Participatory Design in Academic Libraries

New Reports and Findings

Nancy Fried Foster, Editor

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About Nancy Fried Foster

Nancy Fried Foster is senior anthropologist at Ithaka S+R, where she helps libraries and organizations use ethnographic and participatory methods to understand their users and then design spaces, services, and technologies to meet their needs. Since 2009, she has worked through the American International Consortium of Academic Libraries (AMICAL) to introduce participatory design and work-practice study to colleges and universities around the world, and from 2007 to 2013 she delivered workshops in the United States through the Council on Library and Information Resources. She edited the recently released *Studying Students: A Second Look*, about a re-study of undergraduates at the University of Rochester where she served for ten years as director of anthropological research in the libraries. With Susan Gibbons, she co-edited the 2007 book, *Studying Students: The Undergraduate Research Project at the University of Rochester*.

INTRODUCTION
CHAPTER 1

Participatory Design in Academic Libraries: The Second CLIR Seminar

Nancy Fried Foster

In this volume, we hear from a number of librarians and library staff who have taken CLIR workshops and gone on to conduct their own participatory design projects. In these papers, they explain how they learned about the people who use their libraries, whether in person or online, and how they applied their findings to the design or improvement of library technologies, spaces, and services.

More than 250 people have gone through workshops in participatory design and work-practice study methods through the generosity of the Council on Library and Information Resources (CLIR). They represent 95 colleges, universities, and cultural institutions across the United States and are augmented by about two dozen librarians and library IT professionals from colleges and universities in Europe, Central Asia, North Africa, and the Middle East. Additionally, nearly 400 people participate in a listserv devoted to participatory design in academic libraries. As a consequence of all of this activity, the library community is now awash in just the sort of exciting design projects discussed in the following pages.

Participatory Design

Participatory design refers to a relatively recent approach to the design of technology, spaces, services, and resources in all kinds of workplaces (Shuler and Namioka 1993; Spinuzzi 2005; Foster, Bowen, and Lindahl 2011). Participatory design begins with the belief that relying on precedent—on the way things have always been done—no longer serves us as well in these times of rapid and even disruptive change. It used to make sense to build an academic library that looked and worked like other, older academic libraries. To imitate older academic libraries now would be to build a library that is

obsolete even before it opened. It is not simply that physical collections are shrinking, or that more people than ever are using devices that rely on plentiful power outlets and a good Internet connection. The reality is that people work differently now, forming scholarly communities remotely across vast geographic areas and collaborating, sometimes in real time, with the support of communication devices and technologies.

It is no longer easy to imagine a separation between library buildings and library technologies, as today it is possible for either to be the site of using or providing the other. In this complicated and unstable situation, we look to our communities to participate in our design projects and keep us informed about the work they do, how they want to do it, how they overcome obstacles, and how they would do their scholarly work in an ideal environment. Participatory design provides methods for including non-traditional participants—faculty members, staff, graduate and undergraduate students—in projects to design and develop new library technologies, spaces, and services.

The Second CLIR Seminar on Participatory Design of Academic Libraries

The University of Rochester's River Campus Libraries hosted the second CLIR Seminar on Participatory Design of Academic Libraries in Rush Rhees Library in Rochester, New York, June 5–7, 2013. At this seminar, 35 people who had conducted their own participatory design projects met to discuss recent work and the ongoing challenges of improving academic library services, facilities, and technologies. Interspersed with the presentations were facilitated discussions led by Katie Clark, Judi Briden, Cynthia Carlton, Ann Marshall, and Sarada George on the following topics: project planning; getting support from peers and administrators; and taking action based on project findings (see the Appendix, p.109, for highlights of the discussions). Key outcomes of the seminar included confirmation of the value of the methods; new approaches to gaining support for projects and implementing recommendations based on findings; and renewed commitment to the community itself.

The Seminar Program

David Lindahl, of the University of Missouri–Kansas City, opened the meeting with a keynote speech on institutionalizing user-centered design in every function and at every level throughout the library. Using this approach, he remarked, the library can be organized "into groups of people that are each responsible for a discrete step of the user-centered design process" as a means to build competency and, more importantly, to identify emerging needs for the library as old needs evolve or disappear. As Lindahl told us in his presentation, "academic libraries must … answer questions like these: What is the work that people need to be able to do? What technology

and terminology will they understand? How are current tools working?" Lindahl argues, "Growth based on carefully identified needs of the academic community that a library serves … will lead to organizational growth. This approach comes with the benefit of keeping library staff on board with the direction, because decisions will be grounded in data."

After the keynote, we heard three methodological papers.

Sue Cardinal, of the University of Rochester, kicked off the project presentations with a "recipe" for improving course pages. Working on the usability side of user research, Cardinal conducted a quick, low-cost project to reconceptualize two course pages based on an understanding of how students use them in the context of their daily course-related activities. Tracing the evolution of course page technology, Cardinal described her efforts over the years to make these pages usable. In her latest project, she moved beyond usability and examined the way students work on course material and the terms they use to express their resource needs. She writes, "Categories on the page should be based on what students are doing or feeling, rather than on the type of item. For example—textbooks might be listed under 'books' but students suggested that one category should be 'forgot my textbook' … and another should be 'feeling behind'—the place for supplementary textbooks."

Mark Werner and Mark Mabbett, of the University of Colorado at Boulder, presented an effective use of an iPad running *Penultimate* and *Evernote* to gather, organize, store, and analyze data from library walkthroughs. The method allowed them to engage participants in a conversation as they moved through library spaces, capturing images with the iPad and annotating them with the participants' comments in real time. This method made it possible to pick up small but extremely significant details during data collection and then to communicate the needs of students quickly and convincingly after data analysis. As Werner and Mabbett put it, "showing is better than telling," and their method makes showing both easier and more effective.

Marilyn Pukkila of Colby College presented a paper that she wrote with her former Colby colleague, Ellen Freeman, about the value of co-viewing video, both with project team members and with key faculty and administrators who may benefit from visual confirmation of students' academic practices and needs. Co-viewing is, simply, the viewing of research artifacts—DVDs, photos, maps, and so on—by a small group of people who pause to discover and debate the meaning of artifacts during the session. According to Pukkila and Freeman, co-viewing makes it possible to dive deeper into data, bring multiple perspectives to bear, and develop a better understanding of the artifacts' meanings. Co-viewing can also extend the benefits of the project by bringing results to institutional leaders in a compelling way, thereby increasing support for implementations based on findings.

The next pair of papers presented the results of observational studies.

Susanna Cowan and Joelle Thomas, of the University of Connecticut, presented the methods and findings of a comprehensive study they and their coauthors conducted at Babbidge Library. Called a "portrait of one floor," the study collected data on every single seat on one entire library floor, on a nearly hourly basis. This "portrait," which included almost 600 seats and an acre of floor space, generated almost 50,000 data points. Among their many findings were the requirement to think through the goals of the work before starting it and the difference between assumptions—even ones based on long experience—and hard data.

Next, Nisa Bakkalbasi spoke about an observational study she conducted with her coauthors and a team from the Columbia University Libraries. Like the University of Connecticut group, the Columbia team recognized the importance of preparation, especially in training the team to code observations in order to achieve inter-rater consistency. The Columbia study turned up some surprising findings. One was that many students engage in "camping"—staking out a space with personal possessions to reserve it in the owner's absence. Another was a proliferation of devices that occurred even more rapidly than was anticipated by librarians, and the lengths to which students will go to charge their phones, tablets, and laptops. Many of the team's findings will enable team members to anticipate emerging problems and address them while they are still manageable.

The next two papers reported on large-scale projects, one a cross-institutional effort and the other a plan for a large new campus building that will combine library and classroom spaces.

Jeanne Link and Jonna Peterson, of the Library of Rush University Medical Center, write about the planning phase of a project to apply the "Studying Students" approach developed at the University of Rochester to the case of students at Illinois medical schools and health sciences programs (Foster and Gibbons 2007). In the planning year, the question was whether the methods could address clear and significant questions while meeting practical targets such as feasibility, affordability, and relevance.

Echoing Dave Lindahl's presentation, Link and Peterson write, "The collaborative nature of this work yielded much more than the means to make an informed decision. As libraries strive to meet the ongoing challenge of adapting to user needs in the clinical environment, what could be more important than correctly defining what those needs are?" They go on to cite the secondary values of the planning process: engagement and community-building for the librarians and libraries involved.

Jeremy Garritano and Jane Yatcilla, of Purdue University, described a large project to engage library staff, university faculty, graduate students, and undergraduates in the conceptualization of a science, technology, engineering, and mathematics (STEM) library in the twenty-first century. The fact that the new building would combine library and classroom space complicated the project in interesting ways. Among their findings is that a classroom, when used

for a class, may seat twice as many people as it can when used for non-class purposes. The team also learned that students need a clear message when classroom spaces are open for studying, as they will not want to walk in unless they are completely sure the spaces are available to them.

In the final project presentation, Geoffrey Swindells and Marianne Ryan, of Northwestern University, demonstrated how library practice could engage librarians and library staff in participatory design as a matter of course through "continuous engagement with students, faculty, and staff." Covering a range of topics, including the need for training and the problems they encountered and addressed, they described a transition to a more user-centered organizational structure that would provide an "infrastructure for engagement" through such local innovations as a class librarian program, liaisons for non-academic units, and a library ombudsman.

Susan Perry, college librarian and director of library, information and technology services emerita, Mount Holyoke College, concluded the seminar by facilitating a rousing discussion of the role of librarians in the emerging hybrid-teaching environment.

Papers from the Seminar

This book compiles written versions of the seminar papers, including a number of images from the presentations themselves. They demonstrate the range of ways in which library leaders, librarians, and staff have assimilated the approach and methods of participatory design. As the papers show, there is much to gain from these efforts. For one thing, library spaces, technologies, and services that are built with broad participation work better and are more responsive to the work practices and needs of real people. Beyond that, focusing on the people who use libraries, and organizing libraries in a way that supports that focus, is a good way to ensure that libraries will identify emerging needs and shift plans and resources to meet them, rather than continuing to address disappearing ways of work. Participatory design, then, is an essential tool for libraries that aim to support scholarship now and in the future, in ways that ensure continued excellence and relevance in a world of change.

Some Special Thanks

This volume exists only because some very dedicated and generous people made the CLIR seminar possible.

On behalf of all of the presenters and authors, I thank first and foremost Alice Anderson Bishop, special projects associate at the Council on Library and Information Resources. Alice's commitment to the CLIR Workshops on Participatory Design of Academic Libraries and her unflagging energy in creating and organizing the culminating seminar made all the difference. While Alice has always been focused on supporting intellectual work and collegial relationships, it is how she makes sure that everyone is so well taken care of that

participants remember long after the event. Thank you, Alice.

The workshops that generated the projects discussed in the seminar have been funded by the Council on Library and Information Resources, Charles Henry, president; The Andrew W. Mellon Foundation, Donald Waters, program officer; the Institute for Museum and Library Services; and the American International Consortium of Academic Libraries, Jeff Gima, director. We thank these institutions and their leaders for their generosity and active interest. We also thank Kathlin Smith of CLIR for her work to produce this ebook, for her sense of style, and especially for her gentle touch with authors.

Our hosts at the University of Rochester's River Campus Libraries generously provided the beautiful Hawkins Carlson Room and local event coordination. We are indebted to Dean Mary Ann Mavrinac for making us feel so welcome, and to Wendy Kirchmaier and Margaret Engel for handling more details than we ever even knew had to be handled.

As the organizer and editor, I also want to thank Susan Perry for her continued support and encouragement and for her presentation and participation in the seminar. Susan is what Malcolm Gladwell calls a "connector," and connection is essential to the kind of work described in this volume. I encourage all readers to connect—to the papers included here, to the authors if you have questions, and to your stakeholders and constituents: connect to them, get them involved, and try a participatory design project of your own.

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KEYNOTE
CHAPTER 2

Organizing the Library for User-Centered Design

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Organizing the library for user-centered design is a process for defining the roles, responsibilities, and organizational structures of academic libraries that emphasizes elements of E. E. Chaffee's adaptive and interpretive models of strategy (Chaffee 1985). The goal of this process is to equip academic libraries with a consistent, user-centered approach to decision-making, problem solving, and the design of library offerings.

User-centered design is a phrase that I have heard in libraries when user input is needed in the process of project work. The "user-centered" part of the phrase is half the battle for libraries. The "design" part, or the implied process piece, is the other half. Recognizing the need to bring the user into the design process is important. Actually having a process with roles and responsibilities that is understood and practiced by everyone in the organization is no less important.

Approaches to Organizational Strategy

Academic libraries must continue to change and evolve their offerings because of changes in the environment, changes in technology (such as material formats and personal electronics), and changes in end-user work practices.[1] Traditional functional categories such as cataloging, circulation, and acquisitions do not cover all of what most libraries are doing today and will not be sufficient in the future. Libraries are increasingly thinking about and acting on the changing environment.

Strategic planning is a familiar activity in academic libraries. It is an activity that is carried out under the heading of strategy. But

[1] In the first several pages of this chapter, including the sidebar, I explicate Chaffee's 1985 paper on models of strategy as a way to ground my argument for institutionalizing user-centered design in academic libraries.

to define the word *strategy* in the context of an organization is challenging. There are perhaps hundreds of definitions in the literature. Learning about a variety of approaches to forming an organizational strategy has helped me recognize a potentially untapped opportunity space for academic libraries.

Organizing the library into groups of people that are each responsible for a discrete step of the user-centered design process will build competency in these areas. For example, metadata librarians are grouped organizationally to share knowledge and learn from one another. As the steps of user-centered design are made a visible priority through organizational changes and position description changes, skills and experience will grow and hiring might expand in disciplinary scope.

Chaffee did a literature review to better describe the meaning of strategy. She found that there are many hundreds of definitions. To help us understand this topic, she organized the definitions into three models of strategy: linear, adaptive, and interpretive. For each of these broad categories, she has developed a sample definition.

Linear Strategies

Alfred Chandler provides a sample definition for the linear model of strategy: "the determination of the basic long-term goals of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out these goals" (as cited in Chaffee 1985, 90).

Linear strategies are well suited for an organization that is tightly coupled and can apply its resources in a coordinated way with all of the actors working together toward a common set of goals. This strategy requires that an organization set goals. It is hierarchical, with the leadership defining the goals and the subordinates working together, tightly coupled to their leadership. This strategy works when the environment is predictable and the organization is well insulated from environmental changes. The focus of this sample definition for linear strategy is on defining and accomplishing organization-level goals.

Adaptive Strategies

C. W. Hofer provides a sample definition for the adaptive model of strategy: It is "concerned with the development of a viable match between the opportunities and risks present in the external environment and the organization's capabilities and resources for exploiting these opportunities" (as cited in Chaffee 1985, 91).

In contrast with the linear model, an adaptive strategy does not start by setting long-term goals; rather, it works to understand what opportunities exist in the landscape and to understand its own capabilities, and then acts in ways that align the two.

In an adaptive strategy, the organization seeks to match its capabilities with opportunities present in the environment by attempting

to effect changes in the organization, the environment, or both. This strategy sees the organization like a life form that can change and adjust. An adaptive strategy supports a less predictable environment better than the linear one does.

A linear strategy deals with the environment; an adaptive strategy changes with the environment.

Linear Strategies

Organization:
- Tightly-coupled
- Has goals

Environment:
- Predictable
- Well-insulated

Focus:
- Accomplish goals

Adaptive Strategies

Organization:
- Changes and adjusts
- Life form

Environment:
- Changes and adjusts
- Less predictable

Focus:
- Alignment of means and environment

Interpretive Strategies

Organization:
- Collection of cooperative agreements (free-will)
- Loosely coupled

Environment:
- Attracting individuals for mutual benefit

Focus:
- Participants (organization wide)
- Management of meaning and symbol construction
- Legitimacy (through communication and relationships)

Interpretive Strategies

The sample definition for the interpretive model of strategy is: "orienting metaphors constructed for the purpose of conceptualizing and guiding individual attitudes or organizational participants" (Chaffee 1985, 93).

Interpretive strategy focuses on people and how they make meaning of the organization and the environment. It constructs and manages symbols as a way of guiding people toward the organization and its success.

This strategy sees the organization as a collection of participants with free will. The participants need to be attracted toward the organization for the mutual benefit of both the participants and the organization. This collection of strategies is applicable to organizations that are loosely coupled. The use of an interpretive strategy occurs when meaning and symbols are managed and the focus is on legitimacy through strong communication channels and relationship building.

To illustrate this point, consider the national symbol that was developed to represent the library (Figure 1). The "Resolution to Endorse a National Library Symbol," sponsored by the American Library Association, says: "The symbol triggers instant recognition of a library … It does *not* attempt to capture the essence of the modern library … this would be impossible to do in a clean easily recognized image" (American Library Association, n.d.).

Fig. 1: National library symbol

This symbol is challenging because it successfully conveys the concept of a "library" to outsiders using traditional symbols while firmly positioning libraries in the past. Reading a paper book is far from reading on electronic devices, working in collaborative spaces, teaching, supporting scholarly communications, and conducting original research in many of today's academic library organizations. Representing the reality of today's library through the management of symbols and meaning, at least according to this strategy, may influence the future of academic libraries. An authentically shared understanding among library staff members of the modern roles for libraries could help them to shed some obsolete library services in favor of new opportunities they themselves would seek out in the environment. For outsiders, this new understanding of the academic library could bring new appreciation and support.

User-Centered Design and Execution

In a recent webcast I attended, Sonya Betz said "… the biggest problem we are facing in libraries today is discovery and access." She later went on to say: "How much stuff you have and how much money you are spending on that stuff is really irrelevant if your students and faculty can't find it, or if they find it impossible to use" (Betz 2013).

Discovery and access is an important problem and we need to do better, but it is the second part of her statement that I think can be generalized to most of the challenges in libraries.

We need to *execute* useful and usable discovery on the website, otherwise our investments in collections are fruitless. We need to *execute* useful and usable spaces and services, or else all of our investments in these areas are fruitless.

It is easier to spend time on what libraries have historically done, such as collecting stuff, describing it, circulating it, writing a subject guide, and so on. It is more difficult to tackle the unknown: to design something new, to build it, to test it, and to discover that it needs improvement.

Redesigning the academic library to adopt a user-centered design approach to problem solving and project work may take considerable resources. Where will they come from?

A typical approach to solving problems is to form a committee or a task force, but this may be an inefficient use of resources. Perhaps libraries could modify or shed this practice to free up resources to try solving problems in a different way. Sometimes libraries engage in work and provide services that might not be as valuable to users as they could be. This work has always been done, so there is an assumption about its usefulness. If we had a standard approach to pruning services and offerings, as we do with books, we might free up resources for something new.

The user-centered design approach being proposed will be useful for figuring out what to do. It can also be used to solve problems. Now we will look at the challenges to academic libraries in executing user-centered design.

Challenges to Academic Libraries in Executing User-Centered Design

Information gathering. How many times have you been in a meeting and tried to make a decision without having the right information in front of you? This leads to endless and fruitless debate. To get the information we need, academic libraries must first answer questions such as these: What is the work that people need to be able to do? What technology and terminology will they understand? How are current tools working? These are questions we can answer through observation, interviews, participatory design, and usability testing. Collecting information from our own research, or from literature searches, will take time and effort; however, it may be the only way to effectively grow the role of the academic library. Growth based on

carefully identified needs of the academic community that a library serves will lead to organizational growth. This approach comes with the benefit of keeping library staff on board with the direction, because decisions will be grounded in data.

Technology. The technology that is currently available to academic libraries does not always work as well as we think it should. What if we could wave a magic wand and have better technology? What might it look like? Libraries are limited both by what existing technology does and by what libraries might be able to design to augment or replace it. Search engines work in a way that is not always intuitive. The metadata that might help people discover useful content are not always available. Libraries are challenged to decide whether to buy or build. How do they evaluate options when it feels like they do not have enough information or technical knowledge? How much should they invest in the evaluation?

Vendors. Vendors build complex products that must meet the needs of many different libraries. When those products do not work exactly the way we need them to, it tends to drain library resources because we like to discuss their shortcomings to death.

Where I work, the library participates in a customer voting process with our ILS vendor. The vendor provides a list of potential new features to all customer libraries with the promise of implementing the ones that receive the most votes. Our participation in this process takes time and it is possible that none of our high-priority needs will be met. A democratic software design process may seem reasonable but it does not necessarily incorporate an understanding of the users' work context into the software.

Budget. Libraries often have limited resources. These resources may be cut just as libraries want to do something new in support of teaching, research, and learning. We may envision new ways of working in collaboration with students and faculty. When we execute based on good design for users in everything we do, we will have a stable foundation for growth and the best hope for new resources in the future.

Skill sets. Sometimes what libraries need to do looks very different from what we did before. It is a challenge to decide what skill sets to add, as resources and opportunities become available.

Design by group. When committees design something, they often start with the last step. They begin by manipulating the actual design of the product or solution. For example, they may begin by discussing the navigation components of a web page. They rarely carefully construct the goals for the design, with participation from end users and stakeholders. This leads to a design that does not take those goals into account and a discussion that lacks a user-centered foundation.

For example, if you design a webpage without first determining the key tasks for that page, the page will have no clear purpose and will be difficult to use. Design by committee can lead to disagreement, with people staking out and defending their positions rather than learning about and focusing on the work that end users need to be able to do.

Process. We can learn a lot by contrasting a familiar design-by-committee setting with the rigor of a formal decision-making process and a user-centered design process. Breaking up problem solving and design work into steps with roles and responsibilities enables information gathering and testing at each step. Committees without formal processes tend to muddle the steps. This leads to lower-quality outcomes.

How does your library accomplish project work? What process does it follow? Are committees working well for solving problems or designing new services? Is a different approach used each time? Does the entire library have a shared approach to user-centered design? Did they all get trained on the same approach?

Stakeholders. Most important decisions involve one or more stakeholders. A stakeholder is a person or group that has an interest in or is affected by the outcomes that result from solving a problem with a particular solution. When a problem appears and all of the stakeholders in that problem move directly to the default solution that meets their own needs, they tend to want to defend their position against the other stakeholders' solutions. Following a stepwise process that is well understood by all members of the organization offers an opportunity to move away from this approach and can lead to outcomes that might be more inclusive of diverse stakeholder requirements.

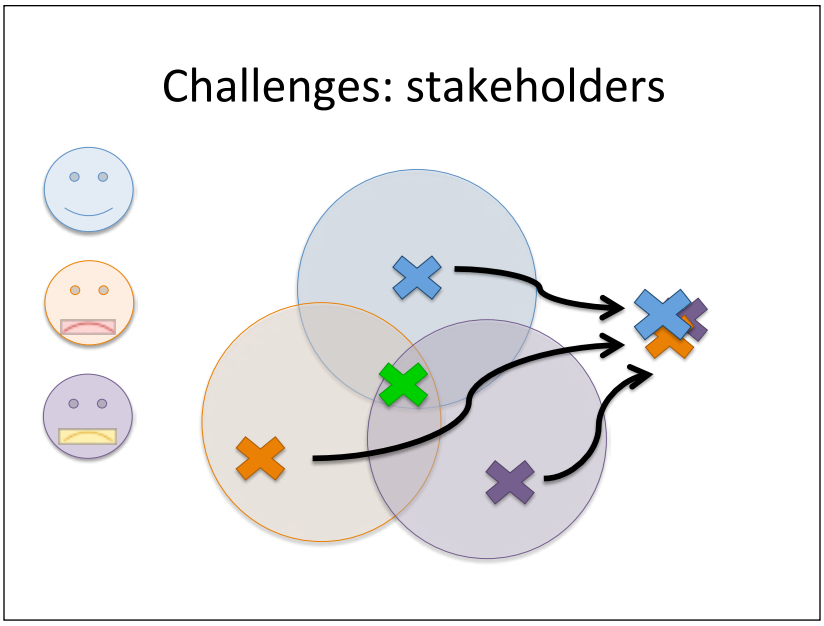

Fig. 2: Challenges to stakeholders

Figure 2 shows three stakeholders in a problem, and each has begun to form a default solution to the problem at hand. The default solution is the first or most obvious solution that came to mind for each person. The blue, red, and yellow X's represent the different solutions of each. These are the solutions that the stakeholders think will meet their needs if implemented.

In this scenario, starting from default solutions, either the

loudest voice will get his or her way, or the final solution will not solve any of the stakeholders' needs very well. Without strong buy-in, some stakeholders may undermine the implementation of the solution at a later time. The problem is that the stakeholders might never have bothered to consider all of their own individual needs or to articulate them prior to imagining the solution. If they had developed their objectives in the problem, they could have imagined creative solutions together.

Now imagine that the blue circle represents all of the possible solutions to this problem that will meet the objectives of the blue stakeholder. The red and yellow circles represent all possible solutions that meet those stakeholders' objectives.

There are often solutions that can meet everyone's objectives, but to get there, our process needs to engage people in a discussion of their objectives. This discussion may require training and practice in stating individual objectives in the context of a problem. The conversation needs to happen *before* the alternative solutions are brainstormed. This way, multiple choices can emerge, and each can be refined and prioritized based on all of the important objectives.

What Can We Design?

We can design most anything, from tangible things such as physical space and software interfaces to intangibles such as services, approaches to collaboration, and processes. Design also applies to solving problems, designing the best solutions to user needs, and maximizing stakeholder objectives.

What if we were to formalize design in libraries? We would first work to consistently apply an organization-wide approach to design challenges. This would require us to follow a process that is well understood by participants and stakeholders. One way to institutionalize the process would be to create permanent teams with rotating membership; this would present an opportunity for people to share and build skills.

It is also important to involve users in the design of the library. In this case, involvement is about users' observable work practices and their participation. We can take an ethnographic approach to understanding end-user work practices by studying people's work. This can happen through a wide range of research methods such as interviews, recorded work observations, and participatory design workshops.

What Can We Design?

