

posIT

KENNING ARLITSCH, COLUMN EDITOR

Dean of the Library, Montana State University, Bozeman, MT, USA

Column Editor's Note. *This JLA column posits that academic libraries and their services are dominated by information technologies, and that the success of librarians and professional staff is contingent on their ability to thrive in this technology-rich environment. The column will appear in odd-numbered issues of the journal, and will delve into all aspects of library-related information technologies and knowledge management used to connect users to information resources, including data preparation, discovery, delivery and preservation. Prospective authors are invited to submit articles for this column to the editor at kenning.arlitsch@montana.edu.*

BUILDING A DIGITAL LIBRARY: WHAT TO EXPECT AS A TECHNOLOGY PROJECT MANAGER ON A LIBRARY CONSTRUCTION PROJECT

SHAWNA SADLER

*Director, Digital Library And Innovation, Deakin University Library, Geelong, Victoria,
Australia*

ABSTRACT. *The Taylor Family Digital Library is the central library opened in 2011 at the University of Calgary dedicated to supporting digital scholarship, creativity, analysis and a supportive learning environment for students. The new building is a technologically advanced converged cultural institution, with mandates to continually evolve in order to meet the needs of students and researchers. The infrastructure to support these mandates required research, collaboration and intense planning, resulting in new construction and technology standards for library renovation and construction projects. This pragmatic article is written for those who will follow in*

© Shawna Sadler

Address correspondence to Shawna Sadler, Deakin University, Geelong Waterfront Campus, Locked Bag 20001, Geelong, Australia, VIC 3320. E-mail: s.sadler@deakin.edu.au

similar footsteps; it provides a roadmap for those embarking on the construction of a new technologically advanced library building.

KEYWORDS *library planning, construction, infrastructure, project management, technology planning, user experience, architectural design, innovation adoption*

COLUMN EDITOR'S INTRODUCTION

Librarians and staff are often thrust into complex construction projects with no prior experience or formal training to help prepare for a process that is exhausting, but impactful and rewarding. Shawna Sadler is the former Associate University Librarian for Digital Library and Research Technologies at the University of Calgary, and during her time there she served as technology project manager for one of the most technologically advanced library construction projects in recent memory: the Taylor Family Digital Library. In this column Shawna shares some of the lessons she learned during Calgary's four-year project, and offers valuable advice to others who are preparing for similar projects.

INTRODUCTION

If you have been asked to lead the technology vision and installation of a Digital Library project, you most likely felt conflicting feelings of excitement and fear. The opportunity to build something exciting, progressive and new should fill your eyes with stars and make you feel giddy. When your thoughts turn to more pragmatic matters of such an opportunity, you will feel a heavy burden suddenly creep over your shoulders, making you slump in despair. This is no small task and they certainly didn't teach you these skills in Library School. I have written this overview hoping it may help others faced with a similar opportunity.

I recognize that my experience was unique, as I was deeply involved in the construction project and worked with a \$13 million budget for technologies and \$200 million budget for the building and landscaping. It was a challenging experience, but overall rewarding. I encourage you to publish your experience in order to build a collection of literature for future digital library construction projects.

STRATEGIC PLANNING

It's vital to write a strategic document articulating a plan to deliver a successful digital library building. Here is a list of significant points to consider including in such strategic planning documents:

- Ask the project sponsors for a vision statement to lead the tone of the project.
- If the project has donors, clearly understand their expectations and plan to report on how their expectations will be met.
- Articulate the project's timelines and budgets.
- Identify the target demographics of the digital library building.
- Clarify the expectations of this new library building. Is the construction project expected to deliver a classroom with cutting edge technologies, enhance the research process for graduate students and scholars, or both?
- Are there specific technologies that project sponsors expect to be installed as part of this project?
- It is also important to understand the standards employed by your institution. Ask the right people and add these standards to the strategic planning documentation; it will help the project in several situations. Standards may exist for items such as data cabling, wireless antenna models, classroom setups, etc. When the standards at your institution are clarified, don't be afraid to challenge and counter-propose new specifications with solid reasoning.

