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Exploring data literacy via a librarian-faculty learning community: A case study

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ABSTRACT

Faculty learning communities (FLCs) are year-long professional development opportunities available at many higher education institutions in the United States. While the literature reflects some librarian engagement with FLCs, it seems limited primarily to areas of traditional librarian expertise such as information literacy and outreach. This article describes a case study of a librarian-facilitated FLC focused on data literacy, which resulted in the development of a teaching toolkit, library-led data literacy instruction, and ongoing collaborations between librarians and faculty. The FLC structure proved to be a valuable framework that facilitated collaborative learning in topics relevant to both disciplinary faculty and librarians. In addition, the tangible work products produced by the FLC serve to advance the strategic, curricular goals of the university while giving the library an opportunity to showcase its value in the academic lifecycle.

Introduction

Faculty learning communities (FLCs) are year-long faculty professional development opportunities offered by centers for teaching and learning at higher education institutions across the United States. First established in 1962 at the University of Michigan, contemporary FLCs are meant to foster multidisciplinary communities of practice among faculty around issues germane to teaching and student learning (Cox & Richlin, 2004). While there is a considerable amount of literature on FLCs, librarians are not often mentioned. In cases where librarians lead FLCs, it tends to be in topics such as information literacy, where librarians are traditionally seen as experts. This case study will present the results of a librarian-led FLC on data literacy that was meant to facilitate librarians and faculty working together to learn more about data literacy, better understand the various disciplinary approaches to teaching data literacy, and identify campus needs for library support in this area.

College students are bombarded with data in every aspect of their lives, yet many are not prepared to critically evaluate the many aspects of data quality, including provenance and how it is organized, presented, and used to make decisions. While data-related instruction was once reserved for students majoring in social or natural sciences that require courses in statistics and data analysis, the advent of big data across academic disciplines has resulted in the need for all students to have some facility for reading and interpreting data visualizations and

understanding the underlying data. As a result, data literacy has joined information literacy to become a core component of undergraduate education.

Librarians at the University of South Florida St. Petersburg (USFSP) collaborate with faculty in the delivery of quality information literacy programs, including one-shot library research workshops and embedded librarian instruction. Elements of data literacy have long been integrated into library instruction as part of the for-credit information literacy course, workshops taught in relevant upper-level and graduate courses, online tutorials, and LibGuides. Coinciding with these efforts, the university's general education curriculum was recently revised to designate information and data literacy as a central component, which has resulted in additional faculty interest in these topics.

Beyond information literacy endeavors, USFSP librarians have also considered how the library may support faculty in data management and other data-related initiatives. A librarian-led data needs assessment in 2014 included interviews with research faculty from varied disciplines—science, education, business, social sciences, and the humanities (Stamatoplos, Neville, & Henry, 2016). Faculty were asked how important it was for them to have access to other researchers' raw data. Many of the researchers felt they had more than enough of their own data but wanted additional data sets for student use. One professor who works extensively with undergraduate student researchers commented on the value of having additional eyes looking at the data. This researcher has observed the students' ability to see interesting new ideas

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or combinations. More recently, faculty have commented that students must be comfortable interpreting raw and published research data but also need the ability to use that data to communicate new ideas to other researchers and lay audiences. Taken together, these comments reflect strong faculty interest in helping students find and evaluate suitable datasets for research. Based on these discussions, the librarians began seeking ways to expand support for data literacy instruction. The USFSP Center for Innovative Teaching and Learning launched its Faculty Learning Community (FLC) program in 2017. To build on the findings relating to faculty data-related needs, two librarians successfully proposed a 2018–2019 FLC on data literacy across the curriculum.

This case study will present the results of a librarian-led FLC on data literacy that not only worked to increase data literacy among undergraduate students but also allowed librarians to more fully integrate into the culture of teaching and learning with disciplinary faculty at the university. The FLC served to advance the campus conversation about data literacy and facilitate a rich collaborative experience for all involved. Librarians' active involvement in FLCs can result in integration of library instruction across the curriculum, thereby improving student engagement and learning and contributing to the strategic directives of the institution.

Literature review

Librarian involvement with faculty learning communities

FLCs are offered at colleges and universities by academic units that provide professional development opportunities for faculty across departments. FLCs are made up of multidisciplinary groups of faculty who volunteer to participate due to a common interest in improving an institutional program or trying out teaching innovations. They are typically implemented via a year-long, self-directed curriculum developed to address the individual and group goals of the members (Cox, Richlin, & Essington, 2012). FLCs may be cohort-based, such as an early-career FLC meant to mentor faculty new to an institution (Cox, 2013). Other FLCs may be thematic in nature, as in a FLC that aimed to increase faculty understanding and use of evidence-based instructional practices in STEM courses (Frost et al., 2018).

