Vocational Education Services:

A Microcosm of the Zeitgeist

JoAnn Brooks
Leota Sigrid Boesen

The library of Vocational Education Services (VES) was conceived and developed in the midst of an international problem and a national trend: the information explosion and the advent of specific computer applications in libraries. Even though most of the professional literature written from 1965 to 1980 heralds the positive correlation between burgeoning information and the use of computer technology to gain bibliographic control over it, few articles have described operational systems[1] that have been successful in bridging this gap. Rather, most of the literary output has focused either on an

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JoAnn Brooks has been Information Specialist/Visiting Associate Librarian at Vocational Educational Services since 1977. Before that time she was Visiting Assistant Librarian at the Institute for Sex Research Library. She has a BA in English and a MLS and Specialist Degree in Library and Information Science.

Leota Sigrid Boesen holds a dual Visiting Affiliate Librarian appointment as Assistant Information Specialist at Vocational Education Services and as Reference Librarian for Interlibrary Services at the Indiana University Libraries. She received her undergraduate degree in Music from Smith College and the MLS in Music Librarianship from Indiana University.

acknowledgment of the information problem and esoteric solutions to it, or on regional, national, and international networking and cooperation as a means to control the printed word. These types of publications are useful for gaining a general overview of current trends in the field, but there is a need for "publications concerned with the question of why particular projects are undertaken. . .and what genuine success has occurred."[2] In other words, there is an urgent demand for a microscopic examination of a system that has met the specialized needs of its collection, clientele, and curators. The following discussion of Vocational Education Services and its automated processes attempts to provide such a view.

Vocational Educational Services

Vocational Education Services began in 1972 as a small project funded to the Department of Vocational Education at Indiana University to produce a newsletter alerting vocational educators to exemplary projects in Indiana. As information needs of state vocational educators grew, the project gradually expanded. In 1976 it began a publication service to edit and condense selected final reports of state-funded projects, program and project abstracts, and position papers. The following year the funding agency, the Indiana State Board of Vocational and Technical Education (SBVTE), decided that in addition to a publications service, Indiana needed a project which could acquire, organize, retrieve, and store research and development documents and final reports which had been collecting in the SBVTE office. The funding agency also wanted access to national data bases and information sources.

When the information service component of VES began in 1977, there were three primary objectives. They were: (1) to conduct a user needs study for the information service, (2) to develop a flexible, multifunctional plan to implement the information service, and (3) to catalog and store reports and products currently available, which were produced in or received by the state. With invaluable input from an advisory committee of Indiana University librarians, the user needs study and the development plan were completed during the fiscal year.[3] The plan covered all aspects of operating the information service from setting selection policy to retrieval from commercial data bases.

The opportunity to develop a new library does not occur often and few librarians are granted the challenges and the struggles of

doing so. There are numerous decisions to be made such as what cataloging and classification system to use, how to maintain the system, and what sort of access to documents is needed. These decisions can only be made in relationship to the purpose and location of the library, the clientele to be served, and of course, the budget.

At VES, located at Indiana University, the decision was quickly made that the data base created must be machine readable and that cataloging and indexing should conform as much as possible to the national education data base: Educational Resources Information Center (ERIC). The purchase of computer hardware or software was not a budgetary possibility; and, therefore, the hardward and software already available at Indiana University had to be adopted or adapted. This article describes the reasons for these decisions and how the resultant processes were implemented at VES.

Technical Processing

The standard factors considered in planning the organization of any type of library collection are the various media in its holdings, the bibliographic format desired, the methods of using the bibliographic information, and the physical processing of each document. Even though the methods for handling these classical tasks never change, the means for handling these processes do. Most research and college libraries are committed to traditional document handling guidelines set forth in the *Anglo-American Cataloging Rules* (AACR) and the Library of Congress' (LC) classification schemes due to the general nature, size, and longevity of their collections. However, special libraries, like Vocational Education Services, which have just started their collections can "provide a micro-testing ground for new and innovative nontraditional approaches"[4] to library technical services.