BUDGET

There are several budgeting techniques, so it's best to become familiar with them and decide which best suits the project's context. Consider the people who will be contributing and reading the budget, as well as any organizational requirements for financial reporting.

It's common practice to build-in a 20% contingency line-item into your budget. This way funds will be available to pay for unplanned issues and hurdles; such as changes orders, rush deliveries and additional accessories. It may sound counter-intuitive, but if possible, hold back a percentage of the budget for the last phase of the project. Once the new space has opened, users will be keen to express what they view as deficiencies. Having budget set aside to respond to these issues will have great significance to the overall success of the project.

Every new construction project seems to run out of money at the end, which impacts the users' impression of the space, because furniture and end-user technologies usually suffer the cuts. It's critical to manage the budget properly to make the new space shiny and exciting for users. Their first impression of the new library will be the marker of success or failure.

ENVIRONMENTAL SCAN

It is helpful to visit other libraries that have completed notable construction projects. When priorities have been identified and approved by the

appropriate people, identify leaders in these areas and pack your bags to see the examples in person.

- Book meetings and tours ahead of time
- Identify people and places to visit and plan appropriate questions in advance. Jetlag and overall travel stress can make anyone's mind go blank.
- On the tour, take care to capture as many pictures and video your device can hold. It will be an overwhelming experience, and you'll probably miss most of what the tour guide explains, so capturing it for review back home will maximize the trip. Live blogging will help colleagues follow the trip real-time and possibly contribute to the experience.
- It's important to bring a thank you gift from your institution and if possible, invite the host to your grand opening.
- Most construction teams will appreciate a presentation of your trip when you return that highlights the lessons learned.

UNDERSTANDING THE CONSTRUCTION PROCESS

It is good to sit down with the construction team early in the project to understand the construction process.

Generally, the construction process follows these phases,

1. Requirements
2. Design
3. Construction
4. Warranty
5. The last phases are preparation for lawsuits and renovations. Prepare your internal staff for these last two phases and remember to hold back 5%–10% of the budget to help you get through it as gracefully as possible.

Creating a timeline or Gantt Chart will help coordinate your work and dependencies on others. This is the best time to check assumptions and clarify work plans with others on the project team. It's difficult and detail-oriented work, but worthwhile.

I suggest asking what significant decisions will be made and when. An example of this is when the electrical and data outlets will be signed off. Changes made after this sign-off require a change order and will incur a cost to the project.

FEEDBACK

Assume that your knowledge is limited, and that it's helpful to ask your target demographics specific questions before making final decisions.

Starting from the project's vision, the strategic planning work done to date has articulated the who/what/where/when/why and how much of your project. Look into each of these issues further and identify which of these you genuinely need feedback from your identified demographics.

Look at the politics of the project's environment, and identify who wants to provide feedback. Some people will want to be involved, but not want to get their hands dirty. Help relieve the pressure by hosting information and feedback sessions, documenting the feedback you receive so they feel heard. Decisions will be challenged later in the project, so be prepared to retrieve this feedback to demonstrate how well the team has responded to early concerns.

GETTING YOUR FEET WET

The InfoComm Convention is one of the best resources for quickly learning about what technologies are on the market. Look at the list of vendors and check out Web sites to learn about specific products. It is best to attend the convention during the planning phase of your project to discover what is on the market, and then again when you are ready to purchase specific technologies. Seeing and testing products in person is far more valuable than pictures online or in print.

Look for inspiration beyond the normal or recognized areas for your project. The most inspirational article I found came from the Harvard Business Review (Huang, 2001) and the most eye-opening use of technology was at the Venice Biennale for Art ("La Biennale," 2014). Go beyond the norm and open yourself up to new ways of doing things.