Although faculty learning communities have operated for several decades, the scholarly literature focusing on FLCs in higher education make little mention of librarian involvement. A recent survey of directors of teaching and learning centers at U.S. higher education institutions explored the nature and extent of the partnerships between librarians and Centers for Teaching and Learning. Mader and Gibson (2019) interviewed a subset of survey respondents and found that perceptions of librarian impact was positive but more could be done. These authors advocated a change agenda that calls for librarians to:

- (1) Expand beyond service roles such as “occasional participation in teaching-related workshops” toward a campus educator role that includes thinking, speaking, presenting, and writing “about student learning with colleagues beyond the library.”
- (2) “Cultivate networks of colleagues and a systems perspective...”
- (3) Engage “in faculty learning communities, where they would both enhance their pedagogical knowledge and become known for their unique perspective and expertise through being actively involved in longer-term relationships with faculty.”

The library literature first mentions librarian participation in faculty learning communities in the late 1990s, as one way librarians could partner with campus teaching centers (Jacobson, 2001). Since then, librarians have led FLCs on a variety of topics such as information literacy (Resnis, Gibson, Hartsell-Gundy, & Misco, 2010; VanderPol & Swanson, 2013) and scholarly communication (Bazeley, Waller, & Resnis, 2014). VanderPol and Swanson (2013) developed and recruited faculty to participate in a librarian-led FLC structured around

information literacy standards, with the goal of assisting faculty in adding information literacy to an assignment or course. Resnis et al. (2010) present a case study of the development of a recurring FLC meant to embed information literacy, or “student research literacy,” in courses across the curriculum. Over the course of six years, this FLC led by librarians also included a major assessment initiative and involved more than 50 faculty members. Once this long-running FLC was retired, librarians at Ohio University leveraged their previous success by developing a FLC to educate members of the academic community about scholarly communication issues (Bazeley et al., 2014). Librarians have also facilitated FLCs as part of library outreach and community building efforts, such as a librarian-established FLC meant to introduce new medical school faculty to the scholarship of teaching and learning (Mi, 2015). While these are excellent examples of librarian leadership and librarian-faculty collaboration, each of these FLCs are centered on topics in which librarians typically have high levels of expertise, which affects the group dynamic and may limit the librarians' opportunity for collaborative learning alongside faculty.

Despite DeEtta Jones's call to action for library workers to “build capacity for ongoing learning and growth” at the 2019 Association of College & Research Librarians (ACRL) Conference (Jones, 2019), there are fewer examples of librarian proposal and involvement in FLCs for their own professional development. Bolan, Bellamy, Rolheiser, Szurmak, and Vine (2017) write of a partnership between the University of Toronto's Centre for Teaching Support & Innovation and University of Toronto Libraries meant to provide professional development for librarians alongside faculty in support of their teaching mission, but even this valuable opportunity limited participation to six librarians and twelve regular faculty while relegating librarian-specific teaching context and strategies to post-class meetings. Just as Rossing and Lavitt (2016) characterize faculty as “neglected learners,” so too are librarians. Mader and Gibson (2019) make a strong case that while librarians and faculty each bring their distinct disciplinary expertise, both groups often “share [the] experience of not having been trained in pedagogy,” and can find value in learning together.

Data literacy instruction

Discussions regarding the formal definition of data literacy are ongoing, and as in the case of information literacy, disciplinary experts may choose to devise a contextual understanding of data literacy. Librarians have often used Milo Shield's work on information, statistical, and data literacy (2004, 2010) as their starting point as they begin to develop data-related instruction, defining data literacy as the ability to “access, assess, manipulate, summarize, and present data.” It is particularly relevant that Schield deems data literacy “an essential component of both information literacy and statistical literacy” (Schield, 2004, p. 8), while recent work from interdisciplinary initiatives such as the Data-Pop Alliance situates data literacy as the central concept encompassing an array of sub-literacies (i.e., media, statistical, scientific computational, information, and digital) (Bhargava et al., 2015).

