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Undergraduate Research Needs: Faculty-Librarian Collaboration to Improve Information Literacy in Policy Papers

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ABSTRACT

To improve the quality of semester-long policy projects of upper-division political science students, a faculty member and research librarian collaborated to reframe the assignment in hopes of improving students' research skills and information literacy, revising the traditional one-way model of faculty sending students to the library to get information. The outcomes over the course of two semesters have been promising. Citations in two sets of student papers showed a remarkable increase in the number and quality of sources used. This suggests that when faculty work with librarians throughout the semester, such collaboration can improve students' information literacy and thus their coursework and overall learning.

KEYWORDS

Undergraduate research, research skills, information literacy, faculty-librarian collaboration, simulation, policy papers

With the opening of every semester, we faculty experience renewed hope that it will be this semester that our carefully devised research assignments will result in final projects that meet our expectations. But we are frequently disappointed, as we accept the reality that no matter how hard we work to scaffold an effective research project, something is still missing. We point to many reasons why student projects underwhelm us, from blaming tech-

nology (cf. Rothenberg, 1998), to lamenting the disengaged and lazy student (cf. Bain, 2004; Bauerlein, 2008; Weimer, 2013), to wishing there were more time in the semester. There is no simple answer to this conundrum, but faculty self-reflection can add to the solutions we try.

After many semesters of teaching an upper-division political science elective in environmental policy and growing frustrated with the

results of a semester-long policy project, it occurred to one of us (Michelle Pautz) that a significant part of the problem was the type of sources and kinds of information that students were utilizing. As a result, a collaboration was started with the political science reference librarian (Heidi Gauder), aiming to improve student research skills. Instead of following the traditional model faculty sending students to the library to get information (cf. Marfleet & Dille, 2005), we began working together before the semester to revamp the entire policy project assignment, and we maintained those collaborative efforts throughout the semester. So far, we have been pleased with the outcomes, which has continued over two semesters in an environmental policy course. Based on our experience, we believe that when faculty and reference librarians work together throughout the semester, the result could potentially improve students' information literacy, their final writing projects, and ultimately their overall learning.

In this article, we discuss the project assignment and origins of our collaboration, situating our efforts in the broader literature about faculty-librarian collaboration and information literacy. We then describe the results of our work over several semesters as well as the specific environmental policy course and the semester-long project, detailing project results and discussing our information literacy assessment efforts to date. The final section turns to lessons learned and additional modifications we recommend for the future. While the project assignment under discussion here takes place in an environmental policy course, the project parameters could easily be adapted to any topical or applied policy course, offering broader implications for the teaching of public policy.

COLLABORATIONS BETWEEN FACULTY AND LIBRARIANS

The origins of our collaboration began after many semesters of trial and error with one course. Once a year, the faculty member typically teaches an upper-division environmental policy seminar in the Political Science Department of

a midsized, comprehensive, private Catholic university. Among the course's student learning outcomes are the ability to conduct policy research, analyze a particular environmental problem, craft a clear and concise policy option to address the problem, as well as to improve critical thinking skills and analytical writing capabilities. Although this course is an upper-division political science elective, it attracts a variety of students, including political science majors taking an advanced policy elective, environmental studies students interested in the topical area, and many students (sometimes more than half of the typical enrollment of 25) from the natural sciences and engineering programs who take this course to fulfill a general education requirement.¹ Often, this latter group has little to no background in government or public policy, as the course has no prerequisite. Student library research skills are likewise uneven. Many students have had at least a basic introduction to the scholarly research process and have passing familiarity with at least one library database, but few enter this course with the information literacy skills needed to effectively find, evaluate, and synthesize sources.

Given this student makeup, a policy project assignment was developed in which students apply the concepts and theories learned in the classroom to a particular environmental policy area that they take a position on and advocate for. This project evolved from, at first, students working individually and selecting their own policy topics to, later, students collaborating in groups to investigate a preselected, broad topic, culminating in a mock congressional committee hearing.² Making the assignment a group project arose from recognition that (1) producing a white paper of decent quality was challenging for individual students and (2) there are significant benefits to be gained from collaborative work and learning. Even so, the end results—the students' policy options white paper and hearing testimony—remained underwhelming. In particular, students seemed to struggle to understand just how complex environmental issues can be. This was evident in the lack of

diversity in the sources students used for information as well as the relevancy and appropriateness of those sources. With this realization and conversations with the political science reference librarian, a new version of the project was born.

