2016

A Studio Model for Academic Data Services

Samantha Guss
University of Richmond, sguss@richmond.edu

CHAPTER 1

A Studio Model for Academic Data Services

Samantha Guss

THIS BOOK SERVES as proof that there are plenty of effective ways to provide data services in an academic environment and that there can never be a one-size-fits-all approach. It is still valuable, however, to look closely at others' service models—to learn from successes, to borrow concepts and metaphors from other realms, and to think about one's own services through new lenses. A service model is a framework used to describe and understand the "who, what, where, when, and how" of a service from different stakeholders' perspectives; it can serve as a useful tool for developing and improving data services to best meet the needs of a community.

There are many such service models for developing data support. This chapter adds to that list by developing the idea of a "studio model" for academic data services—a user-centered model that focuses on patrons as creators and consumers of information—and by defining an academic data service as a public good that bridges the research and teaching and learning missions of an institution. This service model also emphasizes why libraries, in collaboration with campus partners, are ideally situated to house and steward data services. After theoretical aspects of the studio model are explored, New York University's Data Services department is described as a case study.

Conceptualizing a Data Service Model

Perhaps the most important conceptual model in the data services community is that of the *data lifecycle*, which describes the cyclical process of planning and conceptualizing a study, collecting data or discovering and accessing existing data, processing and analyzing data, and archiving and preserving data. The data lifecycle has been described and visualized in many ways[1] and is also sometimes

called a research lifecycle, but all model the actions taken by scholars as they perform research with data. The data lifecycle is a useful model for designing services because it encourages service providers to think about users' activities, and how those activities can be supported. For example, scholars who need to find existing data to use in their research might be helped by a catalog of datasets, membership in the Inter-university Consortium for Political and Social Research (ICPSR), or a data reference service, all of which would be maintained by the service providers in response to that need. Likewise, many libraries and other organizations are responding to the need for scholars to preserve and make their research data available by developing data repositories or advisory services to connect scholars to disciplinary repositories. Other chapters of this book provide numerous examples of the potential data services that can be provided to meet the needs of scholars and scholars in the making.

In their venerable *Data Basics* text, used to educate generations of data librarians through ICPSR's Summer Program, Geraci, Humphrey, and Jacobs describe another way to think about data services utilizing tiers or levels of service.[2] In this model, data services consist of technology, service providers, and collections, with many different levels of computing, reference, and collections services that a particular institution might provide based on the needs of their users and the capacities of their organization. For example, one library might choose to offer reference service at Tier Two, where staff help patrons identify data by subject; another library might require a Tier Four reference service where librarians help interpret file layouts and codebooks. The levels of service are somewhat hierarchical—in the example above, the Tier Four service would also include the functions from lower tiers—but the book's authors emphasize that service quality is independent of service extent; providing additional levels of service does not necessarily make one service better than another.[3] The *Data Basics* model is user-centric in that it asks the service providers to carefully consider local context and needs, but it also benefits from the expertise of its authors, who are expert data librarians themselves and have years of experience developing and providing data services. As a result, one of this model's strengths is that it identifies and explains the range of specific data services that could be adopted. Bennett expands on the *Data Basics* model using a similar model of service tiers but focuses more on the functions of the data librarian in each tier, ranging from occasional data reference to full curatorial services.[4]

Another service model that resonates in a data services context was described by Elliot Felix of the consultancy firm brightspot in a presentation on library spaces that encourage creativity. This model posits that a space is successful when it provides for five aspects: mindset, skill set, toolset, programs/events, and settings.[5] This model reminds data librarians that providing statistical software or datasets (the toolset) is insufficient without providing users with the skills to use them,

which might be done through instruction or consultation on data tools and concepts (skill set). Or, as Thompson and Edelstein aptly describe, "giving a data file to a patron who does not possess the tools and skills needed to analyze it is about as useful as giving a book to someone who cannot read."[6] Additionally, inspiring the right mindset in data users is necessary to help give tools and skills the most impact. A thoughtfully designed, comfortable, welcoming physical space is also important, and events and activities to bring users together ultimately strengthen those users' mindsets and skill sets.