- *Spaces*: study rooms, stacks, service desks
- *User Interfaces*: website, search tools, apps
- *Services*: Reference interview, ILL
- *Collaborations*: the ways we work together with each other and with outsiders
- *Processes*: IR submission, cataloging, user centered design
- *Solutions to problems*, such as:
  - Need for more space for collections or people
  - Need to cut the budget

Formalizing Design in Libraries

To formalize the steps of a process for user-centered design and development within an academic library, we must first identify those steps. Next, we can envision new structural elements in the organization that will accomplish these steps. It is important for the steps to be separated across time and across people. Each of the steps should happen at a different time, and be handled by a different person

Formalizing Design in Libraries

- Identify the steps of a design and development process
- Separate the steps *organizationally*
  - Assign roles and responsibilities
  - Define expected work products
- Support the process
  - Tools and infrastructure
  - Confidence and trust
  - Training

or group. This separation will help to ensure that communication and documentation happen between steps and will help grow and develop expertise around each of the steps. Formalizing the process encourages productive discussions with specific goals and outputs at each step.

Finally, the library must support the process with tools and infrastructure. Tools might include a ticket system for capturing input from all staff, and a document management system to manage the work products or documents produced at each step. Shifting away from *ad hoc* committees that muddle through and stakeholders who defend positions will require confidence and trust among the participants of the organization. Organization-wide training is important because of the subtleties and complexities of each of the steps.

Identifying the Steps of a User-Centered Design Process

When you need to solve a problem in an organization, you should walk, not run, through a design process. Take the time to ask what the problem is and agree on an articulation of the problem. Identify and discuss which people the problem might affect; these are the stakeholders. We should be careful to articulate their needs and objectives as distinct from specifying solutions.

Once we have identified a problem, stakeholders, and objectives, it is time to gather relevant data, analyze it, and use it in brainstorming to come up with a range of alternative solutions. Ideally, we propose multiple solutions to the problem so that we can predict the possible outcomes for choosing each one. Once we have identified alternatives and their predicted outcomes, we can assess which outcomes will maximize the stakeholders' highest priority objectives. Finally, we can execute the solution that meets all of the highest

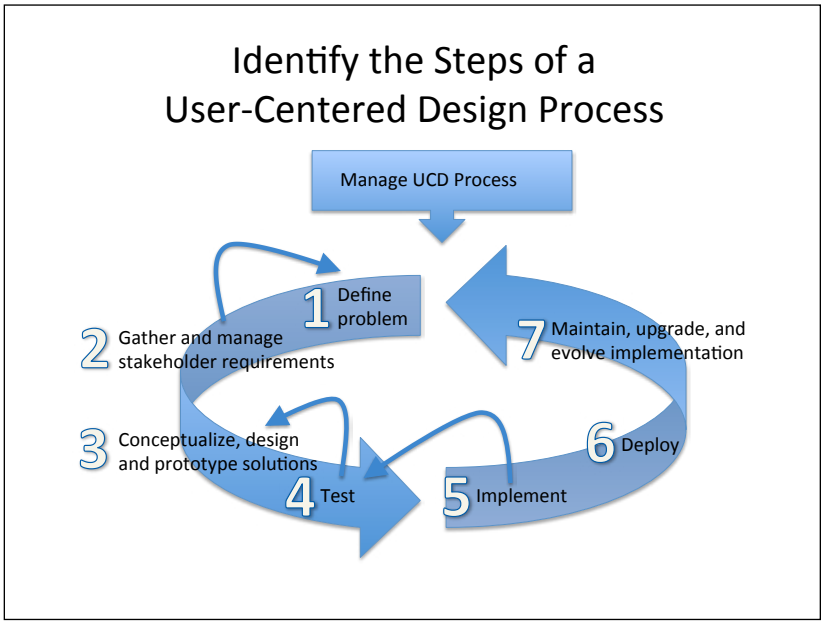

Fig. 3: Steps of a user-centered design process

priority stakeholder needs. All along the way we should test and evaluate and iterate as needed.

The steps to identifying a user-centered design process, illustrated in Figure 3, are as follows.

1. Define the Problem

The first step is to define the problem. Participants need to agree on a carefully articulated, written version of the problem. The next time you are in a meeting and you begin to discuss a problem, I challenge you to pause the conversation and get everyone to agree to the same articulation of the problem. Without this step, each person will be tackling a slightly different one, leading to a circular conversation. Write down the final, agreed-upon articulation of the problem.

Be sure to consider the scope of the problem so that it is reasonable to solve, and not prescriptive of any particular solution.

Problems can come from anywhere, such as library staff, students, faculty members, the public, research into users' work practices, university administration, technology changes, and environmental scans. How can we keep track of these problems? How does a library decide which ones to invest resources into solving? What are the criteria for choosing? How do we set priorities? Do we include alignment with strategic goals, cost, or time frame? What is the cost of not solving the problem? Will there be an impact on prestige, on funding, or on users? What are our available resources to solve the problem? How will we apply them to this problem? Who is responsible for doing this and how often does it happen?

This may seem like a lot of questions, but they are things we should be asking. We need to be consistent in articulating and handling problems.

2. Gather and Manage Stakeholder Requirements

The second step is to identify the stakeholders and their objectives and to manage those objectives toward a decision. Stakeholders are the people who have an interest in solving the problem or who may be affected positively or negatively by an envisioned approach to solving it. Create a table to capture the stakeholder objectives that relate to the problem. Include only stakeholders and objectives that the final decision maker would take into account when making the decision. Each row will represent a prioritized stakeholder objective. Each column will be filled in with one of several alternative courses of action. Each cell in the table will be a cross between an objective and an alternative. Eventually, the process will seek to gather data to predict outcomes for each of these pairings, assuming we were to move forward with the alternative, and we were seeking to predict (using the literature or some other source) how well the objective would be met.

A separate but parallel component of step two is to gain a deep understanding of the work practices of library users. In many problems, but not in all, library users are high-priority stakeholders. Starting from a problem and then going to users to learn more can

sometimes limit the scope of what is looked at and what is learned. The parallel portion of this step is to conduct ongoing work-practice study of end users' work, to learn about what they actually do through observation and other qualitative methods. We might look at student paper writing or faculty fieldwork. By doing this research, we can learn what users need to be able to do, and identify unmet needs for technology, space, services, policies, content, and more.

When the problem being solved has to do with the design of a product, such as a user interface or a library website, learning about "what people need to be able to do" is critical. This data can be used to construct a key task list, which is highly useful in gathering requirements for web design.

Unmet needs can be analyzed and brainstorming and interpretive activities around the analyzed data can lead to problem identification, stakeholder requirements identification, and alternative solutions development. This will, in effect, feed steps one, two, and three.

Despite the steps having sequential numbering and being explained in that order, there is really no set order; you can jump around as needed. But each step should still produce work products (typically documentation or reporting to other groups in the process).

3. Conceptualize, Design, and Prototype Solutions

By step three, we have gathered a great deal of data. We have defined the problem, prioritized stakeholder objectives, gained an understanding of what users need to be able to do, generated a key task list, and gathered other data that might help us to weigh alternatives by predicting outcomes. In this stage, we can be creative. We produce mockups, brainstorm ideas, build prototypes, and try to get to a design specification. Disciplines such as graphic design, user interface design, and architecture are ideal qualifications for the people who might fill this role. A good question to ask is: Who does this in your library today, and are they qualified? Do you hold the qualification of the person designing your interfaces to the same standard as you might for a reference librarian position?

4. Test

Comprehensive testing of the many library products and offerings is a large and important undertaking. One option is to create working groups dedicated to testing various aspects. For example, you might have a usability testing group to verify that web pages and physical spaces are easy to learn and easy to use. You might have a person or even a student worker assigned to find bugs in the website, or to use a checklist to verify that the style guide has been followed.

5. Implement

Once a new or refined version of something has been designed and specified, the library needs a way to make it functional. The implementation step will look very different depending on whether the user-centered design process is calling for software, physical spaces,

or services to become reality. The following list gives a few examples of what might happen in this step.

- Software:
  - Design software architecture and write code
  - Recommend purchase and/or customize
  - Advise design on technical capability and resources
- Spaces:
  - Order signage
  - Construct or reconfigure
- Services:
  - Plan roll-out
  - Document roles and responsibilities

6. Deploy

Deployment is when we take something that we have implemented, built, purchased, or created and move it into the hands of its intended audience of users. It is important to consider communication in advance of deployment to accommodate and adjust to other activities in the library. It is also important to manage expectations for what this new or modified product is going to do or not do. Having a role and responsibility dedicated to this step may lead to a more consistent approach to deployment, and a smoother process.

7. Maintain, Upgrade, and Evolve Implementation

Libraries often have a wide variety of offerings and services but limited staff and resources. It is likely that some of these products have been lost track of and fallen into disrepair. Identifying the maintenance role and responsibilities for all existing library products is an important aspect of the user-centered design approach (Figure 4). One way to implement this step in libraries would be to create a spreadsheet listing all end-user accessible products, from sections and pages on the website to physical signage in the building. Each "product" should have an assigned staff member and a fee that sets expectations for maintaining the product. This might include a regularly scheduled review of products for things like content updates, bugs, and needed repairs.

Management of this user-centered design process is critical because it is a draft approach that will require a great deal of refinement as it is adopted into a real library organization. There is a role and a responsibility for someone to consider the steps in the process, the groups and their charges, the work products and the communication channels, and then to reflect on outcomes that result from dealing with real problems. Making changes to the process as it moves forward and evolving toward improved outcomes is the goal.

The process manager can help with traditional project management activities such as planning and scheduling, resource allocation, and reporting on progress.

Maintain, Upgrade, and Evolve Implementation

- Maintain Library (e.g. signage, webpage contents, carpeting)
- Upgrade (e.g. website design, reference desk)
- Document users and practices for existing products
- Who is responsible for doing this?
  - Web presence: website, catalog
  - Building: study spaces, sidewalks
  - Service points: reference desk, chat
  - Collaborations: collection development, grant writing

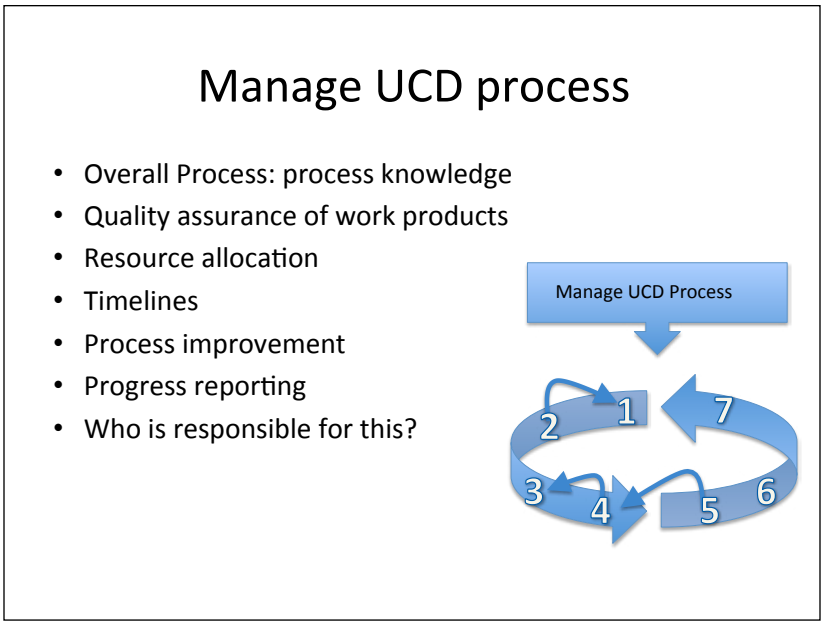

Fig. 4: Managing the user-centered design process

Separate the Steps Organizationally

Each of the steps in the user-centered design process can be implemented by first defining the set of responsibilities for that step. Assigning them to an individual or group in the library is the second step. Figure 5 shows examples of some of the logical groupings of responsibilities. The groups and the steps do not match up exactly: there are more groups and individual roles than there are steps. The group members will have an opportunity to collaboratively grow and develop in their roles.

The work-practice working group uses research methods such as ethnographic observation, interviews, and participatory design to learn about the work of end users. In this group we want to learn about what people need to do as well and identify their unmet needs

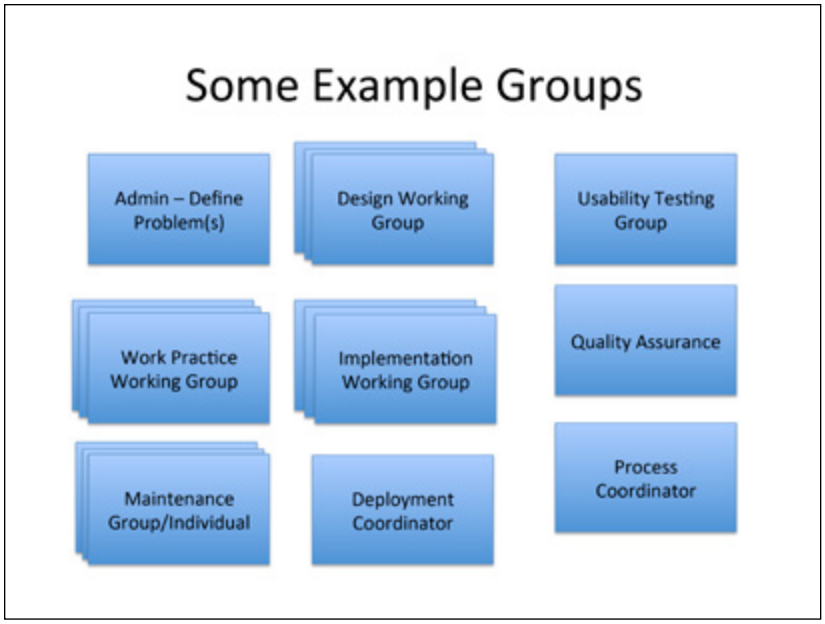

Fig. 5: Logical groups of responsibilities in the user-centered design process

Role: Work Practice Working Group

Undergraduate Group
- Four+ members
- Pick a topic, find articles for a paper, use citation tool, work remotely, create annotated bibliography, coordinate group study

Faculty Group
- Four+ members
- Literature review, find a scholar's work, share work with their community, get tenure, apply for grant money, manage their data sets, keep their data safe

Role: Usability Testing Group

- 6 members, testing and reporting is done in teams of 2
- 3-4 testing techniques to learn and practice
- Lab for testing (h/w, s/w, reserveable space)
- Maintain volunteer list
- Budget for payment of student subjects
- Human subjects approval or exemption
- Produce reports – design format
  - Test results
  - Suggestions
- Ownership of choice of testing methods used

Role: Design Working Group

- Translate requirements into a design
- One voice
- Apply visual theme
- Apply design rules
- Work from written usability test reports, work practice based story boards/scenarios, prioritized content lists, key task lists, issues in issue management system, existing website, discussions with work practice teams and maintenance teams
- Produce design mockups
- Respond to issues/suggestions from issue system (all suggestions deserve a response)

so that we can find innovative ways to support, collaborate, and otherwise intersect the library with their work. The work practice approach starts from people's work, not from an existing library product or offering.

The usability-testing group is becoming more common in academic libraries. The sidebar presents a good recipe for this group in an academic library.

The design working group can be a single individual or a small group that works to define and design solutions to problems, new web interfaces, or even physical spaces. The design group should ideally bring strong graphic design, or architecture skills and experience, to the work.

Support the Process

Tools, confidence, trust, and flexibility are necessary to make the process work. This process depends on trained people executing each of the steps at different times. Since each step needs to start with information generated by the other steps, tools like a document management system and an issue tracking system are useful for capturing and sharing documents and for collecting feedback, respectively. Shifting from design-by-committee to a process like this means that no one individual will see the process through from beginning to end. There will be pushback in the absence of confidence in the process. Trust in the process will require open communications, good training opportunities, and the goodwill of colleagues in the library. Applying user-centered design roles and responsibilities in this way, across library staff, may require many course corrections and adjustments until it works well in an organization. Flexibility is about preparation and expectation setting so that when it inevitably falls down, the process can be changed and not abandoned.

A document management system that is web based can provide access to the work products produced at each step in the process, such as the requirements, designs, and test results. This accessible repository will foster transparency in the process by making it easier to follow a pathway of work and steps from problem to solution. The documented results of each step are exposed to library staff members for scrutiny, discussion, and iterative improvement. This is in contrast with a closed process that has library staff voicing dissatisfaction with the end result, and uncertainty about which step needs refinement. Documentation is an important part of the foundation of maintaining a stepwise process.

The opportunity for academic library strategic planning is to consider how to combine adaptive and interpretive strategies to help library staff focus on end-user needs. This can be accomplished through training in such areas as interviewing, decision-making, and usability testing. It can then be enhanced with a well-defined process for design of new library products and with a focus on authenticity and open communication. Finally, it can lead to a stronger library that engages all organizational participants in addressing the needs of end users.

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METHODOLOGICAL PAPERS
CHAPTER 3

A Recipe for Participatory Design of Course Pages

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At the University of Rochester, library course pages have evolved from simple HTML pages to database-driven, dynamically created pages embedded in Blackboard, a course management system. As the chemistry librarian with a rigorous instruction schedule, I have embraced the use of these pages throughout my career at Rochester. Here, I will describe some historical use of online library course pages to support the chemistry curriculum. I will also share some usability testing experiences and why that methodology left me wanting more. Next, I will describe how Nancy Foster, director of anthropological research, and I put our heads together and created some user research methodology that I could use in a quick meeting with a new instructor. Finally, I will share the outcomes of that meeting and how I changed my pages as a result.

When I started working at Carlson Library in 2000, I used a combination of print handouts and basic HTML pages. The University of Rochester Libraries had a fairly simple home page (Figure 1).

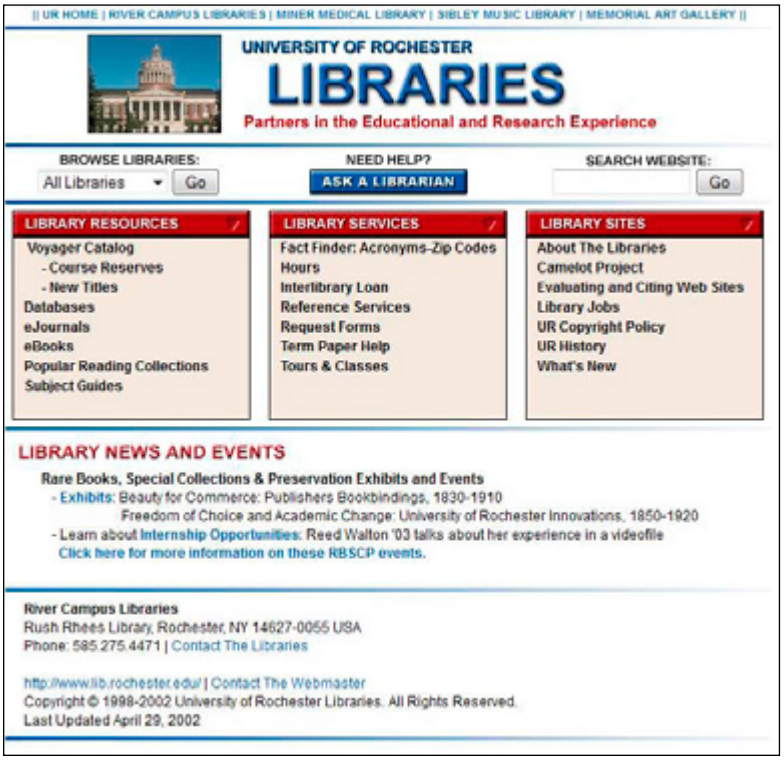

Fig. 1: University of Rochester River Campus Libraries home page, 2000

The course page for General Chemistry students was also basic, consisting of a short list of links (Figure 2).

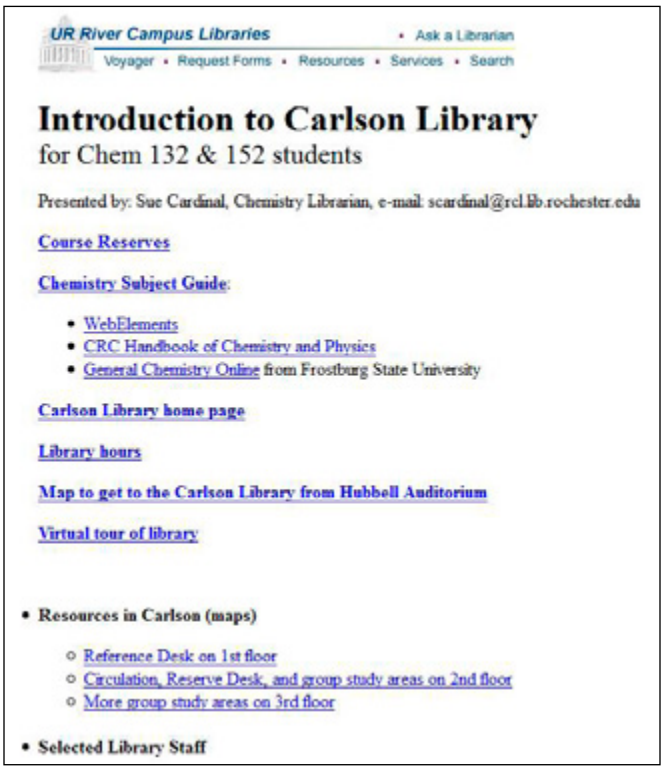

Fig. 2: General Chemistry library course page, 2000

By September 2002, our home page had been redone and a database-driven course system called "coURses" had been built (Figure 3).

Fig. 3: University of Rochester, River Campus Libraries home page, 2002

When students went to read their reserves, they would see a picture of their librarian and a list of resources chosen especially for that course by the librarian, sometimes in collaboration with faculty and sometimes not. The fall 2003 course page shown in Figure 4 was a typical course page for General Chemistry during the early years. This web page became my new handout and my 24/7 proxy for this large class.

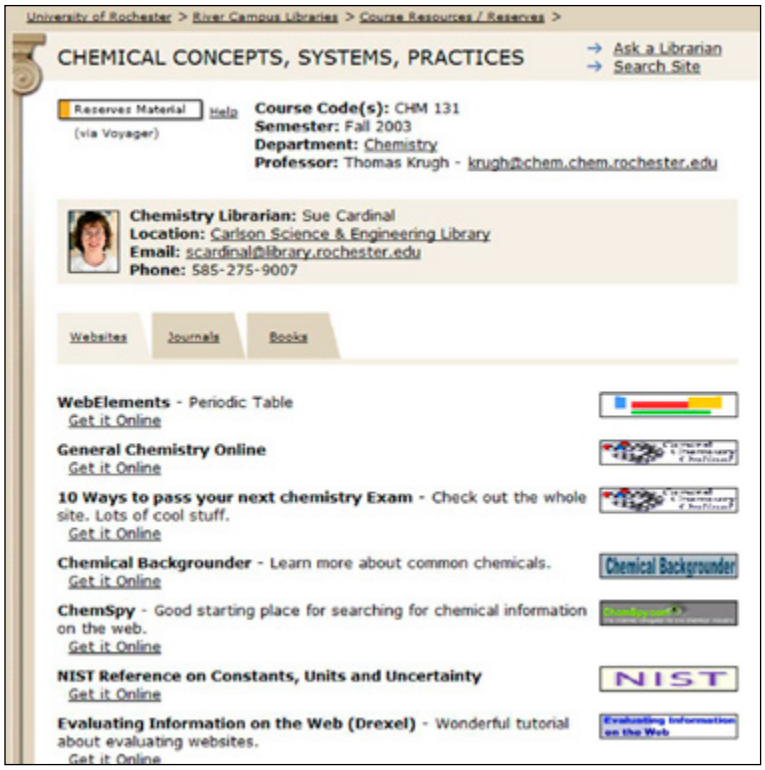

Fig. 4: General Chemistry library course page, 2003

At that time, we tried to obtain syllabi from the faculty and link the readings directly from the syllabi. When we could not do that, we provided a list. I was very enthusiastic and created pages for all the courses that I supported (Figure 5).

This was not just my enthusiasm however. I support a number of courses because of an integrated instruction program that was started in 1979. Arleen Somerville, who was the chemistry librarian at the University of Rochester, and Andrew S. Kende, an organic chemistry faculty member, obtained a National Science Foundation grant to integrate chemical information instruction into the whole chemistry curriculum, not just one course. They met with six faculty members while they were developing their plan to cultivate departmental support. They felt that students would be better prepared for their careers if they had to find information as part of their coursework. The students would learn that using the literature contributed to their success. Students were introduced sequentially to the best reference books and databases in chemistry. They were taught how to use them to find information for their assignments. In 2003, Arleen and I

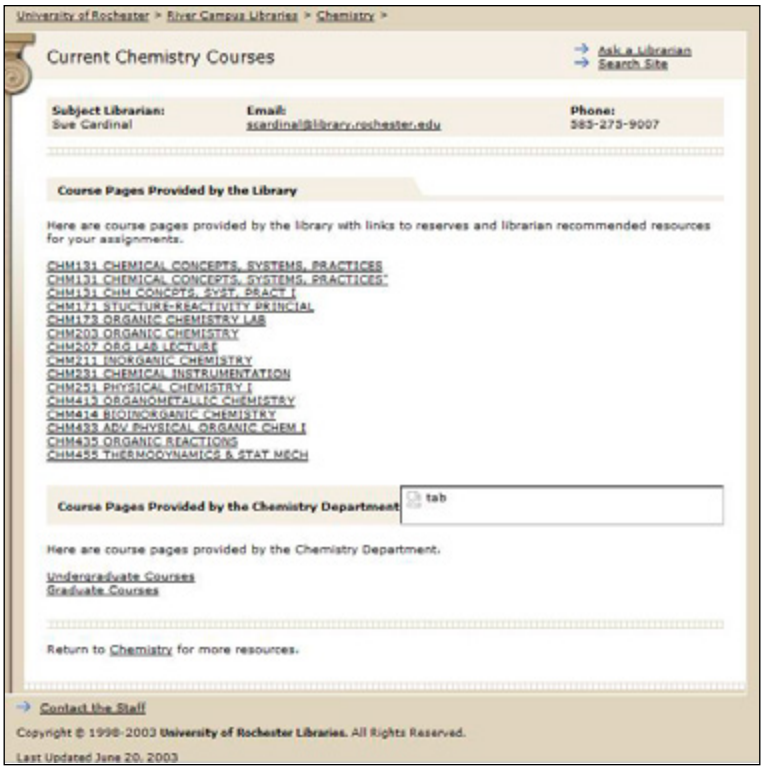

Fig. 5: List of library course pages for Chemistry, Fall 2003

wrote an article about this program called, "An Integrated Chemical Information Program" for the *Journal of Chemical Education*.