The specialized nature of the documents in the VES collection necessitated a different bibliographic control system than was offered by traditional classification schemes and by descriptive and analytical cataloging guidelines. For the most part, traditional cataloging deals primarily with monographs and serials, and not with technical reports or other similar fugitive materials.[5] Since the VES collection consists of exemplary projects, vocational education plans, publications from the states and territories, ERIC documents, and ephemarae, *AACR* and LC classification schemes do not fit all of the

specific needs of this technical literature. Likewise, the LC subject needs of this technical literature. Likewise, the LC subject headings for vacational education are far too general to supply specific topical access even with the direct and indirect headings options.[6]

Even though the *AACR* guidelines for establishing author, title, and publication date entries were eventually adopted, VES faced bibliographic description problems peculiar to its own materials. Indiana State Board of Vocational and Technical Education project numbers had to be included in the bibliographic record for retrieval purposes, as well as sponsoring agency, identifiers, fiscal year designation, budget figures, and target audiences of each project. After realizing that the established cataloging rules were not entirely suitable and that the 3x5 catalog card did not provide the numerous access points needed, a classification and cataloging standard which was more applicable to education report literature was selected.

In view of the information storage and retrieval needs of the collection, the *ERIC Processing Manual* was adopted and adapted as the cataloging standard for VES.[7] This four volume manual for indexing and abstracting report literature was developed by ERIC under the auspices of the National Institute of Education (NIE). In conjunction with the cataloging rules, ERIC also developed a controlled vocabulary list, the *Theasaurus of ERIC Descriptors*, which is applicable to all areas of education. Since VES had a five year accumulation of documents to process, along with the daily influx of new materials, a rapid, but flexible bibliographic record processing system was needed. Since catalog cards would take too long to type, reproduce, and file, and would be difficult to change in the event that the bibliographic information had to be updated, it was decided that an automated system was the only solution.

The work toward an automated system for VES began with the development of a cataloging workform based on the ERIC Report Resume Processing Form.[8] Unlike the catalog card, which is the basic element of the traditional library retrieval system, the processing workform, which "has a passing resemblance to the library catalog card, is only a transitional step in a process which ultimately leads to the addition of a record to a computer file."[9] As a result, the production of indexes and other forms of retrieval "are produced in whole or in part from this computer file [and] not from the [processing workform]."[10] In order to accomplish these information storage and retrieval feats, the bibliographic record has to be "rich enough in detail to be responsive to any need."[11] Library automation is bibliographic file oriented and not procedure oriented.[12] Thus, the design of the document handling system made provisions for the constant updating of the changing elements of the bibliographic records.

Since the SBVTE exemplary projects, consisting of proposals, final reports, and products, were the most complex of the VES materials to catalog, the processing workform was designed with ten fields. The INNU field contains the VES number with an IN prefix, a general media designator, denoted by "report type," and a slot for the recording of an ED number in the event that one of the SBVTE reports is added to the ERIC system. An INNU entry such as "IN-760059 Final, ED167698" means that the document is an SBVTE final project report conducted in the 1976 fiscal year, which has been assigned the accession number 59, and which also appears in the ERIC system under ED167698. This system was devised because it could reflect the diffferent media in the collection by changing the two letter prefix and because the accession number concept could expedite the classification of a rapidly growing collection. Most importantly, this type of numbering system serves the basic function of a call number which is to provide a location on the shelf for the document.

The title (TITL) and author (AUTH) fields are completed according to AACR guidelines. In the event that the document has no title page, the cataloger takes the bibliographic information from the cover page. A title may be fabricated if there is no title on the document. VES denotes a fabricated title in its entry by placing it within brackets. In defiance of standard cataloging practices, VES does not maintain an author entry verification file because of the inordinate amount of time involved. For VES' purposes, the standardization of this file is not as vital to the cataloging process as is that of the agency or identifier file.