Although it might seem an obvious collaboration—librarians and faculty—research demonstrates that cooperation is actually rare (Rader, 2002). It was not until the 1970s and 1980s that formal academic library instruction was offered and, to this day, much of that instruction is a “one-shot” session rather than an integrated, semester-long experience (Stevens & Campbell, 2008). These stand-alone sessions have obvious drawbacks, ranging from not enough time and too much content, to the difficulty in connecting pertinent library research information with the specifics of an assignment (Stevens & Campbell, 2008, p. 231). Yet, integrated library instruction leads to improvement in students’ research skills (Daugherty & Carter, 1997). Further, Buchanan (2002), Fialkoff (2001), and others note that librarians play a critical role in helping students achieve information literacy and they should be fully integrated into the curriculum. Baxter (1986) notes,

Students don’t always know the degree to which librarians can help them with their research, so one important function of library instruction is teaching students that the subject specialist/reference librarian can serve as a ‘trouble-shooter’ in the maze of access tools and an ally in the literature search process. (p. 41, quoted in Stevens & Campbell, 2008, p. 234)

More recently, Shannon and Shannon (2016) affirmed the value of an embedded librarian presence for student research efforts.

These conclusions, combined with our own experiences with students, led us to collaborate on the semester-long project, and we found that such collaboration made for a better learning experience for all involved. We posit that information literacy might even improve as a result.

Information Literacy

In political science and public policy classes, achieving student understanding of a particular policy and the nuanced arguments for and against is paramount. And to reach such understanding, the accuracy and type of information that students use are critical. Thus, students must learn how to (1) get reliable information and (2) assess the accuracy of that information. These challenges span disciplinary boundaries and are frequently discussed broadly as *information literacy*. The Association of College and Research Libraries (2000) defines information literacy as “a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information.” Marfleet and Dille (2005) go further and explain that

information literacy is the set of skills needed to find, retrieve, analyze, and use information. Information-literate people are those who have learned how to learn. They know how information is organized, where to find it and how to use it. They can also distinguish between sources of high and low quality information and therefore research more efficiently and with higher quality results. (p. 176)

This latter description is exactly what we want our policy students to be able to do as they critically engage policy issues.

While it may seem commonsensical that information literacy is essential in political science and public policy education, Williams and Evans (2008, p. 117) conclude that political science appears to lag in incorporating information literacy into its curriculum, an observation seconded by the Law and Political Science Section of the Association of College and Research Libraries (2008). Stevens and Campbell (2008) echo these assessments but note that trend may be shifting. Indeed, Turner’s (2014) case study not only incorporated information literacy as a learning outcome but did so within the context of public service values and professionalism in the public sector. Hutchins (2003) describes assessment efforts to measure student learning

in a political science course, while Stevens and Campbell (2007) describe trying to integrate information literacy into an entire political science curriculum.

Regarding strategies to achieve information literacy, Buchanan (2002) notes four: (1) students should engage in group activities that require them to seek and evaluate information, (2) faculty should provide feedback on students' work to reinforce information literacy, (3) faculty should provide opportunities for students to apply these literacy skills in their assignments, and (4) students should be challenged with a "disequilibrium" experience so that they have to evaluate and seek new information. Marfleet and Dille (2005, p. 180) suggest that specific strategies can help students achieve information literacy, including those that emphasize research-related writing and the involvement of librarians in the instructional environment. These research efforts have informed our collaboration and the modifications we have made to the semester-long policy project discussed here.

