Use of MARC21 control field data in University Library OPACs in Karnataka: A study

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This study discusses about importance of MARC21 control field and its effective implementation in university libraries OPACs in Karnataka. The catalogue records available through library web OPACs of universities under study formed the data source for this study. The university library web OPACs which we examined in this study have used Koha ILMS. One thousand and eighty-eight (1088) records were randomly selected from the nine university library web OPACs for the study. The study examined the proper implementation of 008 control field of MARC21, which is an important data element in information retrieval. The study found that average length of a cataloguing record was 1572.78 characters. The study as also revealed that libraries web OPACs under study have given scant attention for control fields, 001 and 003 were the two tag numbers that have been used extensively. Overall the university libraries have neglected control fields data element in their OPACs. This adversely affect the data retrieval from the user point of view. The study strongly recommend that libraries should fill up the data required for control fields while cataloguing their records.

Introduction

The MARC21 (Machine Readable Cataloguing) format is the international standard for creating computerised bibliographic records. These records can be shared amongst other libraries online, usually via a shared cataloguing network like OCLC. MARC encodes the various descriptive elements of a resource – title, author, physical elements, subjects, etc., into specified fields, each with numerical indicators, that the program recognizes and translate into the data seen onscreen[1]. The MARC (Machine Readable Cataloguing) standards is the representation and communication of the bibliographic information, and is developed and maintained by the Library of Congress (LOC).

A MARC record involves three elements: the record structure, the content designation, and the data content of the record.

- **Structure**: MARC records are typical of Information Interchange Format (ANSI Z39.2) and Format for Information Exchange (ISO 2709).
- **Content designators**: Anything which establishes the kind of data is a Content Designator, for example, there are three kinds of Content designators – tags, indicators, and subfield codes.
- **Content**: This is the actual data which we store in the data fields. Often most of the data elements are defined by standards outside the formats in for example, AACR, LCSH, NLM Classification etc.

The MARC record consists of three parts:

- Leader: data elements that contain coded values based on their position, which define the processing of the record.
- Directory: contains the tags, starting location, and length of each field within the record.
- Variable fields: the data content is variable control fields and data fields (tag, indicators, and subfields)[2].

Control field is coded information about the resource described, standard/control numbers, dates, language, etc. Some are called fixed fields due to their fixed length. Control fields in MARC formats are assigned tags that begin with two zeros. The variable control fields (005, 006, 007, 008) do not have indicators or subfield codes. OCLC uses subfield

codes in 007 field displays to assist with readability and editing. The subfield codes are not included in electronic versions of the record. Variable data fields will vary in number, and in length. Each variable field can have between 1 and 9,999 characters. They are identified by the following information:

- Tag: a 3-digit numeric value coded 010 through 999
- Indicators: 2 positions, coded with blank or 0 through 9 as possible values
- Subfields: A textual element identified by a delimiter and a lowercase alphabetic or numeric code[3].

The MARC21 uses control fieldswhich containcoded information which is used for processing of records. There are six control fields in MARC21. They are 001 – Control number, 003 – Control number identifier, 004 – Date and time of latest transactions, 005 - Fixed-Length Data Elements - Additional Material Characteristics, 007 - Physical Description Fixed Field, and 008 - Fixed-Length Data Elements. A few of them (e.g., tags 000, 006 and 008) are fixed-length fields while others are variable-length fields. Unlike other fields in MARC21, control fields do not have indicators or subfield codes. In fixed-length fields, the meaning of the coded information is positionally defined[2].

MARC 21 is for identification and arrangement of bibliographic data for computer processing and further distribution of catalogue. MARC 21 control fields contain record control numbers and other control and coded information that are used in processing separate MARC holding records. Each control field is identified by a field tag in the Directory and contains either a single data element or a fixed-length data elements identified by relative character position. Variable control fields contain neither indicator positions nor subfield codes.

In MARC21, there are six control fields, viz., 001, 003, 005, 006, 007 and 008. The control field data from the nine university libraries in Karnataka are used for analysis in this study. Of these fields, macro analysis is attempted for the fields 001, 003, 005, 006 and 007. On the other hand, a detailed analysis is taken up for field 008 as it contains the information which helps the software for manipulation and filtering of data at the time of retrieval. The data in field 000 is partially used for discussing the length of the records of catalogue records of the university libraries.

