Purdue University

Purdue e-Pubs

Charleston Library Conference

Collections Data, Tools, and Strategy: Applying R, Tableau, and Excel to Print Assessment

Lori M. Jahnke
Emory University, ljahnke@emory.edu

Chris Palazzolo
Emory University, cpalazz@emory.edu

Lori M. Jahnke and Chris Palazzolo, "Collections Data, Tools, and Strategy: Applying R, Tableau, and Excel to Print Assessment" (2019). *Proceedings of the Charleston Library Conference.*
http://dx.doi.org/10.5703/1288284317141

Collections Data, Tools, and Strategy: Applying R, Tableau, and Excel to Print Assessment

Lori M. Jahnke, Emory University, ljahnke@emory.edu

Chris Palazzolo, Emory University, cpalazz@emory.edu

Abstract

As is the case at most academic libraries, collection assessment has become an essential component of collection management and development work. Although much of the assessment focus has disproportionately fallen on e-resources, print collections remain fruitful areas for evaluation and review. At Emory, print collections, including a complex approval plan, continue to be a significant component of our overarching collection strategy (in volume and expenditure). However, shifting priorities for library space and the growth of interdisciplinary programs and centers within the university are placing a higher demand on subject librarians for communication and coordinated decision-making regarding print acquisitions. As a result, we are currently preparing for a comprehensive print collection review, of which the approval plan is an integral component. This assessment will inform a more coherent print strategy, which effectively and efficiently meets research and teaching requirements as well as administrative needs. Using data cleaning and visualization tools, such as R, Excel, and Tableau, we have enriched our local usage data with detailed GOBI approval data (e.g., series, publisher, subject, etc.) and profile parameters. Merging these data types and enriching local use data will allow us to analyze the print collection in a more nuanced fashion and ask questions that do not require the LC classification framework. This analysis considers the development of additional tools and approaches that facilitate subject specialist communication with collection management and overall collaborative decision-making, especially in cross-disciplinary areas.

Introduction

This material was originally presented as a poster (Figure 1) and the following text is an elaboration of some of the elements in the poster to provide additional context.