Here are the skills and knowledge that Arleen and I tried to cover with undergraduates and graduate students using library course pages and instruction:

- about the library
- librarian and library staff
- evaluating information
- physical properties and spectra
- key reference resources for each course
- key databases, e.g., SciFinder
- locating print and electronic journal articles
- interlibrary loan
- review articles
- writing tools
- teaching tools
- self education

Over the years we employed usability methodology to create more intuitive course pages. We asked our users to do some tasks using the library course pages and we watched as they worked. The tasks were as follows:

- Find contact information for your professor and librarian.
- Locate the professor's course materials, including the syllabus and details of your assignments.
- Find the readings/reserve materials.
- Find materials to help you complete your course work.
- Find help and instructions for remote access.

This testing taught us that:

- Students mostly used library course pages to get to their readings but not to access the recommended resources.
- Students easily found contact information but sometimes confused information about librarians and professors.
- Many tab labels were meaningless because they were inaccurate or too generic. The tab structure was rigid. Until 2007, a librarian could choose which tabs to include, but not what they were called.
- Some resources did not have descriptions so students were not sure why the resources were there.

In fall 2007 we were able to make a big leap forward because we integrated our course pages into Blackboard, the university's course management system.

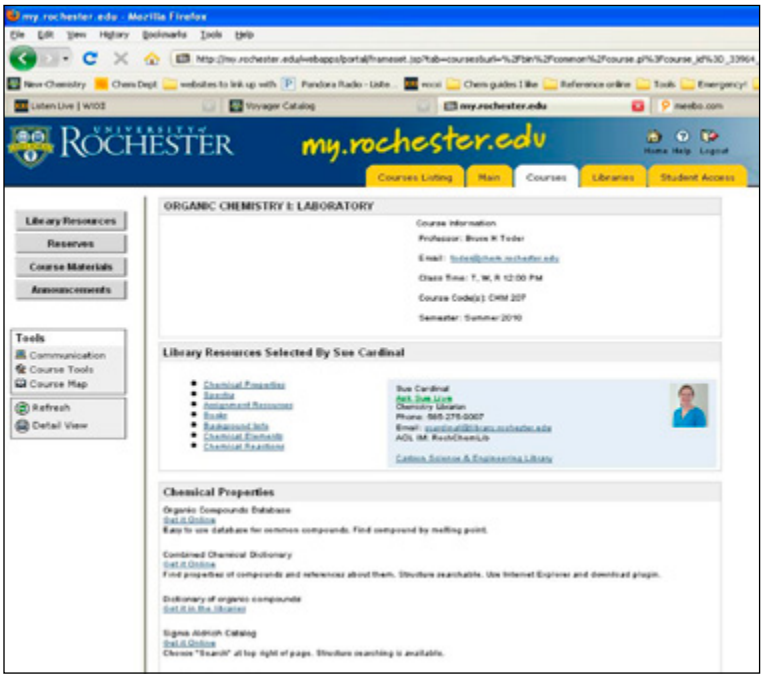

Fig. 6: Organic Lab library course page, 2007

At last, the professor's materials and ours were integrated, and we had the ability to change tab names to something more meaningful (Figure 6). The question was, what should we call them?

Previous usability results gave no insights about what the tab names should be. Students told us that the names did not mean much to them. We also wanted to determine which resources were useful and which were time wasters. Starting in 2002, I asked each class I met with to give me feedback on the pages, but they did not. More would be learned in 2011.

In December 2011, a new chemistry instructor, Ben Hafensteiner, joined the faculty. When I mentioned I was interested in getting feedback on my course pages, he suggested a one-hour meeting with himself and the teaching assistants. I was very excited and called Nancy Foster.

Previously, Nancy and I had worked together on research on the Chemistry Subject Guide and I wondered if I could use some of the same methods we had used for the guide to evaluate the course pages. For the Chemistry Subject Guide, I had also worked with Helen Anderson, collections development department head; Sarada George, library assistant at the Carlson Science and Engineering Library; and Alison Bersani, the engineering librarian. Katie Clark, our assistant dean for public services, had approved this work. In a three-hour workshop, we had met with 12 people: undergraduates, graduate students, and faculty. We had used a combination of a survey and an exercise (Xs & Os) where the users crossed out parts of the pages they did not use, circled parts they did use, and added resources that they thought were missing using sticky-note annotations (Figure 7). Next, they created a chemistry subject page from scratch on a large, blank sheet of paper.

From the Xs & Os exercise, I learned that:

- The chemistry students and faculty wanted to keep my contact information.
- Also of great value to them were electronic journals, books in the catalog, major databases, a link to the chemistry department, a link to the course pages, information about chemistry drawing software, and interlibrary loan.
- They did not want to keep any web search tools. Google was good enough!

Of the three activities, I think the Xs & Os was the most valuable exercise, as I could act on it immediately and it did not take much time to analyze. If you can only do one thing with your users, this is what I would recommend.

Nancy and I discussed how to adapt this methodology for course pages. I did not have time to prepare a full-blown survey and I was

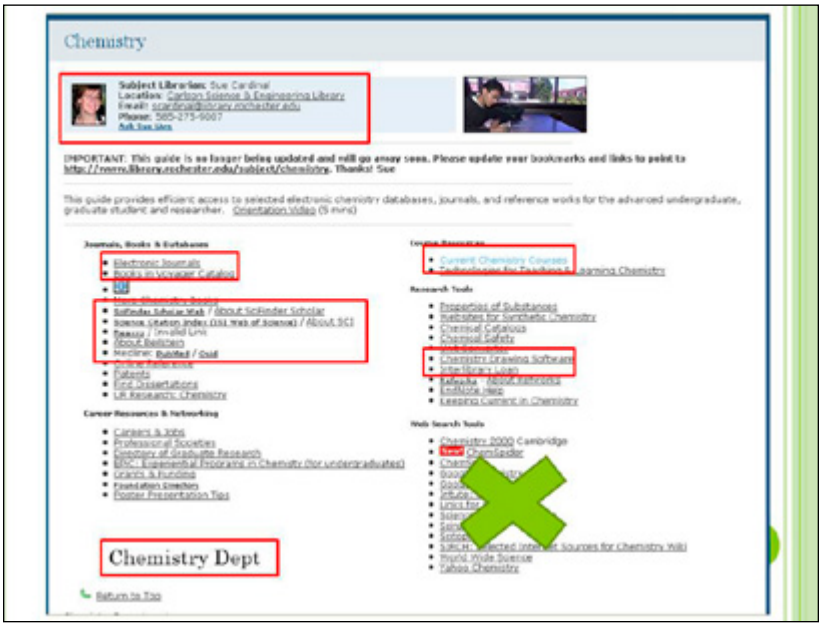

Fig. 7: Summary of Xs & Os exercise on a Chemistry Subject Guide

meeting with the professor and teaching assistants for only a short time. We concluded that we would use the same Xs & Os exercise, keep the survey brief and do it orally, and then I would demonstrate what is there and get suggestions on page organization.

On the day of the meeting, I interviewed the students about their experiences in General Chemistry while Biology Librarian Kenn Harper recorded the session and took notes. Then we talked about the library course page—whether the students used any resources on the page and how they had found out about it. The conversation was free flowing. Some questions I asked were:

- What was your first day of class like?
- How did you feel going into your first exam?
- What resources did you use to prepare?
- Does this page look familiar? When did you first see it?
- What was your path to get to the library resources page?
- What was the key to your success in this class?

Next the students interacted with a poster-size version of the page and crossed off items they never used or thought were a waste of time. They circled items that they used and liked (Figure 8). They were asked about other items they used but which were not on the page.

Then we went through the items on the page one by one. On a large screen, I showed the students each resource and got their reactions. This discussion was useful for developing meaningful descriptions. Finally, we talked about the categories under which the resources were listed and they discussed what would make more sense to them.

Immediately after the interview, I made changes to the course page (Figures 9 and 10).

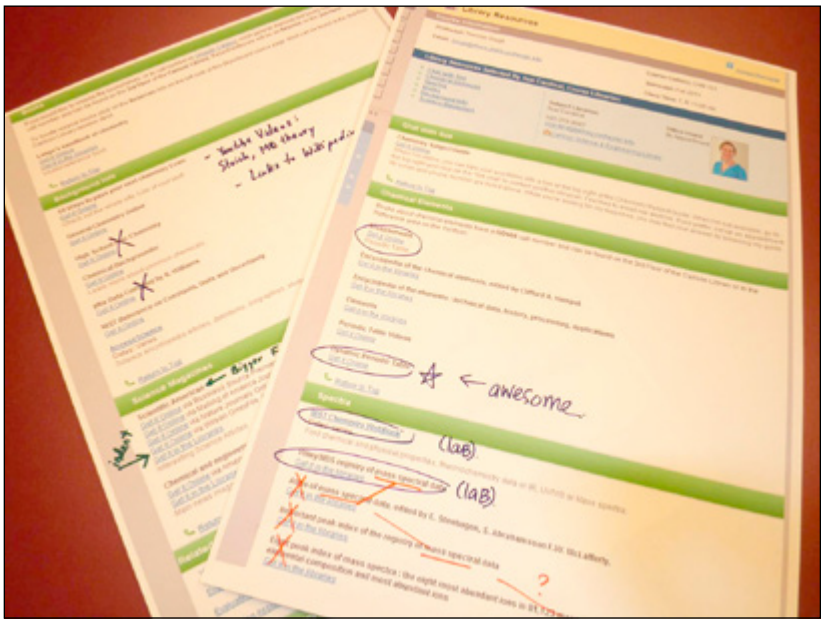

Fig. 8: Annotated course page printouts

What I learned was:

- When faculty and teaching assistants endorse the library course page, students find and use it.
- The students felt that their "wickedly smart TA" was the key to their success.
- The instructor thought of some extra credit assignments that he could implement based on library resources.
- One library course page will work fine for both lab and lecture. There is significant overlap between lab and lecture needs.

Fig. 9: General Chemistry course page, 2011, before revisions

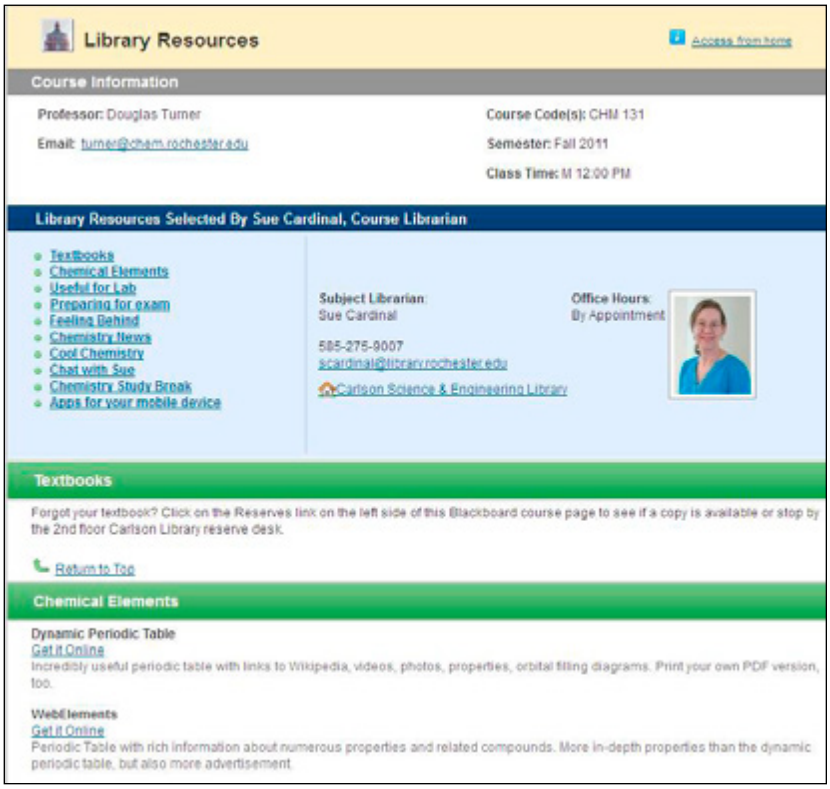

Fig. 10: General Chemistry course page, 2011, after revisions

- Categories on the page should be based on what students are doing or feeling, rather than on the type of item. For example, textbooks might be listed under "books" but students suggested that one category should be "forgot my textbook" (I shortened this to "textbooks") and another should be "feeling behind"—the place for supplementary textbooks.
- There is an increased interest in videos and apps.
- There is decreased interest in books, especially the one copy in reference. Students said that it was too much effort to learn the layout of the library and make a special trip.
- Students wanted the descriptions to tell why similar resources are valuable and how to pick between them. For example, one periodic table had links to Wikipedia, videos, photos, and basic properties, while another has a greater number of properties and resources for related compounds.
- The links called "get it online" or "get it in the libraries" could be embedded in the title of the item. This would greatly reduce the clutter on the page. In the blowup from Blackboard, the blue links drew their attention, so they suggested that the item titles should be bigger. In the next redesign we will address these issues.

These findings were very interesting so I decided to repeat the process with the Organic Chemistry course for freshmen (Figures 11 and 12). At the start of the project, I thought that this library course page was simple, sparse, and very useful. After performing similar research with the teaching assistants and professor, I learned that they loved the spectra link, SDBS: Integrated Spectral Database System for Organic Compounds,[1] so I moved it to the top. I added some videos, such as Digital Lab Techniques Manual Videos (MIT),[2] which the professor was planning to add anyway. Then I applied what I learned from the last research experience. Eventually, I would like to do this with all my course guides.

Libguides are popular and I think this same methodology would work well with naming and organizing the tabs and prioritizing the resources. Libguide users may already get some statistics on what is used and what is not, but sometimes it is nice to know why so that the annotations resonate with the students.

If you are interested in doing some user research to improve your library course pages, the appendix (pp. 31–33) provides a recipe to help you through this process.

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[2] http://ocw.mit.edu/resources/res-5-0001-digital-lab-techniques-manual-spring-2007/videos/.

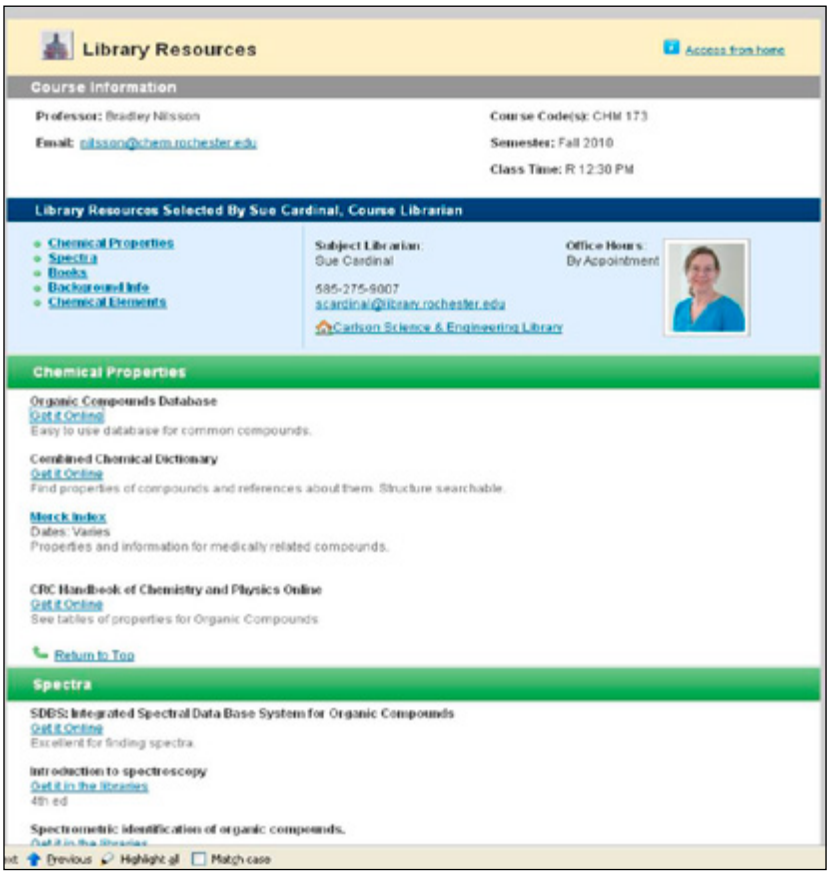

Fig. 11: Organic Chemistry course page, 2011, before revisions

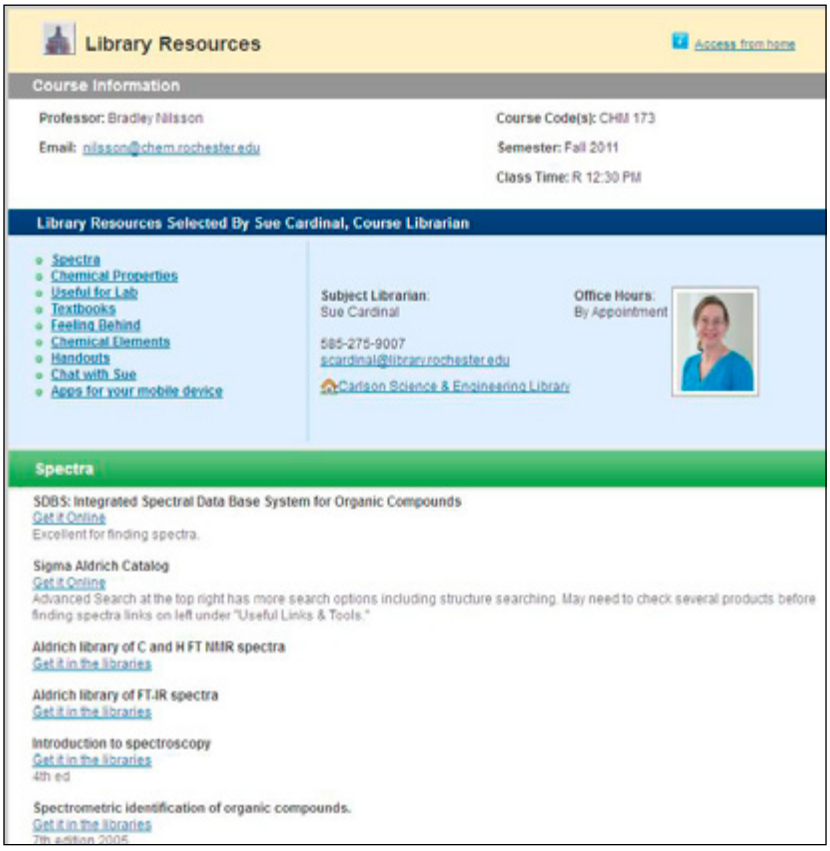

Fig. 12: Organic Chemistry course page, 2011, after revisions

Appendix: "Recipe" for User Research on Undergraduate Course Web Pages

I. Identify course and set up appointments

1. Course name/number: _____
2. Professor/ Instructor you will contact:_____
3. Ask if you might set up a 15–30 minute meeting with the professor to make your **library resources** page more usable for his/ her students.
   a. Date_____
   b. Time_____
   c. Location _____
   Note: It is okay to meet in an office. You will need a computer with which to review the live course page.
4. Ask to meet with 2–5 current (in middle of semester) or former undergraduate students (at beginning of semester) in order to gather some feedback on your library resources page. It is fine if they are TAs or Workshop Leaders. Suggest a meeting of 30 minutes–1 hour.
   a. Date_____
   b. Time_____
   c. Location _____
   Note: When reserving room, give yourself some setup and cleanup time. Have a projected computer screen or large monitor in the room so that you can look at the live page or any resources on the live page.
5. If possible, in email ask which semester the students took the course and with whom or this can also be asked in the meeting as part of the introductions.

II. Preparing for your meetings

1. Obtain poster sized color printouts of the current **library resources** page, one per each student and professor.
2. Recruit a colleague to come and take notes for you.
3. On your own, identify the assignments and activities that the students are working on in this course so that you have a background when the professor and students discuss these experiences. What is the first assignment? See "Questions to ask the students," question 2, on following page.
4. Review the questions for the professor (next page).
5. Review the questions for students (next page).
6. Assemble your materials. Collect pens, pencils, markers and sticky notes of various colors to inspire creativity and fun.
7. Send meeting reminders to students, professors and your colleague.

III. Running the meeting

1. Ten minutes prior to meeting, take the poster(s), pens and post it notes to meeting location and set them out.
2. Turn on the computer and point your browser to the **library resources** page.
3. When the participants arrive, greet them and have them introduce themselves.
4. Quickly state your purpose and then ask your questions. Participants will talk and mark posters. Your colleague will take notes.
5. A few minutes prior to the agreed upon ending time, thank them and wrap things up.

IV. Debriefing and analysis

1. As quickly as possible after the meeting, meet with your colleague and a person that has previously done this research and write down your thoughts.
2. Look at each poster and note what has been circled, what has been crossed off and what resources have been added.
3. Create a "to do" list.
   a. What resources should be removed?
   b. What resources should be added? Is there a type of resource that you'd like to add but need to search for?
   c. What are the organizational ideas and which ones seem best?
   d. What resources will fit under each heading? (This can be done when you are editing the page.)
   e. Do you need more or different descriptions to let the user know why this resource is useful or important?
   f. Were there design recommendations that could be passed on to your designers or shared with colleagues?
   g. Is the layout ideal? Are there distractions?
   h. Does the page need publicity? Is word getting out to the students?
   i. Other?
4. Work on your to do list.
5. Share with your colleagues what you've done and learned.
6. Let participants know when a new version of the **library resources page** has been posted.

QUESTIONS

Questions to ask the professor/ instructor/ faculty member

1. What assignments or activities do your students do in your class?
2. What information resources do they need to use in order to do these assignments or activities? This could be books, websites, people . . .
3. Are you familiar with the **library resources** page? (Show the large printout.)
4. Do you mention it to your students? If so, describe how you do this. What are the students working on at the time? Are there specific resources that you highlight?
5. Do you mention the **library resources** page to your TAs? If so, describe how you do this.
6. Looking at the poster,
   a. Please circle items that you think are particularly useful.
   b. Please cross off any items that you don't recommend or think would be time wasters.
   c. On sticky notes, please note any items that you think are missing.
7. Point to something on this page that you have never noticed or don't recognize. Turning to the computer, click on it and tell me what you think? (Do this as time allows.)

Questions to ask to the students

1. Thinking back to the first day of the course, how did you feel? What were you thinking?
2. Preparing for the first exam/ assignment/ paper (refer to II.3 above), what information resources did you need to use? These could be websites, books, people . . .
3. What was it that made you successful in this course?
4. Here is the library resources page. Have you ever used it?
   - If no: Spend a few minutes looking at the page and skip to question 9.
   - If yes: (continue with question 5.)
5. Describe how you used it. How did you get to it?
6. How did you learn about the **library resources** page?
7. Where were you when you first used it? Which computer? What did you use it for?
8. How often did you use it? What were the main reasons?

9. Looking at the poster,
   - Please circle items that you think are particularly useful.
   - Please cross off any items that you don't recommend or think would be time wasters.
   - On sticky notes, please note any items that you think are missing.
10. Thinking about grouping the items, what is the name of the most important group that belongs at the top? The next . . .
11. Where else did you get your information for the course?
12. As time permits, point to items on the page that you haven't noticed before or don't recognize. I'll click on them. Once you see what they are, let me know if you think they are useful or not.

METHODOLOGICAL PAPERS
CHAPTER 4

Improving Norlin Commons: An iPad + Evernote Approach

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Abstract

In this report, we describe a study we conducted of patron opinions of the Norlin Library Learning Commons at the University of Colorado Boulder. We describe our findings and the method we used to conduct the study. Specifically, we used an iPad running an application called Penultimate to record data from participants involved in interviews and a walk-through of the Commons. We analyzed our data on Evernote, which is a document management system available on Macintosh, PC, and Linux computers; tablets; and various telephones. In this report, we describe the advantages of using such tools to conduct participant observation studies.

Introduction

In 2001, a University of Colorado Boulder study found that many spaces in the Norlin Library had become functionally obsolete and were ill equipped to support information technologies or changes in teaching methods. In response, administrators from the University Libraries and from Information Technology Services[1] created the Norlin Library Learning Commons. This commons expanded beyond the emerging model of information commons to create a *learning* commons. Services from around campus were integrated into the Norlin Libraries' reference area to facilitate the full continuum of learning and to provide a flexible space where patrons could use technologies to discover, retrieve, process, and produce content.[2] The Norlin Commons opened in the fall of 2009. In late 2012, we

[1] Information Technology Services was reorganized and renamed the Office of Information Technology in 2011.

[2] Written communication from Libraries Assistant Professor Caroline Sinkinson including http://www.slideshare.net/csinkinson/calcarchitecturestudentlearning.

conducted a brief study of how the Norlin Commons was being used, to find what patrons expect from the space, and to consider whether anything about the space should be changed.

Four themes emerged from this study.

1. *Patrons like the Norlin Commons. However, it is too crowded at times.* Patrons would like Norlin Commons to expand its footprint and provide more services.
2. *Patrons would like to know the full range of services that are available to them.* Services in the Norlin Commons need to be better promoted and advertised. This would involve developing better, more relevant, and consistent communications across a variety of media, including signage, Four Winds digital displays, websites, and social media.
3. *Patrons are interested in a range of consultative technology assistance.* Patrons would like to be able to walk up to the information desk and receive consultations on how to use office productivity tools, image editing tools, and any tools supported by the Office of Information Technology (OIT).
4. *Patrons enjoy being able to check out rooms and technologies. However, they miss the laptop checkout service.* Patrons like the Team Technology Rooms but they are not widely available, and the room reservation system is problematic. Most patrons commented that they miss being able to check out laptops.[3]A few of them suggested that some kind of laptop or tablet device checkout service be reinstituted.