The Studio Model

The word *studio* has a commonly understood meaning, and most people can easily conjure an image of an artist's studio. A *studio model* for academic data services uses the studio—in this case an academic studio for students of art, architecture, and similar pursuits—as a metaphor for planning spaces, staff, and services to support data intensive work. The qualities of this kind of studio are fundamental to the studio model:†

- A studio is a place for *creating*. Just as an artist may take a piece of clay and transform it into something new, a student may create a survey, take an existing dataset and analyze it in a new way or combine it with new data, or create a visual representation of data.
- A studio is a place for *learning through iteration*. One rarely, if ever, enters a studio with the expectation of quickly leaving with a finished creation, because the purpose is to experiment, make a mess, and try out different techniques. Sometimes there is an underlying vision at work, a goal, and sometimes there is no particular aim at the outset, but there is nearly always learning that occurs during the process.
- A studio is a place for *self-directed work*. There is no common curriculum, nor is anyone telling users what they should be doing, although there is often help available by request. Users bring their own collection of projects and deadlines to the space, but they come at their own discretion and guide their own work during their stay.
- A studio is a *collective*. The studio is made up of shared resources, not only for reasons of economy, but also to encourage a sense of community among its users. Timm-Bottos and Reilly observed that a studio environment "helped [students] to form connections and relationships with one another, to be more expressive, and to foster the sense that 'we were in this together.'"[7]

† These characteristics of a studio were compiled from a variety of dictionary definitions and encyclopedia entries exploring the studio concept and history. It was also influenced by Mark Hatch's *The Maker Movement Manifesto: Rules for Innovation in the New World of Crafters, Hackers, and Tinkerers*.

- A studio is for work that is *open and public*. Regardless of the particular rules for accessing the space, from the individual's point of view, working in a studio is the opposite of working alone. It is a place where failing in front of others is expected and allowed, which in turn leads to greater innovation and learning.[8] Data-intensive work is more often *not* open—scholars have privacy concerns and mandates, or simply do not want to reveal their unfinished projects—but the ideas of normalizing failure and working among others to encourage creativity are still apropos.

The studio metaphor falls short in at least one critical way: traditional notions of an academic artists' studio do not include the idea of access for all, or the idea that the collective resources and use of the space are available to everyone regardless of affiliation and without barriers. Open and equal access is a central professional value for librarians and many others in higher education support roles, and is certainly part of any library service model,† even though it cannot be directly described by the metaphor of a studio.

On a fundamental level, the studio model for academic data services combines space, staff, and resources (including software and library materials) to support data users as creators, learners, and collaborators. For example, many successful data services are made up of staff and resources, or of staff and space, but a key tenet of the studio model is that it emphasizes the incorporation of all three. For example, New York University's Data Services, which is discussed in more detail at the end of this chapter, is made up of data librarians and technologists (staff), access to software, data sources, and training (resources), and an open lab in the library where those people and resources come together (space).

The Studio Model in the Higher Education and Library Landscape

The studio model for academic data services also reflects and stems from several wider trends and themes in higher education and in the practices of librarianship: renewing emphasis on innovative physical spaces, acknowledging the value of informal learning at the collegiate level, participating in the emerging maker movement, encouraging learner-centered education, and fostering development of new literacies.

---

† Admittedly, many academic libraries embrace open and equal access only within a closed community. For example, many restrict access to their buildings or computing resources for those without affiliation to the university, making their resources unavailable to members of the public.

The Value of Physical Space in the Electronic Age

The continual rise and influence of technology and the Web in higher education, through the advent of massive open online courses (MOOCs), synchronous and asynchronous online courses, and flipped classrooms, just to name a few manifestations, has caused anxiety about the future of in-person learning and the traditional college campus experience. The more optimistic view, however, is that there is much to be gained from technology in improving face-to-face learning, and that technology both forces and allows educators to make the in-person aspects, including physical spaces, of higher education more meaningful.[9] Bennett challenges educators, when designing new spaces, to think carefully about what a physical space can provide that a virtual space cannot and suggests that among these are immersive learning, social learning, and collaborative learning.[10] Physical spaces are not obsolete and, on the contrary, must now be designed to intentionally showcase their advantages over virtual spaces.