Data literacy continues to be a growth opportunity for librarian engagement and influence on teaching and learning in higher education. Librarians are increasingly involved with a wide range of data-related initiatives, including campus-wide assessments to determine needs for data-related instruction (Carlson, Fosmire, & Nelson, 2011; Hogenboom, Phillips, & Henseley, 2011). New frameworks have built on established information literacy frameworks to develop and teach data-related competencies (Maybee & Zilinski, 2015; Prado & Marzal, 2013), some of which are meant primarily for graduate education (Carlson & Johnston, 2015; Prado & Marzal, 2013) while others are beginning to focus on undergraduate students (Shorish, 2015).

While many research intensive universities have added functional librarian positions that require specialized expertise in data-related services (e.g., Librarian Lisa Zilinski at Carnegie Mellon University, co-

author of [Maybe & Zilinski, 2015](#)), 4-year and Master's level regional college and university libraries often do not have functional specialist librarian positions and instead rely on a strong team of liaison librarians to contribute in these areas ([McBurney & Kubas, 2019](#)). At the ACRL 2019 conference, Dr. Sheila Corral led a roundtable discussion on "Repositioning Data Literacy as a Mission-Critical Competence," using [Bhargava et al.](#)'s visualization of data literacy as an interdisciplinary multi-literacy construct to argue that librarians should be engaging in this conversation ([Corral, 2019](#)).

Library alignment with strategic university priorities

ACRL's 2017 report on *Academic Library Impact* found that existing librarian research on aligning library assessments with institutional mission and strategy tend to be theoretical rather than empirical in nature ([Connaway, Harvey, Kitzie, & Mikitish, 2017](#)), and suggests that librarians and researchers focus more on this key theme. Because student success is at the heart of most college and university missions, it makes sense for librarians to find ways to communicate the links between library endeavors and student retention and success. A review of the literature undertaken by [Kuh, Kinzie, Buckley, Bridges, and Hayek \(2006\)](#) on the topic of student success found that pedagogical approaches such as active and collaborative learning lead to positive student-faculty interactions and other student engagement opportunities that contribute to student success.

[Jaguszewski & Williams' \(2013\)](#) report outlines a major shift in liaison librarian roles and speaks to the imperative of librarian collaborations beyond the library. Teaching collaborations that extend beyond single in-person workshops or guest lectures are especially valuable. Librarians' physical presence in the classroom has limited scalability, even in small campus environments. Deep librarian-faculty teaching collaborations have the potential to broaden impact on student learning and success, and can also serve to move librarian engagement away from "a service model" toward "an integration and partnership model" to advance mission-critical goals ([Connaway et al., 2017](#)).

Case study

This university is a public Master's level institution serving approximately 4500 students with Colleges of Arts and Sciences, Business, and Education. A data-related needs assessment undertaken by liaison librarians found a strong faculty interest in incorporating data literacy into the curriculum across disciplines ([Stamatoplos et al., 2016](#)). In addition, information and data literacy is a central component of the enhanced general education curriculum that was adopted in 2018 (see [Fig. 1](#)).

FLC proposal and recruitment

Housed in the library, the USFSP Center for Innovation in Teaching and Learning (CITL) was created in 2016 to "enhance teaching and learning through evidence-based and innovative practices" ([Nelson Poynter Memorial Library, 2019](#)). CITL began offering FLCs in 2017 and issues calls for proposals each spring. Ideally, FLCs are comprised of eight to ten members; affiliate members such as students and expert consultants may also participate. FLCs are implemented in an academic year, and receive \$5000 for programming and supplies as well as a \$500 stipend for meeting-related refreshments. In return, members of the FLC are expected to develop a poster presentation and participate in two campus faculty development events.

Two librarians drafted a preliminary proposal to co-facilitate the Data Literacy Across the Curriculum FLC in March 2018 and informally emailed a brief abstract to individual faculty members across disciplines to gauge their interest in participating. Fifteen faculty members expressed interest, and agreed to have their names included with the final

proposal. The proposal used the framework of the research cycle and included the following data-related topics: data production, data analysis and visualization, data ethics, finding and evaluating existing data sets as well as visual representations of datasets.

FLC goals

The preliminary goals of the FLC were to:

- Identify or create teaching activities that help students develop critical thinking and data literacy.
- Identify and compile a library of existing local data sets that can be used in teaching activities that promote critical thinking and data literacy.
- Identify and evaluate data productivity tools or software that may be useful for students regardless of discipline.