The agency (AGCY) field is filled in according to the *COSATI Standard for Descriptive Cataloging of Government Scientific* and *Technical Reports*. The institution index in one of the monthly *Resources in Education* (RIE) may also be consulted to verify the entry for a specific agency. In an effort to standardize the agency entries for retrieval purposes, an agency authority file is maintained by the cataloger.

Descriptors from the *Thesaurus of ERIC Descriptors* are used in the descriptor (DESC) field to identify the document's subject matter. ERIC descriptors, and not LC subject headings, are used because they were developed for the field of education and because descriptors go a step beyond subject headings by expressing the concepts encountered in the related literature of a specific topic. As a result, this particular controlled vocabulary is more applicable to the technical documents in the VES collection. Since all documents in the VES collection deal with some aspect of vocational education,

the descriptor, "vocational education," is used rather sparingly. Even though ERIC assigns this descriptor automatically, the VES indexer does not usually include it in the ERIC document's bibliographic record. The inclusion of "vocational education" in each record would be redundant and would take up too much space in the data base.

The identifier (IDEN) field contains proper nouns which are used as descriptors. This field is important because it provides access points to acronyms, organizations, geographic locations, legislation, and project names which are not included in the controlled vocabulary list.

The publication date (YEAR) is determined according to AACR guidelines. With SBVTE reports, the fiscal year is denoted by FY80 and the actual dates of the project funding are also recorded, such as "October 1, 1979 to September 30, 1980."

The number assigned to each project by the SBVTE is recorded in the grant number (GRNT) field. This number must be included in the bibliographic record because it is the primary access point for the SBVTE. This number reflects the federal funding source for the project. The 1976 vocational amendments (PL 94-482) consist of Part A divided into five subparts, Part B divided into three subparts, and Part C. Most SBVTE projects are funded under Part A, subpart 3, Program Improvement and Supportive Services, which has six numbered sections; 131-research projects, 132-exemplary projects, 133-curriculum projects, 134-guidance projects, 135-professional development projects, and 136-sex stereotyping projects. The last digit of these federal sections are used as the final digit of the SBVTE grant number and the roman numeral, III, indicates Part A, subpart 3. Thus the number 10-80-III-4 means that this was the tenth project funded in 1980 under subpart 3, section 134 (guidance).

The subpart and section of the law, as well as the local and federal monies, are recorded in the monies (MONY) field. This field assists those researchers who are planning to undertake a similar project by providing basic budget figures at a glance.

The population (POPL) field describes, via a numerical code, the target audience of a project and the research populations involved in a project. For example, a project which assesses employment opportunities for handicapped vocational education students would be assigned the codes for the following. population groups: target-handicapped (105), student (117), high school (134), post-secondary (135), and research-employer (215).[15]

Reference materials are assigned an accession number along with a unique two letter prefix which reflects document type e.g., ZD = reference directory, and are then indexed in the same manner as are fugitive documents:

INNU   ZD000008
TITL   Vocational industrial clubs of America. National
        Directory.
AGCY   Vocational Industrial Clubs of America, Falls Church,
        Virginia.
DESC   Directories, Youth Clubs, National Organizations,
        Trade and Industrial Education
IDEN   VICA, Vocational Industrial Clubs of America
YEAR   1975

In an effort to avoid duplication of effort, VES' ERIC documents are indexed as their records appear in RIE using limited fields and including only major descriptors:

INNU   ED164978
AUTH   Kane, Roslyn D.
TITL   Preparing Women to Teach Non-traditional Vocational
        Education. Information Series No. 137.
AGCY   National Institute of Education, (DHEW), Washington,
        D.C.
DESC   Females, Retraining, Teacher Education, Trade and
        Industrial Education, Vocational Education Teachers
IDEN   Nontraditional Occupations
YEAR   1978

After the items have been cataloged, the workforms are checked for conformity and accuracy and are added to the "to be input" folder where they await entry into the VES in-house data base.