Spaces for Informal Learning

Along the same lines, informal learning outside the classroom is often just as important to students' academic learning and personal development.[11] Conceptualizing data services as a studio reinforces the importance of informal, self-driven learning and the idea that physical spaces are still important in the age of technology-enhanced education. Libraries have been championing these ideas for more than a decade through the concept of the learning commons, a space designed to enable collaboration, informal learning, and interaction with technology and library resources (including librarians). Sinclair describes the "Commons 2.0" in similar terms and asserts these guiding principles for such spaces: they are open, free, comfortable, inspiring, and practical.[12] Even when not engaged in collaborative activity, students report that being among others and part of a community of people who are working is a source of motivation and inspiration.[13] This "social ambience" factor described by Crook and Mitchell can be important in a space for data activities, too; even if software and resources are available remotely, there is value to being physically present among others who are also engaged in intensive work.[14]

Data Services and Makerspaces

Academic data services can also be compared to and interpreted through the lens of the Maker Movement, whose broader cultural impact has infiltrated higher education and presents a great deal of potential in this context. Those familiar with Hatch's *Maker Movement Manifesto* may have noticed its similarities to the idea of a studio model for data services: makerspaces are places for social and collec-

tive learning where experts and novices teach and learn from each other, where resources are shared, and where creating is approached with a spirit of play and enabled by technology.[15] They are safe places for anyone to learn and offer access to "skills that students might not have the confidence or opportunity to pursue otherwise."[16] Burke uses Henry Jenkins' concept of participatory culture to describe makerspaces' role in higher education: students can be creators in addition to consumers, can develop skills at their own pace, and can learn through teaching others.[17] Learning here is personalized, but not merely as a gimmick propagated by commercial learning software salespeople.[18] The studio model for data services has a lot in common with the philosophies of makerspaces, and in reality, many data services labs and spaces could themselves be categorized as makerspaces.

Learner-Focused Education

Another notable trend is the shift in emphasis from teaching to learning over the past quarter century. Learner-focused education emphasizes a constructivist perspective in which students assume more responsibility for their own learning and where a great teacher is defined not by her own qualities, but by the learning of her students.[19]

This shift is evident in the new *Framework for Information Literacy for Higher Education* from the Association of College & Research Libraries (ACRL) division of the American Library Association (ALA), a document meant to guide librarians as they work with others on campus to develop information literacy outcomes for students.[20] This *Framework* is based on the idea of metaliteracy, which "demands behavioral, affective, cognitive, and metacognitive engagement with the information ecosystem" and recognizes students as "consumers and creators of information who can participate successfully in collaborative spaces"; it goes beyond the skills of finding and consuming information and asks students to recognize and develop their own roles in the information landscape.[21] The *Framework* identifies six specific frames that are echoed in a studio model of data services. For example, the "Information Creation as a Process" frame describes the state of understanding that humans construct information in social contexts, and that the many decisions made during that creation process affect the end product. Enabling learners and researchers to interact with data—by collecting and creating it or by analyzing data that already exist—is a textbook example of this frame, since a majority of data work requires constant interpretation, decision-making, engagement, and negotiation with the end goals of the project. Likewise, the frame "Searching as Strategic Exploration," describes the "nonlinear and iterative" nature of scholarship and the requisite "mental flexibility to pursue alternate avenues as new understanding develops"; a data studio's emphasis on supporting creative, iterative exploration is an ideal environment for helping students develop this mindset.

Enabling New Literacies

While librarians have been focusing on information literacy, higher education has concurrently been embracing the idea of "new literacies," and the literacies of the digital age along with visual and quantitative literacy are being considered across the curriculum. Quantitative literacy and information literacy have a lot in common; both focus on finding, retrieving, analyzing, and using, with more emphasis of late on the last two.[22] An example is Carleton College's Quantitative Inquiry, Reasoning, and Knowledge (QuIRK) Initiative, which recognizes that all students, regardless of major or focus, need quantitative reasoning skills to be successful members of society.[23] Carleton College also provides an excellent example of librarians and technologists partnering to support quantitative literacy.[24] Even at institutions that do not have formal cross-curricular initiatives, having data services available to everyone can go a long way to support quantitative literacy development in all students, not just those who are required to take a statistics course. For example, a student who wants to use data or create a visualization for a journalism or biology class, or for an independent project, can access software, training, and assistance to develop those interests regardless of whether his curriculum requires a specific course. Academic libraries are often asked to demonstrate their value to the university's mission,[25] and because the studio model dovetails nicely with these strategic directions for higher education, library data services that embrace it are well positioned to thrive and continue growing with the institution.

Why the Library?

Many librarians have written about the imperatives for establishing data services, about effective environmental scans, and about translating those needs into services,[26] but they have not necessarily addressed the question of why these data services should reside in the library at all. The case for the library has been made effectively for matters related to research data management[27] and for providing access to datasets and data resources that are part of the library's collection. But why would a service that encompasses the other parts of the data lifecycle that are less related to traditional library collections (including survey tools, statistical and textual analysis software, and data visualization) reside in the library? Why not in a department that also teaches courses in data analysis? Why would a traditional "studio" not be housed in an academic department?