Based on these themes, we identified the following recommendations.

- **Consider repurposing existing spaces to add more chairs and tables**. The students enjoy and use the simpler elements of the Norlin Commons (such as quiet, private group study space and printing stations) more than videoconferencing rooms or elaborate meeting spaces. So, in the short term, the computer kiosks by the Laughing Goat Café should be removed to make a space for more simple elements such as additional tables and chairs. Also, the printing area should be rearranged to allow more seating and tables. For the longer term, consider repurposing other spaces in the library to allow the Norlin Commons to expand. Perhaps the entryway could include more comfortable seating and some tables. Consider increasing the number of study pods available to students.
- **Improve the room reservation system.** Some patrons said that it was hard to reserve rooms, others mentioned they have had trouble with rooms being double-booked, and we have heard that groups of graduate students have been kicked out in favor of a

[3] The laptop checkout program was created as a pilot, which required substantial resources, both in funding and staffing. It was decided to redirect the funds to build Virtual Desktop Infrastructure (VDI), which will provide student access to software that normally is accessible only from specific labs. The software will be accessible from student-owned devices.

single undergraduate student who wanted to use the room alone. So, the reservation system should be improved. Also, we suggest that study pods be added to the reservation system as resources that can be scheduled.

- **Consolidate and enhance the services available at the information desk**. Enhance the services available at the information desk by conducting intake for the OIT desktop support service at the information desk (instead of at the lone kiosk computer); by providing a walk-up consultant at the information desk for OIT-supported technologies; and by providing scheduled programming in the Norlin Commons to teach patrons about computers and educational technologies.

  Our interviews suggest that students want to be able to check out low-end computing devices. This is a decision that should be fully reviewed to ensure that we have the appropriate infrastructure, staffing, and interest in pursuing that solution. Students did not express a need for higher-end devices such as Macintosh laptops, but they said they could be satisfied with a ChromeBook or tablet.
- **Strategically advertise all Commons services with a renewed vigor.** Patrons are not aware of the full range of information technology services available to them. To address this problem, develop a clear set of messages about what services are available in the Norlin Commons. There are many venues where these messages could be communicated, but the Norlin Commons information desk is a good place to start.

  Redesign the information presented on the Four Winds digital signs (Figure 1) so that it is less dense, changes less frequently, and relates to the programs and services available near that sign. Consider conducting an information-needs audit and a usability study of the Four Winds signs.

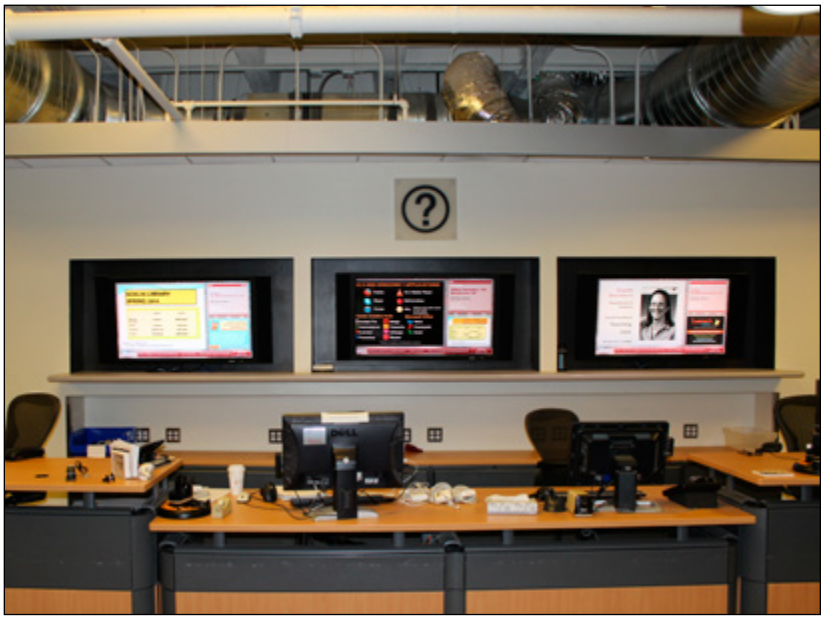

Fig. 1: Four Winds digital signs behind the information desk

In addition to the Four Winds signs, Libraries administration needs to change the overhead printed sign at the entrance to the Commons (Figure 2) to provide correct directional arrows and terminology. For example, the sign refers to ITS (Information Technology Services) instead of the current name of that organization, OIT (the Office of Information Technology). And the sign below shows every service straight ahead when the restrooms and the café are to the right.

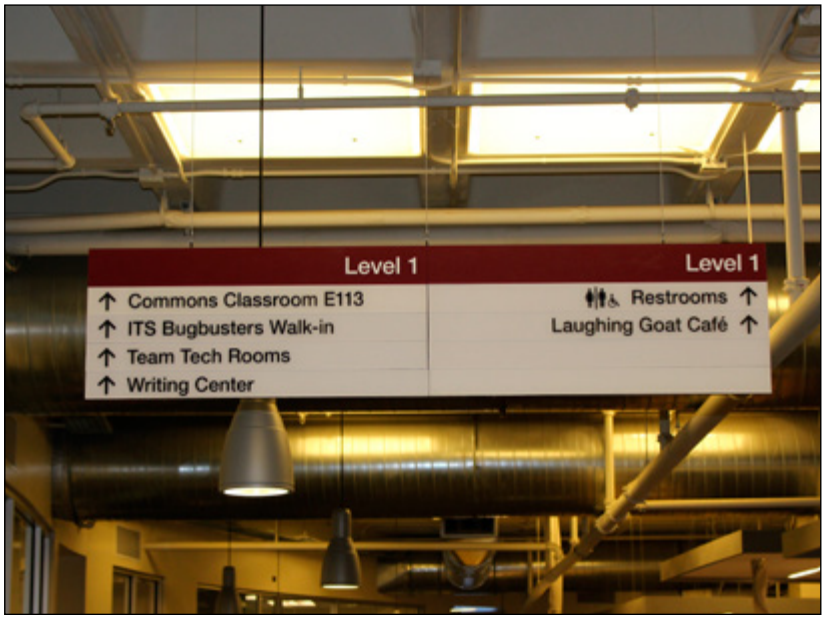

Fig. 2: Overhead directional sign

After conducting and analyzing the interviews, we presented the findings to the Libraries' management team. The management team has supported making many of the recommended changes. Some suggestions are beyond the scope of this project, but many of the recommendations have led to simple adjustments for service promotion and staffing.

Method

To conduct this study, we approached students sitting in the Norlin Commons and asked them if they would be willing to participate. If they agreed, we interviewed them, walked them through the space, asked their opinions of the space, and then gave them a $5 gift card for a coffee shop to thank them for their time.

To increase the number of graduate students and faculty members in our pool, we scheduled interviews with them. We sent interview questions to two faculty members who could not meet us in the Commons but who were willing to give us their opinions in writing. In total, we interviewed thirteen patrons of the Norlin Information Commons: seven undergraduate students, three graduate students,

and three faculty members. Sessions began with a participant interview. We asked them the following questions:

- What tasks do you engage in when you are in the Norlin Commons?
- What would you like to do that you cannot in the Norlin Commons?
- Did you know about our checkout technologies (such as those available at http://ucblibraries.colorado.edu/circulation/TechnologyLending.htm)?
- What other checkout technologies would you like to see made available?
- Did you know about technologies such as desktops, scanners, copiers, printers?
- Would you like to see any other technology available to you in the commons?
- Do you know about our in-depth technology help (professional quality desktop support)?
- Did you know about our general technology and software assistants?
- What other technology and software help would you like to see made available?

After the interviews, we walked with 11 of the participants and stopped at 10 points (shown in Figure 3) within the Norlin Commons, where we asked them the following questions:

- What do you like about that region?
- What do you dislike about that region?
- What would you change about that region?

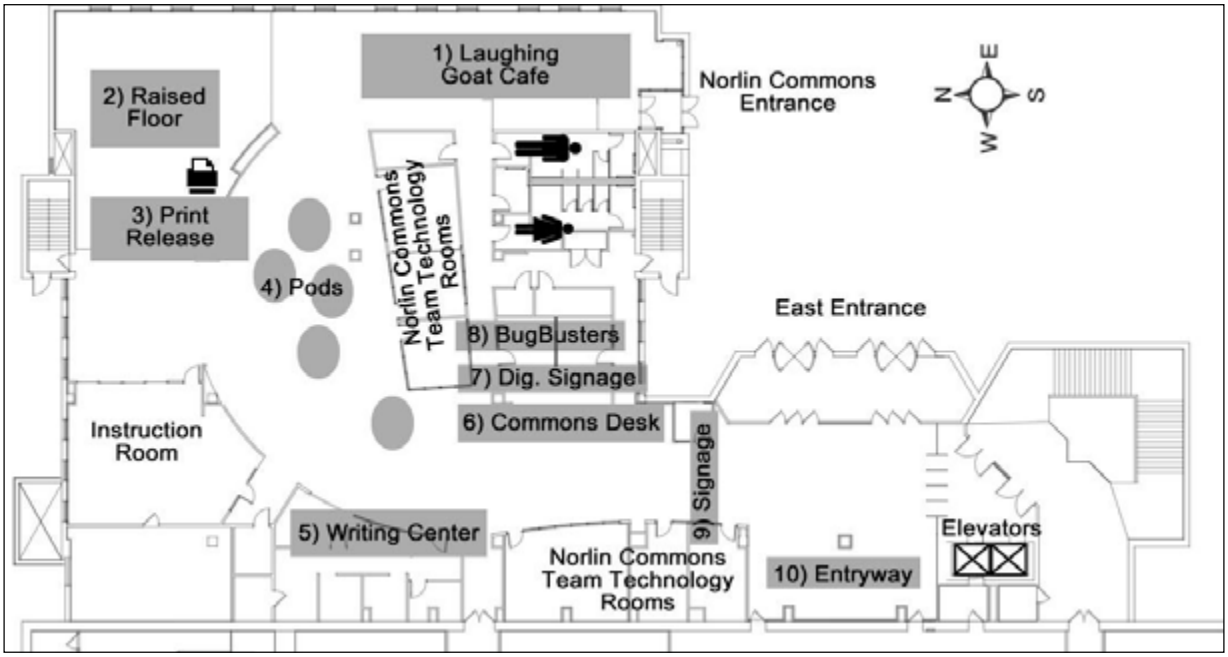

Fig. 3: Floor plan of Norlin Commons showing the ten places where each participant stopped and commented on the space

How We Used an iPad and Evernote

As we planned for recording participants' thoughts, we decided to use an iPad running an app called Penultimate for our note taking. Penultimate is typically used with a stylus to provide a paper-like note-taking experience on the iPad. Penultimate allowed us to select a paper style to guide us in recording images and taking written notes. Figure 4 shows the worksheet format we used to record each participant's ideas. Our worksheet had a photo region at the top and a writing space on the bottom.

Fig. 4: Sample page in Penultimate on the iPad

As we conducted interviews, we recorded them with an MP3 recorder and uploaded them into an Evernote file. While this gave us very high-quality audio files, we could have skipped the uploading step and used the iPad microphone to include audio in the Evernote document. Once the audio file was in the document, we transcribed the audio and put the text in the Evernote document as well. Figure

5 shows an Evernote document containing an MP3 file and the corresponding transcript from one of our interviews. Figure 5 also shows the play/pause button inside Evernote, which lets you listen to the interview.

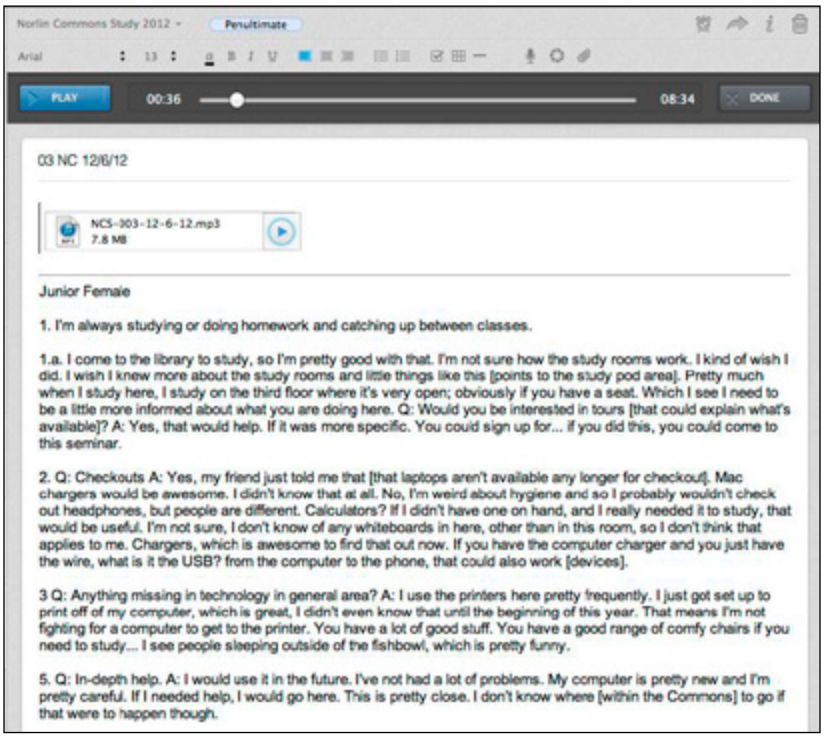

Fig. 5: Evernote window showing the MP3 file from an interview and the corresponding transcript

For each participant, we created a single document that combined the audio file, transcript, written notes, and photographs generated while accompanying the participants through the Commons. In our first interview, we allowed the test subject to hold the iPad, take pictures, and write next to the pictures with a stylus. Figure 6 shows a page that our first participant created. In this photo and annotation, the participant indicates that the space shown in the image could be used more optimally. She thought the computers were too crowded around the wall while the space next to the computers was open.

While allowing participants to use the iPad gave them more control over the information captured and shared with us, it became too cumbersome to train participants to use an iPad and to have them fumbling with it while also answering our questions. So we decided that for the rest of the tours through the Commons, one of us would ask the questions and the other would carry the iPad, take pictures with it, and record with a stylus what the participants said.

The first stop in our tour of the Norlin Commons was the Laughing Goat Café. Several subjects identified the long lines there. As shown in Figure 7, one subject thought the lines were too long and

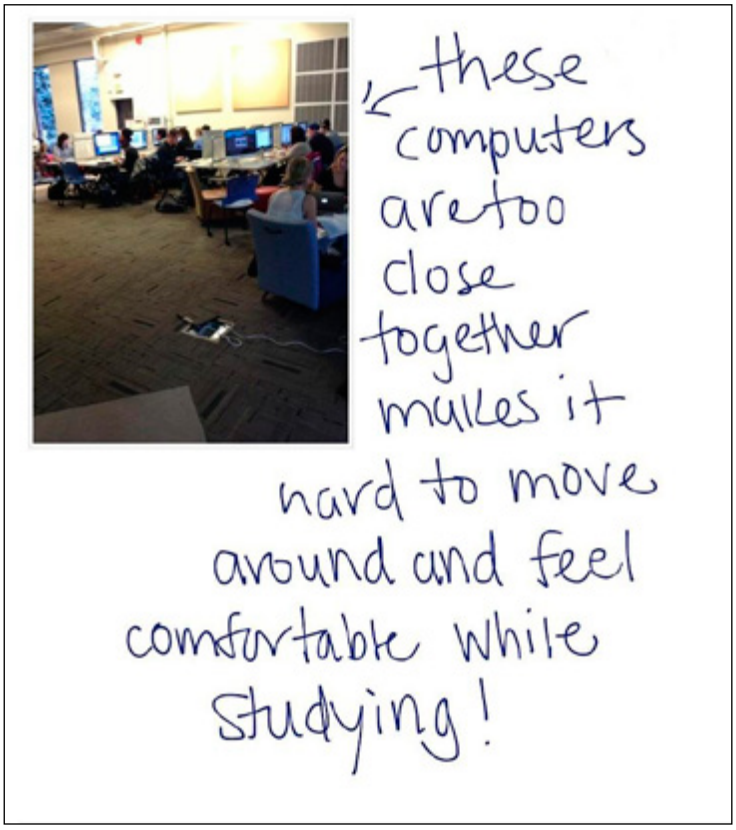

Fig. 6: Worksheet from our first participant who took a photo and made comments on the iPad

Fig. 7: A worksheet from the first stop on the tour: the coffee shop

disruptive to people who want to just get in and out of the Commons quickly. However, the participant noted that it is good that the tables are there. This person also thought the space was not well suited for working there in the afternoon.

Another picture from this vantage point, Figure 8, shows that a participant did not like the long lines. However, this participant also pointed out that the computer kiosks in the middle of the picture (referred to by our Office of Information Technology as SCARPIEs or Stationary Computer And Resource for Personal Internet and Email) are not in use very often. SCARPIEs are walk-up computers that campus members can use to access the Internet.

As a result of this input from participants, we checked the computer logs and found that the SCARPIEs shown in the picture below were used one third as often as other SCARPIEs nearby. So we recommended that they be removed in favor of more coffee shop seating.

Our next stop on the tour was in a study area in the back of the Norlin Commons, which we refer to as the Raised Floor space. Figure 9 shows one participant's comments about this space. This participant identified as positives the layout and the fact that desks were there. The windows to the left of the picture let in natural light, and there are a good number of power outlets in this area. Negatives included the art in the area being weird, a need for more desks, and the fact that some outlets were in the floor, which caused a tripping hazard.

Fig. 8: A worksheet indicating that kiosk computers were used infrequently

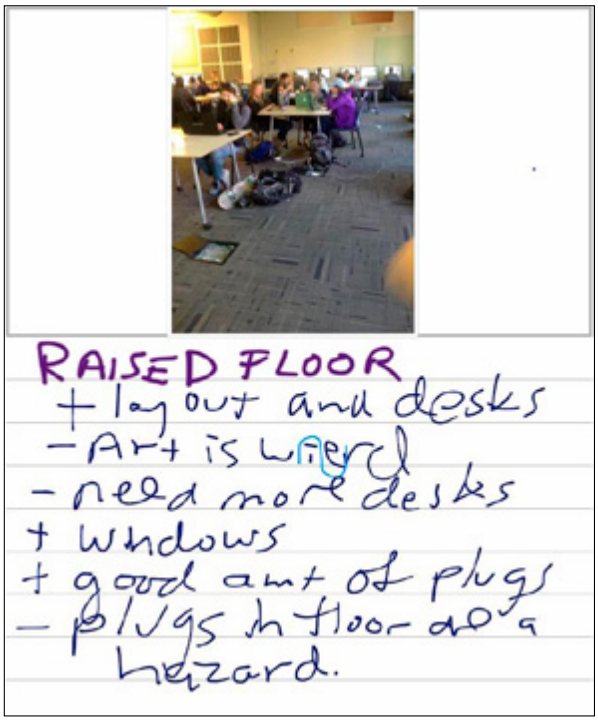

Fig. 9: A worksheet addressing the back wall of Norlin Information Commons

A second participant at this stop on the tour identified sunlight causing glare on the computer screens along the back wall of the Norlin Commons (Figure 10). This is an advantage of the method we used. Without being in the room at the time the sun hit the back wall, we likely would not have uncovered that issue. This participant also noted that the outlets in the floor were unsafe.

The third area on our tour was one where students queue up to retrieve printed files. Our interviews with participants revealed that this area is not efficiently arranged. Figure 11 shows that the line gets long at times, and it was hard for the participants to find the copier in this area. The copier is not in the photo, but it is about 20 feet further to the right of the line for the printers.

The next area on our tour was a series of walk-up iMac computers that people often use to print a file in the area shown in Figure 11. One of our participants informed us that after the Thanksgiving break, when major updates were done to the computers, she found that the computers had a default setting to print to a OneNote file instead of to the printers around the corner. As a result, we were able to tell our labs team about the printing problem and they fixed it quickly. Figure 12 shows the worksheet that recorded one participant's comments on this area. The participant appreciated having the computers available, but realized she didn't know how to use the copiers and scanners in the area.

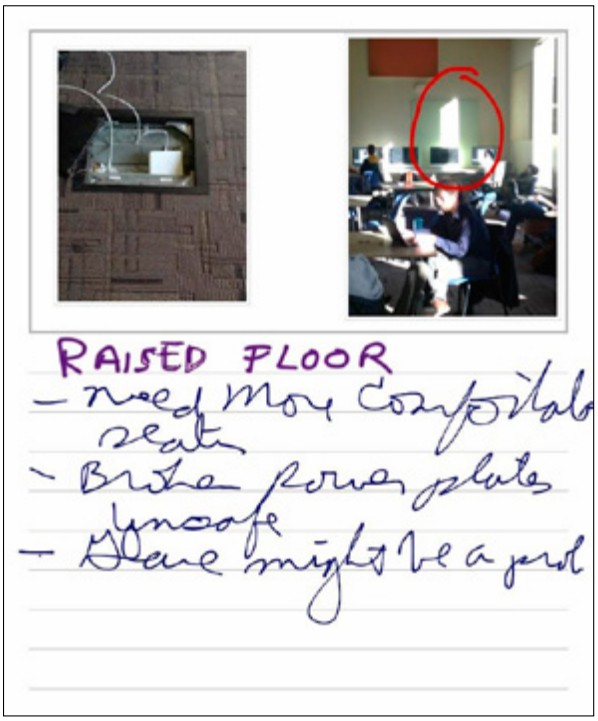

Fig. 10: A worksheet indicating glare on the back wall and hazardous outlets in the floor

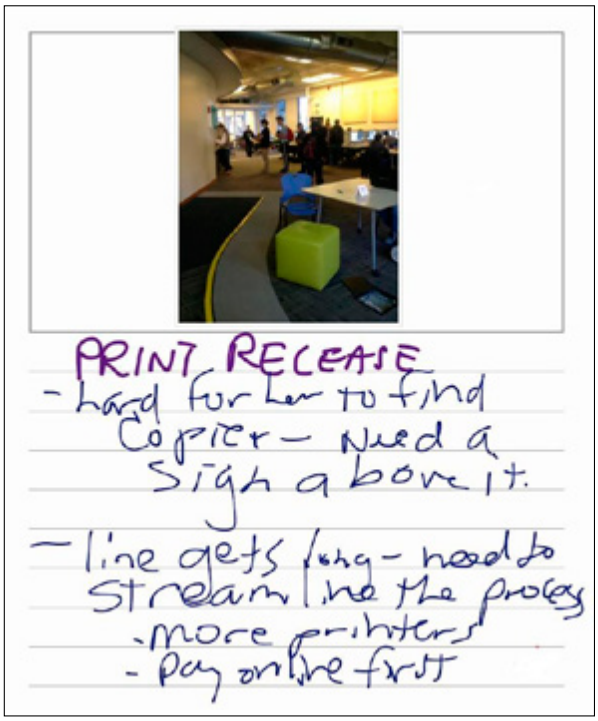

Fig. 11: A worksheet showing the print release station

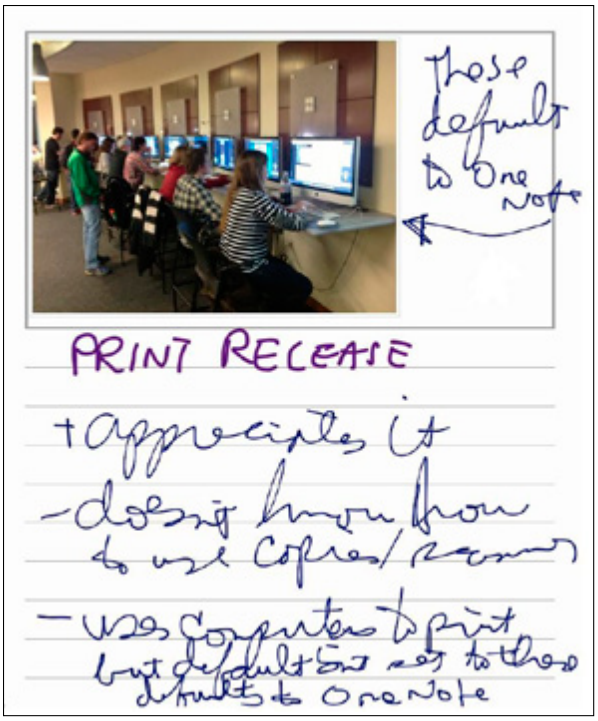

Fig. 12: A worksheet showing walk up computers for printing and quick Internet access

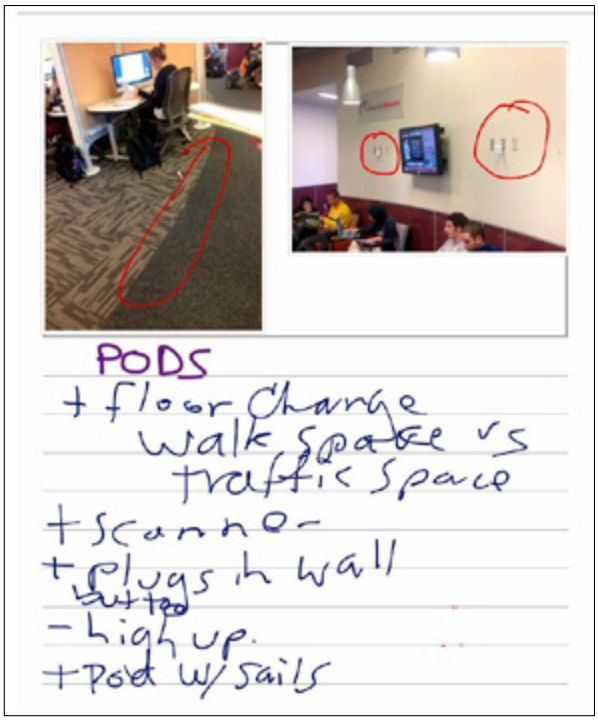

Fig. 14: A worksheet showing the walkway along study pods or cubicles and the power outlets at eye level

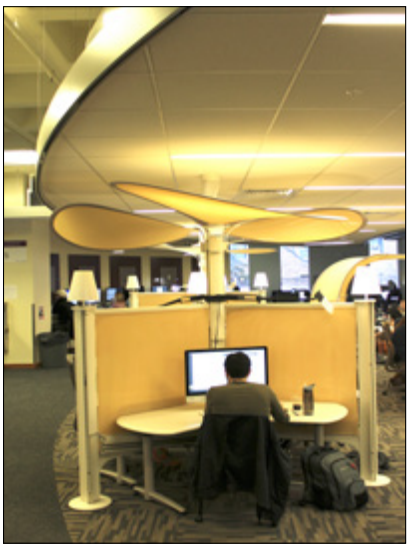

Fig. 13: Fabric sail over a cubicle

The next area on our tour has a series of cubicles with fabric coverings that some of our participants called "sails" (shown in Figure 13).

