From Pumps and Pipes to Data and Discovery: Unifying a New Division

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Abstract

A reorganization of the Brigham Young University Library in 2020 brought many changes to the library, including the formation of the Metadata and Information Technology (MIT) Division. This new division needed to define a vision for itself, encourage a sense of unity among its employees, and foster collaboration among those employees. This article details how the MIT Division created a Data and Discovery initiative based on Pumps and Pipes, a collaborative model that brings seemingly unrelated industries together to discover solutions to their respective challenges by exploring "their neighbor's toolbox" (Pumps and Pipes, n.d., "What We Do"). Here we share the details of many of the MIT Division's collaboration and unity initiatives, including MIT's vision for how employees can come together to use the tools employed by other departments within the library.

Introduction

Libraries periodically update their organizational structure, often bringing departments and individuals together into new units to better achieve the library's mission and serve their patrons more strategically. Libraries play a critical role in facilitating access to information in a variety of ways to support the varied needs of their patrons and must continually adapt to these changing needs. In the academic library, patrons include students and researchers who often have differing needs.

A primary mission of Brigham Young University (BYU) is to support its undergraduates in their education, and one way BYU accomplishes this is by involving undergraduate students in research. To support BYU's patrons in this mission, the BYU library underwent a reorganization in March 2020. As part of this reorganization, the Metadata and Information Technology (MIT) Division was created with two main departments: the Cataloging and Metadata (C&M) Department and the Library Information Technology (LIT) Department. However, these

departments are not always found within the same division in academic libraries. In the new MIT Division, we had a challenge—how would we bring these seemingly discrete departments together under the same umbrella? The C&M and LIT Departments face a continually changing environment, from emerging and updated cataloging standards to increased use of digital access and artificial intelligence. By coming together as a cohesive division, the departments can better find solutions to future challenges.

We will describe how we leveraged the Pumps and Pipes model, in which different industries come together to solve their respective challenges by using the tools of other industries and show its success in uniting the MIT Division's two seemingly disparate departments and helping them explore each other's toolboxes. First, we present background information on how the MIT Division came to exist. Then, we highlight the Pumps and Pipes strategies that the division uses to unify the two departments and help them collaborate to better serve library patrons, and we share the outcome of these efforts. Finally, we highlight new initiatives and future work that will help the division continually meet the needs of patrons and foster unity.

Literature Review

Many case-studies document different aspects of making changes to library organizational structures to better meet the current needs of the library's patrons. Crumpton states that these reorganizations need to come about through strategic planning, even when planning might not be an easy process (Crumpton 2015). The goals of library reorganizations can vary, such as to increase "efficiency, staff engagement, and user satisfaction" (Hackman 2017, 1); to rethink "roles, workflows, and procedures" (Harwell and Williams 2014, 327); or to address "communication, training, staff morale, and streamlining" (King, Metcalf, and Larkin 2007, 312). Additionally, different decision-making and structural models can be used in reorganization, such as a traditional hierarchical model or a ground-up model in which employees have ownership in reorganization decisions and outcomes (Jacobson 1994).

Not only does the structure of the organization need to change to stay relevant to library patrons, but so do the work processes, teams, services, and core competencies. To be successful in a reorganization, librarians need to be flexible, be tolerant of ambiguity, be persistent, and have good time management skills (Chamberlain and Reece 2014). Potential challenges in the reorganization process include working with limited personnel or budget

resources (Dyer and Starbird 2023) and conducting the process through certain external events, such as a global pandemic (Lebbin 2022).

Not all reorganizations happen across the full library; many library divisions and departments periodically need to reorganize within their smaller units. Champieux, Jackson, and Carrico (2008) compare the reorganization of acquisitions departments within the University of Alabama and University of Florida libraries, illustrating how the results of the reorganizations looked different for each library even though they had similar goals. Traditional library work is often siloed into specific departments and work assignments, which can create some barriers between departments through workplace mindsets or rigid hierarchical structures. To break down these artificial barriers and work toward common goals, libraries need to find ways to collaborate and increase cross-departmental communication. Numerous case studies exist about how library departments have implemented collaboration efforts, such as those from the University of New Mexico (Bordeianu and Lubas 2013), Cornell University (Birnholtz et al. 2013), the University of Louisiana at Lafayette (Zetty 2017), and Texas A&M University (Ho 2005).