Once the proposal was approved, it was distributed by the co-facilitators to each of the faculty members who initially expressed interest along with a formal invitation to participate. CITL enhanced the recruitment effort by distributing to all full-time instructional faculty a call for participation in one of the four FLCs that were approved for the 2018–19 academic year. During this time frame, the co-facilitators attended an orientation workshop that provided guidelines regarding FLC logistics and work product expectations. After attrition due to scheduling and workload issues, the FLC was launched with eight members including facilitators in September 2018. Later additions increased the group size to 10 members. Membership in the FLC included library staff from the student technology center, faculty librarians at assistant and full ranks, and instructional faculty including Instructors, Assistant Professors, and Associate Professors. In addition to library and information science, disciplinary expertise among the members included biology, criminology, environmental policy, environmental science, political science, and statistics.

FLC logistics and content

The initial FLC meeting agenda included member introductions, an overview of the FLC structure including the dual purposes of the FLC budget (i.e., larger budget for FLC programming as well as small budget for refreshments), presentation of preliminary goals, and establishment of meeting schedules and content. This agenda proved to be quite ambitious for a 90-minute lunch meeting of librarians and faculty with diverse backgrounds and goals, especially since only one group member had belonged to a previous FLC and was familiar with the structure. At the conclusion of this planning meeting, the group agreed to go forward with the preliminary goals, prioritizing the goal of identifying and evaluating data-related tools or software for student use. Most group members welcomed the inclusion of refreshments, and with careful budgeting, the \$500 stipend was fully used to provide a modest lunch at each meeting. Over the course of the year, ideas for using the \$5000 programming budget to bring in speakers or organize workshops were proposed, but the group did not reach consensus on this issue. At the conclusion of the FLC, CITL disbursed the unused funds among the co-facilitators and members in the form of transfers to each individual's professional development account, and the feedback from the members was unanimously positive.

The three remaining fall meetings were scheduled to be 90-minute lunch meetings as well, and focused on this goal via lightning talks and open discussion. FLC members and other faculty guests gave brief presentations of data analysis tools that they use in the classroom, as well as for their own research. Each FLC member presented on their preferred tool, and faculty outside of the FLC with expertise in specific tools of interest were identified and invited to present. All presentations were followed by group discussion and covered tools including Excel, JMP, Access, Voyant, Data Viz, Stata, Tableau, StatCrunch and ArcGIS.

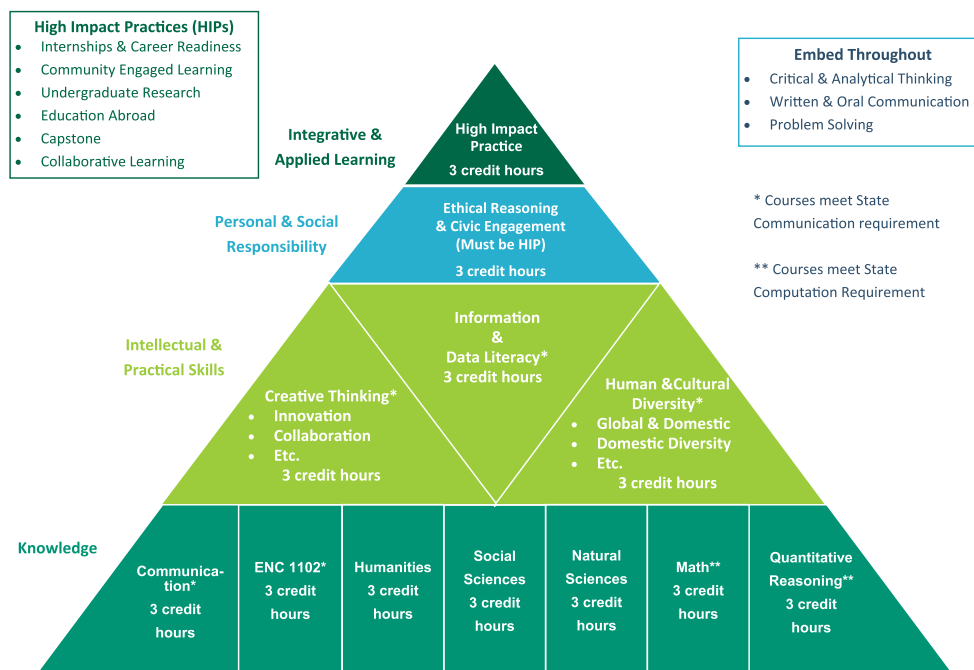


Fig. 1. Information and data literacy are central tenets of the undergraduate curriculum adopted by USFSP faculty governing body (University of South Florida, 2018).