POLICY PROJECT DESIGN AND IMPLEMENTATION

At the beginning of the semester, students are introduced to the semester project, which is a policy options white paper and mock congressional hearing simulation. For the last two semesters, the topic has been set for them (the topic has been hydraulic fracturing, or "fracking")³ and the instructor assigned students to various stakeholder groups based on student preference. Each group represents that stakeholder group, researches their point of view, and develops a policy options white paper advocating for a policy solution based on the stakeholder's perspective. For example, one student group represented the American Farm Bureau Federation's perspective on fracking and, after researching this stakeholder, did not advocate a complete ban on fracking but rather recommended that energy companies publicly disclose the chemical composition of the fracking solution used to extract natural gas. To make these arguments, both in a policy options white paper and during oral testimony to a mock congressional committee,

the student group had to effectively locate, evaluate, and synthesize information and arguments. Such research efforts are at the heart of the course's collaboration with librarians.

As the literature indicates, librarians should be involved in curriculum development from the outset to achieve the best possible research outcomes. We—the faculty member and research librarian—began working together during the summer of 2013, meeting regularly to discuss research expectations and desired library session outcomes. Our collaboration extended throughout the course in both Fall semester of 2013 and Spring semester of 2015. This timeline enabled us to work through two entire semesters of the policy project and, most importantly, make modifications based on our assessment after the first semester.

LIBRARY SESSIONS AND RESOURCES

During both semesters of our collaboration, students attended a librarian-led research session; after that session, the librarian attended two different in-class project workdays during the middle of the term. These face-to-face meetings were supplemented with an online research guide (LibGuide),⁴ and the librarian was available for individual consultations as well. While there were three class periods with the librarian each semester, the sessions were structured a bit differently in each of the course's two offerings.

In the Fall 2013 course, the librarian, in collaboration with the instructor, organized the research session based on the work of the Association of College and Research Libraries (ACRL). The ACRL Information Literacy Competency Standards for Higher Education offer a framework for teaching and assessing information literacy skills. For the librarian-led research session, we used the ACRL's information literacy competency standard 1, "Determining the nature and extent of information needed," as the teaching basis. The session included a brainstorming activity in which group members outlined information that would be helpful for understanding their stakeholders and their own perspectives on the

topic. Since the students were just starting the research phase, we determined that it was important for them to articulate their information needs before conducting any searches. The intention was for students to begin thinking strategically about the arguments they would be making, to identify the information needed to support their claims, and to consider what the counterargument information needs might be. For example, the student group representing the energy trade association identified a need for data about industry job growth and carbon emissions, while the farming interest group wanted to research prior congressional testimony and the group's mission. By sharing with the class, the groups could begin to appreciate other information needs, and the librarian could add more information sources to the online research guide. In reality, however, the exercise proved challenging for students, as they struggled to understand their stakeholder organizations, and the added layer of identifying relevant information needs for the topic seemed to overwhelm several students.

In the Spring 2015 course, we scheduled the library research session just as students finished reading Tom Wilber's 2012 book, *Under the Surface*, a journalistic treatment of fracking. This text contains strong arguments and uses multiple sources and thus presented a perfectly timed opportunity to discuss strategies for using information in students' policy projects. Accordingly, this research session focused on analyzing how Wilber used different types of information to construct persuasive arguments. We used a fairly simple framework—logos, ethos, and pathos—to categorize how information might be used for different rhetorical purposes. We deliberately chose this framework because many students had already written rhetorical analyses in their English Composition classes. Also, by this time, ACRL had approved a new approach to information literacy, known as the Framework for Information Literacy for Higher Education, which takes a more conceptual approach.⁵ This research session focused on the idea that authority is constructed and contextual.

The session then addressed how different information sources could help support arguments in various rhetorical ways, as students prepared their testimony for the mock congressional hearing. For example, students who advocated on behalf of the energy industry considered using sources that pointed to scientific studies or data that supported the industry's positions, such as statistics about economic growth; the environmental interest group, using pathos as a rhetorical technique, searched for newspaper reports about negative health effects of fracking or instances of tap water catching on fire due to the alleged methane seeping from the fracking site. Only after the students analyzed Wilber's use of information and then brainstormed research needs for their own work did we then cover information sources and searching techniques, much of which we had already incorporated in the online research guide.