Library literature lays out several benefits to increased collaboration, such as increased efficiencies, improved morale, positive workplace culture (Kowalski 2017), improved feedback, improved relationships (Atkinson 2018), trust, openness, resilience (Atkinson 2019), extended expertise, and combined resources (Birnholtz et al. 2013). One way that libraries can break down departmental barriers is through reorganization or restructuring to bring related departments together organizationally. Increased collaboration can also help libraries better align with the larger institution's mission and goals (Atkinson 2018). Bringing the right people together to collaborate within the library helps to foster a better organizational culture, increases communication between departments, and allows individuals and teams to excel and adapt to change (Bordeianu and Lubas 2013). Collaborative projects require what Helmer et al. (2012, 185) call "a high degree of cohesion"—and individuals with a history of working together are more likely to be successful (Helmer et al. 2012). And, as Mugridge notes, increased collaboration can only help departments face the new normal that academic libraries face today: stagnating budgets, unsustainable costs, and reduced staff, among other hard realities (Mugridge 2013).

Pumps and Pipes

In this case study, Pumps and Pipes is used as a model for helping separate departments find new ways to collaborate. Pumps and Pipes (Pumps and Pipes, n.d., "Home") brings together several unrelated industries to stimulate discussion and share technology that can further the goals of all organizations and people involved. The conference organizers state that the industries of oil and gas technology, aerospace, and cardiovascular medicine have similarities and common attributes, including ways to learn from and innovate with each other. The creators recognize that oftentimes "the solution to our problems most likely lies in someone else's toolbox" (Lumsden 2010, xi) and that those solutions can only be discovered through collaboration (Lumsden 2010).

Pumps and Pipes was first organized in 2007 in Houston, Texas, home to major centers of innovation for the industries of aerospace, medicine, and energy. Since its founding, Pumps and Pipes has expanded to include other industries, students, and community leaders. Recent innovations and discussions at this conference include oilfield automation, surgical robots, multilateral wells, nanoscale imaging of 3D surfaces and interfaces, and more (Davies et al. 2010). Pumps and Pipes provides a powerful example of not only why collaboration is important but also how it can be successfully implemented. By enhancing the creativity that comes from uniting seemingly disparate people and projects, Pumps and Pipes expands how we might traditionally view collaboration.

A collaborative effort that has been developed through Pumps and Pipes includes K-12 educators working with professionals in the energy, medicine, and aerospace industries to develop STEM-based projects and field trips for students (Feibel 2015). Other initiatives developed through Pumps and Pipes are controlling bacteria growth in pipes (Ryan 2013), improving safety through imaging techniques in astronaut suits (Tarantola 2014), and efforts to utilize small devices used to inspect arteries in the human body to be able to inspect small pipes and equipment in the oil industry (Meyers 2014).

Background

On March 1, 2020, a reorganization of the Brigham Young University (BYU) library took effect. This reorganization included the formation of the Metadata and Information Technology (MIT) Division, which is composed of the Cataloging and Metadata (C&M) Department and the Library Information Technology (LIT) Department. These two departments are the largest departments within the library and are broken down into smaller teams and sections.

At the time of this writing, the C&M Department includes sixteen faculty catalog librarians, one administrative employee, ten full-time staff members, and four part-time staff members.[1] In addition to these benefitted employees, the department also employs nearly thirty student employees. While most of the department is not separated into smaller teams, C&M includes an archival processing section, whose primary responsibilities include processing the library's special collections, creating archival finding aids, cataloging manuscript collections, and preparing collections for digitization. The rest of the C&M department catalogs the library's physical and digital resources for both general and special collections.

