LCS, THE ONLINE CATALOG OF THE OHIO STATE UNIVERSITY LIBRARIES

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ABSTRACT

The Library Control System (LCS), the online catalog of the Ohio State University Libraries, is a unique and evolving system developed at Ohio State. The paper describes its functional specifications, functions, characteristics, and plans for future development.

INTRODUCTION

In 1970 the Ohio State University Libraries (OSUL), a pioneer in library automation, implemented its online circulation system, the Library Circulation System (LCS). Since then, OSUL has continued to develop LCS which is now the official online catalog of the Ohio State University Libraries. Technological developments in the field of library automation have been significant in the last 16 years, during which many libraries have developed and many others are still developing their online catalogs. The main purpose of this paper is to discuss some characteristics of OSUL's Library Control System (LCS) and its innovative functions. The discussion is centered on the LCS Online Catalog, which may give some indication as to the future development of online catalogs in other libraries.

The Ohio State University (OSU) is the largest research institution in the state of Ohio, having approximately 54,000 students, 4,500 faculty members and 15,000 staff members on

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main campus in Columbus. OSUL consists of the Main Library, the Undergraduate Library and 22 other departmental libraries, such as the Education Library and the Business Library. They are all located on the Columbus campus, scattered in a very large area. The University Libraries' principal users are the faculty, staff and students on the Columbus campus. OSUL also serves as the library of last resort for anyone in the state of Ohio.

OSUL's holdings have reached almost four and a quarter million volumes. This figure includes approximately 78,000 serial titles, a little over 23,000 of which are current subscriptions, and close to 3,000,000 microform units in addition. These figures include all the holdings of libraries on the main campus, except those of the Law Library which are under a separate administration. OSU has five regional campuses in the state of Ohio but at this time LCS does not include their holdings.

LCS is located on the University Systems computer, which is one of the three major computer centers at OSU. The other two computer centers are the Instructional and Research Computer Center (IRCC) and the Health Science Computer Center. There are five system programmers at the University System Computer Center who engage themselves solely in LCS programming for the University Libraries.

CHRONOLOGY OF LCS

In 1971 OCLC, the then Ohio College Library Center (OCLC), located on the west bank of the Olentangy River opposite the Main Library of the Ohio State University, announced that the planning phase for the implementation of online shared cataloging and catalog card production had been completed. As one of the early members of OCLC, OSUL had been preparing for the adoption of this innovative method of cataloging as effectively as possible. OSUL planned to use two computer systems: LCS for circulation and OCLC for cataloging.

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LCS, as mentioned earlier, was developed as a circulation system to improve time-consuming circulation activities. all the titles OSUL held were converted from the OSUL shelf list to machine-readable form by a vendor. The information included in a record created for LCS was the call number, author and/or title, a title number assigned consecutively for each input title, publication date, edition statement, copy and location information, and volume number(s) for monographic sets, if any. We refer to this file as the Master File and a record in this file as a short or location record. Since OCLC cataloging was implemented, the new titles have been added to LCS through the interface of the OCLC tapes. OSUL catalogs titles on OCLC and OCLC makes tapes once a week and sends them to OSUL. At university Systems the tapes are edited into the LCS format and interfaced with LCS, thus adding to the LCS data base short records with holdings information.

In 1976 a file we refer to as the Holdings File was added and all the serial titles' holdings were input, some by individual physical unit, and some in summary statements. In 1976, OSUL made the decision to develop LCS as OSUL's official online catalog, providing full bibliographic records for all the titles OSUL holds. Since 1978, all titles processed through OCLC are added to the LCS in full form in the Master File. The Subject Headings File was established at the same time. This file now contains four types of headings: the names, subjects, series and uniform title. All the headings which appear in an LCS bibliographic record are automatically entered to the Headings File and each heading is identified as to its use in the record, name, subject, series, or uniform title. The records can be searched by these headings, which thus function as indexes to the bibliographic records containing them.