TRAINING

Business Analysis tools and techniques helped me strategize and prepare for the project. Conducting MOST and SWAT analyses facilitated the creation of the strategy as well as communicating it to key stakeholders. MOST defines the Mission, Objectives, Strategies and Tactics, to ensure these attributes are in alignment. A SWOT analysis reveals Strengths, Weaknesses, Opportunities and Threats ("IIBA," 2014).

Learning the basic skills of project management is also significant, as it is the language of construction planning and execution. This will improve the level of influence and impact the library can exercise on the construction project overall ("PMI," 2014).

PLANNING

A formal plan for implementation is crucial and can help formulate responses to the vision of the project sponsors, the needs of the target demographics,

the best practices of leaders, the budget and timeline in order to make the project a success. This is a significant point in the construction process. Take time to create the required documents so to ensure success. It's going to get hectic and work will start happening fast, so creating documentation that only requires updating will help the library's construction project be successful in the end.

ACCESSIBLE AND GREEN TECHNOLOGIES

It is the responsibility of librarians to advocate, research and plan for accessible and green features in the library, because the construction industry's approach to both are lukewarm at best. People of all abilities seem to benefit from accessible features in buildings, and they are certainly worth the investment. Accessible features are sometimes placed in restricted areas for the exclusive use of people with recognized disabilities. I find this segregates the populations and is not necessary. Integrate the accessible features and place a discreet sign asking priority be given to those with disabilities. Such features may include motorized desks to raise and lower the desk height. It's interesting how valuable these desks can be for students who are extremely short, tall and in wheelchairs. Research the latest construction features for accessibility and consider them seriously. There are several software packages designed to help those with various sensory disabilities, mainly visual and audio. These software packages may be valuable to students who understand their learning style as visual or audio; so placing accessible software on public computers will help various students succeed in the academic experience.

CONSTRUCTION INFRASTRUCTURE

Work with others on the construction team to ensure the infrastructure will meet the project's needs and project sponsors' vision. Infrastructure such as power, data, cooling and even plumbing can have an impact on the technology program of the construction project.

Early in the process, it is good to think through the implementation of the technologies and identify all the factors that will impact the installation. Dependencies can be identified in a Gantt Chart, which is a concise way of communicating with the project team. Here is a suggested process:

1. List the infrastructure requirements for each of your technologies.
2. Collate these requirements into a single document.

3. Set up a meeting with the leaders of each identified infrastructure, review the project's needs and plan to ensure all these needs will be met.
4. Make a list of project needs that have not been met, and keep in touch with the contractors who will make the necessary changes.
5. Include the university's central IT department to ensure your new technologies will work with existing infrastructure on campus.

Examples of infrastructure mandates in a technology program:

- Electrical—one electrical plug for every public seat and request additional electrical panels to facilitate future growth
- Data—1 GB service to each data port, to support large file transfers
- Plumbing should not go through the ceiling of the server room
- HVAC—to cool rooms with heavy technology infrastructure, such as data centers. Ensure extra capacity is build into the cooling infrastructure, as additional technologies will be added to the space by staff, students and researchers.
- Wireless—every space in the building must be covered by wireless service, including the space between book stacks
- Furniture—select furniture with built-in electrical outlets to support use of mobile technologies and be aware of new table height standards for mobile technologies

WORKING WITH BLUEPRINTS

The construction team will begin developing blueprints for the project. It is critical to have a copy of the most recent version, in both digital and print form. When the project moves from the Design phase to Construction phase, the blueprints will be taken literally. If the project's needs are not shown on the blueprints, they will not be built. Keep on top of the blueprints, have your red pen handy at all times, and keep a list of deficiencies in the blueprints. Report those deficiencies in e-mail (for the time and date stamps) with a scan of the marked up drawings. Ensure those deficiencies are corrected in the next version, which means keeping a list or document of your own. It is hard and detail-oriented work, but when those blueprints are finalized you will be stuck with them, unless you are ready to pay for change orders, which are sometimes denied even if funds are available.