We recognize the importance of not making these library sessions "stand-alone" research skills training. Instead, we acknowledge the importance of repeated efforts and sessions devoted to helping students build their information literacy skills, with the goal of improving policy papers and the testimony at the mock congressional hearing. Therefore, in each semester, we scheduled two workshop days after the library research session. We gave students the entire class period to work in their stakeholder groups, and both the instructor and librarian helped the students with whatever questions or concerns they uncovered as they worked. For example, when the congressional committee group was trying to better understand their representative districts, the librarian was able to walk the students through Social Explorer, a demographic database that includes US Census information for congressional districts.

These workshop sessions were useful for several reasons, and the students and we found the experience beneficial. First, students rarely have questions in a research instruction session, but when students spend time earnestly working on a project, they have a lot of questions. By having workshop sessions during class time, we

were able to help students immediately address their questions. The time leading up to the workshop sessions also allowed each student group to consider their specific information needs. Second, for any group project, scheduling time outside of class is often challenging, and the class-time workshop sessions ensured that groups were working productively early in the semester and that any issues could be addressed sooner rather than later. Finally, the students appreciated having unstructured class time to work on their projects as they saw fit.

PROJECT ASSESSMENT METHODOLOGY

At the end of each semester, we were anxious to examine whether or not the faculty-librarian collaboration improved the quality of the policy project's deliverables and of students' information literacy. For assessment measures, we focused on the number and kinds of sources the students used. We analyzed students' policy options white papers and how they compared across the two semesters. We wanted students to have demonstrated their ability to locate and utilize diverse sources of information.

The written component of the project is a policy options white paper, in preparation for a mock congressional hearing. It is both a research paper and a persuasive argument paper advocating a certain policy position. To be effective, students need to use a variety of sources as well as multiple rhetorical approaches: journal articles from experts, information from news sources for background information, position papers from advocacy groups, and federal government information and data.

To assess information literacy skills, we conducted a citation analysis of the final papers from both semesters, a common means of assessment. Carbery and Leahy (2015) summarize use of this methodology for assessing the effectiveness of information literacy instruction, while sharing their own experiences of using annotated bibliographies from first-year students, much like Emmons and Martin (2002). Gilbert, Knutson, and Gilbert (2012) employed citation analysis as part of a larger assessment effort for

a political science course, although the study's source categories were fairly broad (search engine, course website, discussion with professor, discussion with reference librarian). Robinson and Schlegl's (2004) citation coding schema was more sophisticated but focused more on differentiating scholarly from popular sources.

We expanded our coding schema further. Because our students were also likely using rhetorical strategies to appeal to their mock congressional committee, they would be using sources not necessarily appropriate for an academic research paper. Sources would likely be heavily online-dependent, so we wanted to pinpoint the kind of webpages students were citing. Knowing whether the cited source was an environmental impact statement, a blog post, a press release, or something else was critical for our assessment. As a result, our coding schema included three categories: name of corporate source or publisher (specific), source category (broad), and item type (specific). The source or publisher name was generally the organization that provided the information. We then organized individual sources into broader categories, including federal government, academic journals, magazines, trade associations, and others. Finally, we categorized citations by information format, including press releases, scholarly articles, white papers, government documents, and others.

For each citation, then, we assigned three categories of criteria (see Table 1). For example, a *Huffington Post* citation would include *Huffington Post* as the specific source name, a news organization as the broad type of source category, and the specific information item type as a blog post. If the citation information was insufficient to determine the source/publisher or information item type, then we checked the citation online to verify. We applied this framework to white papers from both semesters and reviewed our application of assessment criteria for consistency. The stakeholder groups remained mostly the same in both semesters, which allowed for comparison at both the class level and by stakeholder type.⁶