These presentations provided a structured way for faculty and librarians to share information about their data practices as related to their teaching and research. Each meeting also included time to eat lunch and talk informally. As the meetings progressed and the group members got to know one another, the interests and goals of the group began to crystalize, and midway through the academic year, the group revisited the initial goals and revised them with an eye toward tangible work products and outcomes.

During the spring semester, the 90-minute monthly lunch meeting schedule was maintained, but the dates shifted to accommodate changes in teaching schedules. In January, an informal survey was designed by one of the librarian co-facilitators (and co-author) and sent to all faculty to get additional perspectives regarding how different data-related tools were being used across campus, both in the classroom and for faculty research. The other librarian co-facilitator (and co-author) explored the emerging scholarly literature regarding data literacy and led two brainstorming sessions during which the group built on existing research and the survey results to identify and prioritize the data literacy competencies that are most relevant for students on the campus.

The remaining spring meetings were dedicated to demonstrations of interactive classroom activities that could be employed across diverse disciplines to teach data literacy competencies at multiple levels. One common thread in the demonstrated activities is that they required students to create their own datasets or visualizations, which provides the opportunity for them to actively engage in issues relating to some of the FLC's original questions, including:

- Data creation: How do different disciplines define the term “data”? How are data collected and data sets compiled in different fields of study? Discussion topics may include creating, processing, and wrangling data sets in preparation for analysis.
- Data analysis and visualization: At what point in the research process is data transformed into information? Discussion topics may include exploratory information visualization and other modern techniques of quantitative interpretation such as data mining, text analysis, etc.

As a result of the FLC presentations and discussions, the group decided that a faculty toolkit would be a useful work product. Consequently, the group invited an instructional designer to be a guest at the final meeting of the FLC, where the final goals and work products were planned. The librarians agreed to work collaboratively with the instructional designer to develop the toolkit, and circulate this to the rest of the FLC for their input.

Results

The primary outcomes of the Data Literacy FLC were:

- Establishment of campus-specific data literacy competencies that could be used as a framework for developing and integrating data literacy content across the curriculum
- Creation of a Data Literacy Faculty Toolkit that includes a video overview of data literacy, a campus data literacy framework, and example activities that can be customized for a variety of levels and disciplinary contexts
- Addition of data literacy content into library instruction that is part of the general education curriculum
- Dissemination of scholarship of teaching and learning

University data literacy competencies

Building on the work of Carlson and Johnston (2015) and Prado and Marzal (2013), the Data Literacy FLC aimed to facilitate the development of data literacy curricula across disciplines based on campus needs. The FLC found that data analysis is a core competency that is often the primary focus of applied statistics and other required courses; as such, the group suggested that a number of data literacy skills should be incorporated in a variety of courses beyond statistics to complement training in data analysis. Fig. 2 shows an updated iteration of the framework for data literacy that was first presented at a campus symposium.

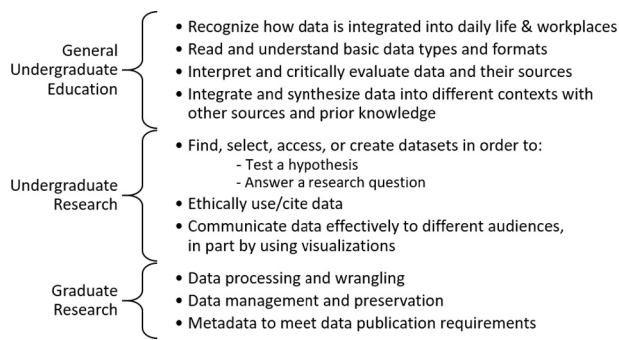


Fig. 2. Framework for data literacy competencies developed by the faculty learning community at USFSP (Adapted from Burress et al., 2019).

Data literacy teaching toolkit

A theoretical framework for data literacy is essential to cohesive curriculum development; faculty also need practical ways to integrate assignments and activities into their specific courses. To that end, the facilitators led the creation of a Data Literacy Teaching Toolkit that was published as a LibGuide on the SpringShare platform (Burress & Mann, 2019) and presented at a campus faculty development event in August 2019.