A few helpful hints:

- Have the blueprints printed in the largest size possible. Architects like using icons, which tend to be small and in close proximity to the next icon. Big printouts help clarify what has been planned for each area.

- Keep the blueprints on-hand at all times. When discussing the project with anyone, pointing to the drawing is the strongest communication tool you have. Describing something abstract is hard for the listener to comprehend and you can't be sure they understand the point you are trying to make. A picture is worth a thousand words.
- Keep handy pictures of the technologies and furniture you plan to install as well.
- Don't be afraid to ask for clarification. The blueprints will be overwhelming at first; ask someone on your construction team to review the drawings with you so you feel comfortable reading and analyzing them. It's not hard and it is certainly a skill worth acquiring.
- When the millwork drawings are delivered (otherwise known as custom furniture or cabinetry), make sure all the dimensions, colors and materials are clearly listed. I found it best to have a cost effective life-size mock-up created and invite the end user to test the mock-up with everyday scenarios before signing-off on the design. This is especially true for service desks.

TIMELINES OR GANTT CHARTS

Timing is one of the most important factors in a construction project. The project sponsors probably have an opening date in mind, and aspects of the project will be impacted by the deadline. Keep on top of everything, and act quickly. Creating timelines or Gantt Charts of the project will be one of the most powerful tools as a project manager.

Timing of purchases is a critical element of leading the technology project. Things to consider before purchasing:

1. Align with the opening of the building.
2. Take into consideration the time required to order, deliver and install.
3. Sometimes a committee will be required to write a Request for Proposal, review the proposals, possibly demo the products and negotiate the price. This can take months for each product.
4. It often takes a week or two for the purchase order to work its way through the bureaucracy of the institution. Make sure to account for this in the Gantt Chart.
5. There will most likely be a six to eight week lead-time between the vendor receiving the purchase order and delivering the product.
6. You'll want to open the building with the most recent model of technology possible, so it's important to hold the purchases back as long as possible.
7. Generally speaking, the cost of technologies reduces over time, which is another reason to hold off as long as possible.
8. Product warranty is generally one year. There may be situations where the technologies must be purchased early for various reasons. This could result

in little to no warranty when the building opens. It's good to test as many of the technologies as early as possible to catch the equipment requiring warranty before the staff, students and researchers find them. The best practice here is to plan as much as possible, use timelines and Gantt Charts to strategize your technology selection, purchasing, installation, configuration, training and testing before your space is open for public use.

INSTALLING TECHNOLOGIES WITH CONSULTANTS/CONTRACTORS

Consultants and contractors will be your best friends and worst enemies. One day you'll hug them with tears of joy, the next day you'll want to wring their necks. Construction projects are emotional, high-stake endeavors for clients, but they are "business as usual" for the consultants and contractors. They know how to weather the storm that comes with each project, so feel free to do what you think is right to get the project done. You won't hurt their feelings.

The process for working with each kind of consultant and contractor is fairly similar:

1. Introduction and kick-off meeting,
2. Review the vision of the project, scope of work, budget and timeline.
3. Decisions will be made to complete the project on time and budget. Ensure these decisions are documented and easily at hand, as you'll be holding each consultant to their original promise at various times in the project.
4. Most of the time drawings will be created for client review and approval. Don't be shy. If the drawings are not clear, ask the consultant for clarification. If you find them too abstract, request an inexpensive model. The consultant will build what is in the signed-off drawing, so make sure it is exactly correct.
5. At every step of the process with each consultant, keep a check on budget and timelines. Update the Project Management documentation as often as possible, noting important decisions and dates.
6. Once decisions are made and the products are signed off by you the client, then document expected delivery and installation times. Ask about dependencies, like the furniture that must be installed before the desktop computers can be setup. Coordinating vendors and consultants can be exhausting, but it's better to coordinate in meetings and documentation than on the floor with everyone pointing fingers at each other.