TABLE 1.
Examples of Coding Schema for Citations

Citation	Name of corporate, government, or other publisher source	Source category	What is it?
US EPA, (2015, March 13), "Summary of the Clean Water Act," http://www2.epa.gov/laws-regulations/summary-clean-water-act	Environmental Protection Agency	Federal government	Web page
U.S. Senate, (2013), 113th Congress, 1st Session. <i>S. 1135, To amend the Safe Drinking Water Act to repeal a certain exemption for hydraulic fracturing, and for other purposes</i> (Washington, DC: Government Printing Office)	Government Printing Office	Federal government	Senate bill
M. Reddin, (2013, November 20), "These members of Congress are bankrolled by the fracking industry," <i>Mother Jones</i> , http://www.motherjones.com/blue-marble/2013/11/chart-these-members-of-congress-are-bankrolled-by-the-fracking-industry	<i>Mother Jones</i>	Magazine	Popular article
D. C. Holzman (2011), "Methane found in well water near fracking sites," <i>Environmental Health Perspectives</i> , 119(7), a289. doi:10.1289/ehp.119-a289	<i>Environmental Health Perspectives</i>	Journal	Scholarly article
ANGA, (2015), "Cutting natural gas industry methane emissions," <i>America's Natural Gas Alliance</i> , http://anga.us/about-us/our-members#.VMI4ZV7F_iR	American Natural Gas Alliance	Trade association	Web page
S. Glickman, (2015), "Natural gas distribution," <i>S&P Capital IQ</i>	Standard & Poors	Proprietary database	Industry survey
R. L. Kosnik, (2007), <i>The oil and gas industry's exclusions and exemptions to major environmental statutes</i> , Oil and Gas Accountability Project,	Oil and Gas Accountability Project	Nonprofit organization	Report
Halliburton Fluids Disclosure, (2014, December 16), http://www.halliburton.com/public/projects/pub-sdata/Hydraulic_Fracturing/fluids_disclosure.html	Halliburton	Business	Web page

Our approach has limitations; namely, we looked only at final effort, not at how students located and evaluated information. Citation analysis provides an indication of the sources used, which may be used to evaluate research outcomes associated with the course. However, a citation analysis does not measure any change in skill development or provide a baseline for how much knowledge students had prior to taking the class. Additionally, since ours was a group project in both semesters, we are unable to gather insights about skill development at the student level; rather, our unit of analysis is the group level (groups typically consisted of four or five students).

CITATION ANALYSIS RESULTS

In light of the two different approaches to library research instruction we used in the two semesters, we were eager to assess differences in number of citations and type of sources used. Table 2 presents the total number of citations for the five stakeholder groups’ policy options white papers across the two semesters.

The number of citations from one semester to the next nearly doubled. Disappointed in the overall level of research after the Fall 2013 course, the faculty member spent more time in the Spring 2015 class discussing the project and underscoring the research expectations of an upper-division course. Additionally, the library research instruction session in the 2015 semester emphasized the need for source variety in making an effective argument, which may have affected the final citation count. Finally, simple differences in class composition from one semester to the next may have also mattered.

In addition to the sheer number of sources students used in their research, we were also interested in the types of sources employed and whether there was a noticeable diversification of those sources between the semesters. Table 3 shows the kinds of sources students utilized in their papers.

In both semesters, students relied most heavily on sources from the federal government and nonprofit organizations, along with those from news organizations and trade associations. Both nonprofit organizations and trade organizations are important constituencies for the issue of fracking, so we found the inclusion of these source types appropriate. Academic journal articles represented only 8% of sources cited over both semesters. Although we had hoped that students would be able to locate and summarize relevant scientific studies and policy analyses, they relied more on study summaries provided by news organizations and government websites. Given the accessibility of information on the contentious topic of fracking, we were not that surprised by the source distribution. We were, however, pleasantly surprised to see students’ reliance on federal government data, given the challenges that navigating federal government websites can present.

In total, the five groups in the Fall semester used only 61 sources, while the five groups in the Spring semester used 115 sources—nearly double. Although this significant increase in the number of citations does not necessarily indicate an increase in student information literacy or use of more appropriate policy papers, this aggregate total was one measure we were

TABLE 2.
Total Citations in Policy Options White Papers, by Semester

	Fall Semester 2013	Spring Semester 2015	Total
Number of citations	61	115	176

TABLE 3.
Citation by Source Category, by Semester

Type of sponsor	Fall Semester 2014	Spring Semester 2015	Total
Book	1	2	3
Business website	6	6	12
Commercial website	0	4	4
Data website	2	4	6
Government, federal	12	32	44
Government, state	4	1	5
Journal	8	6	14
Proprietary database	0	7	7
Magazine	3	6	9
Miscellaneous	1	2	3
News organization	1	16	17
Nonprofit organization	11	14	25
Postsecondary institution	2	3	5
Regional group/organization	4	0	4
Trade association	6	10	16
Wiki	0	2	2
Total	61	115	176

TABLE 4.
Average Number of Citations and Source Types Consulted per Student Group, by Semester

	Fall Semester 2013	Spring Semester 2015
Average number of citations	12.2	23.0
Average number of source types consulted	6.6	9.4

able to operationalize as we assessed our faculty-librarian collaboration. Additionally, we both concluded independently that on the whole, the papers in the second semester were far better than the first. And overall, students in the Spring semester used more sources from a wide range of sponsors.