Libraries as Connectors

Practically speaking, it is easy to argue that all parts of the data lifecycle can be better served when the services are grouped together, even if multiple persons or departments are providing them. Libraries and librarians serve as natural

connectors, linking people and resources, and have always been destinations for self-learning. Most data librarians have strong skills in finding, interpreting, manipulating, and curating data, but librarians do not need to take responsibility for everything on their own. Because of the technical nature of some of these activities, and because providing resources also means providing hardware and software, it is ideal for data services to include support from information technology professionals and many other campus partners.[28] Bennett and Nicholson argue that a successful transaction will also include helping users analyze and use the data, and that librarians may need to seek stronger relationships with other data experts on campus.[29] A fundamental aspect of the studio model for data services is providing space, staff, and resources together, and libraries are inarguably the stewards and providers of intellectual materials on college campuses. The value of locating data services in proximity to these collections and the experts in connecting people to those resources should not be overlooked.

Interdisciplinary, Neutral Space

The other arguments for providing data services in the library return to the tenets of the studio model and the underlying philosophies of librarianship, which point to a welcoming, democratic, interdisciplinary space—and, just as importantly, to the values and skills of the professionals who work there. In their seminal piece, "The Role of the Academic Library in Promoting Student Engagement in Learning," Kuh and Gonyea describe the library as "the physical manifestation of the core values and activities of academic life."[30] The library has long been at the intellectual center of university life, and even though the necessity of visiting a physical library is not what it once was, libraries still command that place metaphorically (and sometimes geographically).

A library is an interdisciplinary space that acts as neutral ground, while at the same time belonging to everyone. A successful library space makes it obvious that everyone is welcome and that there are no prior claims made by individuals or groups that impose on others' sense of ownership; it is a public good for the campus. Walking through the halls of a chemistry building, for example, may be an intimidating experience for a humanist: this space is owned, claimed, and its uses prescribed. Plus, the humanist's trip to the chemistry department is likely an anomaly—it is a break from her normal pattern, and she is not likely to come back without a specific purpose. Spaces for specific community groups are necessary on campus, of course, but stand in contrast to a collective space like a library. Likewise, librarians' interdisciplinary backgrounds can make them ideal providers of interdisciplinary data services that do not preference one discipline over another.[31]

Transcending Disciplinary Differences

Librarians and technologists at universities have a unique ability and, some would argue, mandate, to see the bigger picture on campus and to look for common ground. A scientist might think the concerns of a social scientist are entirely foreign. While a librarian or technologist can understand and respect disciplinary nuances, he or she can also see similarities and when to share knowledge and strategies across disciplines, and identify times when it makes more sense to work together to figure out a path forward. Mooney and Silver describe librarians as "silo crossings, or people in a unique position to see the big picture across campus, while departments and colleges are typically are more focused on their own interests," and note that they can also help the institution avoid costly resource duplication.[32] This is easily apparent when talking about research data management; this concept varies depending on disciplines, sub-disciplines, and sectors. Supporting research data management is a challenge that benefits from taking a broader view to recognize and incorporate the contributions of everyone from NASA to the public opinion polling community.

There are many advantages to providing data services through departmental structures—deep relationships and trust among members, close alignment with disciplinary methods, more control over pedagogy and curriculum, and other reasons—and ideally a university would have some of both types. In a world of limited resources, however, the best impact is achieved through centralized data services, in the library, delivered in partnership with information technology and others.

Case Study: Data Services at New York University

There are plenty of academic data services that fit the studio model described, and many that exemplify it. A small sample of these, all of which have undergone physical space transformations recently, includes Duke University's Data & Visualization Services, which has a new home in The Edge, the Libraries' research commons;[33] Georgia State University's Collaborative University Research & Visualization Environment (CURVE);[34] the StatLab at the Center for Science and Social Science Information (CSSSI) at Yale University;[35] Spatial and Numeric Data Services (SAND) at the University of Michigan Libraries;[36] and the Research Hub at UNC-Chapel Hill Libraries.[37] However, New York University's Data Services is the most fitting case study for this chapter because it was among the first to use the term "studio" to describe its data services and because the metaphor of a studio was intentionally used to guide its development.