Data Base Management
        The selection of software was relatively simple as the data base management packages supported by Indiana University's CDC6600 and Cyber 172 were very limited. When the search for software began, there were two locally developed programs which were considered. They were rejected because one program only created indexes and the other only furnished searching capabilities and the file formats of the two were not compatible. A third program, INFOL-2, developed by the Control Data Corporation was also available. Since it was designed specifically for information retrieval, the creation of indexes from the data base is not part of the program.

In order to create indexes from an INFOL-2 data base, it was necessary to adapt the local indexing program. Even with its drawbacks, a decision was made to go with INFOL-2. The file structure was being designed when chance intervened. A computer science student, Michael Coulter,[16] suggested that VES look at Famulus, a software package that had been acquired for the Indiana University School of Library and Information Science, but which was not yet completely operational. Though not perfect, Famulus was far superior to the other packages and it was quickly decided to adopt it to manage VES' data base. Fortunately, Mr. Coulter was excited about the challenge and VES hired him to implement its Famulus system.

Famulus is not an acronym but rather a job title for a medieval sorcerer's attendant or assistant.[17] It was developed by the Forestry Service of the U.S. Department of Agriculture as a personal documentation system. Famulus is written in Fortran and consists of eight main programs: (1) *Edit* which allows the user to correct, add to, or delete from the data base, (2) *Sort* which rearranges the file order by changing the order of the fields within records so that the data base can be sorted alphabetically on any field, (3) *Merge* which provides updating capability, (4) *Galley* which prints the data base in several formats, (5) *Vocab* which prints in alphabetic order the words in any given field (i.e., a concordance program), (6) *Index* which creates indexes to the data base on the field specified, (7) *Search* which uses Boolean logic to query stipulated filed(s) of the data base, and (8) *Ossify* which punches a card deck equivalent to the data base for backup or for massive corrections.

Famulus allows up to ten fields with each assigned a four-character name. These fields determine the access points to each citation in the data base and thus must be carefully chosen. The ten fields which VES defined have already been identified in the technical processing section and are therefore not repeated here. The original fields and their contents have worked well for VES' applications with the exception of the punctuation adopted in the author (AUTH) field. The Famulus Index Program uses the comma (,) as the delimiter and the VES Information Specialist chose to enter the author in the standard format (i.e., last name, first name). Unfortunately this means that VES is unable to create an author index, although it is possible to sort on the author field and thereby produce an alphabetical list of first authors. The author field is also accessible through the search program, only the creation of an author index is nullified through the misplaced comma.

Famulus was designed as a batch program to be used with card input and paper output. The running of any of the eight programs calls for different machine specific control cards as well as Famulus

specific cards. In order to search, for example, the machine cards get the data base and the Famulus search program. The Famulus cards name the data base, set the output line width, specify the fields to be searched and the search strategy.

The Indiana University computer allows batch submission from a remote terminal which saves punching and submitting cards for each run. Keeping track of the numerous control cards needed for each type of run, however, became time consuming and frustrating. Again, Michael Coulter came to the rescue. He wrote an interactive Pascal program which allows the terminal operator to call any of the Famulus programs, specify parameters, and then submit the job in batch mode.

The interactive program asks the user which Famulus program is needed. Depending upon which Famulus program is specified, the interactive program then asks a series of questions which allows the user to specify fields, to select output width, to decide whether to print field labels, and to specify the location of the printer for final output. In addition, many of the responses to queries are repeated so that the user can correct any errors without starting over. Using the answers to these queries, the Pascal program translates them into appropriate machine and Famulus control commands and writes them to output files. The output files are then submitted in batch mode. A search of the data base can be run using this interactive Pascal program and the results can be printed immediately at the terminal or later off-line. While the search is not interactive since the strategy cannot be changed once it has been submitted, the immediate online access has been invaluable.