The LIT Department includes multiple sections: operations, product management, engineering, design and user experience, and library information systems (LIS). LIT employs eighteen administrative employees, one staff member, and twenty-five student employees. The operations section of LIT has responsibility for the computer systems throughout the library used by staff and the public as well as for library servers, library software, and the library's ticketing system. The product management section is responsible for maintaining the library's portfolio of supported products. The engineering section, responsible for building and maintaining library software, is broken down into three main teams: discovery, accounts, and publishing. The design and user experience section is responsible for shaping user experience across all library websites and applications. The LIS section is responsible for supporting the library's integrated library system. Both departments are served by a staff employee who serves as the division assistant and reports directly to the associate university librarian (AUL).

In addition to dealing with the effects of a library-wide reorganization, the new MIT division also experienced many changes in leadership over the course of three years. In late 2019, the AUL for information technology took on the responsibilities of the university librarian (UL) on an interim basis while university administration conducted a search to hire a new UL. While the AUL served as interim UL, a cataloging faculty member filled the role of interim AUL. A few months after the new UL was hired in September 2020 and the interim UL resumed the responsibilities of the AUL, this AUL left the library to work at another department in the university. Another cataloging faculty member served as interim AUL. A search for a new AUL began in mid-2021, and the new AUL for MIT started at the library in April 2022. The new AUL faced some initial challenges in this position, including a division that had experienced rotating

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[1] At BYU, non-faculty/non-student positions are defined as administrative (exempt, salaried), staff (non-exempt, hourly), and part-time (.75 full-time equivalent [FTE] or .5 FTE, with or without benefits).

leadership for multiple years, employees who were just returning to the library full-time after a global pandemic, and a lack of a unified vision for the new division.

With the numerous employment opportunities in technology that became available during the pandemic, LIT also experienced a loss of many employees. Since the library employs many students, several of these open full-time roles were filled by former student employees who had some experience at the library but did not have the knowledge of institutional history held by many of the former employees.

With a new AUL in place, the MIT Division now needed to come together. During the previous years, the division had been able to complete work within its stewardship, but due to multiple interim leaders, there was not a unified vision for the division. The first goal of the new AUL was to get to know the division, including the responsibilities of each department, team, and individual. This included attending department and team meetings in addition to meeting individually with each faculty, administrative, and staff employee. The AUL met with the seven library committees under his purview to make sure that each committee had a well-defined charge and had the correct stakeholders at the table. These meetings helped the AUL better understand the history of the library, the MIT Division, and the division's departments. With an understanding of the stewardship of the departments and teams in the MIT Division and a basic historical context of the units, the AUL was prepared to begin developing a better sense of unity within the division.

Data and Discovery

In early 2023, the AUL brought the MIT Division together for a retreat with the aim of helping all employees in the division have a high-level understanding of the work completed by different departments and teams and how the work relates to each other. During the retreat, the AUL used Pumps and Pipes as a model of bringing together seemingly unrelated industries to solve common problems and discover new ways to use other industries' tools. The AUL then applied this idea to the two departments that work with library data to enable patron discovery.

After giving an overview of Pumps and Pipes, employees were asked what the MIT Division's pumps and pipes could be. The AUL asked employees to focus on the similarities across the division rather than the differences between the departments. After a few employees gave their ideas, the group soon started talking about creating and using data to enable the discovery of library resources. While both departments work with data and discovery, it was noted that the departments and teams use several different methods and tools in their

responsibilities. The C&M Department is responsible for creating data describing library resources to facilitate patron discovery through the library's search engine. The LIT Department, on the other hand, consumes data that describes resources to enable the discovery of library resources within the systems that the library supports.

The identification of these methods and tools led to a discussion of how the two departments can come together to work toward the same purpose. Like Pumps and Pipes, these departments needed to first understand each other's toolboxes—the major terminology and responsibilities of each team—so they could better identify new ideas and innovative solutions to their shared problems. Having a unified understanding of the work and purpose of the division helped the two divisions communicate and collaborate.