In 1979, the State Library of Ohio added all catalog records and holdings to LCS, and subsequently closed and discarded its card catalogs. Following suit, OSUL closed its card catalogs and designated LCS its official online catalog in June 1982. However,

only those titles cataloged through OCLC since 1972 are on LCS in full form. OSUL has made a continuing effort to retroactively convert full bibliographic information on card catalogs into LCS. In 1986, the Law Library and the Center for Teaching Excellence, which provides instructional materials for class use, added their OCLC cataloged holdings to LCS.

In addition, the LCS online catalog data base includes Resources in Education records from the ERIC.tapes, short records for the microfilm Wing Short Titles Catalog, full bibliographic records for titles held by the Center for Research Libraries cataloged through OCLC since October 1981, and records for document titles distributed by GPO since 1977 on tape.

These non-OSUL records are all integrated into the OSUL online catalog and differentiated by various symbols at the beginning of each call number. For example, call numbers of the books held by the State Library of Ohio start with the capital S followed by a period followed by the call number, and a capital L followed by a period followed by the call number in the case of the Law Library. For example, the numbers would look as follows: S.HB53.L8 and L.KD25.U55, respectively.

OSUL is considering the addition to LCS of OSU regional campus' holdings as well as some other institutions', such as the Ohio Historical Society, located near the OSU main campus.

In all, the LCS data base currently includes bibliographic records for more than 2.6 million titles. All of them have short records and over 35% of OSUL titles, approximately 728,000 titles, and 100% of State Library titles, approximately 214, 000 titles, also have full bibliographic records. In addition, the number of FBR's for government documents added as of May 1987 is approximately 188,000 titles and those of the Center for Research Library are estimated at 46,500 titles.

The data base also contains records of library user names accompanied by ID numbers and addresses. Also contained are three types of special charge codes used to denote (1) processing status of library materials such as "on order," "in cataloging,"

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"in labeling," "at bindery," etc.; (2) circulation status of materials such as "closed reserve," "office collection," etc., and (3) physical condition of materials such as "brittle book."

LCS SYSTEM SPECIFICATIONS AND FUNCTIONS

LCS resides in the University Systems computer, which handles administrative functions such as personnel records of faculty, staff and students, registration records and alumni records, and is managed by the University Systems computer center. The computer mainframe is comprised of an Amdahl 580 model 5860, which is IBM compatible, and three Memorex controllers. The LCS data files are stored on seven disk packs; four IBM 3350s; and three Amdahl 6380s. A typical CPU use by LCS is half an hour in a 16.5 hour day. It is operated by MVS using TCAM communication software. The main LCS programming language is IBM/370 Assembler, and PL/I is used for a small number of batch programs. As of May 1987, there are approximately 225 terminals hardwired to LCS, including 114 public access terminals at OSUL. The term "public access" means that as with public card catalogs, library users can use these terminals to search bibliographic information, as well as location holdings information for availability of wanted items. The remaining non-public terminals are mainly used for circulation and technical processing functions. The terminals hardwired to LCS were specially developed for libraries by Telex. They can display diacritical marks as well as Hebrew and Arabic characters. The 62 slave printers attached to LCS terminals are also made by Telex.

In addition, dial access is available to LCS at 300, 1,200 and 9,600 baud rates through its nine ports at the University Systems computer center.

LCS circulation functions include all general circulation transactions, such as charge, renew, discharge, save request, etc.

LCS generates patron notices, such as overdue notices, notices of available books and fine reports.

LCS FILE STRUCTURE

The core of the LCS online catalog is the Master File explained above, including copy and location information. information in this file can be updated by weekly batch maintenance. The full bibliographic data is attached to the Master File record and includes full bibliographic records of titles, the counterpart of card catalog information. The information in the FBR File can be updated only by updating the record on OCLC and corrected via the OCLC tape. The Headings File, consisting of the name, subject, series, and uniform title headings functions as an index to the bibliographic records. The public display of a heading includes cross-references, while a staff display of a heading includes more comprehensive information, e.g., a control number assigned for each heading, a code to indicate whether the heading is verified or not, usage notes and other technical information for use in cataloging and maintaining the File. In case of a series heading, it also includes a code to indicate whether the series is traced or not. Each heading is connected to appropriate bibliographic record(s) by the heading control number. The information in this file can be updated by online data collection and subsequent weekly batch maintenance.