A final procedure in the Pascal program does not call a Famulus program but processes interactive entry of new citations. The procedure asks for the first field (INNU) which is then typed in followed by a semicolon. It then asks for the author (AUTH) which is entered followed by a semicolon, and so on, through the record. The semicolon is used to delimit each field, a slash to delimit each record, and a dollar sign to end the session. The result of each session is a file of new citations in Famulus input format which can be edited for errors and then added to the data base with the Merge program. The standardized processing workforms and the interactive entry program allow VES to use minimally trained personnel for data entry.

The Famulus program has many disadvantages, the batch mode of access being the primary one. Moving from a vendor search of ERIC to searching the in-house data base using Famulus can sometimes be very frustrating, but for a low-budget computerized library

operation, Famulus completely filled VES' needs. Famulus allows the production of printouts of the data base in alphabetical order by number, title, agency, and first author. VES produces indexes of descriptors, identifiers, grant numbers and acquisition numbers. These printed tools are often all that are needed to answer a specific question. In addition, the data base can be searched on any field when necessary, producing results online or off-line. Famulus is not perfect, but with the development of the interactive Pascal program, it has met VES' needs.

Reflections

When the VES library was established, its primary objective was to develop a flexible, multifunctional system to acquire, process, store and retrieve information. The decisions made in the design and the development were based on the need for flexibility and adaptability to changes over time as well as expeditious processing of the materials in hand. During the implementation of the system, as with all new systems, occasional changes were necessary as new problems arose. Both the technical processing systems and the Famulus program adapted to these changes without major modifications.

The true adaptability of the Famulus program and the VES technical processing system was put to the test when VES acquired 2000 documents and audiovisuals from the Indiana Curriculum Materials Center (ICMC). ICMC, formerly located in Terre Haute, began in 1970 as a resource center to provide materials for vocational education practitioners. Its collection was moved to Bloomington in October 1980 after the SBVTE realized that a central location for research and curriculum materials would better suit the needs of students, researchers, and teachers.

Two months before the collection was moved, the bibliographic record for each ICMC document was entered into a new database. The records were taken from the most current ICMC catalogs available. After modifying the numbering scheme, the new acquisition numbers, titles, and abstracts were put online so that the VES staff

could retrieve the documents more readily. Requests for these materials did not cease just because the collection was in a state of transition. The diversity of the ICMC collection presented new challenges to the VES cataloger. The collection consists of print and non-print media, including games, kits, films, sound recordings, slide and tape presentations, and special needs materials. In order to record the bibliographic informaiton needed to produce annotated catalogs for the use of teachers, the cataloging form was slightly altered. The fields remained, but an abstract (ABST) field replaced the grant field and the description (COMT) field replaced the monies field. The content of the population (POPL) field was changed to reflect grade level, rather than target populations.

Two letter prefixes, followed by the already established ICMC classification field and accession number, make up the call number. IC050020 denotes special needs curriculum print material, whereas AV050011 identifies a special needs audiovisual item.

The media type, such as slide/tape, is recorded only for non-print materials. Following VES practice, the ED·number is also recorded when one exists. The author, title, agency, descriptor, identifier, and year fields are completed just as they are for VES documents. An abstract, however, is written for every curriculum item. The purpose of the abstract is to give teachers a more complete description of the document. Most of the abstracts written are a blend of informative and indicative styles.[18] The description or comment field is used to describe the number of pieces in a kit and the physical description of a film, such as type, millimeter, and length. The grade level is designated by a numerical code.

Since VES already had an operable technical processing system, there were no major problems with adding the ICMC materials to the existing collection. Even though the cost per unit of cataloging the ICMC documents was slightly higher (i.e., $5.52) than that of VES documents (i.e., $2.60) due to an increased number of personnel working in a shorter time period, the cost per unit for cataloging curriculum materials has already begun to decrease.