7. Buy your own pair of steel-toed boots, construction helmet and any other equipment required to be on the construction site. Avoid any reason that would keep you from being onsite to observe the process.
8. Tell your supervisor and the colleagues that you'll be in jeans, tee shirts and probably dirty for this phase. It's important to roll up your sleeves, help out and be an active participant in the construction project.
9. Consider shifting your work hours to align with construction hours, which tend to be quite early.
10. Identify the project manager for each group you are working with, program their cell numbers in your cell phone as quickly as possible and become familiar with the team installing the technologies.
11. Construction sites are notorious for theft, so plan ahead for safe and secure storage space. Try to time the delivery and installation as best you can, so the technologies are installed soon after delivery. Loading docks are busy and do not make for secure places to store technologies.
12. When delivery is complete and installation is ready to begin, it is critical that a meeting is organized, so that all consultants, vendors and clients refresh their memories and have a shared understanding of the work to be done. Make sure you are present for the kick-off meeting and check often on the progress of the installation. Contractors will often need answers and if you're not around they will make the decision themselves. Even though everyone on the team has cell phones installers do not use them very often, so being on site is incredibly important. Your cell phone is the most important tool you have for managing this project. Calling your team, consultants and vendors in a timely manner and documenting issues with pictures will be one of your keys to success.
13. The installation phase of the project is by far the most exciting, taxing and high-stakes period of the entire project. All the decisions made to date will now come to fruition. Keep all your documentation handy to make sure expectations are in line with the agreements made in the past. This may be a good time to introduce some of your library staff to the construction project to either conduct the installation themselves or manage some of the installers. This phase is a great time to get buy-in from staff, and requesting their input to set standards and installation expectations can be quite an empowering experience for them. If you are paying a consultant to install desktop computers, have your staff specify how the computer should be installed on each type of desk, how the cables should be run and ask your staff to build a demo for the consultants and installers to replicate. You can then ask your staff to manage the installation, keep an eye on the quality of work and ensure their standards are being met.
14. Keep an eye on the productivity of the installers and let the project manager know when you see installers not working. It's important to keep a good balance between a positive relationship with the installers

and their efficiency. A good relationship with installers will likely result in a higher quality product. Buying pizza, snacks and whatever it takes to keep them happy and productive should be a priority.

15. Once the installation is complete, check it over and if possible bring the staff that will be using the new space to review the work to ensure it was built to specification. Again, don't be shy, identify issues, document them in a list with pictures and refer to the agreement. Make sure you get the product that you paid for. Diplomacy is important, but so is your reputation.
16. Once you are happy with the install, it's a good idea to notify your director and anyone who has a vested interest in the space to come and take a look.

WORKING WITH PROJECT MANAGERS

The key point to productive working relationships with your various project managers is to keep timelines, budgets and quality of deliverables in-line with expectations and document agreements as the project moves forward. Project management documentation is perfect for this work, but it can be time consuming. Other issues will appear with your project managers such as project burnout, uncompleted work, budget hold-back and potential lawsuits.

Mobile technology is your best friend. A smart phone and laptop in a comfortable bag, like a backpack, will help you keep this documentation up-to-date and accurate, because it is easy to access and use on a construction site. Buy a nice tube to hold the project blueprints. Here are some other tools to keep on hand:

- Durable tape measure
- Small flashlight
- Painter's tape (used to mark where you want things installed without making a permanent mark)
- A light-weight notebook
- Pencils and pens
- Permanent marker
- Business cards

Additional Tips

1. Create Gantt Charts for each project manager and make deliverable dates very clear.

2. Create one Gantt Chart for yourself in order to keep all your projects coordinated and dependencies identified.
3. Very few projects are delivered on time in the construction industry, but it's important to keep track, or they may never be completed.
4. Resolve issues with the project managers as quickly as possible. Hurdles and issues can stack up, quickly impacting other projects.
5. Being well caffeinated at the start of each day and keeping protein snacks in a backpack is helpful to maintain strength and endurance. A little comfort food in your backpack can also help get you through some of the tough times.
6. Hold a weekly meeting with each project manager to check in on the progress and list of hurdles they have come against. Follow the meeting with a tour to see evidence of the work and then document progress with each project manager in person. If progress is not what you expected, create an inventory of work and official sign-off by you, clearly stating when the work is to be completed.