Service Overview

Data Services at New York University[38] was formed in fall 2008 to formally amalgamate the data support provided for many years by what was then Information Technology Services (ITS) with that of the Division of Libraries into a new "Data Service Studio." Since its inception, Data Services has been a joint service of the Libraries and NYU Information Technology (NYUIT), with two co-directors (one from each organization) and staff reporting to both. Data Services provides support for the entire data lifecycle, including access to and help with survey, statistical, GIS, and qualitative analysis software, assistance with locating and using data sources, and data management support.[39] These services are provided through one-on-one consultation, workshops, course-integrated instruction, and online documentation and tools, and are housed in a Data Services lab in a prominent location in NYU's main library (although all of the services are also available remotely).†

Physical Space

Data Services' physical facility is located in the Research Commons of Bobst Library, the main library at NYU. The Research Commons opened in fall 2012 and co-locates five specialized units: Data Services, the Digital Studio,[40] Digital Scholarship Services,[41] Business & Government Information,[42] and the Coles Science Center.[43] While the space is open to everyone, the renovation planning focused on meeting the needs of graduate students,[44] who make up close to half of NYU's student body.[45] The Data Services lab, the physical space component of Data Services' studio service model, has 26 large-screen Macintosh workstations that all run the Windows operating system, due to the fact that several important statistics and GIS software packages only run on Windows. The lab has no walls dividing it from the rest of the floor, which removes barriers for anyone wanting to sit down and experiment with data software, but also creates challenges when the computers are fully occupied by users who are not using specialized software. This issue is partially alleviated by allowing users to reserve some Data Services computers

† Interestingly, the decision was made in 2012 to drop the word "Studio" from the unit's name, so that the NYU Data Service Studio became NYU Data Services. Although no changes were made to the service model at that time, it was decided that having "studio" in the name implied that Data Services was merely a place, and diminished other elements of the service—consultation, expertise, instruction, collections—that were not dependent upon physical space. This was especially important as NYU was actively expanding its global presence, with new campuses in Abu Dhabi, U.A.E. and Shanghai, China, and a dozen other Global Academic Centers around the world, and the idea was that students and faculty could continue to have access to the services offered in New York. Although its name changed, Data Services continued to utilize a studio model as described here.

ahead of time so that they know they will have a place to work when they arrive. In keeping with the philosophy of the rest of the Research Commons, the Data Services lab is not a silent space—the low-level talking of collaborative work is encouraged—and the furniture is designed for intensive work, with high-end office chairs, access to power at every seat, and a desk footprint large enough to allow the user to spread out and make use of supporting materials like books, papers, and laptops. The lab is staffed for 6-8 hours per day by Data Services consultants and full-time staff, who offer walk-up help with a variety of tools and activities. During hours when the library is open but the lab is unstaffed, the computers are available for data and general computing use. In addition to the lab on the 5th floor, Data Services makes heavy use of a dedicated 10-seat computer classroom on the 6th floor of the library that has the same software as in the lab downstairs. This is where most Data Services workshops are held.

Resources

The specific services provided by NYU's Data Services are designed to support the entire data lifecycle and grew from NYU's long legacy of providing support for statistical software. As a result, Data Services has a list of supported software: quantitative (SPSS, Stata, SAS, R, etc.), qualitative (Atlas.ti, NVivo), surveys (Qualtrics), and GIS (ArcGIS, ERDAS IMAGINE, etc.). It also provides support for locating data and statistics and data management planning, and is actively planning and developing new data repository services. For all of these areas, Data Services offers access to software through the Data Services lab and online through NYU's Virtual Computer Lab; e-mail and in-person consultation on research projects, which often involves multiple appointments; and instruction through an open series of introductory workshops and course-integrated sessions as well as a collection of self-help resources and documentation (such as textbooks and staff-created tutorials). Data Services also works with other librarians to build the library's collection of data resources in the form of database subscriptions and standalone datasets and GIS data products. All of these services and resources are free of charge and available to any member of the NYU community regardless of status or disciplinary affiliations. At the heart of Data Services' approach is the notion that methodological consulting is out of scope: Data Services staff will help a user learn how to perform a chosen statistical method, have a discussion about the pros and cons of certain methods, or provide guidance for further research, but will not decide for a user which method is best or "correct." This is partially out of respect for disciplinary methods and the limitations of staff's knowledge to make appropriate recommendations, but also because of the self-directed learning ethos that guides the service.