Review of literature

Quality standards become increasingly important in Web OPACs. Interest in assessing the cataloguing quality can be traced to the 1970s. Accuracy and comprehensiveness were the major criteria for quality assessment in the past. Later, the quality was redefined to include 'timeliness' also. Quick service from libraries was tendered at the cost of consistency in cataloguing. A perusal of the previous studies showed that the error rate in cataloguing slightly increase because of the emphasis on quicker service by the libraries[4-11].

The opinions on the concept 'cataloguing quality' from the 32 cataloguers have been discussed at length[12]. This research highlights the importance of quality cataloguing for facilitating easy access to library resources. A few articles other articles have also discussed this concept[13-17].A full-length discussion on the quality of cataloguing was reviewed in one of the articles by the researcher of this paper[10]. The quality aspects in 52 common catalogue records with reference to the accuracy, comprehensiveness and adherence to standards were examined[8]. Another study attempted at investigating the error rate found in the 624 metadata records of the Mysore University Library (MUL)[4] and in a similar study the quality of cataloguing records in the top five management institutes in India were examined[7]. The investigators identified set of 75 books to study the similarity and variations in assigning of subject headings for the same set of resources by the cataloguers of four universities in Karnataka[9]. The OPACs of 10 Indian universities were evaluated using the 5-point normal scale identified features and functionalities are grouped into- basic features, search, result page and navigation, enriched content and recommendations, user participation, user profile and personalisation, and such other performance trends[11].

The study authored on MARC 21 control fields done by Zeng[18,19]has found in total 172 errors in the fixed fields in OCLC records and 79 in the RLIN records. Inconsistency between codes and information present elsewhere in a record was a very common error. Missing codes is an error also related to consistency. These two kinds of error formed a large part of all fixed field errors and were found in most of the fixed fields. Errors in the sequence of codes occurred frequently in "Date type" field which reflected an unclear understanding of the recording of reprint materials. In one of the study on the subject,

Shin used 2000 cataloguing records in the Korean language for examining the quality of the records. The study reported that errors were found in ISBD punctuations, missing variables and fixed fields, and that these patterns were similar in other studies as well[20]. Intner compared the cataloguing quality of OCLC and RLIN. A group of 215 matched pairs of catalogue records contributed by member libraries to OCLC and RLIN were analysed. Two kinds of quality were recognized in her study: accuracy and fullness. Errors were tabulated for incorrect spelling, punctuation, capitalisation, application of AACR2 or associated LC rule interpretations, and MARC coding[21]. Briscoe opined on online catalogues that "quality control of the metadata in online law library catalogues was shown to be lacking. Academic law reference librarians determined that the errors would affect their ability to answer reference questions accurately and efficiently[22]."

Methodology

The catalogue records of the nine university libraries collected from online public access catalogues (OPACs) are the basis for data collection. Out of the 44 university libraries in Karnataka, OPACsof nine libraries were selected for the study (Appendix-1). The reasons for their inclusion for the study were: first, all of them provided access to their OPACs through the Internet and secondly, all of them are having MARC compatible records. Incidentally, all the university libraries use Koha as their library

automation software that made the data collection much easier for this study. Lack of availability of Web OPACs, and not compatible with MARC records remaining university library OPACs were excluded from the study.

A random sample of 2601 records were identified for the study, after examining the availability of these records, 1156 records were excluded from the study because of the language of the records and we examined 1088 records available in English language in this study and this formed the final data set. The collected data entered into the spreadsheet file to compare the university library catalogue records in terms of their quality and diligence. The analysis deals with the presence of required fields in the data sample. The study gives consolidated data about the presence or absence of control fields.

Results

Control Fields – General Information - (MARC Tag 00X)

Every record in MARC21 invariably has a 'leader' component as a structural part. The 'Leader' is a fixed-field with 24 character positions. The data elements are positionally defined. The first five positions (00 to 04 positions) provide information about the number of characters (length of the record) in a given record. For example, if the first five records read as 01083, it means that the record contains 01083 characters in all, including the characters in the leader and the record terminator. It may be noted that as data

