

Smart Barcodes: A Wise Decision

Ricki Val Brown

In preparing to bring the Cumberland County Public Library & Information Center's circulation online, a number of decisions had to be made. The most important question was how to link the materials in the collection to their appropriate bibliographic record in the data base. The automation team reviewed the two options available: the use of pre-assigned, item-specific or "smart" barcodes; or the alternative, the use of generic, non-specific or "dumb" barcodes.

"Smart" barcodes are pre-assigned to bibliographic records during data base tape processing. The computer assigns a unique barcode to each item (copy or volume) in the collection and then links the appropriate bibliographic record to the specific barcode during label production. These smart barcode labels are generated in shelflist order for ease of application. The barcode, the item's call number and a brief bibliographic description are printed on the label for easy identification and match-up.

"Dumb" barcodes are simply labels that display a barcode and its corresponding number. These labels are applied to materials at random. While this eliminates the possibility of applying a barcode to the wrong book, it creates a highly labor-intensive process. After application, each dumb barcode must be manually linked at a terminal to a bibliographic record, a process that is both time-consuming and vulnerable to human error.

The creation of smart barcodes is more costly initially. Dumb barcodes cost approximately \$30.00 per thousand. The CCPL&IC project included tape conversion, creation of item information, label tapes, MARC verification and labels for more than 230,000 items. Total cost for the project was approximately \$15,000, not including fees for a temporary work force to apply the barcodes.

Smart barcodes also require more time in the initial planning stages, since parameters must be defined. Parameters indicate which MARC tags

are to be indexed. Defining these parameters is a very tedious but crucial step because they will be used to supply the data in an item record from which the smart label is created. Any existing data base is examined very closely, and fields and subfields are "mapped" together for uniformity.

Problems can occur at this step when two or more data bases are being combined. CCPL&IC's main data base had been maintained by General Research Corporation. The North Carolina Foreign Language Center, housed at CCPL&IC's Headquarters Library, had a separate data base maintained by UTLAS. Parameters were used to incorporate and accommodate the differences in these two data bases.

Pre-existing problems in the data base will be discovered during the initial conversion process or while applying the labels if smart barcodes are used. Using dumb barcodes causes any problems or inconsistencies to be uncovered later, during the manual linking process.

The data base manipulation and the time needed for label production for smart barcodes requires patience while waiting for the selected vendor to process the information and produce the final product. CCPL&IC chose to use smart barcodes and estimated label production time at three months. It took six months.

The CCPL&IC decision to use smart barcodes was based on a number of reasons. First, the time required to link more than 230,000 items manually would have delayed the actual implementation of the automated system. CCPL&IC had recently opened a new headquarters facility and a new branch which had caused overall circulation to increase more than seventy percent. The manual circulation system could no longer be maintained without additional staff. Implementation of the automated circulation system was critical to upholding the high level of service expected by Cumberland County's library users.

The automated system acquired by CCPL&IC required input of nine separate pieces of information as part of the linking process for each item—

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Dumb Barcodes: The Smart Way to Go!

Harry Tuchmayer

Why barcode on the fly when you can pay to have someone do it for you? Surely, you should adopt the benefits of technology and have vendors supply smart labels. After all, why are you automating in the first place? Perhaps this technological innovation warrants a second look. When all is said and done, are smart labels the most advanced way of preparing a collection and library for an automated circulation system? What have you gained and, more importantly, what have you lost when you opt for the advanced way of dealing with your item conversion problem?

Rather than viewing the manual conversion process as the cheap (and archaic) alternative to item level conversion, let us regard it as the first step in preparing and adapting your organization for change. Barcoding on the fly provides two benefits that far outweigh any perceived advantage of smart labels. First, the process of adding an item record to each volume in your library provides a unique opportunity to train your staff in the use of the new system. Second, barcoding on the fly is the precursor to change. The process prepares your library for the opening up of the catalog to those qualified employees who can assist the technical services staff in providing patrons with a truly usable catalog.

Any method of adding barcodes to existing items takes time and staff. It is my contention that this time and staff could be put to best use learning how the system operates through the item-add process. In order to affix smart labels, most libraries designate teams of two barcoders, each armed with sheets of labels. These teams then go to their assigned stack areas applying smart labels to specific books matching the correct bibliographic record.¹ Why not take a team of two individuals, provide two terminals and sheets of dumb labels, and begin the process of item-add by barcoding those books just returned? In the same three-hour shift, these two employees will have barcoded almost as many books as their smart label counterparts, yet they will have had

three hours each of hands-on computer training—three hours that they would have, or should have, invested later.² Thus the process of searching for the correct bibliographic record on a computer terminal and then applying a dumb barcode to that record is automation training.