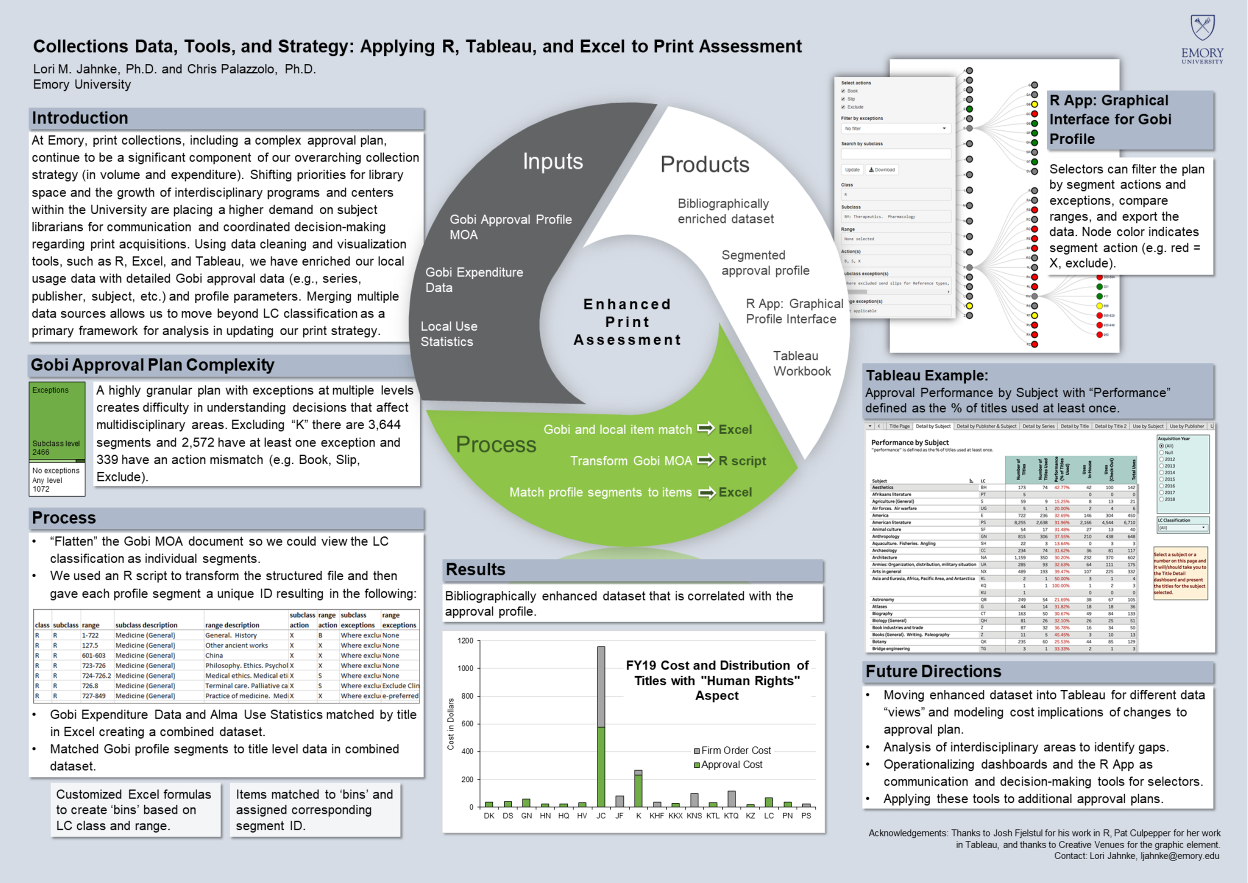
Our overarching goal for this project was to merge three data sets that each describe different aspects of print acquisition and management: (1) LC parameters from the GOBI Print Approval MOA, (2) GOBI expenditure data, and (3) local use statistics from Alma. Creating one data set from these separate sources will provide us with more flexibility in analyzing the print collection and allow us to ask subject-driven questions that cannot be answered by the more traditional categories of the LC classification framework. This project lays some of the groundwork for an upcoming comprehensive print collection review, of which the approval plan is an integral component. A goal of this print assessment is to develop a more coherent print strategy that supports the growth of interdisciplinary programs within Emory University and allows us to balance shifting priorities for library space. As a parallel goal we are using this work to develop tools that will facilitate communication among the subject specialists who are responsible for overlapping areas of the collection. We also hope the development of user-friendly tools will promote more active monitoring of the approval plan and the on-site collection. Although we will expand these processes to our other approval plans, we started with GOBI since it is Emory's primary vendor and all selectors work with this plan.

We view the GOBI expenditure report as enriching the other data sets since it includes item-level profile data such as aspect, interdisciplinary topic, and select or content level. As we move toward another comprehensive assessment of the on-site collection, and a possible reduction in footprint, the content-level data may be particularly useful in setting priorities for materials that remain in the on-site collection. Our local use data collected in Alma includes in-house use and circulation data. The in-house statistics will provide us with another means of determining which materials are best utilized on-site.

Process

As we allude to in the poster, our GOBI print approval plan is highly granular and through its many revisions over the years, it has accumulated exceptions at multiple levels of the plan hierarchy and throughout the LC parameters (Figure 2). This has created a few

https://doi.org/10.5703/1288284317141



Collections Data, Tools, and Strategy: Applying R, Tableau, and Excel to Print Assessment

Lori M. Jahnke, Ph.D. and Chris Palazzolo, Ph.D.
Emory University

EMORY UNIVERSITY

Introduction

At Emory, print collections, including a complex approval plan, continue to be a significant component of our overarching collection strategy (in volume and expenditure). Shifting priorities for library space and the growth of interdisciplinary programs and centers within the University are placing a higher demand on subject librarians for communication and coordinated decision-making regarding print acquisitions. Using data cleaning and visualization tools, such as R, Excel, and Tableau, we have enriched our local usage data with detailed Gobi approval data (e.g., series, publisher, subject, etc.) and profile parameters. Merging multiple data sources allows us to move beyond LC classification as a primary framework for analysis in updating our print strategy.