The Holdings File information is displayed with the Master File record, thus providing a short bibliographic record, copy and location information, together with volume holdings information. This file is maintained online.

The Shelf-Position Search (SPS) File is the LCS counterpart of card shelf lists. It is a call number file and serves as an index to the bibliographic records by truncated display of titles in call number order, thus enabling users to browse by subject — a useful feature for technical services personnel when assigning call

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numbers as well.

The Search Code File contains 9-byte search keys created from bibliographic records and patron name records, and the disk location of the bibliographic record or patron name record. For the bibliographic records, the search keys are created from title words and, for the author/title index, a portion of the author name, thus providing title and author/title access.

The Circulation/Save File contains records for all circulation transactions. The information on circulation status is displayed with each associated copy or volume in the Master File record or in the case of a serial title, with each associated volume or issue number in the Holdings File. This file is updated online.

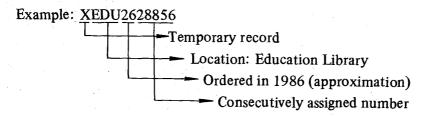
SEARCHING LCS

A bibliographic record can be searched by author, title, author and title, subject, series, uniform title, call number and LCS title number. A library user record can be searched by name or user ID. A particular volume or issue holding information of a serial title can be obtained by qualifying search keys by volume and/or location. A heading in the Headings File can be searched by full heading, truncated heading, or headings control number. The author/title and title searches use derived search keys. For example, the title search key is 4,2,2,1. Users may use exact derived search keys or full words, in which case LCS automatically creates search keys from them. Some searches can be further modified by language code, location code, publication date, etc.

INPUT AND MAINTENANCE OF CATALOG INFORMATION

(1) Acquisition information

After vigorous review of various systems, OSUL adopted the Innovacq Acquisition System for acquisition functions. The Innovacq CPU is located in the Acquisitions Dept. Order records are created on Innovacq, and order slip are printed and sent out to vendors. All the order records created in Innovacq are interfaced with LCS via magnetic tape, thus adding the information on titles-on-order to LCS. Each record for a title-on-order has a unique number (order number) which starts with a letter X signifying a temporary record. It is followed by three letters indicating the location library where the material will be sent when cataloged. These are followed by seven numeric characters, the first two indicating the year the material was ordered, followed by five numbers consecutively assigned.



When these records are added to LCS, they are automatically charged to the code (RESORDER) indicating that the item is on order, followed by the data of order. After materials are received and checked in, they are sent to the Cataloging Dept. and the records for them are charged to the Cataloging Dept. with a predetermined due date. This indicates that the materials have been moved to the Cataloging Dept. and are being processed.

OSUL has arranged for approval plan vendors to supply tapes which include records of books they send under the plan. The titles listed on these tapes are added to both Innovacq and LCS, to Innovacq for accounting purposes and to LCS for providing information to library users on titles-on-approval plan. Each vendor is given a range of numbers and each record on a vendor's tape is assigned a number within that range. When these tapes are interfaced with LCS a program adds X and the

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three location letters (ACQ) indicating the Acquisitions Dept. to the vendor-supplied seven digit numbers. When displayed on LCS these records are charged to a code to indicate that the item is on display on the approval plan shelf in the Acquisitions Dept., where bibliographers from location libraries examine the books and decide whether to purchase or return them. The rejected titles are charged to a code for return and are subsequently deleted from LCS once the items have been returned to the vendors. When the accepted books are sent to the Cataloging Dept. for processing, they are automatically block-charged to the in-processing code, indicating that they have been moved to the Cataloging Dept.

