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Cracking the Code: Course Syllabi Unpacked, Decoded, and Documented for Evidence of Library Value

Colleen Mullally
Pepperdine University, colleen.mullally@pepperdine.edu

Jeremy Whitt
Pepperdine University, jeremy.whitt@pepperdine.edu

Casey Ann Mitchell

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Abstract: Within the academy, what data sources provide insight into the ways in which teaching faculty rely upon the library's spaces, services, collections, and people? Pepperdine University Libraries devised a system to evaluate undergraduate course syllabi using the data analysis software NVivo. Though syllabi are formulaic and lack details about individual assignments, librarians can skillfully mine them with ease to uncover how the library is of value to teaching faculty. This chapter will provide a case study of how institutions can use qualitative data analysis software to discover, interpret, and share the value of the library from the perspective of faculty.

Keywords: course syllabi, textual data analysis, teaching faculty, library collections, library services, non-library data sources, librarian collaborations, text mining, data mining, academic libraries

Project focus: assessment methodologies, techniques, or practices; collections; spaces; services (i.e., customer service at reference desk); data use and technology

Results made or will make case for: improvements in services, proof of library impact and value

Data needed: course syllabi; institutional data (e.g., enrollment statistics by major)

Methodology: content analysis; documents (i.e., course syllabi) will be evaluated systematically so that the text can be translated into a quantitative data source for analysis.

Project duration: between 6 months and a year

Tool(s) utilized: NVivo, Excel, subject liaisons for knowledge of syllabi, technical services staff for query building, project manager

Cost estimate: $500–$1,000; cost varies based on number of librarians involved and cost of NVivo license.

Type of institution: university—private

Institution enrollment: 5,000–15,000

Highest level of education: doctoral

Chapter 31

Cracking the Code

Course Syllabi Unpacked, Decoded, and Documented for Evidence of Library Value

Colleen Mullally, Jeremy Whitt, and Casey Ann Mitchell

Introduction

In recent years, leaders in the academic library assessment community have emphasized the need to move away from using output measures like gate counts, circulation figures, and collection size as placeholders for communicating value.[1] These measurements are library-centric and do not provide context. Tenopir has argued that such statistics "do not show purpose, satisfaction, or outcomes of use."[2] If librarians are to look elsewhere for data points, what outside artifacts or non-library data sources could be examined in conjunction with statistics collected by the library? How could an outside data source be harnessed to guide evidence-based decision-making and to gain insight into the value the library provides to teaching faculty?

The authors at Pepperdine University in Malibu, California, drew on a large, readily available, and previously untapped local data source—faculty course syllabi—to explore and answer our questions. In the Association of College and Research Libraries' *Value of Academic Libraries* report, Oakleaf recommends reviewing course content, readings, reserves, and assignments to "track the integration of the library resources into the teaching and learning processes of the institution."[3] By quantifying the degree of resources used in course syllabi, we worked to "demonstrate and improve library

support of faculty teaching," as recommended in that report.[4] Course syllabi may seem like an unconventional choice of data as a source to demonstrate the value of the library, given their tendency to use repetitive and boilerplate language. Much of the information contained in syllabi is extraneous and of no use to the library. However, a syllabus serves as a primary source documenting the plan for a course. Each document has unique aspects and language that can provide tangible evidence of classroom priorities and assignments—including references to the library—from the standpoint of faculty.[5] We wanted to reveal all references to the library or library-related services in syllabi. The unique aspects in syllabi related to the library particularly interested us, so we set about identifying a method that could both utilize them as data and mine them for library references.

When undertaking this project, we decided to take a systematic approach that could be used by librarians at other institutions to document the value of the library and yet still provide meaningful ideas for areas of improvement. We envisioned that common text, if machine-read, could cut the amount of time spent by librarians in order to evaluate large volumes of syllabi. We had access to NVivo, a software tool commonly used by social scientists while analyzing qualitative data. For our project, NVivo served as a sophisticated tool for querying our syllabi and analyzing the resulting hits. Since librarians are experts in database search and retrieval, we decided to create complex search query strings and run them on the syllabi documents we uploaded into NVivo. Rather than needing to read each syllabus in its entirety, we would need to read only the text surrounding our search results to verify the term was used in a context we intended. Our project findings are unique to our institution and provide not only evidence of library value but also opportunities for further integration of the library within the curriculum.

This case study details the methods, results, limitations, and areas for further research. We want other libraries to be able to systematically and periodically conduct syllabi analyses to document over time their increasing relevance to teaching faculty. With this method, librarians can move beyond personal anecdotes and library statistics in order to gain insight into the curriculum for further integration of the library's spaces, services, staff, and collections.