Gobi Approval Plan Complexity

A highly granular plan with exceptions at multiple levels creates difficulty in understanding decisions that affect multidisciplinary areas. Excluding "K" there are 3,644 segments and 2,572 have at least one exception and 339 have an action mismatch (e.g. Book, Slip, Exclude).

Process

- "Flatten" the Gobi MOA document so we could view the LC classification as individual segments.
- We used an R script to transform the structured file and then gave each profile segment a unique ID resulting in the following:

class	subclass	range	subclass description	range description	subclass action	range action	subclass exceptions	range exceptions
R	R	1-722	Medicine (General)	General. History	X	B	Where exclu	None
R	R	127.5	Medicine (General)	Other ancient works	X	X	Where exclu	None
R	R	601-603	Medicine (General)	China	X	X	Where exclu	None
R	R	723-726	Medicine (General)	Philosophy. Ethics. Psychol	X	X	Where exclu	None
R	R	724-726.2	Medicine (General)	Medical ethics. Medical eti	X	S	Where exclu	None
R	R	726.8	Medicine (General)	Terminal care. Palliative ca	X	S	Where exclu	Exclude Clin
R	R	727-849	Medicine (General)	Practice of medicine. Medi	X	X	Where exclu	e-preferred

- Gobi Expenditure Data and Alma Use Statistics matched by title in Excel creating a combined dataset.
- Matched Gobi profile segments to title level data in combined dataset.

Customized Excel formulas to create 'bins' based on LC class and range.

Items matched to 'bins' and assigned corresponding segment ID.

Inputs
Gobi Approval Profile MOA
Gobi Expenditure Data
Local Use Statistics
Products
Bibliographically enriched dataset
Segmented approval profile
R App: Graphical Profile Interface
Tableau Workbook
Enhanced Print Assessment
Process
Gobi and local item match ⇨ Excel
Transform Gobi MOA ⇨ R script
Match profile segments to items ⇨ Excel

Results

Bibliographically enhanced dataset that is correlated with the approval profile.

FY19 Cost and Distribution of Titles with "Human Rights" Aspect
Cost in Dollars
1200
1000
800
600
400
200
0
Firm Order Cost
Approval Cost
DK DS GN HN HQ HV JC JF K KHF KKX KNS KTL KTQ KZ LC PN PS

R App: Graphical Interface for Gobi Profile

Select actions
☑ Book
☑ Slip
☑ Exclude
Filter by exceptions: No filter
Search by subclass:
Update | Download
Class: R
Subclass: RM: Therapeutics. Pharmacology
Range: None selected
Action(s): B, S, X
Subclass exception(s): Where excluded send slips for Reference types,
Range exception(s): Not applicable

Selectors can filter the plan by segment actions and exceptions, compare ranges, and export the data. Node color indicates segment action (e.g. red = X, exclude).

Tableau Example:

Approval Performance by Subject with "Performance" defined as the % of titles used at least once.

Title Page | Detail by Subject | Detail by Publisher & Subject | Detail by Series | Detail by Title | Detail by Title 2 | Use by Subject | Use by Publisher

Performance by Subject
"performance" is defined as the % of titles used at least once.

Subject	LC	Number of Titles	Number of Titles Used	Performance (% of Titles Used)	Uses In-House	Uses (Check-Out)	Total Uses
Aesthetics	BH	173	74	42.77%	42	100	142
Afrikaans literature	PT	5			0	0	0
Agriculture (General)	S	59	9	15.25%	8	13	21
Air forces. Air warfare	UG	5	1	20.00%	2	4	6
America	E	722	236	32.69%	146	304	450
American literature	PS	8,255	2,638	31.96%	2,166	4,544	6,710
Animal culture	SF	54	17	31.48%	27	13	40
Anthropology	GN	815	306	37.55%	210	438	648
Aquaculture. Fisheries. Angling	SH	22	3	13.64%	0	3	3
Archaeology	CC	234	74	31.62%	36	81	117
Architecture	NA	1,159	350	30.20%	232	370	602
Armies: Organization, distribution, military situation	UA	285	93	32.63%	64	111	175
Arts in general	NX	489	193	39.47%	107	225	332
Asia and Eurasia, Africa, Pacific Area, and Antarctica	KL	2	1	50.00%	3	1	4
	KQ	1	1	100.00%	1	2	3
	KU	1			0	0	0
Astronomy	QB	249	54	21.69%	38	67	105
Atlases	G	44	14	31.82%	18	18	36
Biography	CT	163	50	30.67%	49	84	133
Biology (General)	QH	81	26	32.10%	26	25	51
Book industries and trade	Z	87	32	36.78%	16	34	50
Books (General). Writing. Paleography	Z	11	5	45.45%	3	10	13
Botany	QK	235	60	25.53%	44	85	129
Bridge engineering	TG	3	1	33.33%	2	1	3