This teaching toolkit serves as a faculty resource comprised of an overview of data literacy with a video featuring several FLC members, a proposed Framework for Data Literacy at this university, and model activities that address various data literacy competencies that can be customized and deployed across the curriculum. One extensive data literacy project was contributed by a faculty member who was not able to participate in the FLC due to other commitments, but who also presented her data literacy curriculum at the campus symposium. This teaching toolkit is meant to be a dynamic resource that other faculty will contribute to as they implement and adapt assignments to suit their disciplinary context and course levels.

Integrating data literacy into the general education curriculum

As a result of taking part in the FLC, the student success librarian (a co-author) decided to integrate data literacy into the first-year student library program. First-year students are required to take a student success class in their first semester that does not include a traditional research assignment but does include time in the syllabus for a library workshop. This course seemed like a perfect opportunity to introduce a data literacy activity, which would complement the information literacy instruction that is provided in the required freshman English courses. As of the 2019 summer semester, students complete a data visualization activity in their very first university course. The student success librarian and first year program director are currently working together to integrate data literacy more fully into the course and thus start all students with a stronger understanding of data literacy concepts.

FLC scholarship and future work

The final meeting of the FLC included a reflection on the goals, clarification of work that would continue over the summer in order to complete the work products, as well as discussion of future work. Two of the three initial goals were accomplished. While there was interest in proposing a Data Literacy 2.0 FLC in order to pursue the third goal of creating a library of local datasets for use throughout the curriculum, it was determined that the group would first prioritize completion of the teaching toolkit and video, and plan to incorporate some of the example activities in courses that are scheduled for the upcoming academic year.

The value of the scholarship emerging from this FLC, including this publication, should not be overlooked. While academic librarians have long been involved with the scholarship of teaching and learning, disciplinary faculty often focus on their original fields of study for many reasons and only become engaged in the scholarship of teaching and learning after reaching specific career goals. In addition to this publication, this project has yielded a poster presentation, faculty development workshop, acceptance of a panel presentation at a fall 2019 conference, and the potential for future areas of inquiry and collaboration. Further, the collaborative relationship built among the members has led to the statistics faculty member becoming a consultant to the library in order to support future librarian research and publication.

Discussion

The librarian co-facilitators of this data literacy FLC found the experience to be rewarding and challenging beyond the investigation of data literacy. In addition to the tangible work products created to support data literacy across the curriculum, this FLC fostered librarian-faculty collaboration and yielded opportunities for library instructional initiatives and new avenues for influencing curriculum development, thereby demonstrating library value and alignment with the mission of the institution.

Collaboration with educational stakeholders

Mader and Gibson (2019) suggest that librarians “propose FLCs that focus on information literacy within the larger context of student learning.” However, the authors argue that librarians should go further and also propose FLCs in areas of teaching and learning that they themselves wish to explore. A prior campus needs assessment (Stamatoplos et al., 2016) revealed a topic that was interesting and relevant across academic departments, which attracted faculty who were very engaged in the discussions. Librarian participation in a thematic FLC that focused on a topic outside of traditional information literacy allowed for engaged librarian-faculty collaboration and an opportunity to gain valuable insights regarding disciplinary perspectives on teaching data literacy. While the literature shows librarians often stick to topics where they may already be viewed as campus experts (e.g., scholarly communication, information literacy), choosing a topic where librarians can learn along with the faculty proved to be a good choice as it provided a valuable framework for collaboration with our faculty colleagues.

The structure of the FLC included multiple venues for scholarly dissemination of the work products, including a poster presentation during the spring of 2019 and a panel discussion in the fall of 2019. These collaborative opportunities also served to foster a sense of collegiality that led to new librarian-faculty teaching collaborations, and raised awareness among faculty regarding the scholarly literature in the library and education fields.

While taking part in the FLC was a rewarding experience, it was not without its challenges. One of the biggest challenges was learning to communicate ideas effectively in a limited amount of time. FLC guidelines presume that the facilitators organize meeting logistics and keep the group moving forward toward group and individual goals, but that the group as a whole should agree upon the goals. However, because the librarian facilitators drafted preliminary goals to begin the discussions, some group members may have joined the FLC with the impression that the facilitators were experts in the topic despite the fact that the librarians had intended to use this opportunity to expand their own learning. Future FLC participants would benefit from attending a virtual orientation to the general structure and expectations of the FLC prior to the first group meeting. This would allow more time during the initial planning meeting for the group members to discuss their own backgrounds, expertise, and interests, and to use that information to

collaboratively develop learning objectives.