Institutional Context

Pepperdine University is a private university located in Malibu, California. In addition to its undergraduate Seaver College, which focuses on the liberal arts, Pepperdine has four professional schools, which offer degrees in the fields of business, education and psychology, law, and public policy. Seaver College, the focus of this study, offers forty-four majors, within eight divisions (Business Administration, Communication, Fine Arts, Humanities and Teacher Education, International Studies and Languages, Natural Sciences, Religion and Philosophy, Social Science).[6] As of fall 2016, Seaver College has a full-time equivalent (FTE) enrollment of 3,284 students and Pepperdine University has a graduate FTE enrollment of 3,103. To ensure the scope of this project was manageable

within a six-month time line for the five librarians involved, the project was bounded using 109 syllabi from fall 2014 in the following undergraduate majors: sports medicine, business administration, advertising, psychology, and English.[7]

Literature Review

In 1982 Rambler urged academic librarians to discover users' needs by examining course syllabi.[8] Undertaking an analysis of 162 course syllabi, Rambler evaluated syllabi using a scale that measured the level of library use for various course aspects, such as assigned readings placed on course reserve in the library. Rambler ultimately concluded that a study of course syllabi can inform practices such as budget planning and collection development. Sayles exhorted librarians to analyze course syllabi in order to tailor library research guides to students' needs.[9] Lauer, Merz, and Craig created their own scale measuring levels of required library use in syllabi and applied this scale to a total of 493 syllabi from two private institutions.[10] They concluded that the overall level of required library use was low and that upper division courses required higher levels of use of the library.

Librarians have recently analyzed syllabi to meet a variety of objectives, including understanding library use, identifying research skills expected of students, discovering opportunities to improve library services, and evaluating library instruction. Dewald studied business syllabi to understand faculty expectations for library research, finding that levels of library use were higher than expected.[11] Williams, Cody, and Parnell randomly sampled syllabi and, after applying Lauer, Merz, and Craig's scale, found that 41 percent of classes surveyed use the library for research.[12] VanScoy and Oakleaf randomly sampled undergraduate students and collected syllabi for each student sampled to complete a tabulated study of research skills required of first-year undergraduate students.[13] Several studies have also applied rubrics or scales to analyze syllabi, including those of Smith and colleagues, Boss and Drabinski, and Alcock and Rose.[14]

Others have focused more on undertaking content analysis of syllabi. Shirkey listed 936 required readings from 98 syllabi and analyzed which texts were held or placed on reserve in the library.[15] Maybee and colleagues approached content analysis of syllabi from a theoretical perspective, applying the concept of grounded theory in order to foster a better understanding of faculty expectations of students' knowledge of research data.[16] The team assigned codes to syllabi and generated themes.

Until the publication of Jeffery and colleagues' article in 2017, syllabi studies have primarily relied on a process of manually finding mentions of the library and its services.[17] Jeffery and colleagues analyzed 1,226 syllabi for references to library services or spaces using the text-mining program QDA Miner. The primary purpose of their study was to identify prospects for library engagement by undertaking a content analysis of syllabi. Given their sample size, they were not able to focus on needs of specific academic departments.

As a review of the literature demonstrates, the concept of reviewing course syllabi to improve library services has evolved considerably since Rambler conducted one of

the first such studies in 1982. Syllabi studies continue to become more technologically advanced and research-intensive within the profession, a development that has occurred alongside the advancement of personal computing and library assessment. Librarians are now harnessing data-mining tools for a more detailed analysis of syllabi. Although the tools used and project's scope may differ, this project's methods are similar to those of Jeffery and colleagues.[18] Through content analysis we also sought to discover usage of library resources and opportunities for faculty outreach by focusing on the needs of a set of academic departments.

Essential Project Data

To review syllabi on a systematic level, it is necessary to have access to these documents en masse. At Pepperdine, undergraduate course syllabi had been collected and made accessible to us by staff in the Seaver College Dean's Office. Not every school may collect syllabi in such a way that makes gaining access so straightforward. A more time-consuming, but still fruitful, way of obtaining syllabi would be to view and download each within the course learning management software such as Blackboard, Sakai, or Moodle. Before taking this approach, it makes sense to investigate other strategies at your home institution and have conversations with the library director, IT staff, and senior assessment leaders on campus. Faculty departments may be routinely collecting their syllabi already, so inquire about access.

Syllabi comprise the major data source required to complete this project. However, looking at institutional-level data can be beneficial when seeking ways to scale the project. You may find it helpful to examine enrollment figures, typical number of courses offered in a semester or year, and breakouts of faculty information by department to provide situational context when preparing an analysis of syllabi. Our methodology section will detail how we chose to use FTE figures by majors as a means for deciding which syllabi to target first.

Librarians planning to undertake a similar study should also consider complementary sources of library data. The results from the syllabi analysis can be examined together with the library's own data to provide context to both data sources. For instance, because faculty commonly refer to materials available on course reserve via the library, print and electronic course reserve data may be worth examining to fully understand references found in syllabi. Instruction statistics are another valuable source of library data that can be used during the analysis of course syllabi. There may be other sources of data that you are tracking but have not yet considered. For example, perhaps your library has a makerspace and records statistics on its usage, or your library space sponsors tutoring. Be creative when asking questions of your library data sources.

Methodology

Members of Pepperdine's library assessment team elected to join this project with several shared goals. We set out to evaluate the process of reviewing syllabi on a large scale using

an automated tool. We also wanted to learn more about the feasibility of using syllabi as a tool for uncovering evidence of library value. Additionally, we sought to provide senior administrators with evidence of library value while also providing library liaisons specific takeaways to continue building relationships with their departments.