To better understand the mission and responsibilities of the division, the AUL reviewed the mission statements of the two departments in the next section of the retreat. The opening of the mission statement for C&M states that the department seeks

> *to develop and maintain a unified catalog of the holdings of the [BYU] Library which provides thorough, accurate, and timely bibliographic identification of all items in the collection as well as an effective means of accessing records by bibliographic or subject terms; and to organize these holdings into subject, reference and special collections in accordance with standard classification schemes and local needs. (BYU Library n.d.)*

LIT's mission statement reads, "It's our job to see the BYU campus community realize their academic and personal goals through effective websites, software, and other IT solutions" (Brigham Young University n.d.). And the library mission statement states, in part, "The Library seeks to foster the spiritual and intellectual growth of BYU students and faculty by providing access to collections, experiences, services, and spaces that nurture, hasten, and deepen that growth" (BYU Library 2022). The departments at the retreat briefly discussed these mission statements, identifying the similarities between the statements and how all employees and departments work toward a shared mission.

The mission statements for the two departments include information about what each department does and a high-level overview of how each department accomplishes its goals, but neither mission statement specifies *why*. The *why* in a mission statement is the ultimate reason for all work within an organization. At the retreat, the division employees and the AUL continued their discussion by showing that the *why* of the departments is to meet the mission and vision of both the library and the university.

The next segment of the retreat helped employees dive deeper into the actual work completed in the division. To start sharing this information, the chair of the C&M Department and the director of the LIT Department shared an overview of all areas within their departments, the stewardship of their departments, and how they are meeting the department and library missions. Then five employees from different areas of the division gave lightning talks about their individual duties, their teams' duties, and interesting recent projects. Topics of these brief talks included examples of unique items from the library's special collections that were currently being cataloged, the role of the archival processing section, the relationship between the various library systems, updates being tested for the library's discovery layer, and information about updating Machine-Readable Cataloging (MARC) fields in the integrated library system. Prior to these talks, none of the speakers were given a prompt to talk about data and discovery, but during each talk, it became apparent how each employee's responsibilities and projects fit within the data and discovery theme.

This initial retreat gave employees a common understanding of the current work being completed in the division. While the retreat helped employees see a high-level view of the division, the next step was to identify initiatives on the theme of data and discovery to increase communication, collaboration, and unity. The next section of this article details several of the initiatives underway or being planned to continue these discussions.

Ongoing and Planned Initiatives to Increase Collaboration

To increase collaboration and unity across the division, employees are implementing or investigating several initiatives such as unity events and retreats, joint committees, positions with cross-department responsibilities, and cross-training between departments. Based on the initial division meeting to discuss Pumps and Pipes, division employees plan to have an annual data and discovery retreat to continue exploring each other's toolboxes to brainstorm solutions to current library projects. While the division will have opportunities for collaboration throughout the year, these annual retreats will bring the division together to work together on new projects. A future retreat will continue the conversation of refining unified mission and vision statements for the division and to update the statements for each department. These statements should provide more information about why the departments are doing their work in addition to what they do and how they do it.

In addition to annual retreats, additional events will be held throughout the year to emphasize unity within the division. These unity events will not include work-related tasks but

will bring employees together to get to know other members of the division. By knowing more about colleagues than only their assigned tasks, employees should be able to better understand each other and work together more collaboratively. A division task force with five people representing all areas of the division is already working together to plan retreats and unity events. The membership of this task force will rotate annually to allow all division employees an opportunity to plan and carry out collaborative events. The first of these unity events included playing games, socializing, and eating treats with colleagues who do not usually work together.

Since there are nearly as many student employees within the division as there are non-student employees, an internal conference is being planned for the end of the next academic year where student employees can share their work experiences with other members of the division, both student and non-student employees. The university puts emphasis on creating experiential learning opportunities for students, so this conference will allow students to prepare a presentation and deliver it to their peers. This will also give students across the division time to learn more about the work completed across different areas of the library and to get to know other students working in the library.