Appendix-1

List of University Library OPACs Selected for the Study

Sl. no	Parent Institution of the Libraries	Code	Type of University	URL of the University Library
1.	Azim Premji University, Bengaluru	APL	Private	http://library.azimpremjiuniversity.edu.in/cgi-bin/koha/opac-search.pl
2.	Alliance University, Bengaluru	AUL	Private	http://jvbi-koha.informindia.co.in/cgi-bin/koha/opac-search.pl
3.	Bangalore University, Bengaluru	BUL	State	http://bublib-koha.informindia.co.in/cgi-bin/koha/opac-main.pl
4.	Gulbarga University, Kalaburagi	GUL	State	http://libcat-guglib.informindia.co.in/
5.	Mangalore University, Mangalore	MUL	State	http://mu-koha.informindia.co.in/cgi-bin/koha/opac-search.pl
6.	University of Agricultural Sciences, Bengaluru	UAL	State	http://uas.bestbookbuddies.com/cgi-bin/koha/opac-search.plhttp://uasbagrilibindia.org/cgi-bin/koha/opac-search.pl
7.	University of Horticultural Sciences, Bagalkot	UHL	State	http://14.139.87.152/cgi-bin/koha/opac-main.pl
8.	University of Mysore, Mysuru	UML	State	http://libcatmysore-koha.informindia.co.in/
9.	Visvesvaraya Technological University, Belagavi	VTL	State	http://library.vtu.ac.in/cgi-bin/koha/opac-search.pl

Source: https://www.ugc.ac.in/stateuniversitylist.aspx?id=12&Unitype=2

elements are positionally defined, the numbers written will always be right-justified and unused positions contain zeros.

The present study examined 1088 records. It may once again be noted here that the records were selected randomly and all of them were in English language. Table 1 shows the details of the cumulative total of record lengths and the average length of a record in each of the nine libraries considered in this study.

Table 1 indicates the data from the control field '000'. Only the leading first five characters from the concerned records were taken for analysis.

The total number of characters examined in this study is 7,26,914. The last column is an indication of the descriptive nature of the cataloguing practice in each university. A catalogue is a descriptive account of a resource. A detailed description provides not only the better picture of the described resources but also provides enhanced access points for search and retrieval of them. Seen from this perspective, AUL had more detailed cataloguing records than other libraries considered in this study. The average length

of a catalogue record in AUL was found to be 1572.78 characters per record. In layman words, each book was found to be described in AUL in about 2/3rd of an A4 page with 1.5 line space and 12 font size in Times New Roman font.

The next position in terms of maximum length of records went to APL which has 1083.57 characters per record. The number of characters per record was found to be least in GUL which has 347.70 characters per record. Except for APL, all other libraries also had less than 50% of the characters than AUL. In the interest of comprehensiveness of the description, the analysis showed that the libraries have to adopt more detailed cataloguing.

Control Fields - (MARC Tags 001 to 007)

The fields 001 to 007 have been taken together for analysis. These fields give important information about the records such as control number (001), organisation code (003), and date and time stamp of the latest transaction (005), additional materials (006), and physical description of non-book materials (007). Generally speaking, the university libraries were found to have not given much importance in recording these information. Hence, only macro-level analysis has been attempted. Table 2 shows an unsatisfactory situation as far as entering the data in the control fields is concerned. University libraries have given very scant attention in populating the data in the control fields 001 to 007. Tags 001 and 003 were the only tags found to be present more than others. However, the percentage of their presence is far from an acceptable level. It may be noted that the presence of tag 007 is context-dependent, meaning that the tag will appear if it is found to be necessary for the record. It appears that they have not realised the importance of entering the data in them. In this

Table 1—Length of records

Sl. No.	University library	Number of records	The cumulative total of the number of characters in records	Average length per record
1.	APL	100	108357	1083.57
2.	AUL	100	157278	1572.78
3.	BUL	165	101261	613.70
4.	GUL	120	41724	347.70
5.	MUL	125	55398	443.18
6.	UAL	100	72121	721.21
7.	UHL	100	37575	375.75
8.	UML	178	90621	509.11
9.	VTL	100	62579	625.79
	Total	1088	726914	668.12

Table 2 — Control Fields - (MARC Tags 001 to 007) *

Sl. No.	University Library	Total records	Number of records containing tag 001	Number of records containing tag 003	Number of records containing tag 005	Number of records containing tag 007
1.	APL	100	46	0	50	0
2.	AUL	100	75	3	10	0
3.	BUL	165	161	0	0	0
4.	GUL	117	0	0	0	0
5.	MUL	125	0	0	0	0
6.	UAL	100	6	75	97	87
7.	UHL	100	4	37	37	0
8.	UML	178	106	0	6	0
9.	VTL	100	1	3	39	1
	Total	N=1088	399	118	239	88
	Percentage		(36.67%)	(10.85%)	(21.97%)	(8.09%)

Note. No records were found to have the tag 006. Hence, the tag is not shown in Table 2

regard, it may be suggested that there should be some national awareness about the creation of catalogue records by the libraries. UGC or some other national body should come out with a national policy for a minimum standard that needs to be followed by libraries in creating catalogue records.