Acquisition Year
◉ (All)
○ Null
○ 2012
○ 2013
○ 2014
○ 2015
○ 2016
○ 2017
○ 2018

LC Classification: (All)

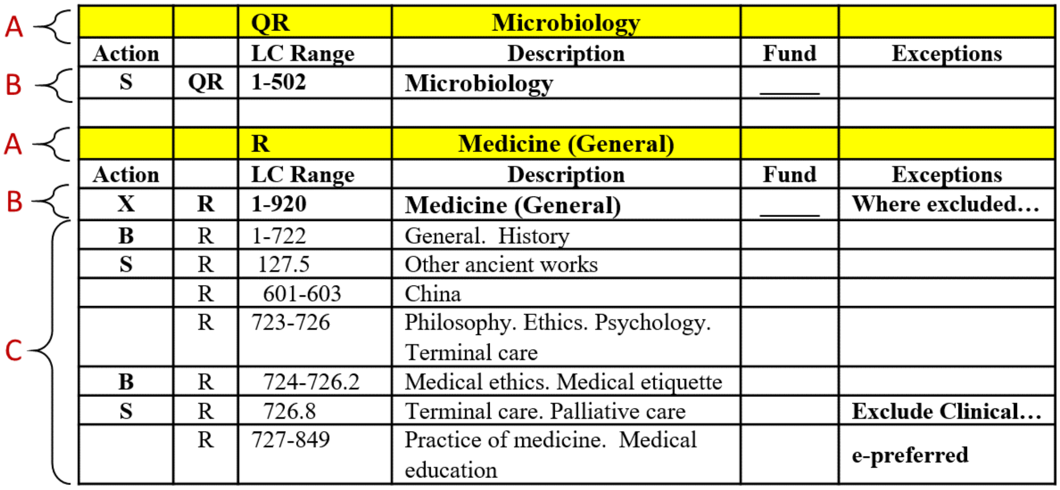
Select a subject or a number on this page and it will/should take you to the Title Detail dashboard and present the titles for the subject selected.

Future Directions

- Moving enhanced dataset into Tableau for different data "views" and modeling cost implications of changes to approval plan.
- Analysis of interdisciplinary areas to identify gaps.
- Operationalizing dashboards and the R App as communication and decision-making tools for selectors.
- Applying these tools to additional approval plans.

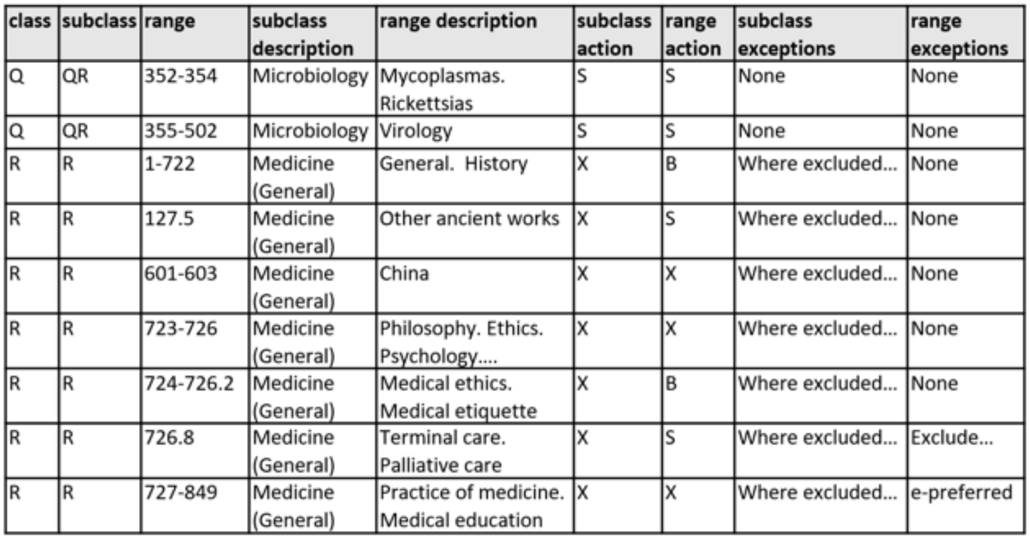
Acknowledgements: Thanks to Josh Fjelstul for his work in R, Pat Culpepper for her work in Tableau, and thanks to Creative Venues for the graphic element.
Contact: Lori Jahnke, ljahnke@emory.edu