Defining the Project

The team met several times at the outset to discuss the time line, to flesh out and prioritize project objectives, and to bound our analysis. Our initial objectives included

- confirming faculty use of the library services and resources in the context of teaching,
- testing the hypothesis that research-intensive classes highlight the library more than non-research-intensive classes,
- analyzing unique and common uses of the library among lower and upper level courses,
- exploring whether course syllabi mention library services or resources in the context of research assignments, and
- discovering courses where library instruction is not provided but may benefit students.

Longer term goals included

- identifying undergraduate research-intensive courses that would provide useful research paper artifacts for large-scale rubric-based assessment of information literacy, and
- comparing research requirements and library-specific resources between undergraduate and graduate business classes.

Since we were building an automated approach from scratch, we decided not to run our project on all syllabi for which we had access. By looking at only a selection of the syllabi from 5,514 courses offered at Pepperdine during 2014–2015, we would be more effective when manually reviewing the syllabi afterwards to evaluate how well our process worked. To bound the project, we used university enrollment data. We examined FTE figures from the five largest divisions within Pepperdine's undergraduate Seaver College, selecting the major with the most FTE within each of these largest divisions. From the Business, Communication, Natural Sciences, Social Sciences, and Humanities and Teacher Education divisions, we looked at fall 2014 syllabi from the top-enrolled majors: business administration, advertising, sports medicine, psychology, and English.

Designing the Queries

With our road map of the project complete, we began the time-intensive process of brainstorming, testing, and refining a master list of keywords that would be searched across all our syllabi. We were looking for our queries to ultimately recall syllabi that were demonstrating use of the library and courses that were asking students to complete projects requiring research. In this deductive approach, our themes of Library and Research would be rendered by codes that we would need to fully define. Our team

proceeded to build a codebook, a standard practice for research of this kind.[19] This involves identifying and defining each code, detailing when (and when not) to use it, and providing examples of each code so that we could prepare a list of keywords and phrases that would be searched across all syllabi.

For the *Library* theme, we decided a reference to the library could be direct (as simple as referring to "Payson," the name of the main undergraduate library building), which we coded as "Library Explicit." Alternatively, a reference could be indirect (such as a reference to EBSCO or generically mentioning scholarly journals), which we coded as "Library Implicit." For the full codebook entries on Library, see appendix 31.1.

As for the theme of Research, our team developed definitions for three codes that would identify the likelihood that student-led research would be involved in the course: "Conclusive Research Evidence," "Some Research Evidence," and "No Evidence of Research." Syllabi making reference to components involved in a student-led research assignment (such as "annotated bibliography") would be considered "Conclusive Research Evidence." We also hypothesized that not all syllabi would have direct or definite research assignments. For example, research *might* be expected of students with the phrase "works cited." Thus we created the code "Some Research Evidence" for capturing ambiguously worded syllabi that we would manually review for evidence of research. By direct contrast, a syllabus classified as "No Evidence of Research" might reference a paper or project by simply using the word "essay," but would fail to include any term related to research. Appendix 31.1 provides codebook definitions.

Several meetings enabled us to reach agreement on the codebook definitions and to discuss key terms and phrases that might be found within the syllabi to describe each of the codes. Our team shared access to files and folders in Google Drive for documents related to our project and used a Google Doc to collect our brainstorming sessions related to keyword generation. As a result of our sessions, we developed a list of keywords and phrases associated with each code, known in NVivo as a "node."[20]

Each research objective was paired with a node in NVivo. Relevant keywords were grouped together to form a single query. Due to the limitations of NVivo, described below, several queries may be required for each node. Our list of keywords was separated into ten separate queries. Since NVivo does allow for a hierarchical parent and child node structure, each separate query for a specific research objective became a child node (see appendix 31.2). This hierarchical approach allowed us to view results for each query individually but also for each node and objective as a whole. The ability to review each child node and subquery prevented information overload and allowed for easier review of data. A manual check of results was necessary to eliminate any false positives and to correctly code our data.

Test Run of Queries: Discovering Issues with Search Terms and NVivo Search Limitations

Using syllabi from departments outside of our scope, we tested this preliminary set of nodes as a proof-of-concept study. At this point, we were less interested in the numbers

we were getting, but we did want to see how well our search terms were used in the context we intended. We revisited these test syllabi and observed the highlighted text results where NVivo had found matches of our search queries and discussed our flaws and assumptions.

One immediate issue we encountered was problematic terms for the Library theme, such as "ILL" (faculty refer to protocol for students missing class due to illness more often than interlibrary loan), "reserve" (e.g., when faculty "reserve the right to…"), and "journal" and "article" (these terms did not return library-specific results). Similarly, we ran into issues with terms in the Research theme, such as "footnote," "cite," "citation," "research," "research project," "source," and "sources." These all appeared consistently in the text that referenced violations of the university's Code of Academic Integrity. While all of these terms could easily have indicated library or the presence of a research assignment, we decided to exclude them from our queries after realizing how often they appeared in contexts we had not intended.