The cubicle area is bounded by a walkway of contrasting carpet types (shown in Figure 14 in the image on the left). In the worksheet above, one participant noted that he liked the different carpet patterns, the scanner that is provided in the area, and the fact that power outlets were available in the wall (shown in Figure 14 in the image on the right). However, he did not like the height of outlets.

His comment about the power outlets was interesting to us because the outlets were not intended to be used for charging personal devices. Rather, they were there to provide power for two additional digital signs that were to be added later. We surmised that even though the Norlin Commons had attempted to accommodate the demand for power outlets, there still is greater demand than supply. By walking with this participant, we were able to observe patrons cope with the scarcity by accessing difficult-to-reach power outlets.

The main entrance to the Norlin Commons has an overhead sign, shown in Figure 2, that directs people to various regions of the Commons. One participant had two comments about the sign. One was a rhetorical question, "They are supposed to direct you to places in the library?" This was followed by a big sigh. We interpreted this general comment to mean that the sign was not directing people correctly. The other comment was, "Why are the direction arrows all in the same direction?" It is interesting that the arrows all point forward when the restrooms and the Laughing Goat Café are much more quickly reached if you turn to the right.

The sign in Figure 2 uses terminology that is unfamiliar to the participants we spoke with. The term "Team Tech Room" refers to a series of group meeting rooms that are available for students to check out. Our staff in the Office of Information Technology named them Team Tech Rooms years ago, and that name has stuck with the rooms as more have been built. One of our participants informed us that the name "Team Tech Room" is not helpful because students do not know what it means. This participant suggested that the term "Student Room" be used instead.

Another problem with the overhead sign (and in this case another sign on the wall shown in Figure 15) was the term "Bug Buster," which has been used on campus by our OIT staff for years to refer to the desktop computer support service. Some longer-term faculty and staff probably know what that term means, but as we learned from one of our participants, it is not a familiar term. This participant also told us the sign did not match the design of other signs in the library, and it did not stand out enough (it had white text on a blue background).

Also at the entryway to the Norlin Commons is an information desk, which is shown in Figure 16. Several patrons told us they did not know the full range of services that were available at the desk. They also assumed that the "Bug Busters" computer support service, which was advertised directly adjacent to the desk, could be accessed

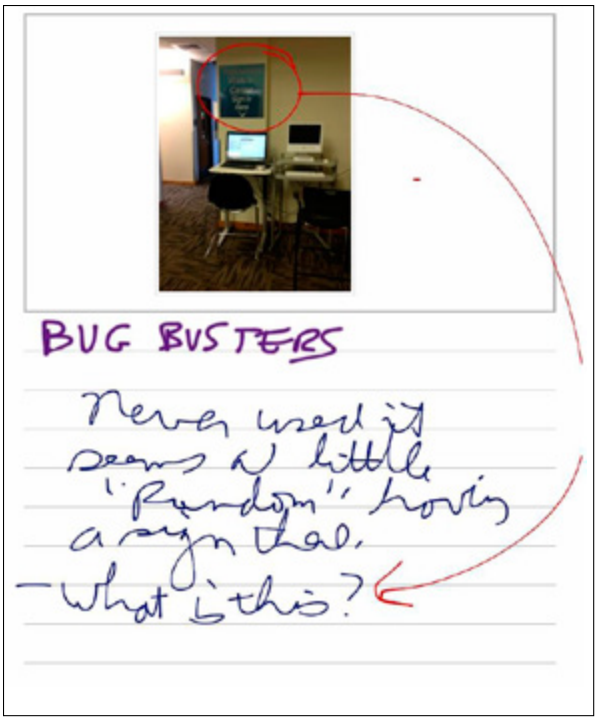

Fig. 15: A worksheet showing a sign referring to Bug Busters, a term not known to students

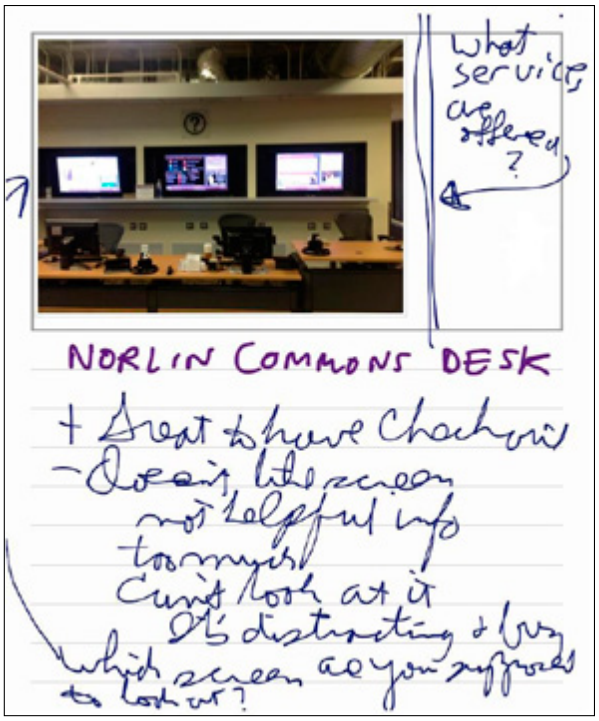

Fig. 16: A worksheet showing the Norlin Commons information desk and questions about what services are available there

at the desk. In fact, it can be accessed only by signing in on a kiosk computer. Patrons also told us that having three digital signs behind the desk made them think that the content on the signs was relevant to the services at the desk. This was not the case. The signs were actually about services for the wider Norlin Library and the campus. And patrons told us they disliked the density of information on the screens, and the fact that the screens refreshed so often. We captured a video of the screens to show how frequently they refreshed. This video is available at http://youtu.be/iwP7TdNEX1c.

The final stop on our tour of the Commons was the grand entryway into the space. A worksheet corresponding to that space is shown in Figure 17. Several participants commented that the space did not seem to have a purpose. As we interviewed one participant, we could see that the fixed wooden benches were empty but a lone student had dragged a chair from another part of the Commons over to the entryway to work. This led us to surmise that the entryway could be repurposed and outfitted with more usable furniture. If this was done, an extra room could be added to the space in the Commons.

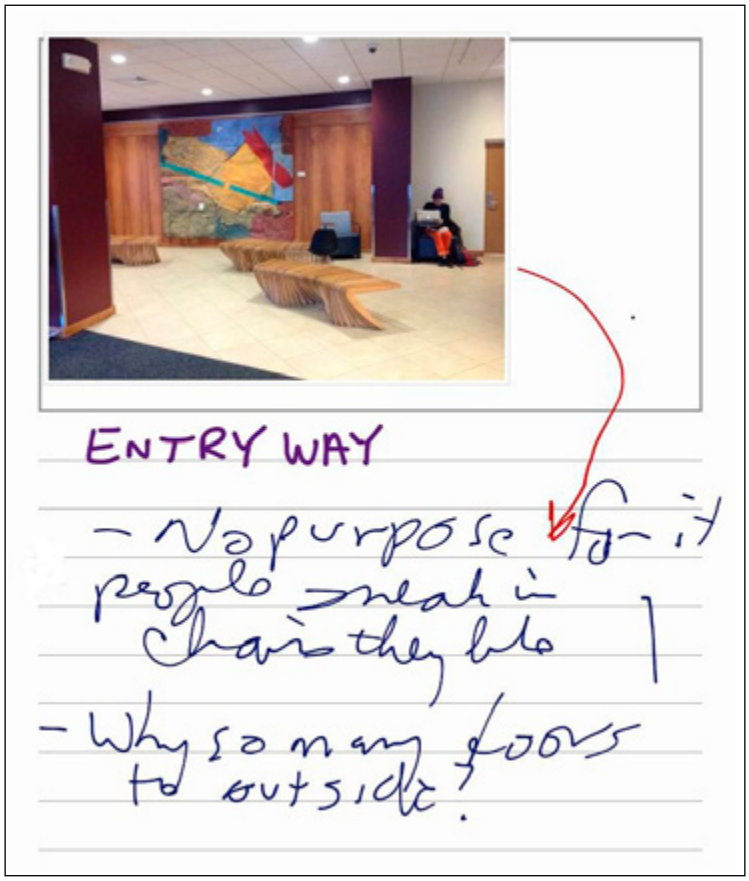

Fig. 17: A worksheet describing the form and function of the entryway

Conclusion

Getting feedback from patrons has always been an effective strategy for making improvements. An iPad made the collection of user feedback very easy. In the end, a picture was worth a thousand words. The University Libraries and OIT worked together to enact and promote many of the services and suggestions that came out of these interviews for fall 2013.

Our decision to use Penultimate on the iPad and Evernote was a good one. The iPad allowed us to quickly capture visual and script information as we walked through a space with a participant. We could also have easily used the iPad to capture the audio portion of our interviews. The advantage of this method is that it provided a media-rich analysis and authoring environment. It did not interfere with the participants and the process. It allowed transitory phenomena to be recorded.

We recommend that participatory design project teams consider the iPad and Evernote for their projects. However, we offer a few caveats. The data are stored in Evernote, so if you plan to gather sensitive data (such as private or protected data), consult with appropriate officials about whether those data are safely guarded to ensure compliance with legal requirements for secure data.

There are a few things to know about images when using them in Evernote. If you click on the icon showing photographs within Penultimate (see Figure 4), you are able to import a picture, but that picture is not saved in the iPad's Photo Stream. This can be an issue if you mark up the photo in Penultimate but would like a clean image later for publication. To obtain a clean copy of an image, you can use an application called Skitch, which is owned by Evernote.

And, finally, it is possible to edit documents collaboratively in Evernote, but all the parties involved need to have a Premium account and the editing must be done asynchronously.

The following are some additional observations on the process.

Media-rich analysis and authoring environment worked well. Because Penultimate synchronizes with Evernote, we were able to add typed transcripts of the audio, and then have access to a variety of media types as we analyzed the input from participants. We had one document for each participant; most documents contained an audio file, a typed transcript, photographs, and handwritten notes.

Use of iPad minimized impact on the participants and the process. We found that it was better to for us to use the iPad than to give the iPad to our participant. This is because the iPad became a mediating factor as the participant related her or his answer to our questions. Because the iPad enables handwritten entries with a stylus, we were able to quickly take notes and keep walking with the participants. If we had tried to type the notes, each tour of the Commons would have been significantly longer.

Transitory phenomena can be quickly documented. Our method of using an iPad and Evernote allowed us to quickly capture phenomena that were somewhat transitory during our walks through the Commons. For example, we could quickly photograph and note the glare from the sun on the computer screens (Figure 10). Also, as we observed the queues that sprang up at the printers (Figure 11) or at the coffee shop (Figure 7) we were able to document them. As we came across the student who dragged a chair into the entryway to study (Figure 17), we were able to quickly capture it and document it for our report.

Showing is better than telling. We could have described the fact that the student moved the chair (Figure 17), but seeing it, especially amid the emptiness of the benches provided in the space, we allowed our readers (many of them administrators who were going to make decisions about changes to the Commons) to experience more viscerally what our report was telling them. Also, the pictures showed much more than we could have described. The glare on the screen (Figure 10), for example, shows precisely where along the wall the problem was. The stretched-out charging cords (Figure 14) show the inconvenience for students who need power outlets and the strong demand for charging areas.

METHODOLOGICAL PAPERS
CHAPTER 5

Co-Viewing: Creating Broader Participation Through Ethnographic Library Research

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***Ellen L. Freeman**, Formerly Instructional Technologist, Academic ITS, Colby College; now Instructional Designer*

In the academic year 2010–11, we interviewed ten faculty at Colby College to learn more about their research and teaching methods, using ethnographic techniques described in the groundbreaking *Studying Students* report (Foster and Gibbons 2007). The interview technique involved filming participants, and the resulting videos were co-viewed by members of the Colby Libraries and Academic Information Technology Services (ITS). We also shared some of our findings with the wider community in a published report (Pukkila and Freeman 2012). The results of the study were so positive, including various changes in our practices with faculty, that we decided to do another study, this time focused on students and their research processes. We hoped to use the co-viewing sessions to share our work with a wider audience this time, and we were not disappointed.

Methods

We decided to use a two-step process of uncovering student research methods, using both a student's previously completed assignment and a real-time prompt. Ten students participated. We created an instrument modeled in part on James Nichols' questionnaire (Nichols 2009) and in part on what we learned from CLIR ethnographic research workshops with Nancy Foster. We used five open-ended questions (see Appendix A, p. 55) to prompt students to draw their experiences of writing a research paper for a course in their major, from the moment they received the assignment to the moment they turned it in. We then asked them to show us on a computer how they would go about researching an assignment to write about their major discipline and the Olympics. We videotaped the drawing of the research process, and then videoed the computer screen as the

student searched for the prompt. We also used Screenflow software to capture the entire computer transaction, including all comments during the searching. All students received an alias, and their faces were never shown during the taping. Each participant received a $10 gift certificate to the Colby Bookstore.

Both portions of each of the ten interviews were then co-viewed by self-selected members of the Colby Libraries and the Academic ITS department, with a few additional visitors we will discuss later. All this was described in our Institutional Review Board (IRB) file, which included the consent form with its permissions from the participants to store the material on the Web and use clips from the interviews in various presentations and workshops (see Appendix B). We were pleased when the committee approved our project with these wider online parameters, as they had been denied to us in the first project.

We decided to use our previous faculty participants to locate students for the interviews, since those faculty members already had an idea of our research methods and intentions. We emailed the previous ten participants and asked them to suggest students who had just completed research in the fall of 2011 and who they thought would be willing to be interviewed about their research processes. As a result, we had about 25 or 30 names to choose from and were able to get ten students to participate, including two student workers for Academic ITS and one from the Libraries.

Our interviews were conducted between January and May 2013, with nine seniors and one sophomore. Two of the students majored in East Asian Studies, two in Economics, and one each in Science Technology and Society (STS), Computer Science, Biology, Psychology, Art, and French. Once each interview was recorded, it was copied to a DVD and converted and uploaded to a WordPress site accessible only to us. This was done to preserve the terms of the IRB but also to make it easier to work with the material, co-view it, and present clips in various venues. Ellen also created an online version of the interview instrument to allow co-viewers the option of recording their reactions to the videos online or on copies of the instrument.

Results and Co-Viewing

The best way to demonstrate the results of this type of research is to watch the videos of the interviews, but this is impracticable for a wider audience. Coding the students' behaviors and collating the co-viewers' observations is an ongoing task, but Marilyn was able to compile some quick notes during the co-viewing sessions.

Of the ten students, only four reported that a librarian had offered a class on doing research for the assignment; the other six had their faculty members teach them about library resources. When doing the "live" research on their major and the Olympics, all ten students used the Libraries web site at some point, but only three started there. Four started in Google, two in Wikipedia, and one went directly to their major's primary subject database. Eight of them used

Google at some point, six of them used Wikipedia, and none used Google Scholar.

Library resources did come into the picture at some point for all ten students; those used were OneSearch (Colby's name for Summon) (2 students), WorldCat (2), JSTOR (4), PubMed (1), Academic Search Complete (1), World of Science/Science Direct (1), PsycInfo (1), ARTStor (1), Larousse Online (1), and Gallica (1). The most striking take-aways were the extent to which the faculty were teaching students how to do research (with varying levels of accuracy); the students' lack of facility in using the more powerful features of the databases; their lack of knowledge of available assistance for computer challenges; and the absence of any backing up of personal computers (which were used extensively by many of the interviewees).

All ten co-viewing sessions were carried out during roughly the same time period as the interviews. The number of participants varied from session to session; in order of viewing we had 9, 10, 5, 8, 5, 6, 5, 8, 3, and 8 participants (these numbers including both Ellen and Marilyn), giving an average of 6.7 and a mean of 5-6 viewers. While most were from either the Libraries or from Academic ITS, there were a few gratifying additions. In the course of other interactions outside the Libraries, Marilyn mentioned the project to both a dean for academic development and the head of the writing program, and both expressed such interest that she invited them to attend as many sessions as they could fit into their schedules. In the future, Marilyn hopes to work with the evolving Center for Teachers and Learners (one of the dean of faculty's projects) to present some of the research results to faculty, in order to highlight the importance of faculty/library/Academic ITS collaboration in the instruction of research methods to students.

The co-viewing sessions produced thoughtful discussions of what we observed and how we might change as a result. Having many minds consider the same interview is a critical component of this research, as each person will receive and interpret the same data differently. The co-viewers were often engaged beyond the discussion of the moment; they requested copies of their notes after we collated and coded them, to remind them of what they saw. Indeed, some co-viewers even took personal notes as well as co-viewing notes, reflecting on their own teaching methods as well as the students' practices.

Here are some examples of the observations recorded and discussed:

- Watching the students draw maps is very helpful because it shows their thought process.
- Students don't retain information unless it's something they really want to use (one student had had a library class, some faculty instruction, and a librarian consult, and still was barely beyond the basics).
- The major or faculty approach seems to drive the style of researching; half our interviewees (five) were referred by only three

faculty members, and those three are heavy book users with a strong humanities focus.
- Some of the co-viewers thought that the pressure of research on the fly and under observation makes students search faster and that they would thus be less likely to go to the next page of results, but others felt students would have done the same regardless.
- During the interview, one student said: "I should've contacted the library people—they would've been more helpful than my brain."
- Students are adept at using PDF, MS Word, and browser add-ons in many ways to support research, note taking, and organization.
- Students are printing less and reading more on laptops.
- Even though Google docs are supported on campus, students rarely use this tool for coursework.
- Students almost never back up their personal laptops; instead, they email themselves drafts and final papers as a means to backup.

Outcomes

One of the greatest benefits of ethnographic research is the ability to see and hear, without guesses or intermediaries, what our patrons are doing with and thinking about our services. As in our previous study, we were keen to keep track of what changes came about as a result of our interviews and the co-viewing sessions. While we are certain that there will be more changes in the future, including some we will never know about, here are some of the changes that are under consideration or already accomplished as the result of our work:
- [Librarian] "I'm more aware now of student use of alternate media and will need to feature some of it in my teaching."
- We should make links to our subscriptions of the *New York Times* and *Wall Street Journal* more obvious and accessible, as students often go to news articles directly from Google or Wikipedia links, thus bypassing our free (to them; paid for by us!) access.
- We have increased the number of returns per page on various search engines (e.g., EBSCO), as students rarely look beyond the first or second page of hits.
- [Librarian]: I'll have to include more information about dissertations in my teaching, since students who pull up a thesis in their returns usually have no idea what they're seeing. Also, we recently added full text PQDT because ILL is getting so many requests for theses, so we'll need to bring it to students' attention.
- [Librarian who taught a class] "That was very helpful for me to see. I'll do more about walking them through context next time."
- We need to talk up new databases to faculty in fall meetings, since so many faculty are teaching research to their students, and they don't always know what they're missing.
- Academic ITS recognizes a need to market our services on campus; this may become easier with the creation of the Center for Teachers and Learners, and with the move of Academic ITS offices to Miller Library (Colby's main library).

- Academic ITS will consider how to provide technical training and support for Evernote.

Broader Participation

Co-viewing always brings in more participants to the process of improving services. This project was unusual, though, in the way it reached beyond our two departments to include key pedagogical administrators. Our enthusiasm for what we do and learn with our ethnographic research would keep us going on our own, but with this project we were able to expand to new areas and extend our collaboration. Here are some of the ideas under consideration as a direct result of our interviews:

- Compile five-minute segments to share with faculty about how students are reflecting on their assignments [suggested by assistant dean of faculty for academic development].
- Suggest to faculty that they encourage students enrolled in upcoming research seminars or other capstone courses to think about and discuss their topics ahead of time—e.g., over the summer for the fall seminars, and during Jan Plan—a short semester—for the spring seminars.
- Offer a faculty workshop. We had two STS interviews and two East Asian studies interviews, which made us think that we might get the two faculty members to talk about their assignment at a workshop, then co-view how the students talk about it to see the many ways students interpret and act upon assignments; we hope to do this in the coming year (at which point the interviewed students will be alums).
- For future research, consider having students watch an online lecture and film them as they take notes, then talk about what they learned from the lecture [suggested by assistant dean of faculty for academic development].
- As part of an open house for faculty to view the renovations in Miller Library, include a session with some short clips from the interviews to emphasize students' needs for instruction in using library and ITS resources.

These ideas only begin to touch the surface of what we might do with just ten interviews.

It is important to realize that "broader participation" can apply not only to those who came to view our research results, but also to the students themselves. Our intention with this project has always been to improve student research, and this would be much harder without the participation of the students themselves. Searching and re-searching the interviews will allow us to uncover new approaches to our work, and suggest even more questions to be answered. Best of all, there are doubtless many unexplored collaborations just waiting to be created, all with the goal of offering our students, faculty, and staff the best possible services for their teaching and learning.

Works Cited

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Appendix A

Students Doing Research
Student Interview Protocol and Notes

Date:
Note taker: Student alias:

Questions

1. What was your assignment? Which class was this assignment for? Are you majoring or minoring in this subject? If not, why did you take this class? Did you have any instruction, training, or other help on the use of technology or information resources prior to completing the assignment?

2. We'd like you to draw the process you followed for your research assignment. Please draw the first event in the process (receiving the assignment, etc.), and give the date, location, and approximate time that occurred.

3. What happened next? When and where did it happen? If you took an action, how did you do it? [REPEAT this prompt until the final draft of the assignment is handed in.]

4. What, if anything, were some of the obstacles you experienced during your process with this assignment? What helped you remove those obstacles?

5. What questions did you have as you progressed through your assignment? What helped you get answers to those questions? Or were there questions that you never did get answered?

6. Now we'd like you to move to this computer and show us how you might approach researching a topic. Could you please show us how you would look up information for a research project on the Olympics, focusing on material that is relevant to your major? For instance, the psychology of Olympic athletes, or the biology of long distance running, or the politics of choosing the Olympic venue, or the economic impact of hosting the Olympic games on the host city, or the ways the Olympics have been depicted in literature or drama, or the music written for the Olympics, etc.?

OTHER NOTES for Marilyn or Ellen:

Adapted from Foster, CLIR Workshop, n.d., and James Nichols, "The 3 Directions", *C&RL* (November 2009): 515-529.

Appendix B

Consent Form
Study Title: Students Doing Research

Principal Investigators: Ellen L. Freeman, Instructional Technologist, Academic ITS & Marilyn R. Pukkila, SRS Librarian for Social Sciences & Humanities, Colby College Libraries

This form describes a research study being conducted by the Colby College Libraries and Academic ITS to understand how students conduct their research. The findings will support improvements to facilities, ITS student services, Academic ITS support services, Library Scholarly Research and Services, and the Web presence of the Colby College Libraries and Academic ITS.

All research will be done within Colby College with college students, who will be assigned aliases to protect their privacy. The study involves interviews of students, correspondence with students, mainly through email and messaging, and the creation of videos (with no faces visible,) a screencast and other artifacts. In most cases, observations and interviews will be recorded for later viewing by the researchers and other Colby librarians, library staff, and ITS staff. The researchers may also use drawings made by students, photographs or clips of the observations or interviews or excerpts from transcripts and emails at professional meetings on or off campus, or in publications to illustrate study methodology or findings, or as part of the Libraries' and/or Academic ITS' Web pages. The researchers may show video of interviews and/or the screencast to audiences of library, IT, and higher education professionals.

Your participation in this study is completely voluntary. You are free not to participate or to withdraw at any time, for whatever reason. If you withdraw, you may ask that all documentation of your participation be erased or otherwise destroyed. You will not be harmed by participation in this study. To thank you for your time, you will receive a $10 gift card for the Colby Bookstore.

For more information about this research or to withdraw from the project contact Ellen L. Freeman at 859-4234 or Marilyn R. Pukkila at 859-5145.

I agree to participate in this study and to allow the researchers to interview me, to take notes, and to create audio and video documentation of the interview. I also agree that the researchers may contact me by phone or email, and may use any material produced from the study in the ways described above. I reserve the right to revoke this agreement at any time and without explanation.

Signature

Name/alias

Date

Adapted from: Gibbons & Foster, Consent Form, n.d.

OBSERVATIONAL STUDIES
CHAPTER 6

Portrait of One Floor: What Students Are Doing in a Library Space

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University of Connecticut

Background: Assessment 360

In early 2010, the still-new Undergraduate Education Team at the University of Connecticut (UConn) Libraries undertook a four-part study to "take the pulse" of undergraduates. The study was intended to help direct the work of the team, which had been charged, in essence, with "all things undergraduate" in relation to the Libraries. Primarily, the focus was on how and where students got work done and what technologies they used or would consider using. The study comprised four separate research instruments:

1. a series of focus groups evaluating the function of the Learning Commons in the flagship library;
2. an online technology survey;
3. filmed interviews with students about how they accomplished academic work, especially with regard to their use of computers/technology; and
4. filmed "workspace monologues," for which students took video cameras and filmed spaces they frequently used to do academic work while answering questions out loud about what made these spaces good or bad for doing work.

The study answered many questions but inevitably led to new ones. The study was intended to capture data in a variety of ways that would be cumulatively meaningful, rather than to approach in great depth a set of questions using just one technique.