Figure 1. Thumbnail of the poster presented at the Charleston Conference, "Issues in Book and Serial Acquisition," November 6, 2019.



A			QR	Microbiology		
	Action		LC Range	Description	Fund	Exceptions
B	S	QR	1-502	Microbiology	____	
A			R	Medicine (General)		
	Action		LC Range	Description	Fund	Exceptions
B	X	R	1-920	Medicine (General)	____	Where excluded…
C	B	R	1-722	General. History		
	S	R	127.5	Other ancient works		
		R	601-603	China		
		R	723-726	Philosophy. Ethics. Psychology. Terminal care		
	B	R	724-726.2	Medical ethics. Medical etiquette		
	S	R	726.8	Terminal care. Palliative care		Exclude Clinical…
		R	727-849	Practice of medicine. Medical education		e-preferred

Figure 2. Structure of the original GOBI MOA spreadsheet. Each LC class is a separate table within the same sheet that begins with a highlighted row, followed by a header row, a subclass description row, and then the range descriptions. Each LC section is followed by one empty row. The levels of hierarchy are labeled as A, B, and C. This structure is replicated throughout the LC instructions spreadsheet. This is a representation of the Emory MOA and it does not include accurate data.



class	subclass	range	subclass description	range description	subclass action	range action	subclass exceptions	range exceptions
Q	QR	352-354	Microbiology	Mycoplasmas. Rickettsias	S	S	None	None
Q	QR	355-502	Microbiology	Virology	S	S	None	None
R	R	1-722	Medicine (General)	General. History	X	B	Where excluded…	None
R	R	127.5	Medicine (General)	Other ancient works	X	S	Where excluded…	None
R	R	601-603	Medicine (General)	China	X	X	Where excluded…	None
R	R	723-726	Medicine (General)	Philosophy. Ethics. Psychology….	X	X	Where excluded…	None
R	R	724-726.2	Medicine (General)	Medical ethics. Medical etiquette	X	B	Where excluded…	None
R	R	726.8	Medicine (General)	Terminal care. Palliative care	X	S	Where excluded…	Exclude…
R	R	727-849	Medicine (General)	Practice of medicine. Medical education	X	X	Where excluded…	e-preferred

Figure 3. A section of the GOBI MOA file after it has been cleaned and transformed by the R script. Rows in the QR section were hidden in the original spreadsheet (Figure 2). Although the script cleans and transforms all rows, several were omitted here for space. This is a representation of the Emory MOA and it does not include accurate data.

challenges locally for interpreting how changes to the plan will affect multidisciplinary areas, which has impeded decision-making for selectors who share responsibility in those areas. Our 2018 assessment of the R, S, and T classifications provided ample lessons for how we might change our local processes and improve access to collections data for selectors.

As a starting point, we used an R script, written by Josh Fjelstul, to convert the GOBI MOA LC parameters spreadsheet (Figure 2) to a “flat” table. The R script uses the structural elements in the original file, such as highlighted or empty rows and the structure of the header row, which always begins with the value ‘Action’, to locate the relevant data in multiple tables and extract it to new variables. Once the data have been extracted to the new variables defined by the script, the transformed data can be downloaded as a csv file (Figure 3). Cleaning and flattening the GOBI file resulted 3,644 separate range segments, excluding K, which could then be assigned unique IDs (gseg_id) that we used to relate approval plan actions to the expenditure and local use data sets. The K ranges were excluded from this step since this part of the GOBI file has a slightly different structure. A subsequent version of the script will account for the distinct structure of the K tables and include these data.