(2) Catalog information

In the Cataloging Dept., the OCLC data base is searched for catalog copy and if it is available, the record is edited and produced, utilizing the most efficient and economical method, sometimes using the OCLC MicroEnhancer. When copy-editing at an OCLC terminal, a copy cataloger checks the LCS terminal located right next to the OCLC terminal where he/she is working, calls up the SPS File to see if the call number provided in the OCLC record is appropriate for the OSUL shelf number and if not, makes an adjustment in the call number on the OCLC record, choosing a number appropriate to the OSU shelf arrangement. Usually headings are verified by program after the new OCLC cataloging records are added to LCS. However, some necessary checking is made on the LCS Headings File at the time of cataloging to verify variant series titles, etc.

Finally, the copy cataloger adds the local field information in the 910 field. According to the specification, one of several one-letter codes is entered in the first position in the 910 field to command a particular transaction to be used in adding this particular record. If there is no one-letter code, this signifies that the record is entirely new to LCS and therefore the record is simply added. Most of the catalog records added to LCS have their order records already on LCS, as mentioned earlier, and these

order records must be replaced with the incoming full bibliographic records. In this case the 910 field starts with the letter B, signifying bibliographic replace, followed by the X-number to be replaced, followed by the section and editor initials and the date of input. Some other one-letter command codes are C, followed by an old call number, which replaces a record already cataloged; and H, which replaces the holdings information already on LCS with the incoming 049/949 information, and does so without changing the bibliographic information in the record.

Original catalog records are prepared on worksheets with MARC tagging by professional catalogers and input into the OCLC data base by student assistants. Most non-Roman language records are transliterated and entered into OCLC and subsequently added to LCS. Japanese and Chinese language materials are cataloged using OCLC CJK workstations, and cards with CJK characters are printed locally at CJK printers connected to OCLC CJK hard disk workstations. These records for CJK materials are also included in the OCLC tapes and added to LCS. However, since LCS does not have the capability to display CJK characters, it displays only the Romanized portion of CJK records and the information in the fields with CJK characters is stored for future use when OSUL develops the capability to display CJK characters.

LCS also handles analytics and bound-with titles. In the case of analytics, the collective title is considered a main record and includes all holdings information. Each volume in the record is also cataloged under its distinctive title using the same call number from the main record plus an individual volume number. On the records for individual titles, the holding information is not given. Instead, a note is added which reads: To see location and availability, enter xxxxx (call number of the collective title). This is done so that only one record allows the item to be charged.

The bound-with titles are handled similarly. In this case, the record for the first work in the physical volume functions as the main record. Records for the second and subsequent titles carry a note similar to that described above. There is no separate

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volume to be charged out for the second and subsequent works. Both analytics and bound-with titles are specified in the OCLC record's 949 field. When a numerical indicator in the 949 is used (4=analytic, 7=bound-with), a formatted note is automatically displayed instead of the holdings information, and volume holdings information is automatically added to the main record in the case of an analytic title.

(3) Interface of OCLC tapes

OSUL receives weekly OCLC tapes which include OSUL cataloging transactions. Those tapes are sent to University Systems where the records are edited and then added to LCS. The initial phase of this process is called to "edit run" and formats the information for LCS. With the next phase called the "maintenance run," the information is added to LCS. OSUL utilizes this interface to maintain quality control of the LCS online During the edit run, some records are rejected and catalog. reported. Records lacking information in certain fields, such as the 300, and records with multiple call numbers are typical examples. During the maintenance run, incorrectly input 910 field, duplicate call numbers, etc. are examples of items reported or rejected. Weekly tapes are added each Friday beginning at 10:00 PM after the libraries are closed and LCS is down. On the following Monday, the reports of errors and rejected records with various statistics are sent to the Catalog Management Section in the Cataloging Dept. The Bibliographic Maintenance Unit of the Section makes the necessary corrections on the input bibliographic records and re-inputs rejected information. Some field information is corrected on LCS by online data collection/batch maintenance, and most other field information is corrected by B-transaction through OCLC, as mentioned earlier.