Regarding undergraduate use of space, there were several conclusions:

- The library was more often than not one of the places undergraduates used to get work done.
- Students identified access to power outlets as a basic requirement for getting work done.

- Students liked options when it came to study spaces. Their choice of a particular space among favorites was often dictated by the type of work they needed to do (reading a textbook or reading online; writing on a computer or handwriting work such as math homework).
- Students preferred spaces that offered lots of room to spread out books, notebooks, laptops, and so on.

Because the workspace monologues in particular were aimed at gathering information about *all* spaces students frequently used to do academic work, they left unanswered questions about how, specifically, students were using furniture and space within UConn's flagship Babbidge Library on the Storrs campus.

The Babbidge Library

The Babbidge Library at the University of Connecticut's main Storrs campus opened in 1978 and underwent one major renovation in the 1990s. That renovation affected several architectural features a great deal, but had little impact on the furnishing of specific floors beyond a couple of key existing or new areas. Most of the furniture in the building, especially on the study and stacks floors, dates back to the 1970s and is in great need of refurbishment or replacement. As we seek the funding to do this work, we find ourselves asking what sorts of furniture we should choose: more of the same—study carrel-style desk and tables—or something new?

Gate counts for the main library at the UConn Storrs campus have been high for the past several years. During the week we conducted the observation—a non-midterm week in November 2012—we hit a gate count of 10,000, a number once reached only during finals. Beyond these numbers, however, we have had little *use* data other than glimpses caught in the footage from the work-space monologues, telling us exactly where students are locating themselves within the library. We have ample anecdotal data (from security guards, for example, who are frequently on the study floors), but we have lacked the kind of concrete data that would inform decisions about specific kinds of furniture at specific locations.

Before we had time to design any formal study, fiscal conditions forced us to spend a limited amount of one-time funds to buy some new furniture before the end of the 2011 fiscal year. Somewhat blind, but informed in part by the Assessment 360 study, we took a gamble and introduced several new kinds of furniture to the library at the end of summer 2012. This furniture included café tables (high tables with stool seating); bench-style booth tables; and three "serpentine" carrel clusters, each made up of 12 adjoining carrel-desks with built-in power and offset from each other by the curve of the snake-like structure.

The new furniture provided added reason to conduct a floor observation study. Not only could we amass data about how students used existing (old) furniture in the library, we would simultaneously

learn whether the new furniture was being well used, and this could inform future furniture and design decisions.

The Call to Observe: Beginnings of the Observation Study

The Portrait of One Floor was thus designed to add to our understanding of what students prefer in study areas by generating some focused data about how students used the Babbidge Library.

The study took shape during a retreat held by the Undergraduate Education Team at the end of summer 2012. The main purpose of the retreat was to provide a team-building experience just before the start of the busy fall semester. Additionally, the retreat was intended to put everyone on the team, whose members had shifted several times since its creation in 2008, on the same page, particularly with regard to the ethnographic study techniques that have been so influential on academic libraries since Nancy Fried Foster and Susan Gibbons published their groundbreaking *Studying Students* report in 2007. By the summer of 2012, four of the nine team members had attended at least one CLIR-sponsored workshop in ethnographic techniques and participatory design led by Foster, and five members had been investigators for the team's Assessment 360 project.

The first part of the retreat provided an overview of ethnographic techniques as they related to the work being done in academic libraries under Foster's mentorship. The team reviewed the basic tenets of ethnographic technique, including observation and activity coding, and participated in a mock observation at two locations on campus. The exercise brought an element of experience-based learning to the day and underscored the difficulty of remaining neutral when conducting an observation. (How quickly we move to wanting to interpret what we see!)

The second part of the retreat was a scripted brainstorm structured to answer four basic questions about designing an observation study:

- What (Who) shall we observe?
- How shall we observe?
- When shall we observe?
- Who shall do the observing?

The discussion at this stage was not meant to lock us into anything, but we laid important groundwork in establishing the "why" of the study. We agreed that:

- Our purpose was to add both quantitative and qualitative data to give us a more accurate picture of how our students were using the library to work (or not work).
- Our purpose was primarily space focused. We were not interested in the age, ethnicity, or gender of students, but rather in where they worked and what they were doing in the broadest sense, i.e., academic vs. non-academic activities.

- We hoped that the study would generate data that could be used to make design and space decisions about furniture and infrastructure (power poles, for example).
- Our object was to observe students in places they did academic work; therefore:
- We would set out to observe the "study floors" of the library, excluding the crowded, chaotic Homer Commons floor and the administrative/entry plaza floor. We would especially avoid the Bookworms Café on the plaza level.

We decided to focus on the stacks and study floors, comprising the two sub-entry floors, A & B; and the primary collection and study floors, levels 2, 3, and 4. We further determined that we would use coding to indicate what students were doing. That is, we would accomplish more than a simple count of bodies in chairs; we wanted some descriptive data as well.

The Pre-Study Process

In the weeks following the retreat, we developed the study instruments, submitted the Institutional Review Board (IRB) application, worked out staffing and scheduling details, and ran through practice observations. It is difficult to present this process as anything linear, since many of the pieces were iterative and most of them overlapped. The following outlines what took place but there was no precise order for these steps.

Floors (Plural) vs. One Floor

Early in the process of map and instrument design, we realized that there was no way, even with a team of nine (plus extra help), that we were going to be able to observe levels A, B, 2, 3, and 4 of the library, every hour of every day for a week. Levels 2–4, the primary study/stacks floors in the library, have well over 500 seats each. Coding 500-plus seats on multiple floors across multiple days was beyond what we could accomplish.

So *floors* plural became a single floor and the study's scope shifted. We reminded ourselves that our aim was not to paint a picture of every person in the library at a given moment in time. Rather, the aim was to capture a representative slice of the library that would offer enough data to allow us to draw more general conclusions.

The choice of level 3, the floor to which we had recently added three new styles of furniture, seemed obvious. Observing there would allow us to compare the use of new furniture with use of the old and existing furniture. Level 3 was informally known as the "social floor" because of its popularity, so we guessed we could count on typical to high use across the week.

At this point the internal, working name of the study became—thanks to a team member with a quick wit—POOF, or Portrait of One Floor.

The Observation Instrument

Initially, we spent some time investigating whether we could do the study using an available online or mobile application. We had heard of a few, including Suma, a mobile space assessment software developed by North Carolina State University. However, the schedule for our study did not leave us enough time to get an instance of Suma on site and to explore and master it sufficiently to apply. So we focused on creating and refining a paper instrument instead.

We needed a tool that would allow us to navigate—literally—the acre-sized floors of the library and quickly record codes; any instrument that required frequent stopping would make the observation too slow to be feasible. The two main contenders were a tallying sheet, where rows and cells would match specific seats, or a map. A tallying sheet would require physically affixing numbers to seats on the floor so that we could match them to our instrument. A map would require coming up with a simple representation of the library floors with all seating in its spatial location.

There was no immediate consensus about the instrument, but we finally decided that a map or series of maps made the most sense—perhaps because we saw that even a tally-coding sheet would eventually have to be mapped so that we could visualize activity and occupancy on the floors.

Nothing was simple, it turned out, about designing the perfect map for our purposes. The level 3 floor maps available on the Libraries website looked like the map in Figure 1. Although an accurate map of the stacks and useful for finding books, it did not work well for our purposes. It was the *non-stacks* areas in which we needed to put precise representations of every table, carrel, and other type of furniture on the floor.

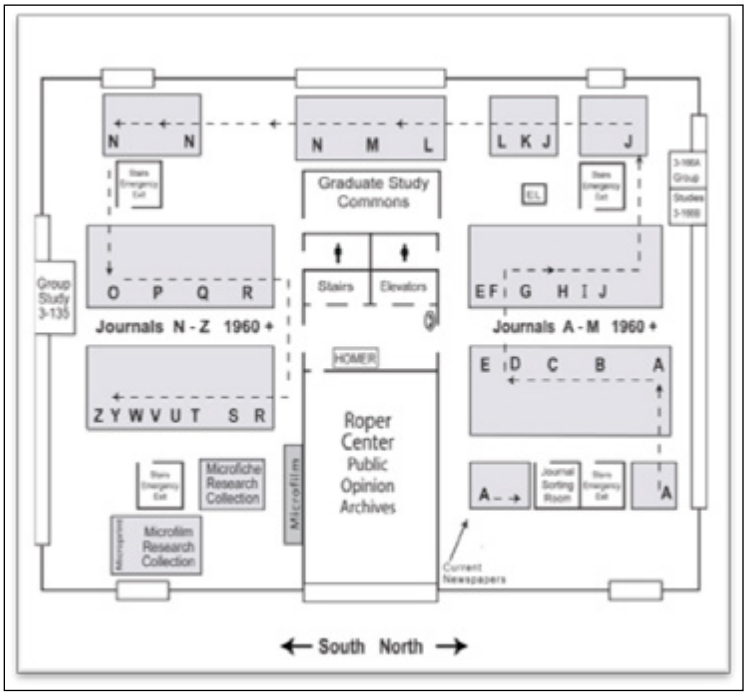

Fig. 1: Floor map

From scratch we slowly developed the maps to suit our needs. In early attempts we tried to remove irrelevant details (stacks ranges) to leave room for coding (see Figure 2; the boxes in the image are traditional closed-door research carrels along the walls).

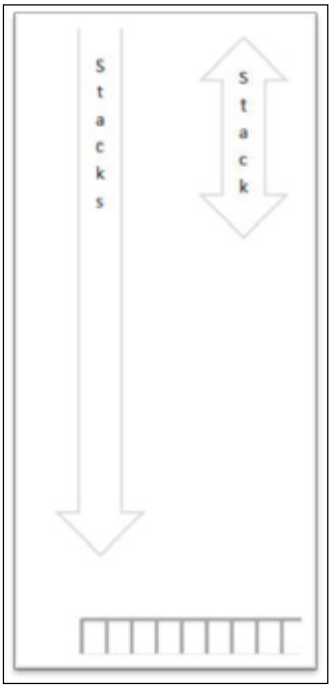

Fig. 2: Floor plan to use for coding

After some initial efforts, one team member with good visual and drafting skills took the lead on creating the instrument. She played with how to represent various types of furniture (see Figure 3).

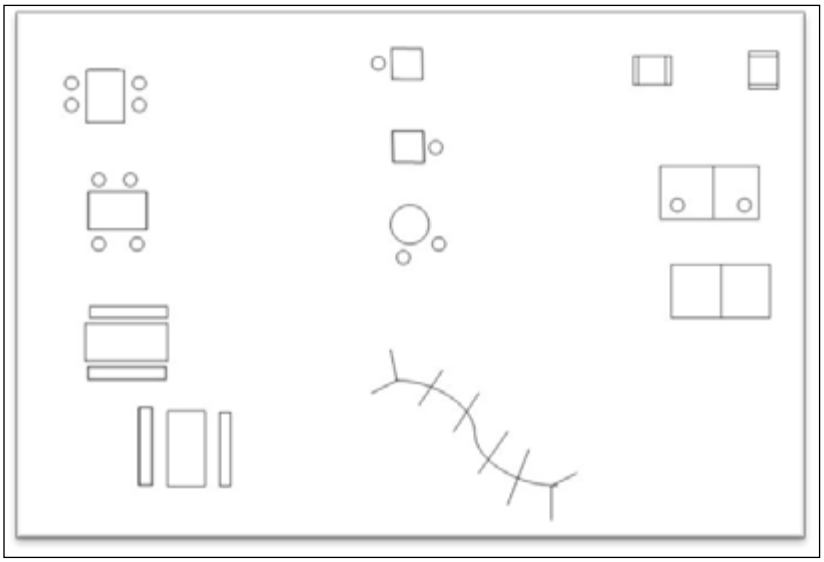

Fig. 3: Draft graphic representation of furniture on floor

After several iterations, we decided on a streamlined map that removed all but essential detail (and useful spatial indicators such as stacks blocks) to leave room for writing codes at each place where there was a seat. To make the maps readable (and writable), we would either have to use one huge map or—what we went with—four page-sized maps that broke the floor up into recognizable quadrants.

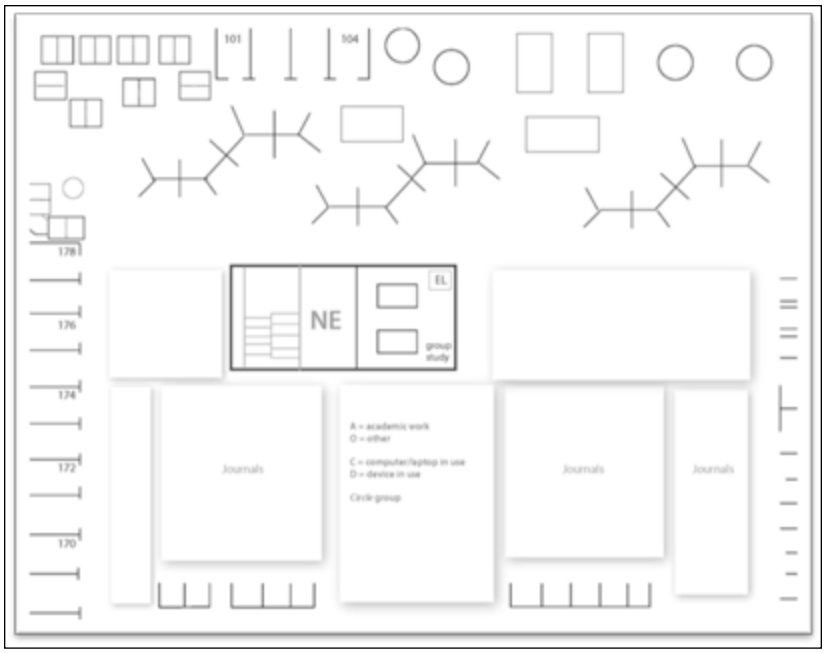

Fig. 4: Part of the northwest quadrant map

The images here (Figures 4 and 5) show part of the northwest and the entire northeast quadrant maps of level 3. They show the full range of furniture types on the floor, including tables, private study rooms (numbered every other one), "side by side" traditional study carrels, "alternating" traditional study carrels, lounge chairs (the squares at the corners), booth-style tables, café tables, and the "serpentine" seating clusters.

Coding the Observation

Next to designing the study instrument, coming to consensus on what, how, and why we should code during the observation was the most difficult part of designing the study.

Codes are used in observational and similar studies as shorthand for activity or attribute. Codes are pre-chosen and limited to the scope of a study. If researchers, for example, were observing how children interact in a public playground, they might design a series of codes indicating whether the child is playing alone or with others, whether a child is playing with another child or adult, whether a child is interacting with a structure on the playground, whether a child is playing with people who came with the child or with others, and so on.

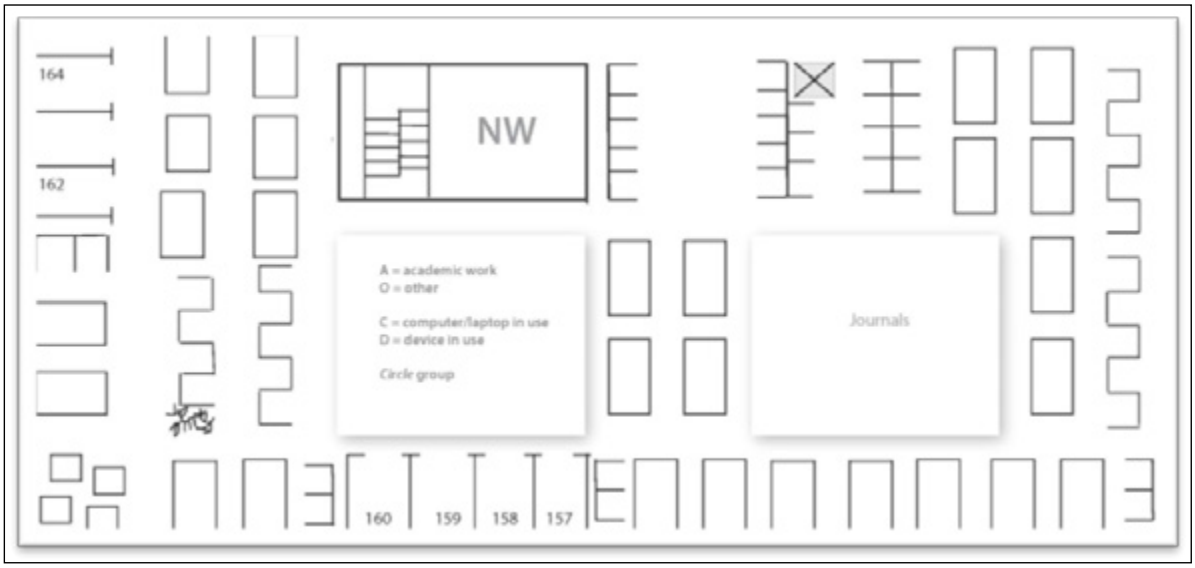

Fig. 5: The northeast quadrant map

Research into basic coding techniques that have been used in similar observation-style studies in libraries yielded incomplete guidance. The kinds of codes being used for this type of study signified a fairly consistent range of activities; for example: *A* for reading/working on academic assignment, *AC* when using library computer, *B* when taking break, *S* when socializing, and so on.

From the start, we were more certain about what we *would not* capture than what we would. To ensure that our study did not raise any alarm bells for the IRB, and because it was irrelevant to our study's desired outcomes, we left out identity codes—for example, codes that would signify gender or ethnicity. There was some rigorous debate on the team about whether we should attempt to capture (perceived) student vs. (perceived) non-student, but that quickly got so tangled in complex identity and privacy issues (having to judge age and to further make judgments about who "looked like" a student) that we dropped that as well.

Discussions to clarify what we were coding and for what purpose persisted in the early weeks of designing the study. It was understandably difficult for some members of the team to be comfortable with the idea that we would not know, for example, whether a student watching a video was doing so for personal or academic reasons, as both interpretations were plausible. It took a while for us to come to terms with the idea that observation is never a completely neutral act, that one has to rely on one's first impression, and that "mistakes" become statistically unimportant given the large amount of data.

In the end, we went for a simple approach and used only two code categories: (1) academic vs. non-academic (not worrying about sleeping vs. eating vs. talking); and (2) computer or device in use.

Our final codes were:

A = Academic work
O = Other activity (non-academic work—would include eating, sleeping, and so on)
C = Using a computer (= laptop, as there are only two wired-in library computers on the floor)
D = Using a device (phone, Kindle, iPad, and others)

We decided to also circle people obviously working together, but that seemed to fall by the wayside during the observations (see final analysis below).

Thus, one individual might be coded as *AC* or *ACD* (doing academic work using a computer or a computer and a device). If we found two people sitting at "one spot" (that is, where only one chair normally sits—meaning they brought in an extra chair), we would simply put the codes together, for example, *ACA*, *AAC* or *ADACD*.

IRB Approval

Submitting an IRB protocol application has two parts: the protocol itself and the investigator certification. The application for the study was fairly straightforward, although we felt panicked about timing as we neared the target dates for the study. We knew we could not submit the application until every piece was in place—every instrument, every investigator, every piece of marketing material (text for web, language on signs/handouts)—because every piece of supporting material must receive the stamp of approval from the IRB.

We felt confident that the study would likely receive "exempt" status, as there was minimal risk to participants.[1] Studies based on observation are an established form of research in the social sciences; our job in the application was to be clear about the scope and method of the study so that the IRB could be confident we were taking steps to protect the privacy of those we observed.

A key element to our IRB status was that we required not only overall exempt status, but also—and more to the point—an exemption from requiring written or oral consent.[2] In an observation-based study, which relies on investigators observing actions "as they are" in the moment, stopping to ask for permission would have a strong adverse effect on the research. In other words, what we would be

[1] "Exempt" status has precise meaning in the world of IRB study certification. An exempt status is one excused from "continuing review," which means it still requires IRB approval, but it does not have to be re-approved or reviewed every calendar year. Exempt is not the same thing as something not needing IRB approval to conduct a study.

[2] Definitions of consent are wordy and often laden with references to U.S. regulation. Generally speaking, informed consent has to do with the requirement that subjects of a study be informed fully about a study, that subjects fully understand this information, and that they indicate their voluntary participation in a study. The importance of informed consent for conducting a study is first and foremost that it is a legal requirement. However, its importance conceptually rises from the historical context that has resulted in informed consent laws. See for example the Health & Human Services page on The Belmont Report, specifically the section on informed consent at http://answers.hhs.gov/ohrp/questions/7184, or a recent research report from the Presidential Commission for the Study of Bioethical Issues at http://www.bioethics.gov/sites/default/files/Informed%20Consent%20Background%20090413.pdf.

observing "in the moment" if we stopped for consent would be library users completing a consent process.

We did create an information sheet that provided basic information and a link to a more detailed LibGuide on the study. We posted the sheet in several places on the floor (unobtrusively, since the object was to make it visible but not advertise it). We also carried copies of this information sheet with us, and we wrote into our IRB application that we would give these sheets to anyone who asked for more information about our activities.[3]

Scheduling and Staffing

In addition to making decisions about the overall scope of the project to keep it to a manageable size, we also realized fairly quickly that we would have to reduce the number of hours observed. We came to quick consensus about the following adjustments to our "one week" study:

1. We would drop observations on Friday evenings, Saturdays, and Sunday mornings, which were all low-traffic times. Because furniture, design, and space decisions are made based on use (not disuse), data from hours during which the library was relatively empty would have little impact and could therefore be dropped with no loss to the integrity of the study (which was already, given its reduced scope, a study based on a kind of "sampling"). Furthermore, as we would still be observing across most hours of most days, we felt confident that we would still be gathering data from both peak and off-peak hours of library use.
2. For the same reasons, we dropped the first and last hours of the days the library was open. We open at 7:30 am; we began observing at 9 am. We close at 2 am; we did a last observation shift between midnight and 1 am.

Even with these adjustments, we were left with 83 hours, or observation shifts, to cover. We shared the load as equitably as we could, although investigators already working evening shifts (until 9 pm) took the lion's share of those after-workday hours. Even with the solid participation of the team and partner investigators, we realized a few weeks before the proposed study dates that we would still have holes in coverage for the late-night hours.

With the clock ticking to get all investigators through the online human subjects training and the IRB approved,[4] we hired two students to cover most of the observation shifts between 9 pm and 1 am. We chose students we had worked with during our summer retreat activities and who were also on the Libraries payroll; we simply compensated them at their normal pay scale for their time. Because

[3] The information sheet and other study instruments too cumbersome to include here can be viewed at our team's new blog, Traversing the Library: http://blogs.lib.uconn.edu/traversingthelibrary/2013/07/10/portrait-of-a-one-floor-study-instruments/.

[4] We were lucky in that about half of us had completed online human subjects compliance training (through CITI at citiprogram.org) for our previous Assessment 360 project. We were unlucky in that all of our certifications were about to expire, so all of us had to either complete a new certification or a refresher course before we could submit our IRB application.

they would be doing observations, we had to ask these students to complete the online training, and we compensated them for that time as well (it takes about 1.5 to 2 hours to complete the course).

Our final schedule was as follows (a more impressive visual representation of this can be viewed in the observation schedule file uploaded to our blog).[5]

Thursday: 9 am–1 am
Friday: 9 am –5 pm
Saturday: no observation
Sunday: 1 pm–1 am
Monday/Tuesday/Wednesday: 9 am–1 am

The Observation

The Run-Through

When designing the study instruments (maps), we had asked the Babbidge Library's lead security officer to take us on a tour of level 3 that showed us how to "walk the floor" most efficiently and hit every seating area with minimal backtracking. If this seems overdone, it is worth noting that each study floor of the Babbidge Library is about an acre in size and, as noted elsewhere, contains nearly 600 seats.

Every member of the investigating team did a run-through—a single full observation with the draft map and codes. In retrospect, this was an essential activity. What we learned during this process was extremely useful for both the observers and the project:

- We still had too many codes, even though we had whittled them down to what seemed like a short list. Recording information without being obtrusive required a short list of codes that demanded little thought and could be used quickly before moving on. Recording whether devices or computers were plugged in, for example, was untenable given that it was not always clear at a glance whether a student (or other patron) was using an outlet.
- It was much harder—or at least much more awkward—to do the observation than we had thought. It was difficult to walk through a crowded floor writing down codes on a map while dozens of students glanced up or stared at us. In other words, doing an observation took a lot of mental (and psychological) energy.
- Related to the previous point, during busy times of day (mid-afternoon for the most part), completing an observation was slow-going and could take up to 45 minutes.
- It was easy to get disoriented and lost even on a floor we thought we knew well. Following the flow of furniture was challenging; all of us, at times, found ourselves having to stop and look closely at the map before continuing.

We used what we learned in the run-through to make tweaks to the codes and the map and felt much more prepared going into the "live" observation shifts.

[5] Viewable at http://blogs.lib.uconn.edu/traversingthelibrary/2013/07/10/portrait-of-a-one-floor-study-instruments/.

Ready, Set, Observe!

In the end, we began on a Thursday and finished the following Wednesday after midnight. Why such an odd "week"? When it came time to choose dates, we ran up against several constraints, including the already-scheduled absence of investigators and the beginning of the week-long Thanksgiving break. We squeezed the study into the last possible "normal" span of seven days we could find that was well after midterms and well before the crazy end of the semester. Leaving out Saturday, that left us with four full days and evenings (Thursday, Monday, Tuesday, Wednesday), and two partial days (Friday daytime and Sunday afternoon through late night).

The process for doing an observation shift was straightforward. The schedule was posted on a master calendar of observation shifts. In time for a given shift, investigators picked up map packets (four maps, each representing a floor quadrant, and a cover sheet[6]) and a large envelope. After completing an observation, or several, team members returned sheets to the principal investigator's office.

Investigators signed up for hour-long shifts. So long as the observation was conducted sometime during that hour, we did not obsess over having everyone begin observing at exactly the same time on or after the hour. Given that investigators had different rhythms for conducting the observation, trying to conform to a micro-schedule would not have been reasonable or feasible.