You will be judged poorly if the project is not completed well. One tool to assure completion is holding back payment until the work is done. Some contractors would rather walk away than get final payment, so try to make the "hold-back" as substantial as possible.

Documentation is important and sometimes used for legal purposes. Unfortunately, lawsuits are common in construction projects, so it's important to keep documentation as current and accurate as possible.

COMPLETION OF WORK

At some point, it is important to transfer knowledge of the project from the contractors/installers to the library staff. The contractors should deliver documentation accurately describing what was installed, along with final specifications, configurations and training for the library staff. Unfortunately, this rarely happens well, which means a lot of time, effort and money was spent on technology that staff don't understand or know how to use. Be adamant, and keep track of the required deliverables from each consultant/contractor. Here are some helpful hints:

- In the project documentation, list each contractor and create an inventory of the required deliverables to officially declare that they have completed the project, and should be paid.
- Contractors sometimes just disappear and are happy to not complete the work, usually because their next project seems more interesting.

- Keep in touch with your finance office, and do not approve final payment until your list of deliverables is complete.

CLEAN-UP AND GRAND OPENING

It's an odd transition to quickly shift from dirty jeans and steel-toed boots to suits and shiny shoes. Your work will transition from detail-orientated project management documents and intense conversations with contractors to writing broad descriptions of the project for the public relations staff and speaking as diplomatically as possible with the press and VIPs. Develop interview-friendly statements and practice delivering them well. Stuttering on television is embarrassing. Help your communication staff with lists of significant spaces and technologies in the new library along with pictures of your target demographics using them.

USER EXPERIENCE

Once the project is finished your key demographics will begin using your newly designed space and they will be excited to offer their opinions. Make sure you provide opportunities for them to express these ideas and if possible, capture these insights and analyze the feedback. It will help the library staff understand the library's new strengths and weaknesses.

Four to six months after the library's key demographics start using the new spaces and technologies, it will become clear where renovations or changes are required to achieve the original vision. It is at this point where holding back a percentage of your original construction budget will come in handy. You will look smart and responsive to the users' needs by recognizing the problems and having the financial and human capacity to make the identified changes.

LIFE AFTER CONSTRUCTION

Change and renovations have become a normal part of life and our organization's operating budget. Keep the work alive by conducting user testing and evolving the spaces to meet the ever-changing needs of students, staff and faculty.

Good luck with your library construction project and please send me a note about it. I love hearing about innovative spaces and how technologies are helping people learn and research in the 21st century.

ACKNOWLEDGEMENT

I would like to thank Kristin Antelman and Maurice York from the library at North Carolina State University for inviting me to participate in the Learning Space Toolkit project. It was my work writing for the toolkit that formulated the basis of this article. If you are part of a team planning a new library construction project, please find the Learning Spaces Toolkit and review it with your team.

REFERENCES

- Huang, J. (2001). Future space: A new blueprint for business architecture. *Harvard Business Review*, 79(4), 149–158.
- International Institute of Business Analysis. (2014). Retrieved January 10, 2015, from <http://www.iiba.org>
- La Biennale. (2014). Retrieved January 10, 2015, from <http://www.labiennale.org/en/Home.html>
- Project Management Institute. (2014). Retrieved January 10, 2015, from <http://www.pmi.org>

Copyright of Journal of Library Administration is the property of Taylor & Francis Ltd and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.