Our scrutiny of the syllabi for flaws in the search terms also led us to the discovery of two issues within the search query builder of NVivo version 10. We noticed the bugs only because we were closely examining these syllabi and came upon instances where our search terms were not included among the list of query results. After contacting NVivo support staff, we learned the error was due to copying and pasting queries from our Google Doc into NVivo's search query builder. The clipboarded text from our Google doc contained "smart quotes," a default style used in Google apps, but NVivo is able to parse only straight quotes. This character set difference affected the performance of the search strings and consequently misrepresented the results. To correct this mistake, we manually retyped the search strings directly into NVivo. Users can also disable smart quotes in the Preferences menu of a Google Doc.

The second issue we encountered at the time of completing this project was a limitation in the software's ability to combine wildcard and phrase searches. The documentation for users did not point out this limitation, but we learned that we could not create an exact phrase search with quotation marks while including another wildcard search term in the same search string. Our workaround was to break out these queries into separate strings, keeping keywords and phrases separate from wildcard searches. The hierarchical node structure of the nodes allowed us to assign child node status to these various searches while allowing the data to feed into a parent node, which corresponded with each individual objective. Our parent nodes were based on our themes of Library and Research. Therefore, our child nodes were branched into relevant themes such as "Spaces and People," "Library Services," or "Some Evidence of Research," and "No Evidence of Research." Additionally, we utilized NVivo's settings to refine our text searches. The ability to find "Exact matches" or include "With stemmed words" in our query, combined with phrase searching, proved advantageous to our query building. This fine-tuning eliminated the need for too many child node queries. Overall, this process of conducting a test run was invaluable—it helped us refine, rebuild, and restructure our final node search strings. The final list of query terms we used can be found in appendix 31.3.

Advanced Planning for the Data Analysis

While refining our process for inputting search strings and determining the keywords and phrases to include, we also reviewed our plan for using the data provided by NVivo to pull out answers to our analytic objectives. We looked at how we would answer our analytic objectives using the different overlaps of nodes needed, and we discussed how best to combine library instruction statistics essential for highlighting new areas of potential faculty outreach via library instruction. With a final set of search query strings and a plan for answering our analytic objectives, we ran the queries in NVivo on the 109 syllabi. We were interested in examining syllabi for those that contained a reference to Library and also those that had evidence of Research.

Before we could begin analyzing our results, we needed to verify and clean up our data. This process was done together in a meeting so that we would not have to adopt a rubric and establish inter-rater reliability. Our group simply referred back to our guiding definitions (see appendix 31.1 for definitions). We wanted to ensure that we had valid references for results in the Library theme, and we used a similar process described by Jeffery and colleagues by manually examining each search hit in the context of the surrounding sentences.[21] We also had to examine the context for results in the Research theme for all courses where there was "Some Research Evidence." As a group, we looked at the hits and other areas of the syllabi to determine whether this would be a course requiring any use of outside source materials (see appendix 31.1 for definitions). Exporting our results as an .xlsx file and analyzing the results in Excel allowed us to correctly categorize courses that appeared in more than one type of Research node. Once we validated all results for Library and reviewed all flagged courses for Research, our data cleanup concluded.

Results

Our final analysis was performed on 109 syllabi for courses offered in fall 2014. The breakdown of those syllabi was as follows: business administration (Business Division), 48 syllabi; psychology (Social Sciences Division), 27 syllabi; English (Humanities and Teacher Ed Division), 19 syllabi; sports medicine (Natural Sciences Division), 9 syllabi; advertising (Communication Division), 6 syllabi. NVivo search results indicated 93 out of 109 syllabi had either a research term or a library term, which shows that overall our query terms had results in 85 percent of all syllabi. After running our library queries on all syllabi, we found that 68 of them (62.38%) were coded within the library nodes, meaning the syllabus contained an implicit or explicit reference to the library as defined by our query. To understand the accuracy of the process, our team then manually verified each reference to the library and found that 47 of 109 syllabi (43.1%) contained at least one valid library reference.

Answering Our Analytic Objectives

We examined courses that fulfilled our analytic objective of showing overlap between use of the library and a requirement of research. Syllabi were classified under this objective

if they met the condition of having both a confirmed research component and being coded for a library query. Of the 44 syllabi that we determined could be considered *research-conclusive* since they had a research component, 38 of those also had a library query (86.3%). We then manually confirmed each library term in these 38 syllabi to eliminate any false positives. Twenty-three of the 38 syllabi with a research component had a confirmed library term (60.5%), while terms from the remaining 15 syllabi were either false positives or inconclusive. Table 31.1 provides data related to the disciplinary findings, the corresponding library instruction statistics, and the syllabi analysis results. It is interesting to note that the number of instruction sessions provided for advertising and business is higher than the number of syllabi with a confirmed research component. From these numbers, we can see that the terms we used to describe research were incomplete or that some syllabi lack any language describing an assignment that contains a research component. However, this breakout of data by discipline helps liaison librarians quickly assess gaps between their library instruction and classes where the library or research is referenced. Information presented to liaisons in this way provides evidence of library impact and areas for future collaboration and growth.