To continue fostering collaboration, the MIT Division committees have created a joint subcommittee whose goal is to improve the use of library data to optimize the discovery of resources. In this spirit, they have set out to investigate improving the metadata to ScholarSearch (the library's homegrown discovery layer) pipeline. This joint subcommittee includes two employees from each department in the division and four other library employees from other library divisions whose primary responsibility is working directly with students and other library patrons. After the first six months of the subcommittee working together, there have been improvements to the library's discovery layer, which has helped the library make better use of the metadata records describing library resources and has improved the communication between the C&M and LIT Departments. An additional division-wide team has been identified to bring together catalogers and IT professionals to investigate and collaborate on linked data initiatives.

Another method the AUL is implementing to increase division-wide collaboration is to have some positions with responsibilities that extend across the MIT Division. One position that works across the division is the division assistant. Many departments in the library have a department assistant to help with clerical tasks (e.g., travel arrangements, supplies ordering, invoice payments, meeting minutes, and schedule coordination). When the C&M Department assistant left to pursue other employment opportunities, this position was repurposed to be the assistant for both departments within the division. The previous version of this position included

some cataloging responsibilities, but to free up time for assisting the LIT Department with clerical tasks, these cataloging responsibilities were given to other C&M staff members. Another division-wide position is a student research assistant (RA) who reports to the division AUL. This RA works on multiple research projects, including a study of cataloging and IT departments at other Association of Research Libraries (ARL) institutions that will help the library strategically plan for personnel needs in the division.

The Metadata Standards Librarian reports to the C&M Department chair but has some responsibilities closely associated with the LIT Department, including meeting weekly with the LIS manager to discuss issues and questions that affect the cataloging and IT departments. This librarian will also be a key member on several of the library's committees that span C&M and LIT responsibilities, such as the integrated library system management committee and the metadata management committee.

While each employee and every team within the division has a specific stewardship and area of responsibility, cross-training can help them learn more about and appreciate the work completed by other employees and teams. The library has an internship program for staff and administrative employees to become familiar with the work of another area of the library. Through this program, the director of IT completed an internship with the digital metadata librarian in C&M. The two goals of this internship were for LIT to gain a better understanding of work completed in C&M and to help identify at least one cataloging process that could be automated. Through this internship, several processes and tasks were identified for automation where APIs or other existing tools could be utilized to help integrate multiple metadata systems into more cohesive workflows. This also helped identify areas in which C&M employees could benefit from LIT programming training. Within LIT, the LIS team cross-trained with the software engineering team so that both teams could use the same programming stack, resulting in consistency and standardization of the tools created in the department.

C&M has implemented some cross-training through a regular "training and treats" program where they come together regularly to learn from each other. This training program has included sessions on using MarcEdit, creating inclusive metadata, and using OCLC FirstSearch. Future sessions will highlight the work of others within the department and will include topics such as inclusive subject headings, using various genre terms, and manuscript collection processing procedures. When appropriate, employees across the division are invited to learn more about the work of their colleagues through the training and treats sessions.

The MIT Division is also addressing other structural differences that are holdovers from before the 2020 reorganization. One of these is travel funding. Travel funds are distributed at

the division level, but the departments within MIT still had separate travel accounts three years after reorganization. With the next budget year, these accounts will be combined, making it necessary for leadership across the division to work together to approve annual travel requests within the set budget. There are likely additional, still unknown concerns related to how the departments function separately, and these practices will be addressed and updated as needed to increase consistency and collaboration across the division.

Conclusion

Being united within the division does not mean that departments are without their differences. Neither does it mean that employees must always be working together on all projects. By better understanding the work of others and knowing when to call upon the expertise of others, the division and library will be more united. The goal is to further implement the data and discovery program within the division so that employees can further the discussion and collaboration that have already begun and continue to find innovative solutions to the challenges they face.

While many of the initiatives to help the division collaborate and use each other's toolboxes are still in their initial stages, the benefits of these efforts are already visible through the division's increased communication and the improved use of library data to increase discovery. As these initiatives mature, they will likely evolve and will be continually assessed to ensure they are fulfilling the missions of the division, the library, and the university.

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