Our script uses the Shiny app to create a graphical interface that selectors can use to explore the LC ranges and download the cleaned data set for alternate views or manipulation. The app is shown in the upper-right of the poster (Figure 1). Selectors can use the app to view all aspects of the LC parameters that are relevant to their subject simultaneously. The app also includes other features, such as filtering the plan by exceptions or actions, and searching the exceptions fields.

Merging the Expenditure Data and Local Use Data

We merged the GOBI expenditure data and our local use data from Alma using the Fuzzy Lookup tool in Excel. This tool performs fuzzy matching of textual data and returns a similarity score with each match. It can be used to identify duplicates within a table or to merge tables based on matching selected fields, as we did here. We achieved good match results based on the title fields in the two reports, but depending on your local data, the ISBN field could work well or a match based on multiple fields might yield better results. Fuzzy Lookup is robust to spelling mistakes, synonyms, many abbreviations, and other errors. The same task could be accomplished with Excel formulas or by writing a script.

Matching Profile Segments to the Merged Data

The most complex part of this process was to match the GOBI profile segments to the title-level data in the combined Expenditure-Use dataset. We accomplished this through a series of formulas in Excel that extract the range number from the item’s LC call number and match it to the ‘bins’ represented by the gseg_id. For example, this is the formula that extracts the range number from the LC classification, where ‘A2’ contains the full LC classification for the item.

```
=IFERROR(IF(ISERR(VALUE(LEFT(MID(A2,
SEARCH(“.”,A2)+1,1),1)*1)),VALUE(MID(LEFT
(A2,FIND(“.”,A2)-1),MIN(FIND({0,1,2,3,4,5,6,7,
8,9},A2&”0123456789”)),LEN(A2))),VALUE(MID
(LEFT(A2,FIND(“.”,A2)+1),MIN(FIND({0,1,2,3,4,5,
6,7,8,9},A2&”0123456789”)),LEN(A2)))),VALUE
(RIGHT(A2,LEN(A2)-MIN(FIND({0,1,2,3,4,5,6,7,
8,9},A2&”0123456789”))+1)))
```

Once the range number has been extracted from the call number, it is relatively straightforward to use the INDEX and MATCH functions in Excel to identify the correct gseg_id for the item and add it to the data set. In future versions of this data processing we will incorporate this step into an R script, which is much more efficient than Excel at handling large data sets. This will also allow us to display item-level data within the interactive tree structure of the R app.

Results and Future Directions

The resulting data set includes all of the expenditure data (e.g., fund codes, order type, cost, etc.), standard bibliographic data, GOBI profile data (e.g., aspect, content level, YBP select level, interdisciplinary topics), local use data (e.g., number of loans, in-house loans, last loan date), and the gseg_id for the relevant portion of the GOBI MOA. With this enhanced data set we are planning an analysis of multidisciplinary areas of the collection to identify gaps in the approval plan, as well as other areas that could be updated.

For the last couple of years we have been using the Emory University implementation of Tableau to provide access to collections data through dashboards that allow selectors to choose from a variety of preconfigured and customizable views, or to download data as needed for additional analysis (see Tableau example in Figure 1, middle-right side). Moving forward, we plan to make this enhanced data set available through this platform as well, which will allow selectors to model the cost implications of changes to the approval plan, working as a group or individually.

As mentioned above, we plan to revise the R script to accommodate the unique structure of the K ranges and to incorporate the other data processing tasks that are currently performed in Excel. In addition to reducing the number of steps that could introduce error, extending the R script will allow us to integrate the item-level data with the interactive R app. Some of the selectors have requested this feature, but it will be challenging to display the detailed data in a manner that is still legible. Possible work-arounds could include automatic filtering, such as by fund code, budget year, or order type, which would select a more digestible subset of the data. Future iterations of this project will also explore applying these tools to our other approval plans; however, we have not yet decided on the approach or scope of this work.