The order of the four maps reflected the route through the floor suggested by the library security staff member who had led us on a guided tour. We began in the lobby and walked to the southeast quadrant, then continued through the southwest, the northwest, and finally the northeast quadrants (Figure 6). Investigators either began or ended their observations with the main lobby.

Fig. 6: Observation route

[6] The cover sheet is also viewable at http://blogs.lib.uconn.edu/traversingthelibrary/2013/07/10/portrait-of-a-one-floor-study-instruments/.

Most of us used a clipboard; some used less obtrusive surfaces (books, for example) to write on. Investigators took anywhere from 10 minutes to more than 40 minutes to complete an observation. The variance depended on how crowded the floor was and on other factors, including the fact that observing is awkward. In planning this kind of study, we didn't stop to consider the actual *experience* of observing: the awkwardness of standing still in the middle of a space furiously scribbling while students cast curious glances.

What seems a breeze during a non-peak hour, for example, becomes a very odd, almost embarrassing, activity in the middle of the afternoon, when hundreds of students congregate at tables and carrels around the floor. At quiet times, one can almost code while walking by. At busy times, it is impossible to avoid stopping for a while to capture every student *in situ*. Some investigators found themselves silently inventing cover stories for themselves that they would "act out" by pretending to do something else to avoid attention.

Students take a lot in stride and rarely ask questions, even when they are curious. All of us doing the observations experienced the inquisitive looks of students. Sometimes they would look up and then return to their work. At other times they would look up and continue to watch (or whisper to friends) while we made our circuits through the floor. But fewer than 5 times across 83 observation shifts did any student or group of students stop an investigator and ask, "What are you doing?" When they did so, we handed over the information sheet and offered a brief verbal explanation. They always seemed satisfied with the explanation and several students gave unsolicited positive feedback when we mentioned that the study might result in better, updated furniture on the floor (such as the new "serpentine" seating we had put in the northeast quadrant).

What Went Wrong

Very little went wrong, but two things are worth noting:

- *Storms happen.* Although observations were scheduled to begin at 9 am on the first day of the study, a large snowstorm kept campus closed and staff at home until 11 am. The PI managed to get in by 10 am and did the first observation shift then.
- *Technology crashes*. The university's vPC (Virtual PC) software crashed Sunday, meaning that students would not have been able to use any library computers (which require vPC login). The impact of this on the study is difficult to measure. The third floor has no computer lab areas; nevertheless, it is hard to say whether word of the outage kept students away from the library. The outage ran most of the day and through the evening.

After the Observation

Debriefing as a Team

Because of the week-long Thanksgiving break and the following end-of-semester crunch, our formal project debriefing did not occur until the final week of November, two weeks after we finished the study.

Although this might seem like a long lapse of time, it points to the first lesson from this (or any) sizeable qualitative study: it is one thing to pull off the study itself. It is quite another (a sort of second, follow-up project) to find time to go through the necessary next steps.

During the week of the study, a group of very busy people made it their priority to do observations. That's feasible as a one-time push toward an exciting, common goal, but one cannot easily ask a group of 11 staff members (not counting the two students who helped with observations only) to keep a study on the front burner week after week.

Members of the Undergraduate Education Team, in addition to taking on studies like this one, also run the library's virtual and face-to-face research help service; are information literacy instructors for the Freshman English program; serve as primary contacts for general undergraduate outreach (first year experience, for example); act as subject liaisons; and much more. So when we finished the intense week of observation, the day-to-day caught up with us for a while.

We held a pre-holiday casual gathering to debrief the study. The structure of the meeting was simply a "share": those who had participated in the study were asked to give feedback on their experience doing the observation, their thoughts about the study instruments, or anything else.

The debriefing gave us the chance to share anecdotal findings (e.g., "Wow, there's a lot of food up there in the evenings") and observations that would be unlikely to make it into the formal findings we would share with library staff and administration. For example:

- A particular fraternity had as much as claimed one large group study by occupying it across huge spans of time.
- "Seat sharing" (one student on another's lap) was not something we had foreseen.
- A plant that our colleague had drawn on the map as a squiggle in a particularly crowded part of the floor proved to be a very useful navigation guide. Most of us clung to that plant as an indicator that we were still on track.
- The windows on level 3 are filthy.

Data Entry: From Maps to Spreadsheets

The debriefing also served as a formal call for investigators to advance to the meaning-making stage of the study: formal analysis. The anecdotal data shared at the debriefing would now be tested against the data we had gathered.

Before we could do this, we faced the monumental task of entering 83 shifts of data in the form of codes written on maps into Excel spreadsheets. This data would then be manipulated to derive big-picture results from thousands upon thousands of data points (specific activities recorded at specific seats during specific time ranges).

Before returning observation sheets to team members for data entry, the PI scanned every map for every observation shift to help ensure against accidental loss or destruction of the originals. Once that was done, the originals could be distributed with less anxiety about their fates. Given that there was no personal data on the sheets

(data about the students we observed), we did not have to worry about guarding the sheets under lock and key, which made it simple to disseminate them for data entry.

We had two tools to facilitate data entry: the observation maps (with data), and a master map on which every seat on the floor was assigned a number. To enter the data, we would first open an Excel spreadsheet into which a series of preset data had been added, including seat number, seat type (both general type such as "study carrel" and specific type such as "side-by-side" carrel), and quadrant.

We began by transcribing our own maps to reduce the likelihood of being unable to decipher someone else's codes. As it turned out, several on the project team who were particularly fast at data entry took over for others who had less time to devote to this work. The students we had hired to help with late-night observations were unable to find time to help during this stage, as this ran well into winter break, so a team member did those as well as her own.

There are 593 seats on the third floor of the library, so entering data from a busy time of day was painstaking and required constant checking (and double-checking) that one was in the right place, both on the map and in the spreadsheet. The process yielded almost 50,000 data points, a good—if overwhelming—basis for the analysis that followed.[7]

Data Analysis: From Spreadsheets to Visual Analysis

We used two primary tools—Excel and the online data visualization tool Tableau[8]—to make sense of the data. We first converted a complex master spreadsheet into simpler tables that could be used to produce traditional and pivot charts.[9] We used Excel to upload tabular data into Tableau. This produced a number of lovely, easy-to-grasp visualizations of the data, especially regarding use of particular furniture types and peak use times. Samples of both Excel-created and Tableau-rendered charts appear at the end of the next section.

What We Learned, What We've Done, Where We Are Headed

We learned a lot, and are still learning a lot as we figure out how to draw new conclusions from the observation. Several findings, however, came swiftly, first expressed in our debriefing and then made firm when we had the numbers to back up our perceptions. Below is

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[7] Snapshots of coded instruments/maps, the spreadsheets we used for analysis, the master (numbered) floor map, and other instruments can be viewed at http://blogs.lib.uconn.edu/traversingthelibrary/2013/07/10/portrait-of-a-one-floor-study-instruments/.

[8] tableausoftware.com.

[9] The master spreadsheet was complex because it was created to anticipate the full range of questions we "put to the data" after the study. For that reason, every seat on the floor was described in several ways—seat number, seat "type" (both macro, for example: study carrel or lounge; and specific, for example: side-by-side or lobby), and quadrant. But pivot tables don't like spreadsheets that "mix ingredients." We had to reduce the master spreadsheet to tables that took only x type of information in columns and y type of information in rows. The creation of these derivative tables took a lot of play—and some lucky guesses.

a brief narrative summary of our findings; at the end of this section are several charts that visually represent many of our key findings.

Key Findings

A is (Almost) All. Although we spent a considerable amount of time choosing our codes, we found that most students were doing "A" (academic work), and it became somewhat meaningless to capture the much lesser amount of time they were doing "O" (other) things (usually texting, eating, sleeping, or socializing). Similarly, we could almost have written "C" (computer) next to virtually every student, as laptops were ubiquitous. Capturing that data, however, was not a waste of time, as we had never had much beyond anecdotal evidence that laptops were key to almost all academic work. If students were not actively using them as we walked by, they had them there.

The New Furniture Rocks! The new "serpentine" style seating[10] was hands-down the most popular seating on the floor. Of the top 25 seats on the floor, measured by how many times those seats were occupied across the 83 observation shifts, all but two were in one of the three new serpentine clusters.

Second to serpentine seating, traditional study tables (four chairs each) are still very popular, although as often as not only one or two of the four chairs at a given table are used, which is a utilization issue we will have to consider as we continue to refurbish our study floors.

Our older style, "classic" study carrels are not being used well, perhaps because they lack electrical outlets and the space students now require to spread out, not only for textbooks, notepads, and notebooks, but also for laptops and other devices.

We Love Research Carrels (Rooms)! We had only recently begun holding back a number of traditional research carrels (rooms) for check out by undergraduate and graduate students. Our study fairly conclusively confirmed that the "long-term" carrels—those assigned to faculty or graduate students for the year—have a very low level of use. In contrast, the ones we now loan out for six-hour periods are being constantly used, especially during peak study hours.

We Don't Lounge. Despite the movement over the past ten years to increase lounge furniture throughout libraries, on this floor at least, lounge furniture was poorly used. It made no difference whether it was brand new or old; it just was not used much.

Data in Pictures

These are snapshots of some of our key (and most readable) findings, derived from both Excel and Tableau.

[10] A collage of images showing the furniture types on the floor can be viewed at http://blogs.lib.uconn.edu/traversingthelibrary/2013/07/10/portrait-of-a-one-floor-study-instruments/.

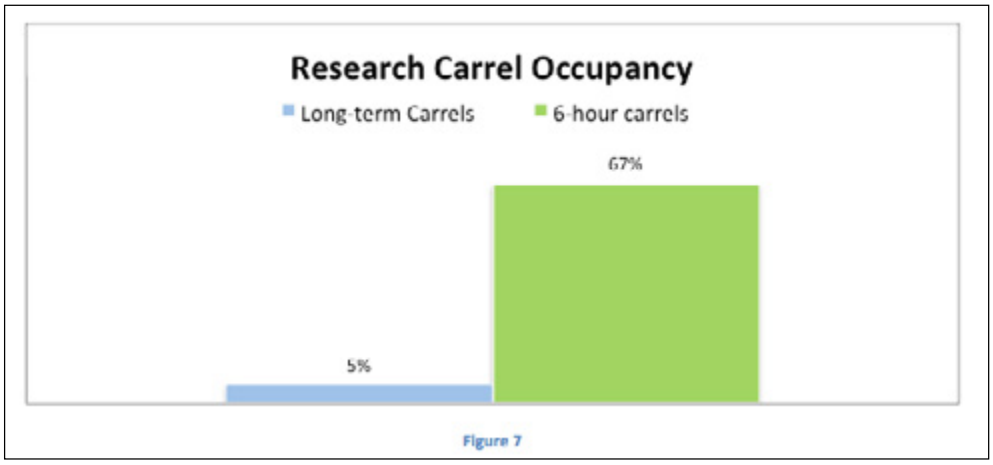

Fig. 7: Research carrel occupancy

Figure 7 shows research carrel occupancy and measures what percentage of the time (out of total possible occupancies), traditional private research carrels (rooms) were found occupied, compared to the ones now allowed to circulate for six-hour periods.

Figure 8 shows uses against seats available (overall). This chart shows how furniture types measured up when total occupancy across all 83 observation shifts was measured against total possible occupancy across all shifts. In other words, it shows which seat types are used a higher proportion of the time. The clear winner here is "serp," which are the new serpentine-style clustered study carrel-desks.

Figure 9 is derived using Tableau software and shows the power of using visualization software to look at the same data in a different way. Compare with Figure 8.

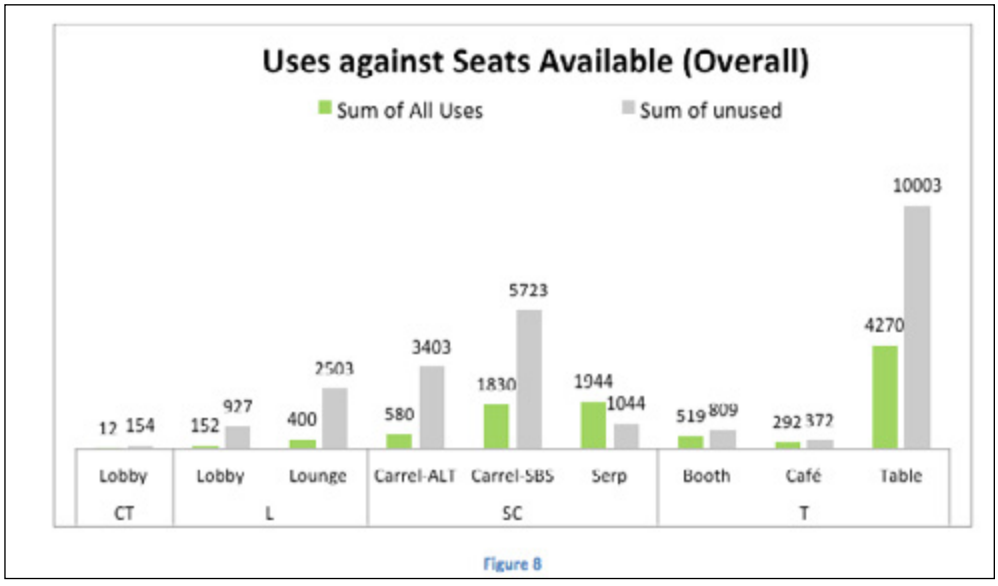

Fig. 8: Uses against seats available (overall); (macro categories are CT=computer terminal; L=lounge; SC=study carrel-desk; T=table)

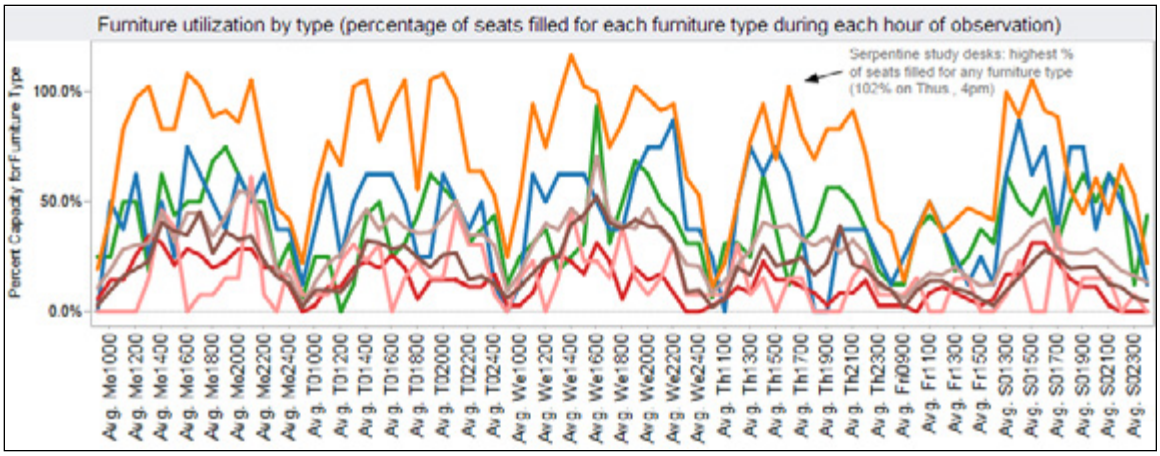

Fig. 9: Furniture utilization by type

Figure 10 shows seats by popularity. The numbers in the legend (545, 548, and so on) are from the master map on which every seat on the floor was assigned a number.

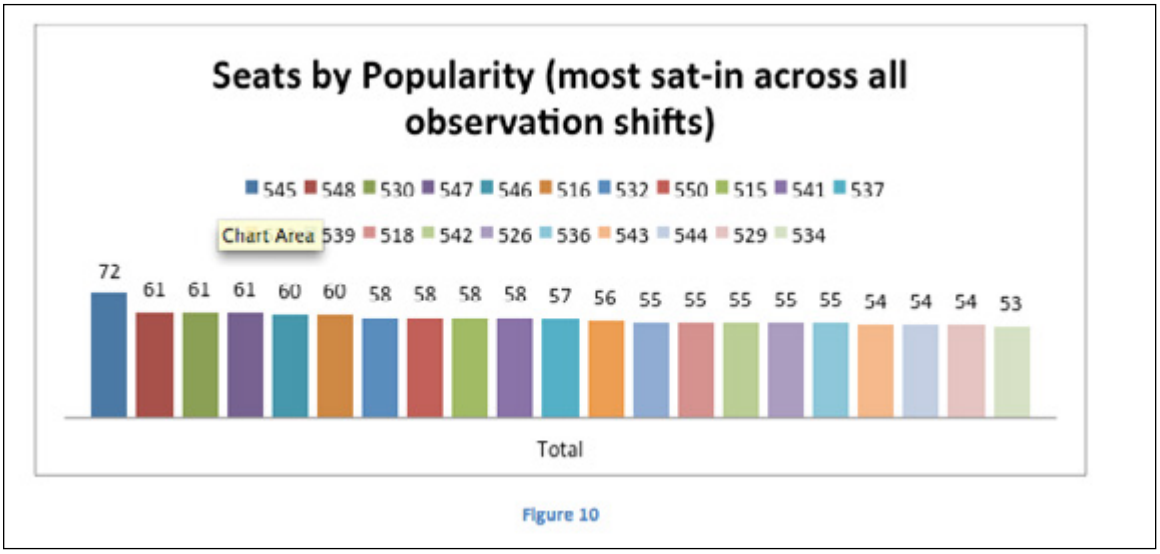

Fig. 10: Seats by popularity

Figure 11 shows two happy students sitting in the "most popular seat" (seat number 545), which is the end seat of one of the new serpentine study carrel-desk areas.

Immediate and Future Steps

The availability of some one-time funds has already allowed us to add serpentine configurations to the floor. Three new such clusters have been added to the floor in areas formerly occupied by tangled and often crowded rows and small clusters of side-by-side or alternating study carrels.

We have asked the Provost's Library Advisory Council to consider the data documenting the non-use of traditional private research rooms. We hope that we will be able to release at least some of the rooms for short-term circulation.

Fig. 11: Seat 545—the most popular seat

Lounge furniture is not a priority as we continue to refurbish our study floors. We are already considering moving existing lounge furniture to more appropriate places—perhaps our Commons floor—to make room for more tables and carrels.

Although at some level we knew this, we are fairly confident now in identifying level 3 as a "study" floor; that is, studying goes on there more than anything else, and despite the floor's reputation as a social space, it is usually a quiet (not silent) floor where students go to get work done, alone or—and here perhaps the social nature of the floor does appear—with groups of friends. Understanding the character of this floor will help us determine the extent to which it is like every other space, and to what degree it is a unique space.

This leads to the last, perhaps obvious point: level 3 is probably typical of our floor dedicated to collections and study space, but it may be worth our taking the time to capture the character of other spaces (our "Quiet Floor" on level 4, for example). It came up in the debriefing that it may not require such an in-depth analysis of other spaces to gather enough data to be representative and therefore useful. The when, where, how, and who of such further observation will have to be worked out in coming months and years.

Work Cited

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OBSERVATIONAL STUDIES
CHAPTER 7

Qualitative and Quantitative Studies at Butler Library: Exploring Student Use of Library Spaces

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Columbia University Libraries/Information Services (CUL/IS) is one of the top five academic research library systems in North America. The collections include more than 12 million volumes, over 160,000 journals and serials, and extensive electronic resources, manuscripts, rare books, microforms, maps, and graphic and audiovisual materials. The services and collections are organized into 22 libraries and various academic technology centers, including affiliates.

Butler Library is the largest of the 22 libraries and collections constituting Columbia University Libraries and affiliates. With two million volumes, Butler Library comprises the university's collections in the humanities, which are particularly strong in history, literature, philosophy, and religion.

Because libraries provide spaces that facilitate group and individual academic activities, Columbia University Libraries is keen to understand student study habits and to build learning spaces that support the needs of our students. In the past, library staff have used different research methods, including descriptive statistics of quantitative data collected from a swipe access system, to arrive at broad conclusions about time and frequency of library visits/visitors, and to capture user demographics (such as department, program, status, and repeat visits). While descriptive analysis produces a rich understanding of library entrance patterns, it does not give us information about visitors' experiences of library spaces. The purpose of this study was to gain insight into students' use of various spaces and their study habits, and to advance our understanding of their interactions with library environment.

Methodology

In this study, we used direct and structured observations to capture structured data, thoughts, and ideas across time in multiple settings with minimal intrusiveness. The first observation study was conducted before finals week, from December 3–9, 2012, after which we evaluated the methodology and made minor revisions to the data-gathering process. Four observers conducted the follow-up study during a typical week (one that is neither unusually busy nor unusually slow), between Monday, April 1, 2013, and Sunday, April 7, 2013, over three time periods (10 am, 4 pm, 10 pm). Overall, 6,967 library visitors were coded, including 3,584 in December 2012, and 3,383 in April 2013.

Using a floor plan for each room included in the study, we coded each person occupying a user seat in the space as follows:[1]

A	Reading and/or working on an academic assignment
AL	Using own laptop/tablet/mobile device as part of academic work
AC	Using library computer as part of academic work
AG	Doing academic work as a group
R	Socializing, resting, and relaxing
RG	Socializing, resting, and relaxing as a group
X	Not engaged (e.g., getting ready to leave or to sit down—not clear what he/she did or will be doing)
Z	Sleeping
C	Camping (e.g., books, coat, bag occupy the user seat but there is no person in sight)

All observers were asked to stand or sit in one place to observe the space for five minutes at the end of the coding and make notes on their impressions of the space.

To capture a representative sample of the primary users of the library, we selected the following rooms for the study:

Butler Library	Seating Capacity	Room Use Policy
Room 209–Undergraduate Library Reading Room	118	Food purchased at the library coffee bar only; drink in covered container only.
Room 301–Reference Reading Room	110	No food; drink in covered container only.
Room 310–Quiet Study/card catalog	62	No food; drink in covered container only.
Room 503–Graduate Reading Room	22	No food, no drink.

We conducted a training session to obtain inter-coder agreement a week before the observation period. During the post-observation meeting, we identified the following challenges related to direct observations:

- Observers reported few, and minor, problems during their shifts, such as interacting with subjects (for example, a library visitor approached the observer with a research question).

[1] Codes in this study are adopted from the Intermediate Workshop on Participatory Design of Academic Libraries, conducted by Nancy Foster at Washington University on November 8, 2012.

- Observers felt that they were more intrusive than they would like, as they walked around with a clipboard, writing down what people were doing.
- Observers reported having a hard time with coding, as many subjects fall into multiple categories at first glance (for example, a library visitor would be texting using a phone but there was an open notebook and a laptop in front of him on the desk).

Results

Overall, we coded a significant number of people (50 percent in December, 51 percent in April) as "AL," indicating that students rely on technology to do their academic work (see Table 1).

	December 2012					April 2013					
Codes	*209*	*301*	*310*	*Total*	*%*	*209*	*301*	*310*	*503*	*Total*	*%*
A	142	200	147	489	14%	213	206	167	20	606	18%
AC	144	42	7	193	5%	106	44	8	5	163	5%
AG	27	19	20	66	2%	2	2	11	-	15	0%
AL	666	741	397	1,804	50%	593	706	370	64	1,733	51%
C	248	379	158	785	22%	146	271	111	11	539	16%
R	62	42	31	135	4%	61	64	39	10	174	5%
RG	15	11	2	28	1%	13	10	15	1	39	1%
X	24	31	13	68	2%	31	40	25	6	102	3%
Z	8	3	5	16	0%	6	2	2	2	12	0%
Total	**1,336**	**1,468**	**780**	**3,584**	**100%**	**1,171**	**1,345**	**748**	**119**	**3,383**	100%

Table 1: Number of observations by location for each activity

Figure 1 shows the number of observations for each category during the two periods. Student activities did not change significantly from one period to the next, except for "camping" activity, which was higher in December before the exam week. Camping—a term used to describe students' practice of leaving their belongings on study desks and seats for prolonged periods of time—is a growing problem in Butler Library. Figure 2 shows a snapshot of camping activity on December 9, 2012, at 4 pm. The observer noted that because of camping, there were not enough seats available for users in the library.

During our post-observation meeting, observers reported remarkable differences in atmosphere among the shifts. The mornings, particularly Friday, Saturday, and Sunday, were very quiet and mellow. Observers reported that the library is a much livelier place at night than during the day.

Rooms appeared to be messy, particularly at night, at many of the observations. Coffee cups, water and soda bottles, take-out food, candy bars, hand lotion, lip balm, and over-the-counter headache medications were some of the items observed on the tables.