By way of summary, Table 4 captures the differences in citation use that we observed between the two semesters. The average number of citations used by student groups nearly doubled in the second semester, and the average number of source types groups used increased by 50%. Of course, these numbers are not proof of improved information literacy, but they are encouraging in terms of students' utilization of more research and more types of sources.

LESSONS LEARNED AND FUTURE PLANS

We were pleased with our efforts and modifications in the second semester, Spring 2015, even as we look to improve our work in the future. We see value in continuing the semester-long collaboration between faculty member and librarian, rather than the typical stand-alone library visit. We believe that students also recognized the value of research, and several met with the librarian for one-on-one consultations.

Although multiple factors contributed to a more successful Spring 2015 course, we believe that connecting rhetorical approaches to required reading and research helped students. By an-

alyzing Wilber's arguments, students not only identified a research approach that could be easily modeled but also achieved a greater understanding of the need for a variety of information sources. This kind of conceptual approach was lacking in the Fall semester library research session, which asked students to conduct an inventory of information needs for their interest group, a task that seemed to overwhelm them.

There were no quotas or specific requirements for the number of sources needed for students' research papers.⁷ However, it is interesting to note that the papers with the lowest grades in both semesters also had the lowest number of citations. To ensure that all students are working toward locating and evaluating a sufficient number of sources, one future plan is to incorporate a more scaffolded approach by adding an annotated bibliography assignment after the library research session. This assignment would serve multiple purposes: we would be able to quickly see if students were facing research challenges or were having difficulty formulating appropriate arguments; we would be able to remediate problems with citation mechanics; and this assignment could help students identify how sources might be employed in a final paper for each of the rhetorical strategies discussed during the library research session. Overall, such an additional assignment would help us ascertain information literacy skills at the individual level.

This annotated bibliography assignment could then establish the groundwork for another aspect of information literacy that we want to investigate; namely, students' ability to synthesize source information into their white papers. Because we discussed in class various rhetorical strategies (logos, pathos, and ethos) as a basis for information gathering, our next iteration of this course could include reading through student papers independently and coding rhetorical strategies based on information type used. We would hope to see a wider range of rhetorical strategies from a broader range of sources, demonstrating students' effort to make a convincing argument in the policy white paper.

We also looked at student feedback surveys about the library research session to gauge student perceptions of new skill acquisition, and we tracked students' use of the online research guide to see how often they chose to use library-selected resources. These measures provided us with a holistic picture of skill development, but their utility was supplemental, as our focus for this endeavor was the analysis of citations. Student feedback was generally positive and thoughtful. Using the one-minute-paper technique, we asked students to reflect on what they had learned during the library research session and to consider what they thought would be the most difficult part of their upcoming research. Students noted the usefulness of the online research guide and of specific databases like Social Explorer, as well as the necessity of evaluating a source's credibility. One student noted,

One of the most useful things I learned are the various sources that are available. Before I had been simply Googling to find things like polls and statistics, when I could have been using the library resources. I learned how to find congressional documents more efficiently as opposed to stumbling through Google searches.

Other students commented potential research roadblocks, including "Making sure that the people I am citing are credible" and "Forcing myself to break my habit of just Googling."

The research papers and course data contribute to our understanding of student information literacy development, but other factors beyond our control affect the research performance of our students, in both semesters under review.

CONCLUSION

We learned much from this collaboration and we intend to collaborate in the future, both on the policy project discussed here and other endeavors. Librarians and faculty members need to look to each other as partners and get beyond the stand-alone approach that has historically dominated this relationship. From each of our perspectives, there was much to observe and learn.