By using automation to simulate classical library techniques, VES has satisfied its needs for information storage and retrieval. Frederick G. Kilgour acknowledges that ". . .it is difficult to see how the course [of library computerization can be] otherwise [since] technology advances from an existing base."[19] He, as well as other

observers, seem eager to move into a "central-station type of computerization, rather than local, dedicated library computers."[20] Obviously, VES offers the latter type of system. Even so, it is hoped that the VES system can act as a role model for and offer guidelines to other special library librarians who are searching for an adaptable, cost-effective automated system.

Notes

[1] Simmons, Peter. "Library Automation," *Annual Review of Information Science and Technology*. Vol. 8. Cuadra, Carlos A. and Ann W. Luke, ed. Washington, D.C.: American Society for Information Science 1973, 167.

[2] Alper, Bruce H. "Library Automation," *Annual Review of Information Science and Technology*. Vol. 10. Cuadra, Carlos A. and Ann W. Luke. ed. Washington, D.C.: American Society for Information Science, 1975, 226.

[3] Eigeman, Elaine G. and JoAnn Brooks. *The Continuation and Expansion of a Reserach and Development Information System. Final Report*. Bloomington: Indiana University, 1978.

[4] Bierman, Kenneth J. "Library Automation," *Annual Review of Information Science and Technology*, Vol. 9. Cuadra, Carlos A. and Ann W. Luke, ed. Washington, D.C.: American Society for Information Science, 1974, 158.

[5] *ERIC Processing Manual. Rules and Guidelines for the Acquisition, Selection, and Technical Processing of Documents and Journal Articles by the Various Components of the ERIC Network*. Bethesda, MD: ERIC Processing and Reference Facility, 1974, 143.

[6] See *Library of Congress Subject Headings II*, Library of Congress, 1980, Washington, D.C.: 2493-94, for the listings and cross references for vocational education subject headings.

[7] Eigeman, Elaine G. and JoAnn Brooks, 57.

[8] *ERIC Processing Manual*, 146.

[9] *Ibid.*, 143.

[10] *Ibid.*

[11] Avram, Henriette D. "Library Automation," *Annual Review of Information Science and Technology*. Vol. 60. Cuadra, Carlos A. and Ann W. Luke, ed. Chicago: William Benton, 1971, 185.

[12] *Ibid.*

[13] U.S. Congress. *Education Amendments of 1976*, P.L. 94-482, *Title II-Vocational Education*. Washington, D.C.: 94th Congress, 2nd Session, October 12, 1976. 90 STAT. 2091.

[14] Brooks, JoAnn and Nancy Steenhausen. *Implementation of the Expanded Indiana Vocational Education Information Services. Final Report.* Bloomington: Indiana University, 1980, 97-8.

[15] *Ibid.*, 100.

[16] Michael Coulter was instrumental in the development of the VES System and later assisted other Famulus users at Indiana University, Bloomington. Now he works as a programmer with a local software firm.

[17] Burton, Hilary D. and Theordor B. Yerke. "Famulus: A Computer-Based System for Augmenting Personal Documentation Efforts," *Proceedings of the American Society for Information Science*. Vol. 66. North, Jeanne B., ed. Westport, CT: Greenwood Publishing Corporation, 1969, 53.

[18] Rowley, J.E. *Mechanised In-House Information Systems*. London: Clive Bingley, 1979, 34.

[19] "Library Automation," *Annual Review of Information Science and Technology*. Vol. 4. Cuadra, Carlos A. and Ann W. Luke, ed. Chicago: William Benton, 1969, 328.

[20] *Ibid.*, 329.

If you are interested in obtaining the unpublished graphs and data from Barbara Kasper's article, "Children's Services in Indiana Public Library," please write to her at the Indiana State Library, Extension Division, 140 N. Senate Avenue, Indianapolis, IN 46204. The article was published in the Fall 1981 issue of *Indiana Libraries*.