Bringing faculty members together from different areas of study was very rewarding but also presented its own challenges. Because each member brought diverse disciplinary perspectives regarding data literacy, the group spent a long time learning to speak each other's languages and communicate effectively. Meetings only occurred once a month and lasted for ninety minutes, and it was challenging to find regular meeting times for faculty with disparate class schedules. It was also difficult at times to keep the discussions on track. Preliminary interest from 15 faculty members dropped to a total of 10 FLC members (including the two facilitators) who committed time and energy to this initiative. Because of time constraints and obligations some members couldn't meet for the whole time. Getting work done in monthly meetings while trying to understand everyone's point of view was a challenge but eventually led to stronger collaborations. When bringing faculty together from different disciplinary departments and cultures, establishing communication norms and team-building are essential to group success. While it may seem counterproductive, the informal lunch discussions were key to building trust and establishing rapport among members of the group, and for future FLCs, building in more informal communication opportunities would be beneficial. More than one FLC member expressed interest in seeing the FLC continue into the next academic year solely for the purpose of "receiving the emails," which speaks to the interest of faculty in being part of communities of practice as well as the continuing relevance of asynchronous methods of communication such as electronic discussion lists.

Enhancing teaching and learning through scaffolding

Over the course of the FLC presentations on data analysis tools, the librarians learned which data analysis tools are used most by faculty in the classroom as well as for their research, which will inform decisions regarding librarian and staff expertise needed in the library for purposes of student support and programming. They also learned that faculty are less familiar with some data analysis tools such as R and Tableau, which could result in future opportunities for the library to offer professional development and training for faculty as well as students.

One faculty member who teaches field methods often requires students to create new datasets comprised of local environmental data. He suggested that it would be helpful to have local hosting for these small datasets that future students could build upon or compare to their own original data. This is another example of the organic way that ideas can be generated through the structure of a librarian-faculty FLC. While the group was not able to bring this idea to fruition because of time constraints, the library is currently exploring mechanisms to offer this type of service in the future and a future FLC could be an appropriate venue to pursue a pilot project in this area.

The FLC meetings regarding core data literacy competencies and demonstrations of existing assignments engaged librarians and faculty in rich conversations about instructional needs. This led to implementation of data literacy library instruction at the most basic level. Participation in the FLC helped inform this decision and empower the librarians to feel comfortable moving forward with the topic. To date data literacy has been used in instruction for university success classes. The idea of using data literacy instruction for classes that include a library instruction session but don't have a research assignment is an interesting one that will allow the library to further engage with student success and teaching. The integration of data literacy competencies in information literacy instruction is ongoing and although not yet assessed is something the authors plan to investigate and assess in the future. A Data Literacy FLC 2.0 could be an appropriate venue for an assessment building on the work done thus far.

The demonstrated activities requiring students to generate their own data were well received by the group, who expressed strong interest in increasing the number of active learning assignments in their

courses. Such activities are well documented methods of increasing student success and retention (Kuh et al., 2006). These activities also address the data literacy competencies specifically identified for students conducting undergraduate research, scaffolding up from the first year activities mentioned above.

Conclusions

Librarian engagement with faculty learning communities offers excellent opportunities to:

- Increase understanding of faculty pedagogical perspectives, expertise, and needs for librarian instruction and programs;
- Develop relationships with faculty and staff with regular meetings in library and other campus spaces that can lead to a range of collaborative teaching and learning opportunities;
- Integrate librarians as partners with faculty as co-developers of curriculum in core areas such as information and data literacy that are explicitly tied to the institution's mission and strategic goals; and ultimately,
- Influence teaching and student outcomes at the institutional level.

The faculty toolkit and campus presentations served to raise awareness that information and data literacy are core components of the university's general education program and support faculty in their efforts to integrate data literacy into their courses. Beyond these tangible outcomes, the FLC provided a venue to explore and develop ideas in the library and beyond. Adding a data literacy activity to a university success course is the first among many opportunities for collaborative programming, and facilitating the FLC helped the librarians identify new partners and strengthen existing librarian-faculty partnerships. The librarian-faculty collaborations that flourished within the FLC also have led the library to hire one of the faculty members as a statistics consultant. In the short time since the FLC ended, the library is seeing benefits in improved relationships with faculty, improved instruction and online learning objects for students and faculty. FLCs are an effective framework to foster communities of practice and provide an opportunity for librarians to learn from and influence the teaching community of their university.

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Declaration of competing interest

None.

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