Data for the Fixed Fields – Books - (MARC Tag 008)

MARCTag 008 is a fixed-length field of forty characters. Like any other fixed-length field, the coding and their meaning are positionally defined. These coded factors are significant facilitators in the management and retrieval of the required data at any point in time. As 008 is a vital control field, its usage analysis in university libraries in Karnataka is taken separately.

The entered data are positionally described. A hash mark (#) is used to mark those character positions which contain a blank. All the character positions must bear a defined code. Some positions may have a fill character (|). It is interesting to note that the mentioned fill character can be utilised in particular sets of characterpositions when there is no effort from the catalogue organisation to do the needful in coding the character positions.

The fill character is forbidden and disallowed in character positions 00-05 as it shows the date of creation of the record. Subsequently, its usage is deterred in the 07-10 positions illustrating 'Date 1', and 15-17 positions marking the 'place of publication, production, and/or execution'. Positions 23 or 29 are filled based on the configuration required for 'form of item' in field 008.

00-17 and 35-39 character positions are exemplified similarly across the entire type of material with a consideration for position 06. The codification for positions 18-34 varies by the type of material

described. The list given below shows the character positions for books and their corresponding meaning.

00-05 - Date entered on file
06 - Type of date/Publication status
07-10 - Date 1
11-14 - Date 2
15-17 - Place of publication, production, or execution
18-21 - Illustrations
22 - Target audience
23 - Form of item
24-27 - Nature of contents
28 - Government publication
29 - Conference publication
30 - Festschrift
31 - Index
32 - Undefined
33 - Literary form
34 - Biography
35-37 - Language
38 - Modified record
39 - Cataloguing source

Table 3 is a frequency table of the data gathered from nine universities for 1088 catalogue records. It shows the use of 008 by the cataloguers of the university libraries under the consideration of this study. By and large, libraries were found to have neglected to enter the data in 008 without realising that it would negatively influence the retrieval facility. Only one data element (positions 07 to 10, Date 1) was tested as a demonstration of the scant attention about 008 by the libraries. The absence of information in 'Date 1' would disable the system to apply the filter 'Date range' found in the advance search of Koha. Similarly, aninvalid date in 'Date 1' will induce retrieval of inappropriate records.

Table 3 — Data for the Fixed Fields – Books - (MARC Tag 008)

Sl. No.	University Library	Records with a valid date in 008		Records with an invalid date in 008		Records with missing field 008		Total number of records
		No.	%	No.	%	No.	%	No.
1.	APL	50	4.60	37	3.40	13	1.19	100
2.	AUL	14	1.29	71	6.53	15	1.38	100
3.	BUL	155	14.25	10	0.92	0	0.00	165
4.	GUL	117	10.75	0	0.00	3	0.28	120
5.	MUL	0	0.00	125	11.49	0	0.00	125
6.	UAL	98	9.01	2	0.18	0	0.00	100
7.	UHL	3	0.28	42	3.86	55	5.06	100
8.	UML	6	0.55	128	11.76	44	4.04	178
9.	VTL	1	0.09	38	3.49	61	5.61	100
	Total	444	40.81	453	41.64	191	17.56	N=1088

Chi Square = 4.60243E-68, Alpha = 0.05

Majority of the catalogue records had field 008. Out of 1088 records, 897 (82.44%) catalogue records had the field 008 'fixed-length data elements'. It may be noted that in the present study, only the document type 'book' was considered. However, the university libraries have not filled-up all the data elements required in 008. Hence, it is quite evident that the system can't effectively manage the output. The only data element that was found to have entered in 008 was 'Date 1' corresponding to the character positions 07 to 10. Hence, further analysis is made only for that element.

Table 3 shows that only 40.81% of the records had a valid year in field 008 in 'Date 1'. It is not a very satisfying result. The absence or inaccurate data in the positions 07 to 10 in field 008 cripples the retrieval efficiency. This disadvantage was found in 59.20% (41.64% + 17.56%) of the catalogue records.