(4) Headings maintenance

Each heading from a designated field, such as 1xx and 6xx, is entered and identified as to type of heading (e.g., a subject heading from a 6xx is identified as a subject), and assigned a consecutive heading number. If an incoming heading matches

exactly with one already existent as the same type of the heading, incoming heading is simply added to it without creating another entry. Within a bibliographic record only headings numbers are stored in the field, instead of the headings themselves. When a bibliographic record is displayed, the program retrieves the appropriate headings from the Headings File using headings numbers stored with the bibliographic record. This arrangement makes it possible for a global change of headings. When necessary to change the form of a heading, it is changed only once in the headings file. All the bibliographic records which contain the particular heading number for the changed heading will display the new form of heading in the bibliographic record.

Incoming headings are reported on 3 x 5 slips and sent with other maintenance reports from University Systems to the Headings Maintenance Unit of the Catalog Management Section. Since the number of reports is enormous, OSUL decided to receive the report only to review them after the headings are used for the second time. Each heading report contains information identifying the heading as a name, subject, uniform title or series title, indicating whether a heading is from an LC AACR2 bibliographic record or a record of OSUL original cataloging, when headings are automatically verified. Headings from OCLC member library records are considered unverified and are reviewed by the Authority Librarian when reported. Once reviewed and necessary corrections are made the heading status is changed to "verified." It should be noted that if a heading contains misspelling, it is almost always reported as a new heading. Thus the report also functions as a quality control measure.

OSUL obtains the Library of Congress Name Authority Tapes and Subject Authority Tapes and periodically uses them to update the LCS Headings File. The extremely sophisticated programs developed in-house (1) match the headings on LC tapes against the headings in LCS and add cross-references and other predetermined information, such as the parts of history notes found on LC tapes; (2) flip headings between 1xx and 4xx

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fields if an LCS cross-reference is the LC established heading; and (3) report various discrepancies according to predetermined policies. Much of the Series File and Uniform Title File are yet to be reviewed. Since the current LC Name Authority tapes include series titles, it will not be too long before the Series File will have a high proportion of verified headings.

CONCLUSION

LCS is a dynamic system. It is evolving and there are numerous plans for further programming. Its programming priority list consists of several pages; some are new additional capabilities (e.g., display of MARC-tagged records for staff members) and some, improvements of existing capabilities (e.g., addition of more help messages and user-friendly screens). OSUL recently appointed a committee to select a future terminal for LCS which would utilize the most advanced technologies, such as the data communication lines.

LCS is a unique system originally developed and still being developed by OSU. University Systems has cooperated with OSUL throughout the development of LCS. LCS is growing into a regional online catalog as it incorporates important catalogs of neighbor institutions, such as the State Library of Ohio and Ohio Historical Society. Future addition of regional campus' holdings can also be considered.

The primary purpose of LCS when it was first implemented was for it to function as a circulation system, the assumption being that OCLC would serve as an online catalog. In 1976 it was decided that LCS would function as an online catalog. Therefore, the Master Record required enhancement to include full records and the Headings File was added. As a result, the internal system configuration has become very complicated after adding many files and relating them to each other to perform extremely sophisticated transactions. Frankly speaking, this is not a very positive

factor. However, the system works efficiently and is very functional considering the number of transactions on LCS each year (approximately 25 million). Its availability is over 97%—it rarely goes down, and its response time is almost instantaneous.

LCS functions neither as an acquisition system nor a cataloging system. OSUL has chosen the most suitable system for each particular function, utilizing its capabilities to the optimum, and interfaces tapes from each system to feed the necessary information into LCS, resisting the current trend toward developing a total system. This requires very sophisticated thinking as well as programming and this makes the system challenging.

OSUL utilizes interfacing activities for quality control by arranging to report of reject certain erroneous incoming information. This requires the careful selection of information through additional programming but the additional effort is well worthwhile.

