an experienced fiche user, was timed at 11.6 minutes; this was the fastest time recorded by either fiche or film users.
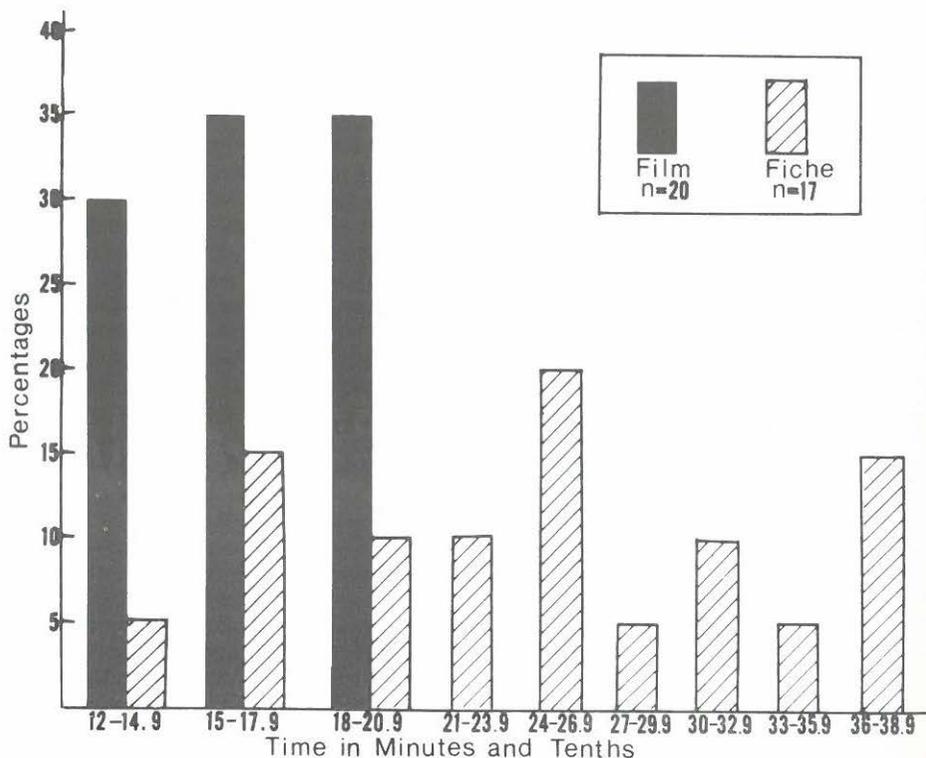

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Electronic Order Transmission

James K. LONG: OCLC, Inc., Dublin, Ohio.

In this era of decreasing library allocation from the public sector, libraries are realizing increased benefits from the automation of the acquisitions process. The price of hardware is decreasing and the capabilities of the available offerings increasing. We have evolved from the small local library collection of data and printing of orders, through the book vendor offerings of an online connection to a single vendors inventory. These systems still required local mailing for all other vendor orders.

In 1981 we have seen a greater emphasis on electronic ordering. Memorial University in Canada has been experimenting in sending orders directly to John Coutts Library Services Ltd. in print format using the UTLAS CATSS System. Wayne State University is planning to use the Ringgold NONESUCH acquisitions system to transmit orders electronically to Book House using the BISAC tape format. Blackwell/North America and the Academic Book Center have experimentally used WLN to receive test orders in a print file format. These all save time in getting the orders to the respective vendor. If sufficient volume can be generated there may be a savings in transmission costs over the U.S. Mail.

However, in order to realize maximum economics in this electronic process, four activities need to occur.

1. Acquisition orders must be collected from multiple libraries at a central site to generate volume for dispersal to multiple sites.

2. Standard formats need to be accepted and enforced for order transmission.

3. The ISBN must become a universally accepted part of the library acquisitions order.

4. The library must receive order status information from the vendor. Once again, this should occur via a standard data format.

At OCLC there were 113 libraries, as of November 1981, that could send printed orders from a central site to over 15,000 addresses of their choice. By July 1982 the projection is for over 200 libraries to be using the system. The library's order is batched by the vendor address that the library has specified. This process offers savings by sharing mail and printing costs between participants. With the proposed installation of direct transmission in 1982, this central collection will afford shared transmission costs. This is the type of centralized collection that maximizes the benefits of electronic ordering.

Within the book industry, standards for electronic data transmission for book ordering have been developed. In May of 1981 the Book Industry Systems Advisory Committee (BISAC), a subcommittee of the Book Industry Study Group (BISG), ap-