Staff

The Data Services staff has grown since 2008 into a team of ten professional staff members plus six to eight graduate student consultants at any given time. The professional staff is made up of two co-managers, three quantitative data/statistics specialists (two full-time and one part-time), one qualitative analysis and surveys specialist, two GIS specialists (one full-time and one part-time), a GIS librarian, and a data librarian. The student consultants are hired from a variety of departments around campus for their skills in software packages and tools. In addition to the core Data Services staff, the service draws heavily on relationships with subject librarians, other technologists (such as those in neighboring Digital Scholarship Services and the Digital Studio), and a few statistical methodology institutes and centers on campus and uses those relationships often to make successful referrals. A typical illustrative example is when a student meets with a Data Services staff member with questions about a project and it quickly becomes clear that the student could benefit from further exploration of the literature of her discipline through a consultation with a subject librarian. The GIS and quantitative consultants often collaborate with the GIS and data librarians when patrons' needs include finding data and analyzing it. The Data Services lab is staffed using an informal triage system: the desk is staffed during open hours with several student consultants who are hired specifically for their statistical or GIS skills, so that one can generally expect to walk up to the desk and be able to get help with any of Data Services' supported software. Student consultants are also trained to recognize more complex questions and anything that would benefit from an in-depth consultation, and can either call full time staff out from their offices or refer the patron to make an appointment. This system allows the full time staff to concentrate on higher-level work by leaving the simpler questions to student consultants. Data Services has also benefited over the years from employing student consultants from a range of programs with a wide variety of experiences and expertise, and their insights have often been the impetus for new or expanded services.

Communicating About the Service

The outreach strategy for Data Services has varied over time, but the general goal is wide exposure with a welcoming and accurate message about the services available, while at the same time avoiding the perception of evangelism. The aim is to respond to the needs of the NYU community, raise awareness and enthusiasm about data tools and resources, and expose community members to needs they might not have considered (such as good data storage practices), while taking care

not to impose staff interests or preferences.† This outreach strategy relies heavily on relationships with subject librarians and other colleagues who interact with faculty, word of mouth among users, plus some targeted communications with faculty based on their teaching or research interests.

In recent years, Data Services has worked to build relationships with teaching faculty and instructors to make its instruction program more effective, because learning about data resources and tools is more meaningful when it is contextualized within a course and integrated with a course's overall learning outcomes. At the same time, maintaining the open workshop series is still a priority because it keeps the tools available to anyone (acknowledging that the toolset is not truly available without a skill set to use it), rather than just to those who are enrolled in a course. These workshops frequently attract students, faculty, and staff who have a general interest in data or GIS (without a specific project or goal in mind) and are more willing to attend a workshop "to see what it is all about" than to seek out an appointment with a staff member. The open workshops cater to these patrons and contribute to Data Services' outreach goals of creating a welcoming and wide-reaching service.

Assessment and Looking Forward

Data Services has kept detailed statistics on every patron interaction and workshop since its inception, clearly documenting the growing demand for its services over the years. This documentation has greatly supported the department's growth and addition of new staff members and other resources, and also helps the staff identify trends and respond to them. While Data Services also maintains other mechanisms for gathering patron feedback (especially on workshops), there has been considerably less assessment of patron experience, which would surely be valuable for future planning. Adding and expanding services based on demand worked well in the early days of Data Services, but as it develops services for data management planning and data archiving, for example, it will not be able to rely only on documented demand. These services are critical, but their audience is unlikely to be as large and forthcoming as the audience for statistical software consulting has been. This is because research data management services are generally more complex and less defined, and there is less precedent in this area for faculty seeking data management support and for libraries providing that support. At the same time, Data Services' studio model provides solid infrastructure for developing these and other new services through the combination of staff with a variety of data expertise, a collection of resources, and a welcoming space for consultations, workshops, and self-directed work.

---

† For example, just because a software or tool is supported by Data Services does not mean that it is the right tool to fulfill a patron's needs (e.g. insisting a patron should be using ArcGIS when Google Maps would work better for the students' needs.)

Conclusion

Academic data services are typically seen as research services—conceived and fashioned to support the research needs of faculty and students—but by looking at data services through the lens of the studio model presented here, it is easier to see how they actually bridge the teaching and learning and research functions of a university and help bring them together. The studio model uses the studio as a metaphor to reinforce that data services patrons are creators as well as consumers, that research and learning are inseparable, and that physical space, in conjunction with staff and resources, can still make an impact in today's university. As with all models, the studio model has strengths and weaknesses. Regardless, it is a useful addition to the collection of models that inspire data librarians to plan, rethink, and improve the valuable services they provide—and also a tool to help them articulate that value to their communities.