Table 31.1
Summary of Syllabi Findings on Research and Library with Library Instruction Data and Potential Classes

Discipline	Total Syllabi	Syllabi with a Confirmed Library Term	Syllabi with a Confirmed Research Component	Syllabi with a Confirmed Research Component and Library Reference	Library Instruction Sessions	Classes Where Instruction May Be Appropriate
Advertising	6	3	1	1	2	3
Business	48	10	7	3	12	9
English	19	16	16	11	10	9
Psychology	27	18	14	8	2	13
Sports Medicine	9	1	0	0	0	1

Having confirmed the intersection of library and research, we next focused our efforts on syllabi that contained a library reference, but lacked evidence of a research component; 38 unique syllabi were coded in this category, based on our queries. Upon confirming the library references in this set of syllabi, 19 of 38 (50%) had at least one confirmed library reference. We discovered this resulting data set of syllabi to be a rather interdisciplinary mix of subject areas, as psychology (8), business administration (4), English (4), advertising (2), and sports medicine (1) comprised the distribution of syllabi fitting these criteria. This finding confirms our hypothesis that research-intensive classes highlight the library more than classes that are not research-intensive; 60.5 percent of courses identified as being research-intensive had a confirmed library

term, whereas 50 percent of courses without evidence of research had a confirmed library term.

We also compared use of the library between upper and lower division courses. Of the 38 syllabi that were research-intensive and had a library query, 12 syllabi were from lower division courses and 26 syllabi were from upper division courses. Our library query was much more accurate at identifying valid library references within lower division syllabi as shown in table 31.2.

Table 31.2
Distribution of Syllabi with Research and Library Terms by Course Level

Course Level	Research Syllabi with at Least One Library Term	Research Syllabi with a Confirmed Library Term	Percentage of Research Syllabi with a Confirmed Library Term
Lower Division	12	10	83.3%
Upper Division	26	13	50%

Regarding research terms, both upper and lower division syllabi utilized the terms "annotated bibliography," "literature review," and "research paper" to refer to a research assignment. Upper division syllabi also referred to research assignments using the terms "research project," "works cited," and "research essay." Confirmed library terms for lower division courses primarily called out physical spaces of the library; "library," "Payson," "writing center," and "library visit" were the most frequently used terms. As was the case with research terms, upper division courses utilized a wider array of terms referring to the library, including "journal articles," "database(s)," "e-book," and specific databases, indicated in table 31.3.

Table 31.3
False Positives and Unique Library Terms by Discipline

Discipline	False Positives	Unique Library Terms Used
Advertising	None	Mintel, MRI, SRDS
Business	Library (part of an irrelevant URL) Selected works (generic reference, not to Bepress) E-books (non-library resources on required reading list) "library visit" (generic statement)	Librarian's name, Mergent, Wall Street Journal, SPSS
English	Magazine, newspaper, encyclopedia, dictionary, database, selected works (all generic references)	N/A
Psychology	None	PsycINFO, SPSS
Sports Medicine	Library (Pearson Custom Library Lab Manual), Sage (textbook publisher on required reading list)	N/A

Common Query Terms

To inform our understanding of faculty language as it relates to the library, we also looked at which research and library terms were used in syllabi with confirmed library queries. Within the set of syllabi that was deemed research-conclusive, 19 out of 38 syllabi (50%) utilized the term "research" in tandem with the term "paper" or "essay." Other terms referring to research that were used included "annotated bibliography" (9 out of 38), "literature review" (8 out of 38), and "works cited" (2 out of 38). Among syllabi with confirmed library and research components, research terms varied by discipline as shown in table 31.4.

Table 31.4
Most Frequently Used Research Terms by Discipline

Discipline	Research term
Advertising	Research paper
Business	Research paper
English	Annotated bibliography
Psychology	Literature review
Sports medicine	N/A

Terms referring to the library were much more diverse than their research counterparts, though there was more overlap with library terms than with research terms among the five disciplines studied. Confirmed library terms in syllabi with evidence of research included "help desk," "library," "librarian," "Payson," "Scholarly Journals," "Writing Center," "database," "electronic journal," "library visit," "peer review," "electronic resources," "journal articles," and "library research day."

The degree to which research-conclusive syllabi specifically referenced library resources varied by discipline. There were common terms used; however, disciplines used unique library terms as shown in table 31.3. For example, psychology syllabi referred to library resources in specific ways with terms including "PsycINFO" and "SPSS," but also used general terms like "peer-reviewed," "database," and "library" that overlap with the English department.

We also discovered that our queries contained false positive results of terms that did not relate to the theme of library. Advertising and psychology syllabi were the exceptions to this discovery, as syllabi from these disciplines contained no false positive library results. Table 31.3 presents the false positives contained within the sports medicine, business administration, and English syllabi.

Project Redux and Reports

We interpreted and analyzed the data from NVivo to demonstrate the value of services and resources that the library provides. By examining the number of syllabi that refer to the library both explicitly and implicitly, we now have direct evidence of the extent

of the reach of library services in course syllabi; 47 out of the 109 syllabi we examined had a confirmed library reference. Although we suspected that course syllabi would mention the library before conducting this study, we now have concrete data and a sample indicating the extent to which this is true.

Our study has allowed us to identify which courses have research assignments and to what extent these research-intensive courses are relying on the library's resources. In conjunction with the liaison reports, described below, we can also now identify faculty stakeholders for particular resources and services, such as databases and library course instruction. The results from this project empower librarians to make evidenced-based decisions to improve services, both from a collections and an information literacy standpoint. Syllabi mining provides a contextual snapshot of library use when compared with traditional library output measures. These extra details can be used to cultivate relationships with faculty in terms of promoting or providing services.