From the reference librarian's perspective, we recognize the difficulty of incorporating research skills acquisition and information literacy development as course outcomes, when there is so much content to cover. However, librarians are willing collaborators in helping students become better researchers, which includes getting students to think more deliberately about the information they seek and how they intend to use that information. Many librarians welcome the opportunity to assist, whether by suggesting information resources, building online course guides, conducting assessments within the campus learning management system, teaching a research session, or meeting with students during class workshops. Faculty need not think they are solely responsible for teaching students how to conduct research. The research landscape is shifting, and librarians welcome the chance to share changes with their constituents; what made this particular collaboration so rewarding was the opportunity for students, faculty, and librarians to work together on a regular and ongoing basis.

As campus partners, librarians are also deeply invested in student learning, not only from a teaching standpoint but also in terms of assessing how well learning happens. Librarians can provide support, whether in using campus assessment tools or by utilizing measures devised by the library community. For example, citation analysis is an effective tool for understanding

what students chose to use for research; in particular, this article offers guidance on how librarians and faculty might construct a coding schema for a citation analysis. Additional measures are needed to get a better picture of growth in student learning over time, such as pre- and post-tests. Other examples include minute papers/reflections, which can help shed light on student perceptions, and analytics from online guides, which can help document student use of preferred resources.⁸

From the perspective of the faculty member, this collaboration was a rewarding experience. It was very useful to work with the reference librarian while asking students to do the same. It can be difficult for faculty to keep up with the latest library databases, tools, and other resources, so this close collaboration with a librarian can help faculty members stay up to date. Additionally, as the old adage goes, two heads are better than one, and during the class workshop session, it was very productive to have both the faculty member and librarian available to help students. Student group discussions in which the faculty member and librarian were present resulted in productive brainstorming. Further, students did a better job in the second semester, when there was more faculty-librarian collaboration. Students' papers were better, the testimony during the mock congressional hearing was better, and learning was better. Finally, it was useful to work through an assignment, objectives, and student learning outcomes with the librarian to test out ideas and determine what seemed feasible. And the faculty-librarian collaboration demonstrated to students just how important research is for achieving a successful semester policy project. Of course, it is impossible to say definitively that the collaboration resulted in better outcomes, but it definitely contributed to improvements.

Ultimately, we strongly believe that our collaboration was productive. We encourage all faculty members working on an extensive research project to work in partnership with librarians, because librarians do add value.

NOTES

- 1 Additionally, from time to time this course is co-listed as an elective for graduate students in the Master of Public Administration program. The few graduate students who do enroll have additional course requirements.
- 2 For a discussion of the project's particulars, please see Rinfret and Pautz (2015).
- 3 An established topic has proven useful, enabling the instructor and librarian to provide some foundational knowledge about the topic and ensure that the topic is manageable for this assignment. Tackling climate change, for example, would be far too broad for the confines of this simulation.
- 4 The online research guide uses the Springshare LibGuide authoring software (<http://libguides.udayton.edu>). The online research guide is organized to help students navigate relevant federal agencies and information, plus other information sources, such as statistics, journal articles, and citizen response, which students would likely need to include in their research papers. Because the guide organizes information sources, our library research sessions were less about the mechanics of searching and more focused on higher-order research concepts.
- 5 The Association of College and Research Libraries (2015) describes this frame thusly: "Information resources reflect their creators' expertise and credibility, and are evaluated based on the information need and the context in which the information will be used. Authority is constructed in that various communities may recognize different types of authority. It is contextual in that the information need may help to determine the level of authority required."
- 6 Simulations in both semesters included student groups representing a relevant federal agency (US Environmental Protection Agency), a business interest/trade group, an environmental interest group, and a farming interest group. Both semesters also included a fictional environmental interest group (as students were given the option of creating their own public interest group).
- 7 It might be worth considering a requirement for a minimum number of sources and/or a minimum number of different types of sources in a future

semester, which agrees with the findings of Robinson and Schlegl (2004).

- 8 Library literature is rich in describing teaching approaches for conducting research; we provide only a few examples here. At the program level, librarians can also help departments determine the best placement for library instruction or embedded librarians within a program (Shannon & Shannon, 2014).

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