Ironically, the process of applying smart barcodes is not really very automated. It relies on a manual method of searching the shelves, pulling the book, and visually verifying that the item in hand matches the preprinted barcode. If the method used to apply smart barcodes is compared to the one advocated here and tested on a public library fiction collection, you begin to see the advantages inherent in this less sophisticated method. In order to get the most mileage out of the smart label process, machine-readable records must contain exact and accurate holdings information. Otherwise, those titles for which your library has numerous copies (usually those titles most heavily in demand and most likely to be circulated) cannot be barcoded in this manner. Therefore, the library's most popular fiction titles will inevitably need to be barcoded manually, negating the advantage of the smart label.

If you barcode items while they "rest" comfortably on the shelf, you are probably spending too much time and money converting that portion of your inventory which does not need immediate barcoding and which may be appropriate for discarding. Barcoding materials after they are returned and/or as they are circulated also avoids the "sticky" problem of how to handle those pages and pages of barcodes waiting to be attached to books not yet located in the stacks. In addition, the library saves money by not printing labels for books not previously recorded as missing from the collection. If, as convention has it, eighty per cent of your circulation is represented by twenty per cent of your collection, it stands to reason that most of what needs to be barcoded immediately can be converted in this fashion. Focusing your barcoding efforts in this way converts that portion of your collection most likely to circulate and speeds up the time it takes to get

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barcode number, owning agency, circulating agency, cost, classification, format, circulation indicator, fine indicator, and statistical category. This information was inserted during the data base conversion phase before the generation of the smart barcodes. The use of dumb barcodes would have involved pulling materials from the shelves, carrying them to a terminal, locating the appropriate bibliographic record, inputting the nine pieces of information specific to each item, and then returning the materials to the stacks for reshelving.

Since CCPL&IC's smart barcodes were generated in shelflist order, the barcodes were simply taken into the stack area and applied. Library staff, from the director on down, had been assigned areas to shelf-read prior to the barcoding to ensure that materials were in correct order so that the barcoding could progress as rapidly as possible. CCPL&IC employed a temporary work force of eight people to attach the barcodes. The barcoders worked for twelve weeks at a cost of \$23,000.

The initial barcoding sweep through the collection at the system's seven locations was completed within eight weeks. The temporary work force spent the remaining four weeks barcoding materials as they were returned from circulation.

The Cumberland County system benefited in many ways by choosing to use smart barcodes. In actuality, an inventory was conducted during the barcoding process. When all materials had been labeled, the remaining smart barcodes, for which no matching materials could be found, indicated items that needed to be deleted from the data base. The data base then reflected the true holdings of the library. The automated system also generated a list of the deletions. Collection development officers used this list to replace and update missing titles and to supplement certain subject areas.

While planning and deciding the parameters to produce the smart barcodes, the library was given the opportunity to make universal changes in its data base. The existing data base has inconsistencies in the labeling of materials. These inconsistencies resulted from personnel changes over time, the changing needs of the community and changes in processing procedures. For example, at one time, the library's fiction collection had been divided by genre. Mysteries were classified "M" with the author's last name, science fiction was classified "SF" with the author's last name, westerns were classified "W" with the

author's last name, etc. Some works were cut-tered by the first letter of the author's last name, some by the first three letters and some by the entire last name.

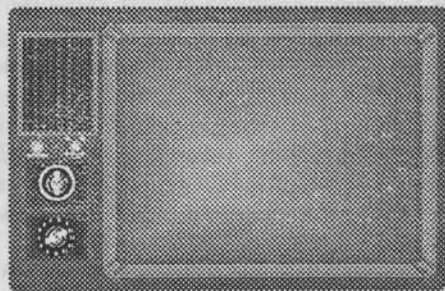
At the time of automation, the fiction collection had been totally integrated into one alphabet, but the existing data base did not reflect this change. During the conversion process, CCPL&IC was able to make the necessary universal changes with simple parameters prior to barcode production. Had CCPL&IC chosen to use dumb barcodes, these changes would have had to have been done on an individual basis.

The decision to use smart barcodes was the best decision for this library. The decision was based on review of relevant literature and consultation with other libraries. Each library must examine its own needs and resources before making a decision. Given the resources at CCPL&IC, choosing smart barcodes was a smart decision.

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More importantly, it allows the staff immediate use of your system, providing them with hands-on experience in a working environment. While most libraries spend 1000-plus staff hours applying smart labels to books gathering dust on the shelf, your staff could be accumulating valuable computer time experimenting with the varied ways of locating books in your system. This hands-on experience offers an organization the opportunity to evaluate the possibilities of opening up the catalog to other qualified employees.

There is no question that automation exposes every flaw, error, and mistake in a catalog. The percentage of errors in your data base, no matter how small, are magnified as a result of automation. Help in some form or other is needed in correcting these flaws. As the barcoding project progresses, technical services personnel will see that other library employees could be trained and relied upon to assist in solving automation-related problems. Involved in this way, circulation and reference librarians will not only begin to appreciate the special concerns technical services personnel have for the "integrity" of the catalog, but they will also participate in improving the catalog—a process made possible by automation and accessibility to the catalog at any number of work stations.