Communicating Results and Impact

We communicated the results and impact of this pilot project internally in multiple ways. We presented an overview of the project at an all-library staff meeting and communicated the overall findings from our pilot study to the senior library administration. More detailed reports were provided to library liaisons. We used the data to compose personalized memos using subject-specific data for each liaison, highlighting the analysis from course syllabi and instruction statistics. These briefs provided the liaisons for business administration, advertising, sports medicine, psychology, and English with a broad overview of the project as well as specific takeaways. We highlighted the Library and Research findings within their departments, suggested a tailored course of action based on the data including a list of courses and corresponding faculty for which library instruction may be appropriate, and provided access to our project data.

Considerations for Future Project Iterations: A Reflection

When undertaking an analysis of course syllabi, it is essential to plan the objectives and to carefully consider the background and interest of team members. It may also be useful to seek out members of your institution's computer science department. They can help evaluate tools designed specifically for data mining, are aware of open-source software, and may be able to provide programming expertise in the event that you are seeking alternatives to NVivo and QDA Miner. But it is not essential to begin the project already knowing the software tool. None of us had savvy NVivo skills at the outset. We did, however, embrace a spirit of persistent curiosity about whether course syllabi could be data mined. It was this question that propelled our group along the way. The team at Pepperdine was comprised of librarians whose areas of expertise ranged from assessment and project management to systems and taxonomy to database and

scholarly resources to reference and public services. We found that it was helpful to have a variety of perspectives and an effective group dynamic to carry out the project.

Developing keywords is at the heart of the project. Our team spent a considerable amount of time creating, testing, refining, and adding additional search words. The quality of keywords is impacted by the limits of the group's experience and creativity. While specific subject liaisons are not critical to all parts of the project, we would advise seeking out their input in the early stages of developing query terms. Liaisons can offer insight into the language that their faculty use. They will be familiar with the types of resources that are most likely to appear in their faculty's syllabi (e.g., advertising faculty encourage students to use SRDS). And their experience helping students with assignments will reveal the nuanced assignment types that require research (e.g., business faculty can expect students to write a company business plan after researching industry and market reports).

Leveraging the Findings

As this study has demonstrated, there are several variables to examine and data subsets to consider when conducting a syllabi mining project, yet it is important to manage the project so as to communicate the results to campus stakeholders effectively. When replicating this project, an executive summary of results is helpful for all stakeholders.

For subject librarians, reports providing context between overall findings and individual departments will include the specific language used by faculty, common terms used to describe the library, and the composition and context of courses studied in the project. This project can not only reveal the language used by faculty to refer to the library and research, but also can indicate faculty's priorities in these areas. For library and university stakeholders, it is essential to tie the connection and significance of project results back to campus-wide initiatives such as assessment, curriculum mapping, and strategic planning.

Systematic methods for regularly examining syllabi offer many dynamic opportunities for libraries to demonstrate their value and to provide data for making decisions that will ultimately enable further integration of the library into the curriculum. Replicating the project with different majors within a department can provide data for comparing levels of impact within a department. Additionally, this process can be beneficial to liaison librarians who have been assigned new or additional subject areas; a syllabi analysis may provide an introduction to the department's levels of library use and suggestions for outreach. This project can also provide valuable longitudinal data if repeated with the same set of courses as part of a cycle of assessment. At San Diego State University, Jeffery and colleagues note that "moving forward, individual subject librarians have planned syllabi-analysis projects based on this study in order to uncover specific needs within the schools, departments, and colleges they support."[22] Once the initial project data has been analyzed, the project can be implemented routinely to track the impact of library outreach and build new relationships.

Our own project served as a pilot to determine whether the process would work, and it can be operationalized again to measure growth and can be folded into larger programmatic assessment cycles within the university. Librarians can look at the value proposition from the perspective of accreditation officers, using a syllabi analysis project to study integration of information literacy within the faculty course learning outcomes. As demonstrated by McGowan, Gonzalez, and Stanny, syllabi can be successfully evaluated for large-scale assessment projects jointly partnered between librarians and university assessment offices.[23]

The Place of Course Syllabi in Demonstrating Library Value

Librarians have been documenting their motivations and approaches when undertaking analyses of faculty course syllabi since Rambler's study in 1982, and these approaches have broadened significantly. Instruction statistics by themselves are so limited that they leave librarians wondering, as Alcock and Rose ask, "Are there courses that contain a research component and do not have library involvement, let alone library instruction session? How are the IL needs of these students being met? Are there characteristics shared between courses that tended to influence library involvement?"[24] As Boss and Drabinksi note, syllabi provide evidence beyond anecdote, and instruction statistics and results from a syllabi analysis provide data that enables conversations about information literacy between faculty and librarians.[25] In 1982 Rambler concluded her pioneering syllabi study by expressing concerns about cuts to funding for academic libraries and questioning whether libraries can sustainably expand their services to faculty.[26] We are still faced with the challenges raised by Rambler; however, we have arrived at a time where we are seeking ways to effectively communicate our relevance to university officials. *Yes*, syllabi analysis provides us with data showing areas ripe for increased outreach. Let us not forget to harvest evidence of our usage via faculty syllabi *and* connect it to other compelling data to craft a compelling demonstration of the value of academic libraries. By carefully applying a systems approach to examining course syllabi as done in our study, librarians can use tools like NVivo or QDA Miner to uncover important data to "demonstrate and improve library support of faculty teaching."[27]