---

1. For examples, see: Ann Green, "Conceptualizing the Digital Life Cycle," *IASSIST Communique* (blog), June 1, 2006 (8:49 p.m.), http://www.iassistdata.org/blog/conceptualizing-digital-life-cycle.
2. Diane Geraci, Chuck Humphrey, and Jim Jacobs, *Data Basics: An Introductory Text*, 2012, http://3stages.org/class/2012/pdf/data_basics_2012.pdf.
3. Ibid, 106.
4. Terrence B. Bennett, *Research Data Services at Singapore Management University: Engagement Summary Report*, July 1, 2010, http://ink.library.smu.edu.sg/library_research/5: 4–6.
5. Elliot Felix, "Fostering Creativity" (presentation, ACRL 2015 Conference, Portland, OR, March 28, 2015), http://www.slideshare.net/elliotfelix/fostering-creativity-46468132.
6. Kristi Thompson and Daniel M. Edelstein, "A Reference Model for Providing Statistical Consulting Services in an Academic Library Setting," *IASSIST Quarterly* 28, no. 2 (2004): 35.
7. Janis Timm-Bottos and Rosemary C. Reilly, "Learning in Third Spaces: Community Art Studio as Storefront University Classroom," *American Journal of Community Psychology* 55, no. 1–2 (March 2015): 108.
8. Felix, "Fostering Creativity."
9. Audrey Watters, "The Case for a Campus Makerspace," *Hack Education*, February 6, 2013, http://hackeducation.com/2013/02/06/the-case-for-a-campus-makerspace/.
10. Scott Bennett, "First Questions for Designing Higher Education Learning Spaces," *The Journal of Academic Librarianship* 33, no. 1 (2007): 15.
11. For an extensive literature review on this topic, see: George D. Kuh, "In Their Own Words: What Students Learn Outside the Classroom," *American Educational Research Journal* 30, no. 2 (1993): 277–281.
12. Bryan Sinclair, "Commons 2.0: Library Spaces Designed for Collaborative Learning," *EDUCAUSE Quarterly* 30, no. 4 (2007): 5.
13. Charles Crook and Gemma Mitchell, "Ambience in Social Learning: Student Engagement with New Designs for Learning Spaces," *Cambridge Journal of Education* 42, no. 2 (2012): 136.
14. Ibid, 135–136.
15. Mark Hatch, *The Maker Movement Manifesto: Rules for Innovation in the New World of Crafters, Hackers, and Tinkerers*, (New York: McGraw-Hill Education, 2014), 1–2, summarized in John Burke, "Making Sense: Can Makerspaces Work in Academic Libraries?," in *ACRL 2015 Proceedings* (ACRL 2015, Portland, OR: Association of College & Research Libraries, 2015), 497–504, http://www.ala.org/acrl/acrl/conferences/acrl2015/papers.
16. Watters, "The Case for a Campus Makerspace."