So why should you apply dumb barcodes to your collection? They are cheaper. While the unit cost of any label is still somewhere in the neighborhood of .025 cents, there is an additional data base charge associated with smart labels. Granted, it remains to be seen if anyone can successfully use the argument that the money saved (usually some factor times the number of titles in your data base) by not producing smart labels can be converted into one more microcomputer for the library. We all know that it is, unfortunately, easier to say it costs a certain amount to make the system operable than it is to reduce costs in one area and convince the funding authorities to let you spend the savings on something else.

Clearly both processes require roughly the same number of actual hours in converting a collection, but there is no doubt that the decision to utilize smart labels means that you are committed to applying these labels in the shortest number of days possible. After all, you have to. Once the smart label is generated, your system thinks all titles are in the stacks and available for use. But does this decision render the system using smart labels any more accurate? No. First, your system

is virtually useless throughout the entire time it takes to apply these labels, and only when you decide to deal with those items still checked out, missing, or for which no item/records were produced, can your system become fully operational. Applying dumb labels on the fly means that you have, for a limited but steadily increasing percentage of your collection, immediate and accurate information pertaining to its status. Only those titles for which no items/records yet exist are in limbo as to their current status—a situation certainly no worse than the one presented to us by using smart labels. And, in fact, because your staff is trained to recognize and handle these titles, any uncertainties concerning their status can be easily solved. Second, there is no guarantee that a team of "dumb" library staff and volunteers can apply smart labels to books any more accurately than teams of "smart" library staff can apply dumb labels to books. Seriously, errors happen, regardless of which method is employed. The anticipated one to three percent error rate seems consistent regardless of the barcoding method employed. The overall accuracy rate of either technique is roughly the same.³

Where does this leave us? It seems clear that either method of attaching barcodes to your collection will work and produce roughly the same results. So why apply dumb labels when you can pay to have smart labels? Because by using dumb labels, you produce a smart staff.

Barcoding on the Fly: A Step-by-Step Approach

Certain preconditions are assumed in this outline for barcoding on the fly. The first is that you already have established some mechanism for dealing with your patron conversion; second, you have purchased barcoding supplies; and, finally, your terminals are installed and your system is operational.

1. *Don't* go online to the public immediately. Allow yourselves as much time as you would if you had purchased smart labels. Failing this, give yourself about a month to become familiar with the equipment and permit barcoding without attendant circulation pressures.

2. Schedule teams of barcoders to begin barcoding during the slowest part of the public service day in roughly one and one-half hour shifts. Designate technical services staff as team leaders and pair them with other fulltime staff members (obviously, this will require some double-teaming).

3. Once the teams and schedules are arranged, set up a series of training sessions to explain the process: how to search the records,

how to recognize inconsistencies, and how to verify that the item in hand matches the bibliographic record.

4. Designate a trained and qualified individual or individuals, as the size of your library warrants, to deal with such problems as bibliographic errors, questions about editions, and unmatched entries. I strongly advise you to invest in a large quantity of stick-on notes to identify and pre-sort problems. That way, books with minor bibliographic typographical errors can be channeled to a copy cataloger for correction and barcoding, while the unmatched entries and more complicated bibliographic errors can be sent directly to the cataloger.

5. For the first three-week period, as books are returned and sorted onto trucks, roll them to the barcoding team to be converted before shelving. At the end of this period, assuming your director won't allow you to delay going online any longer, continue this process, but take these additional steps:

6. Schedule team leaders and other staff members who have shown an aptitude for barcoding to work at the circulation desk during peak service times. Dedicate these employees and terminals to nothing but barcoding books in order to assist staff before the checkout transaction begins. It is wise to devise some mechanism for pre-sorting materials into two stacks, barcoded and not, to hasten the barcoding process. Chances are, your patrons will be delayed anyway, as you update your registration files, so no significant additional delays will result.

7. Circulation staff should continue to barcode returns during this time. Since your circulation system will no doubt be operational, you should probably pre-sort returns so that only those items needing conversion are put aside.

8. Establish procedures and create forms to handle titles that are displayed in your system with no barcoded items attached. Assign responsibility for searching these item/records thoroughly before a decision is made to replace the material or delete the bibliographic record.

9. Within a year to eighteen months, generate a report to list all bibliographic entries for which no items exist. Use this report to begin the process of weeding and establish a collection redevelopment program for your library. You can also take this opportunity to barcode the remaining titles in your system; but remember, the fact that these books have not been barcoded has in no way hindered the use of your system.

References

1. John Buschman, et al., "Smart Barcoding in a Small Academic Library," *Information Technologies and Libraries* 7 (September 1988): 263-69.
2. Helen H. Spalding, et al., "Behind Bars in the Library: Northwestern University's Bar Code Project," *Information Technology and Libraries* 6 (September 1987): 186.
3. Randall Library at the University of North Carolina-Wilmington (using smart labels) and the New Hanover County Public Library (using dumb labels) both experienced around a one percent error rate, while Northwestern University's error rate was lower than the one percent anticipated. *Ibid.*, 188.
4. This brief outline was prepared with the assistance of Marie Spencer, technical services librarian at the New Hanover County Public Library.

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