Unlike other sources of non-library data being collected and analyzed by librarians to show the value of the library in the academy, course syllabi usage provides data to help librarians in their everyday decision-making. Indeed, the findings from course syllabi data serve many practical purposes that enable librarians to make meaningful decisions to support faculty teaching and impact student learning.

Appendix 31.1

Codebook

Research

Conclusive Research Evidence

Brief definition
Activity that involves locating materials other than those provided in course readings in order to complete an individual or group class project, presentation, or writing assignment.

Full definition
A course engaging students in some way to locate, gather, review, incorporate, synthesize, and/or cite informational sources outside of the assigned class material.

When to use
When the course syllabus (including the class calendar, course objectives, assignments, grading section, and other specific notes unique to the professor) references "research paper*" "research project" "research essay" "research assignment" "bibliograph*" "annotated bibliography*" "lit* review".

When not to use
Do not use when the only reference in the syllabus to research is made in the Academic Code of Integrity; also do not use whenever the syllabus does not explicitly mention any research term above; a separate code should be used for inconclusive papers that may/not involve research but that may be argumentative or pro/con (see: Some Research Evidence) or be of a certain page length or reflect a major percentage of the student's grade (see: No Evidence of Research).

Some Research Evidence

Brief definition
Activity that may involve the students locating materials other than those provided in course readings in order to complete an individual or group class project, presentation, or writing assignment.

Full definition
A course that may include an assignment in the form of an essay, paper, or project that requires students to locate materials outside of their course readings.

When to use
When the course syllabus (including the class calendar, course objectives, assignments, grading section, and other specific notes unique to the professor) includes "list of references"

"references list" "works cited" "works consulted" "outside source*" "argumentative paper" "pro/con paper" in proximity to an individual or group assignment, project, essay, or paper.

When not to use
Do not use when the only reference in the syllabus to citing sources or sources in general is made in the Academic Code of Integrity; do not use when the terms appear in the syllabus along with any of the following: "research paper*" "research project" "research essay" "research assignment" "bibliograph*" "annotated bibliography*" "lit* review" (see: Conclusive Research Evidence); also do not use with papers of a particular page length or when the paper reflects a major percentage of the student's grade (see: No Evidence of Research).

No Evidence of Research

Brief definition
An individual or group written assignment completed outside of class.

Full definition
A course requiring students to complete a written assignment as part of their final grade.

When to use
When the course syllabus (including the class calendar, course objectives, assignments, grading section, and other specific notes unique to the professor) references paper* essay* "term paper" and the papers are greater than or equal to 5 pages and/or reflect a major percentage of the student's final grade.

When not to use
Do not use when the terms appear in the syllabus along with any of the following: research or bibliograph* or "lit* review" appears in the same description about the paper (see: Conclusive Research Evidence); also do not use when the terms appear in the syllabus along with any of the following: "list of references" "references list" "works cited" "works consulted" "outside source*" "argumentative paper" "pro/con paper" (see: Some Research Evidence).

Library

Library (Explicit)

Brief definition
Direct mention of library.

Full definition
Anywhere the library is called out directly using explicit library terms "library", "Payson", "librarian*", "library database"~5, "research databases", "ACE", "Digital Learning Lab", "Library instruction", "Reference desk", "reserve", "ILL", "Interlibrary Loan", "library website", "library.pepperdine.edu", and other explicit library keywords from the "Library Services

NVIVO Keywords List", such as "library visit" OR "library instruction" OR "library class" OR "research day" OR "research visit", "InterLibrary Loan" OR "Inter-Library Loan" OR "Inter Library Loan" OR ILL, librar*, Kresge, Payson, iPoint, "circulation desk", "circ desk", "checkout desk", "front desk", "help desk", "special collections", "university archives", "library computers", "study room" OR "study rooms", "library research"~10, "library assignment"~10.

When to use
Whenever the library is being explicitly called out in the syllabus.

When not to use
Do not use when the only reference in the syllabus to reserve materials is made in the Academic Code of Integrity; do not use when there is indirect mention of the library (e.g. ProQuest).

Example/Quote
"The library is your friend."

Library (Implicit)

Brief definition
Indirect reference to library, library services, and/or library resources.

Full definition
In any instance where the library is not directly called out, but its resources (or, less likely, services or spaces) are referenced. Terms include ProQuest, LexisNexis, EBSCO, specific library journals, trade publications, newspapers, research help, "academic journals", "peer reviewed", or other implicit library keywords from the "Library Services NVIVO Keywords List," such as printer OR printers OR printing, microfilm OR microfiche OR microform*, "reference book" OR "reference books" OR "reference material" OR "reference materials", dictionar* OR encyclopedi* OR atlas*, magazine* OR newspaper* OR "trade publication" OR "trade publications", "scholarly journal" OR "scholarly journals" OR "scholarly article" OR "scholarly articles", "historical news" OR "historical newspapers", periodical, "LA Times" OR "Los Angeles Times" OR "NY Times" OR "New York Times" OR NYT, WSJ OR "Wall Street Journal, etc.