17. Burke, "Making Sense," 500.
18. Watters, "The Case for a Campus Makerspace."
19. George D. Kuh and Robert M. Gonyea, "The Role of the Academic Library in Promoting Student Engagement in Learning," *College & Research Libraries* 64, no. 4 (2003): 256.
20. Association of College and Research Libraries, "Framework for Information Literacy for Higher Education," February 2, 2015, http://www.ala.org/acrl/standards/ilframework.
21. Ibid.
22. Terrence B. Bennett and Shawn W. Nicholson, "Research Libraries: Connecting Users to Numeric and Spatial Resources," *Social Science Computer Review* 25, no. 3 (August 1, 2007): 305.
23. Carleton University, "About QuIRK," last modified May 5, 2014, http://serc.carleton.edu/quirk/About_QuIRK.html.
24. Carleton University, "Goals of Research Data Services," last modified July 30, 2014, http://apps.carleton.edu/campus/library/about/data/model/.
25. Megan J. Oakleaf, *The Value of Academic Libraries: A Comprehensive Research Review and Report* (Chicago, IL: Association of College and Research Libraries, 2010): 6.
26. For example, Bennett and Nicholson, "Research Libraries: Connecting Users to Numeric and Spatial Resources."; Minglu Wang, "Supporting the Research Process through Expanded Library Data Services.," *Program: Electronic Library & Information Systems* 47, no. 3 (July 2013): 282–303; Brian Westra, "Data Services for the Sciences: A Needs Assessment," *Ariadne: A Web & Print Magazine of Internet Issues for Librarians & Information Specialists* 30, no. 64 (July 2010): 13–13.; Eleanor J. Read, "Data Services in Academic Libraries," *Reference & User Services Quarterly* 46, no. 3 (2007): 61–75.
27. Carol Tenopir, Robert J. Sandusky, Suzie Allard, and Ben Birch, "Research Data Management Services in Academic Research Libraries and Perceptions of Librarians," *Library & Information Science Research* 36, no. 2 (April 2014): 84–90.
28. For further thoughts on campus collaborations, see: Samantha Guss, "Campus Collaborations for Holistic Data Services" (presentation, Social Sciences Librarians Boot Camp 2013, Medford, MA, June 7, 2013), http://goo.gl/l1b8Vc.
29. Bennett and Nicholson, "Research Libraries: Connecting Users to Numeric and Spatial Resources," 304.
30. Kuh and Gonyea, "The Role of the Academic Library in Promoting Student Engagement in Learning," 256.
31. Wang, "Supporting the Research Process."
32. Hailey Mooney and Breezy Silver, "Spread the News: Promoting Data Services," *College & Research Libraries News* 71, no. 9 (2010): 482.
33. Duke University Libraries, "The Brandaleone Lab for Data and Visualization," accessed January 10, 2016, http://library.duke.edu/data/about/lab.
34. Georgia State University, "About," 2016, http://sites.gsu.edu/curve/about-2.
35. Yale University, "Spaces," 2016, http://csssi.yale.edu/spaces.
36. University of Michigan Library, "Spatial and Numeric Data Services (SAND)," last modified May 6, 2016, http://www.lib.umich.edu/clark-library/services/sand.
37. UNC Libraries, "About the Research Hub," accessed January 10, 2016, http://library.unc.edu/hub/about.
38. New York University Libraries, "Data Services: Home," last modified January 4, 2016, http://library.nyu.edu/dataservices.
39. For more information on Data Services' history, services, and organizational structure, see: http://library.nyu.edu/dataservices; Scott Collard, Matt Zimmerman, Alicia Estes, Gretchen Gano, Frank LoPresti, Heather Stewart, and Jennifer Vinopal, *Report of the Data Services Working Group*; Jenn Stringer, Lynn Rohrs, and Samantha Guss, "What Role Can Peer Benchmarking Play in Planning for the Future of Research and Teaching Technologies?" in *Proceedings of the 2014 Library Assessment Conference: Building Effective, Sustainable, Practical Assessment* (Seattle, WA: Association of Research Libraries, 2014), http://libraryassessment.org/archive/

index.shtml; Jeanine Scaramozzino, Russell White, Jeff Essic, Lee Ann Fullington, Himanshu Mistry, Amanda Henley, and Miriam Olivares, "Map Room to Data and GIS Services: Five University Libraries Evolving to Meet Campus Needs and Changing Technologies," *Journal of Map & Geography Libraries* 10, no. 1 (January 2014): 6–47. doi:10.1080/15420353.2014.893943 ; Jason B. Phillips, Samantha A. Guss, and David M. McGarry, "The NYU Survey Service," "The NYU Survey Service: Promoting Value in Undergraduate Education," *College & Undergraduate Libraries* 18, no. 2–3 (2011): 183–99, doi:10.1080/10691316.2011.577672.; Samantha Guss, Michelle Hudson, Jen Green, and Nicole Scholz, "Data in Common(s): Collaborative Models for Robust Data Support," presentation at the International Association for Social Science Information Services & Technology (IASSIST) (Washington, D.C., 2012), http://iassistdata.org/conferences/archive/2012.

40. New York University Libraries, "Digital Studio: Home," last modified December 8, 2015, http://library.nyu.edu/digitalstudio.
41. New York University Libraries, "Digital Scholarship Services," last modified January 2016, http://library.nyu.edu/research/dss/.
42. New York University Libraries, "Business, Government Documents and Public Policy: Home," last modified January 7, 2016, http://guides.nyu.edu/busdocs.
43. New York University Libraries, "Coles Science Center," last modified January 5, 2016, http://guides.nyu.edu/science.
44. Lucinda Covert-Vail and Scott Collard, *New Roles for New Times: Research Library Services for Graduate Students* (Washington, D.C.: Association of Research Libraries, December 2012), accessed July 22, 2015, http://www.arl.org/storage/documents/publications/nrnt-grad-roles-20dec12.pdf.
45. National Center for Education Statistics. "New York University." *College Navigator*. Washington, D.C.: U.S. Dept. of Education, Institute of Education Sciences, National Center for Education Statistics, July 21, 2015, http://nces.ed.gov/collegenavigator/?q=new+york+university&s=all&id=193900.