Only three libraries paid attention to filling up the 'Date 1' in field 008. The libraries were Library of the University of Agricultural Sciences (UAL), Gulbarga University Library (GUL), and Bangalore University Library (BUL). Out of 100 records from UAL, 98% of them had correct information in 'Date 1' of 008. One hundred and seventeen (97.50%) out of 120 records had the correct information in the data element 'Date 1' in GUL. Similarly, BUL out of the 165 records tested, 155 (93.93%) found to have recorded the 'Date 1' information correctly in BUL. It is surprising that Mangalore University Library (MUL), on the other hand, has completely ignored the field 008. None of their records, out of 125 tested, was found to have field 008. The situation in other libraries was not very encouraging either.

It was generally observed that none of the university libraries had paid attention in filling up all the data elements as far as field 008 is concerned. Hence, other data elements have not been taken up for the analysis. It is interesting, however, to note that the records which have been created using 'copy cataloguing' from Library of Congress (LoC) have a more accurate description in 008 than the catalogue records created locally.

Numbers and Codes - General Information (MARC Tags 01X-09X)

Fields 01X-09X shelter the variables such as standard numbers, classification numbers, codes and other record related and assigned data elements. This section reports the status of records having these fields. The fields that were found have been included in the records were: 010, 015, 016, 024, 025, 035, 037, 040, 041, 042, 043, 050, 070, 072, 084, and 09X. It may be noted here that some of the fields like 010, 015, 016, 025, 035, 050, 070, and 072 are not very relevant to catalogue records of Indian libraries. Surprisingly, they were still found in the catalogue records. The possible reason is that those records have been downloaded from LoC (Library of Congress) or other sources and they have not been edited properly to suit the local requirement. Their presence, however, may not hamper the retrieval except that it occupies the memory space. In this context, the Indian libraries have to come out with some common policy to use these fields to suit the local conditions. This will enhance the prudence in the creation of metadata records in university libraries.

Table 4 shows the presence of fields 01X – 09X in the catalogue records of nine university libraries. The fields 041 and 040 were the most used in the range. The significant contribution came from BUL and UAL. The field 041 was used by UML

Table 4 — Presence of Fields 01X–09X*

Sl. no	University Library	Total records	010	015	016	024	025	035	037	040	041	042	043	050	070	072	084	09X
1.	APL	100	45	5	5	0	1	12	4	64	31	20	14	44	0	0	1	0
2.	AUL	100	7	0	0	0	0	2	1	8	62	0	3	7	0	0	0	0
3.	BUL	165	0	0	0	0	0	0	0	163	154	0	0	0	0	0	0	0
4.	GUL	117	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5.	MUL	125	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.	UAL	100	3	0	1	0	0	6	0	100	85	1	1	4	0	0	0	0
7.	UHL	100	3	0	0	0	0	1	0	21	2	0	0	3	1	0	0	0
8.	UML	178	4	0	0	0	0	0	0	0	167	0	0	0	0	0	0	0
9.	VTL	100	0	0	0	1	0	0	0	2	0	0	0	1	0	1	0	0
	Total	N=1088	62	5	6	1	1	21	5	338	501	21	18	59	1	1	1	1
	Percentage		5.70	0.46	0.55	0.09	0.09	1.93	0.46	32.90	46.05	1.93	1.65	5.42	0.09	0.09	0.09	0.09

*Note. The detailed analysis of fields 020 and 082 have been dealt with different study and hence not included in the table.

consistently, and AUL has used the field frequently. From Table 4, one can observe that the cataloguers at APL have not edited the records properly and thus have retained most of the fields downloaded through Z39.50 protocol.

The micro-analysis of the catalogue records revealed that AUL, BUL, UHL and VTU were consistent in giving the cataloguing source details in 040 as DLC, Bangalore University, GKVKLIB and VTU respectively. On the other hand, it was found that APL and UHL were not that consistent. The remaining three libraries GUL, MUL and UML, have not entered any information in 040.

Conclusion

The study shows that the data entry and editing work needs more attention from the cataloguers. The emptying of unwanted information downloaded from other sources needs to be carried out conscientiously. There is a need to study some libraries web OPACs and compare the result of this study and if the result appears to be similar there is a need to train librarians or library staff in how to catalogue library records efficiently and diligently to improve the efficacy of the retrieval performance of the catalogue or OPACs.

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