When to use
Use whenever a library resource or services is identified but not called out in the context of it being a library service or resource.

When not to use
Do not use when within 5 words there is reference to the word "library", "librarian", "Payson".

Example/Quote
Com 313.01 "You will research the interaction in news outlets and academic journals in order to provide an intercultural analysis of the case."

Appendix 31.2

Node Query Hierarchy

Library

- Implicit
  - Paid Resources
  - Resources
  - Resources 2
  - Resources 3
- Explicit
  - Spaces and People
  - Services
  - Services 2

Research

- No Evidence of Research
- Some Research Evidence
- Conclusive Research Evidence

Appendix 31.3

Query Keywords by Node

Library

Implicit

Paid Resources—Exact search
ProQuest OR EBSCO OR LexisNexis OR Springer OR Sage OR JSTOR OR Scopus OR EBL OR Medline OR Mintel OR SPSS OR RefWorks OR Swank OR JAMA OR SRDS OR GMID OR RMA OR Mergent OR PsycTests OR Photoshop OR "Adobe Illustrator" OR InDesign OR "Adobe Premier Pro" OR NYT OR WSJ OR "Value Line" OR "Project Muse" OR "Thomson One" OR "Business Source Premier" OR "Project Muse" OR "Academic Search Complete" OR "IBIS World" OR "Standard & Poor's" OR "LA Times" OR "Los Angeles Times" OR "NY Times" OR "New York Times" OR "Wall Street Journal" OR "Gale Virtual Reference" OR EconLit OR PsycINFO OR PsycARTICLES OR SportDiscus OR PubMed OR ScienceDirect OR Factiva OR EconLit OR eMarketer OR "Emerald Management" OR "eStatement Studies" OR Factiva OR "IBIS World" OR NBER OR OxResearch OR PrivCo OR ThomsonOne OR "Health Source" OR PsychiatryOnline OR PsycTests OR ScienceDirect OR "Alt Health Watch" OR BioOne OR eMarketer OR e-Marketer OR GFK OR MRI OR "University Reporter" OR "Mass Media Complete" OR AdSpender OR "Ad$pender" OR SportDiscus

Resources—Stemmed words search
"print journal" OR "print journals" OR "electronic journal" OR "e-journal" OR "academic journal" OR "academic journals" OR "peer review" OR "peer-review" OR "peer reviewed" OR "peer-reviewed" OR "scholarly journal" OR "scholarly journals" OR "scholarly article" OR "scholarly articles" OR "reference book" OR "reference books" OR "reference material" OR "reference materials" OR "trade publication" OR "trade publications" OR "historical news" OR "historical newspapers" OR "electronic resource" OR "electronic resources" OR "journal article" OR microfilm OR microfiche OR microform OR dictionary OR encyclopedia OR ebook OR e-book OR newspaper OR magazine OR periodical

Resources 2—Exact search
"printer library"~5

Resources 3—Exact search
"tutor library"~5

Explicit

Spaces and People—Exact search
library OR Payson OR Kresge OR iPoint OR ACE OR librarian OR ["insert librarian's name"] OR "reference desk" OR "circulation desk" OR "circ desk" OR "checkout desk" OR

"front desk" OR "help desk" OR "special collections" OR "digital learning lab" OR "academic center for excellence" OR "study room" OR "study rooms" OR "library computers"

Services—Stemmed words search
Contentdm OR database OR selectedworks OR e-reserve OR worldcat OR "course reserve" OR "class reserve" OR "selected works" OR "library database" OR "library databases" OR "library research" OR "library assignment" OR "research database" OR "research databases" OR "interlibrary loan" OR "inter-library loan" OR "inter library loan" OR "digital collections" OR "digital commons" OR "electronic reserve" OR "university archives" OR "library.pepperdine.edu" OR "library website" OR "library catalog" OR "library visit" OR "library instruction" OR "library class" OR "research day" OR "research visit" OR "writing center" OR "writing lab" OR "speech lab" OR "media mentor"

Services 2—Exact search
"reserve library"~5

Research

No Evidence of Research—Stemmed words search
paper OR essay OR "term paper" NOT "research paper" NOT "research papers" NOT "research project" NOT "research essay"

Some Research Evidence—Exact search
"list of references" OR "references list" OR "reference list" OR "works cited" OR "works consulted" OR "outside source" OR "outside sources" OR "sources outside" OR "source outside" OR "argumentative paper" OR "pro/con paper" OR "pro-con paper" OR bibliography NOT "annotated bibliography" NOT "annotated bibliographies" NOT "research paper" NOT "research papers" NOT "research project" NOT "research essay"

Conclusive Research Evidence—Exact search
"research paper" OR "research papers" OR "research project" OR "research essay" OR "research assignment" OR "annotated bibliography" OR "annotated bibliographies" OR "lit review" OR "literature review"

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