LCS will be increasingly utilized through dial-access by many more library users as a part of research processes. LCS will certainly continue to contribute to the increasing number of institutions providing information on the largest research collection in Ohio.

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APPENDIX A

Figure 1. LCS Short Record

Command: ds1/1

Response:

CALL NUMBER: RM216A7571986

AUTHOR: Aronson, Virginia

TITLE: The dietetic technician:

effective nutrition counseling

DATE: 1986

LINE LOCATION COPY LOAN STATUS

NOH [

1 3wk available

PAGE 1 END

FULL CATALOG INFO: FBL/1

APPENDIX B

Figure 2. Full Bibliographic Record

Command: fb1/1

Response:

RM216A7571986

Aronson, Virginia.

The dietetic technician: effective nutrition counseling / Virginia Aronson. Westport, Conn.: AVI Pub. Co., c1986. xii, 430 p.: ill.; 29 cm.

Bibliography: p. 416-421. Includes index.

SUB: 1. Diet therapy 2. Nutrition

LC CARD #: 85-6110 TITLE #: 3745194 OCLC #: 11918178 &1q860618

PAGE 1 END

APPENDIX C

Figure 3. Shelf-position Search Display

COMMAND: sps/rm216a7571986

RESPONSE:

DSL/	CALL NUMBER-		- AUTHOR -		TITLE	DATE	FBL/
1	RM214N983	/		1	Annals of nutrition		1
2	RM214N99	/		1	NUTRITION REVIEWS	1942	•
3	RM215L481986	/	Lewis, Clark	/	Nutrition and nutritional	1986	3
4	RM216A361981	1	American Diete	1	Handbook of clinical diet	1981	4
5	RM216A7571986	1	Aronson, Virgi	/	The dietetic technician	1986	5
6	RM216A76	1	Aronson, Virgi	/	Guidebook for nutrition c	1983	6
7	RM216B3641985	1			Nutrition and dietetics f	1985	7
8	RM216B42	1		1	FACTS ABOUT FOOD	1938	. 1
9	RM216B44	1	BENDER. ARDIS	/	DIETETIC FOODS.	1968	
MORE:	: PG+ BACK:			•		מסבו	
FOR I				Ri	FULL CATALOG RECORD, ENTER:	FBL/nu	mber

APPENDIX D

Figure 4. LCS Subject Index Display

COMMAND: sub/nutrition

RESPONSE:

TBL/	ITEMS	SUBJECTS		· SAL/
1		Nutrition	and the second of the second o	1
2	7	Nutrition—ABSTRACTS		
3	3	Nutrition—Abstracts—Periodicals		
		Nutrition—Aging effect		
5		SEARCH UNDER: Aging—Nutritional aspects	\$ 1 miles	
6	6	Nutrition and dental health		6
7	2	Nutrition and dental health—United States		
		Nutrition and state		
9		SEARCH UNDER: Nutrition policy		
MORE	: PS+	BACK: PS- FOR TITLES, ENTER: TE	3L/number	
FOR I	NOTES	OR RELATED SUBJECTS (ONLY WHEN NUMBER IS AT RIC	GHT), ENTER: SAL/r	number

APPENDIX E

Figure 5. LCS Subject Index Display (for staff)

Command: sub/nutrition/all

Response:

TBL/	ITEMS		SUBJECTSSAL/
1	764	264	Nutrition
2	7	23019	* Nutrition—ABSTRACTS
3	3	1384247 1853888	* Nutrition—Abstracts—Periodicals Nutrition—Aging effect
5		116337	SEARCH UNDER: Aging—Nutritional aspects
6	6	106473	Nutrition and dental health 6
7	2	1935136 1885787	Nutrition and dental health—United States Nutrition and state
9		5218	
MORE:		BACK:	PS- FOR TITLES, ENTER: TBI /number
FOR N	OTES (OR RELATED	SUBJECTS (ONLY WHEN NUMBER IS AT RIGHT), ENTER: SAL/number