Before presenting conclusions it is important to identify the primary users of Butler Library. Table 2 displays the count of entrances,

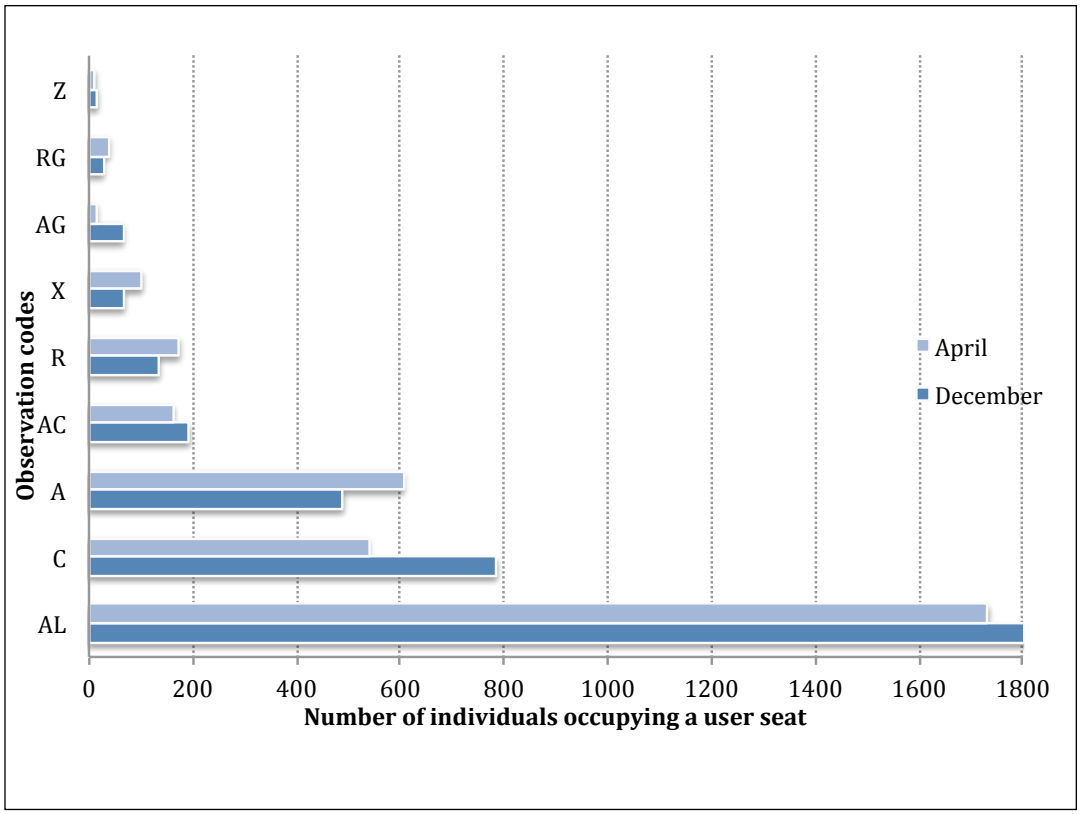

Fig. 1: Number of observations for each activity in December 2012 and April 2013

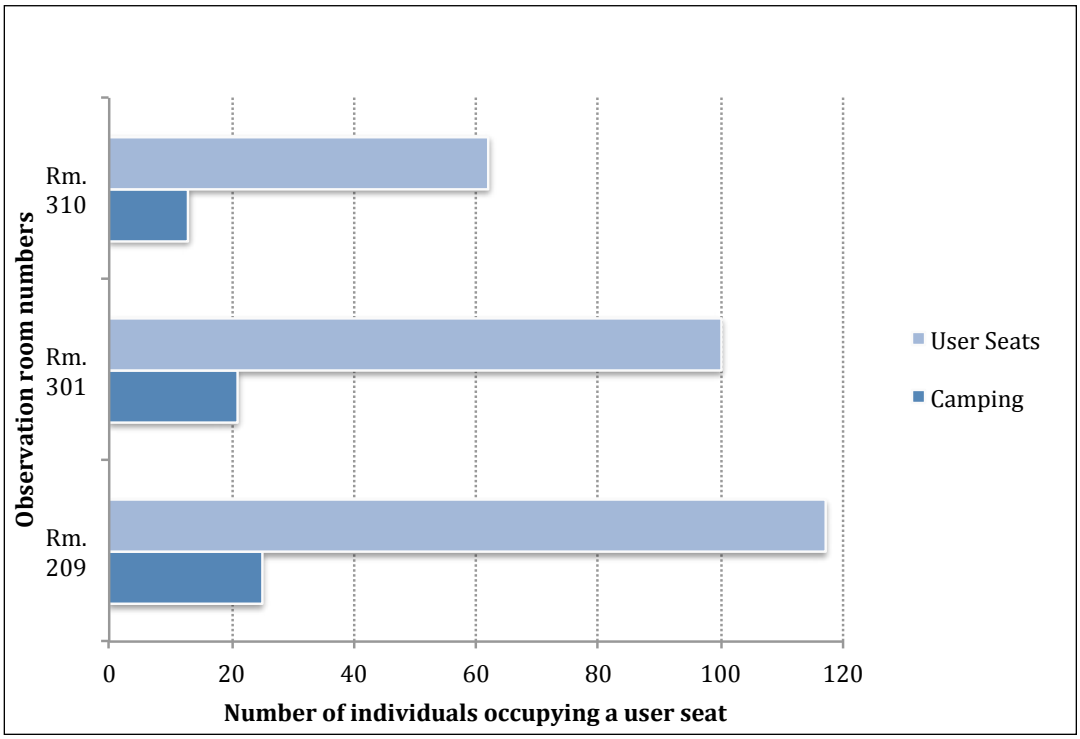

Fig. 2: Snapshot of camping activity on December 9, 2012, at 4 pm

by academic affiliation, to Butler Library from September 2011 through August 2012. A visitor may be a student, faculty or staff member, alumnus, or member of the public. Each cell shows the number of visits by school and month. A visitor may enter the library multiple times.

Library Visits by School and Month to Butler Library in 2012 Academic Year														
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total	%
	148,427	173,046	143,261	137,262	82,063	153,461	136,458	170,368	90,514	49,588	56,099	49,875	1,390,422	
Undergraduate Schools														
Columbia College	40,116	52,423	39,861	43,575	19,417	48,460	40,539	57,456	26,189	3,502	3,520	4,027	379,085	27%
Engineering & Applied Science	8,738	10,789	7,771	9,601	3,576	9,384	8,185	11,052	6,426	873	805	1,064	78,264	6%
General Studies	13,594	15,549	12,545	10,935	8,001	15,139	12,731	15,129	7,225	3,944	3,767	2,764	121,323	9%
Graduate & Professional Schools														
Architecture, Planning & Preservation	996	921	1,017	936	594	982	693	1,034	586	531	676	425	9,391	1%
Arts	2,841	2,670	2,335	1,596	1,549	2,381	1,962	2,050	1,140	929	1,003	951	21,407	2%
Arts & Sciences	20,131	21,560	19,466	15,144	11,626	17,946	17,511	20,051	10,586	6,658	6,166	7,354	174,199	13%
Business	822	918	634	762	387	765	615	947	344	264	220	420	7,098	1%
Engineering & Applied Science	8,798	11,566	9,678	9,490	3,893	7,645	6,251	6,482	3,608	846	1,189	1,885	71,331	5%
International & Public Affairs	1,744	2,446	1,679	1,718	788	1,876	1,618	2,180	1,036	516	620	739	16,960	1%
Journalism	689	725	613	464	514	722	599	562	350	202	235	490	6,165	0%
Law	1,533	1,683	2,229	2,710	926	1,364	1,395	3,719	1,418	787	1,148	849	19,761	1%
Social Work	1,115	1,054	822	786	392	611	539	918	404	413	311	453	7,818	1%
Medical Center Graduate Schools														
Dental Medicine	282	392	427	347	273	186	219	256	171	152	62	130	2,897	0%
Medicine	843	918	626	486	623	875	490	598	312	327	404	266	6,768	0%
Nursing	184	265	170	177	132	228	154	138	87	276	254	106	2,171	0%
Public Health	480	704	621	603	218	450	572	746	318	186	154	97	5,149	0%
Continuing Education & Special Programs														
Continuing Education	7,997	8,737	7,285	5,294	4,128	7,337	6,143	7,032	3,649	4,772	10,696	3,648	76,718	6%
Global Programs	216	239	201	139	148	398	335	351	216	38	7	28	2,316	0%
BLANK														
BLANK	37,308	39,487	35,281	32,499	24,878	36,712	35,907	39,667	26,449	24,372	24,862	24,179	381,601	27%

Table 2: Visits to Butler Library in 2011–2012 academic year, by school and month

Table 2 shows that the primary users of Butler Library are undergraduate students from Columbia College; graduate students from the Arts & Sciences programs; and alumni, library members, trustees, retirees, and affiliates (coded as "blank").

Interpretations and Conclusions

From the observation study, we learned some new things about room use in Butler Library and validated some of our intuitions. Over the two observation studies, fall 2012 and spring 2013, we noticed use patterns within each room. In Butler 209, we expected to see more group study and socializing, but found that the room is used mostly for quiet, solitary study. The room also had a lower instance of camping than we expected, especially in comparison to Butler 310. The room appeared messy at many of the observations.

We knew that Butler 301 is a desirable quiet study space, but were still surprised at the amount of camping (or saving of seats) in the room. At some points during the day, seats with unattended belongings ranged from 16 percent (April 2013) to 22 percent (December 2012) of total seats. We even observed seats being saved over the course of a day, without any sign of the camper. This leads us to believe that the space is much coveted and that we have a potential problem on our hands if so many seats are being underutilized.

The observation of Butler 310 was particularly interesting in light of our plans to convert the room into the Digital Humanities Center (DHC). Our observations confirmed that the space is used for quiet study and is populated by many "regulars" who tend to sit in the same seat daily. The seats on the lower level by the windows and mezzanine fill up first, followed by the seats in the center of the room on the lower level. Camping was noted in the most desirable seats by the windows and mezzanine.

Butler 503 was a part of the observation study only in the spring, so we do not have many data points for that space. We did observe that the room was often not very full. We may have chosen a less desirable reading room for the study, or the room's small size may discourage use.

In all the rooms in Butler Library, devices were ubiquitous. Students often had both a laptop and mobile device and sometimes even a tablet. Students tend to spread out and fill as much space as they can with books, devices, food, and drink. We also observed that 4 pm seemed to be the peak social time via mobile devices in these rooms. While at 10 am and 10 pm, students tended to be engaged with their studies, at 4 pm many students were texting, on Facebook, or using other social media. We found this increased recreational behavior across all the rooms we observed at 4 pm.

Recommendations

The Butler Library observation study was a great success and we are pleased to see that data gathered during the study have been used to improve our spaces. Following are the recommendations that were made as a result of this study:

- Upgrade existing wireless connectivity in Butler Library public spaces to address the use of multiple devices (completed in January 2013).
- Add wireless jacks in various stack levels, giving wireless access to approximately 85 more seats; confirm wireless connectivity for jacks installed.
- Routinize inspection and reporting of non-functioning table electrical outlets (began in spring 2013).
- Use observation data from Room 310 to inform space planning for the DHC; this includes determining which seats will be available for general seating when the DHC is closed.
- Develop and launch a "Respect your Space" marketing campaign during the next academic year to address camping and trash disposal problems.
- Work more closely with Facilities to improve the morning cleaning routine, especially on floor 2 and the 310 mezzanine.
- Continue the observation study assessment, including other "fringe" spaces such as the Butler circulation lobby and hallway alcoves where students tend to study in groups.

LARGE-SCALE PROJECTS
CHAPTER 8

Replicating Rochester: Developing a Feasible Multi-Institution Study of User Information Needs in the Health Sciences

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***Jonna Peterson**, Education Coordinator/Reference Services Manager, Library of Rush University Medical Center*

Most studies presented during this seminar contain information about a completed project. The project outlined in this paper is different. We do not have conventional results to report. Our project investigated the feasibility of a larger ethnographic project in a new population: medical students and other users of academic medical libraries. Why should this grab your attention? The types of questions we answer often affect people's health, treatment, and survival.

Jim Shedlock, former library director of the Galter Health Sciences Library, Feinberg School of Medicine, Northwestern University, was convinced that academic medical libraries could improve themselves with the type of information ethnographic methods reveal. When awarded funding for a feasibility study by the National Network of Libraries of Medicine (NN/LM) Greater Midwest Region, Shedlock made a wise and crucial choice to enlist the expertise of Nancy Fried Foster to guide those willing to become part of the "Replicating Rochester" project. Seven institutions—all members of the Council of Illinois Medical School Libraries—participated (Figure 1).

Although all seven participating libraries are academic health sciences libraries, we are very different. Clinical contact varies by institution; some are more and some are less integrated with respect to decisions being made about patient care. Others provide more emphasis on support for researchers and the services they require. Some have physical space connected to a clinical environment; some do

We thank Nancy Fried Foster and the project members who worked tirelessly to submit reports, apply for NN/LM Greater Midwest Region funds, and tend to numerous other important details. These are the folks truly making things happen. Very special thanks to all those involved with CLIR and our fellow CLIR event attendees. We have learned so much about many things, been inspired, had our confidence bolstered, and best of all, enjoyed your company.

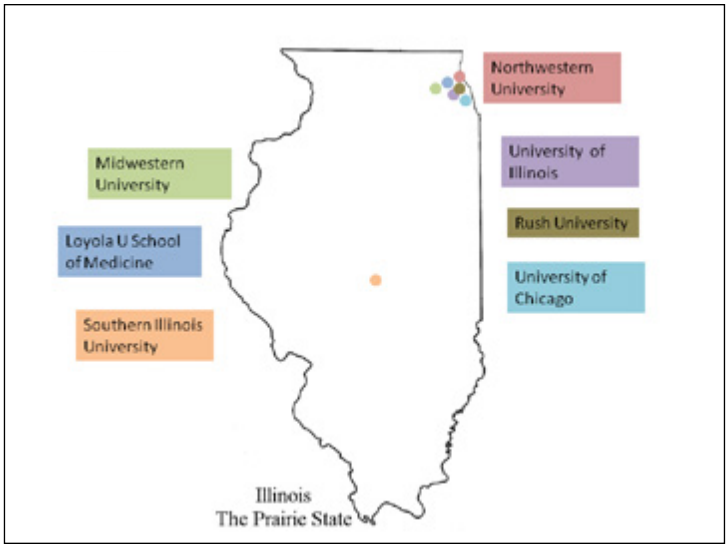


Fig. 1: The seven institutions participating in the "Replicating Rochester" project

not. Some provide service from the larger National Library of Medicine network. All agreed that participatory design methods could provide useful information.

In October 2012, the Crerar Library at the University of Chicago hosted a two-day workshop, facilitated by Nancy, to explore aspects of planning a collaborative project focused on learning and implementing ethnographic methods to gather data about medical student information-seeking behavior. Representatives from each of the seven participating medical school libraries attended.

Activities during the workshop produced a list of potential projects. Enticing questions and possibilities came to light. The authors of this summary emerged from that first workshop noting that we were two of very few librarians who were not directors or administrators. Throughout the debates and discussions at the workshop, each individual's input was valued, regardless of his or her role. Still, many of us struggled unwittingly with trying to place the round peg of participatory design into the square hole of the hard science world. The focus of clinical education puts a different spin on research, when compared to academic research in the humanities or social sciences and how libraries and library resources are viewed. With great patience, Nancy led exercises allowing us to discover what we wanted to know (Figure 2). We began to learn how to ask the right questions.

In November 2012, the authors of this summary, along with two other members of the team, attended a second workshop led by Nancy, held at Washington University in St. Louis and sponsored by CLIR. We practiced ethnographic research methods under her guidance. We became aware of the rich data we could gather and how it could be applied to our institutional problems. Our team now comprised four potential researchers who had an opportunity to practice four data-gathering techniques.

In the following months, project members learned how very different their libraries were, and yet common questions emerged. What should we study? Faculty information-seeking behavior? Student use of space? The students themselves? Despite challenges, the group remained committed to finding a path that would benefit all. At times, team members seemed befuddled by aspects of participatory design, but they were determined to prevail. They kept asking questions of Nancy and their colleagues and kept moving forward. Individuals began to embrace ambiguity, whether they were comfortable with it or not, to complete the project.

Events unrelated to the project presented challenges, especially repeated changes in project leadership. We decided to refer to change in leadership as "passing the baton" (Figure 3). Later we learned

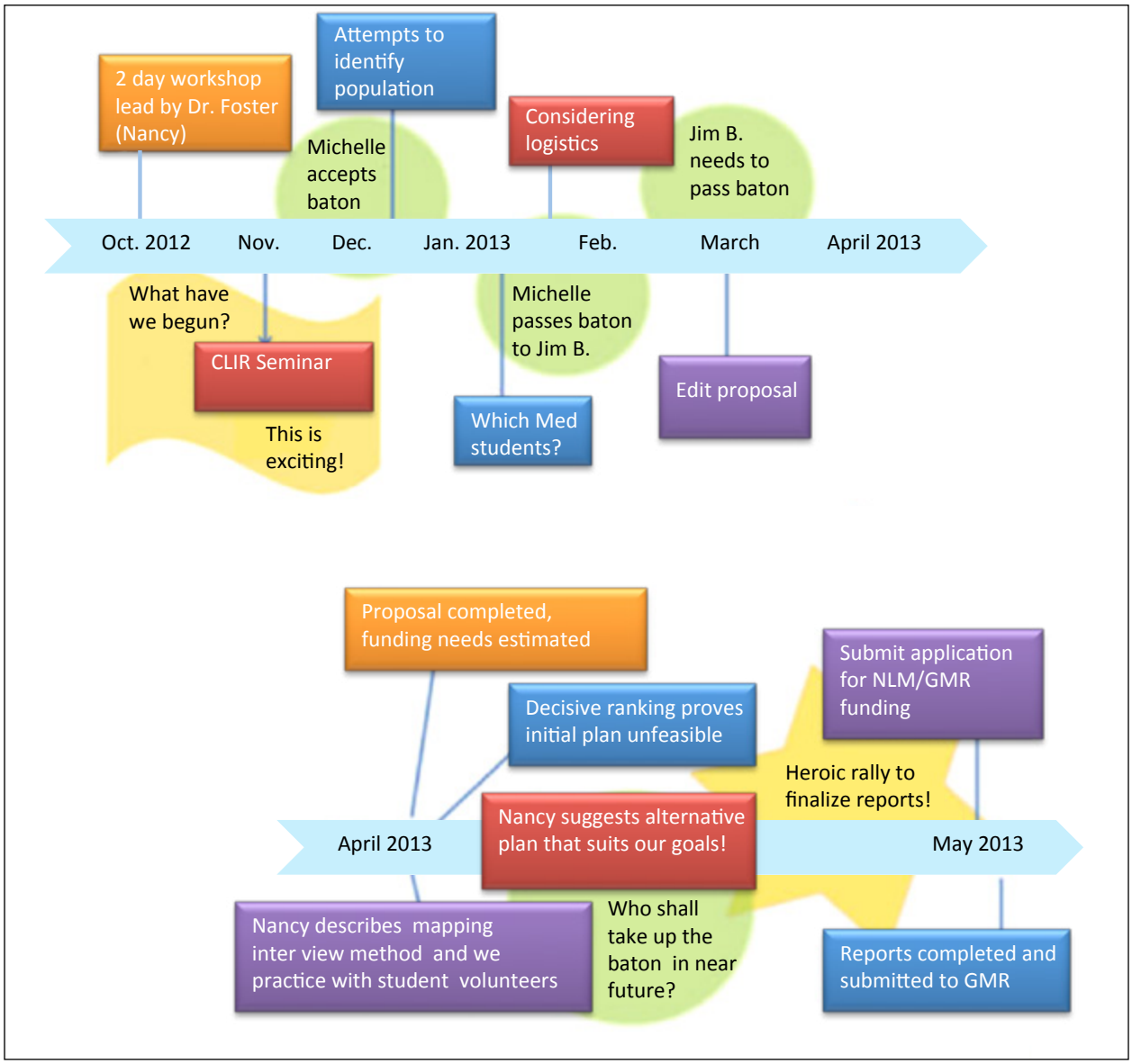


Fig. 2: Timeline of "Replicating Rochester" project

Fig. 3: Project leaders "passed the baton" several times

that the discipline of project management uses the same phrase. We also learned that our group broke every rule considered necessary for successful baton passing. Although the changes in leadership were sometimes abrupt, and in only one case planned, progress did not suffer. Miraculously, when one person needed to relinquish the baton, the strengths of each person who stepped up to provide leadership matched the new tasks at hand. There were doubts and concerns, but people just kept showing up, focused on problem solving and doing what needed to be done. Perhaps this is what is key to successful baton passing. We are grateful to those who chose to run with the baton.

One of the most difficult aspects of the planning process was identifying the population we wanted to observe. We decided that each school would conduct 30 interviews, engaging faculty members and first- and third-year medical students. We determined that all libraries had access to their first and third-year medical students. All agreed that our goal would be to explore how our medical students answer clinical questions. Which resources do they use most frequently? When, where, why, and how?

By April the project plan had been outlined in detail and team members from five of the seven schools were able to meet with Nancy in person. During the visit, Nancy led an exercise to aid decision making. The group was presented with an evaluation tool: a set of attributes to be ranked on a scale of one through five by each participating library (Figure 4). The greatest degree of confidence was represented by five; lower numbers represented diminishing confidence. Charting the results would help us determine the feasibility of carrying out our project plan.

According to the numbers, our original project approach (full plan) was not feasible. However, the chart also illustrates a revised plan (mapping plan) proposed by Nancy that was rated feasible.

Revisiting the ranking chart, there are some things worth noting. If a value of 24 is considered the "tipping point," at first glance, the numbers seem to designate the full plan as feasible. However, the

Replicating Rochester planning evaluation

CRITERIA	FULL PLAN					"MAPPING" PLAN				
	MWU	NU	Rush	UofC	UIC	MWU	NU	Rush	UofC	UIC
Affordable	1	2	2	2	3	5	5	5	5	5
Feasible	3	2	2	3	3	5	3	5	4	5
Right Methods	4	5	5	5	5	4	5	5	4	5
On Target	5	4	5	4	5	3	4	5	3	4
Compelling	5	4	5	5	5	4	4	4	4	5
Innovative	5	5	5	5	5	5	4	4	4	5
Total	**23**	**22**	**24**	**24**	**26**	**26**	**25**	**28**	**24**	**29**

- The 80% "tipping point" is a total of 24 points
- The first two criteria ("Affordable" and "Feasible") are essentially "deal-breaker" items and should probably be given a degree of additional weight

Fig. 4: Ranking the two plans

first two criteria in the list, "affordable" and "feasible" carry greater weight or impact. Because they are so important, these two essential factors are considered deal breakers. Across the chart, for the full plan, "affordable" and "feasible" scored less than four. Among institutions, all but one ranked "affordable" as two or less. Sadly, lack of funding usually negates feasibility.

According to the ranking exercise, the full plan was not a realistic option. The full plan proposed to complete a total of about 210 interviews. The resources required would be formidable, without taking into account transcribing and coding the data. The mapping plan proposed by Nancy, though much smaller in scope, would be viable for a fraction of the estimated cost of the full plan. As a result the "affordable" component for the mapping plan in the ranking chart received unanimous scores of five and additional criteria maintained strong numbers. Figure 5 shows an extremely terse comparison of the two plans.

In March we learned that we could apply for additional NN/LM Greater Midwest Region funding—nothing near the sum needed for the full plan but a significant amount, close to $15,000. Team members from the University of Chicago were awarded funding via the NN/LM GMR thereby making it possible for the seven libraries to proceed with the mapping plan. The project began in August 2013.

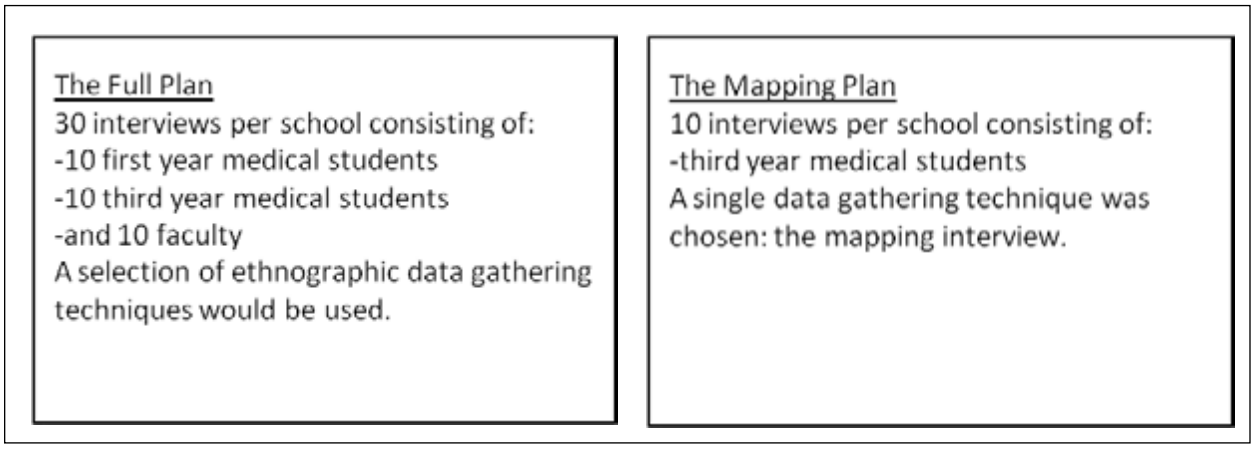


Fig. 5: Brief comparison of full plan and mapping plan

Most research about information seeking behavior in undergraduates is considered too general to be applied specifically to students training to practice clinical medicine. Evidence of the application of ethnographic methods in the academic medical library setting, whether that refers to user experience of library digital resources or the library physical space, is particularly rare. The crucial nature of evidence-based medical decision making compels efforts to capture useful data about how clinical information is accessed.

Examining feasibility guides prudent allocation of funds. Libraries have long been experts in using cooperation as a means to maximize limited resources. The collaborative nature of this work yielded much more than the means to make an informed decision. As libraries strive to meet the ongoing challenge of adapting to user needs in the clinical environment, what could be more important than correctly defining those needs?

LARGE-SCALE PROJECTS
CHAPTER 9

Participatory Design of the Active Learning Center: A Combined Classroom and Library Building

Jeremy R. Garritano, *Chemical Information Specialist and Associate Professor of Library Science, Purdue University*
Jane Yatcilla, *Health and Life Sciences Information Specialist and Associate Professor of Library Science, Purdue University*

Purdue University is embarking upon an ambitious plan to redefine what a science, technology, engineering, and mathematics (STEM) library is for the twenty-first century. As planned, Purdue's Active Learning Center (ALC) will result in the consolidation of six libraries at the university (the Chemistry; Earth, Atmospheric and Planetary Sciences; Engineering; Life Sciences; Pharmacy, Nursing and Health Sciences; and Physics libraries) and include additional classroom space (traditional classrooms and classrooms designed for active learning). As a first step in planning for the ALC, the Purdue University Libraries hired Nancy Fried Foster as a consultant to coordinate a large-scale, participatory design study from January through May 2013. The study was planned to gather data through a variety of methods since the new library space in the ALC would be designed from the ground up and not simply be a remodel of existing space. The final report of this project is available at Purdue University's institutional repository, e-Pubs (Foster et al. 2013).

Why an Active Learning Center?

Two recent initiatives at Purdue have allowed for the shared vision and support of the ALC. First, in the fall of 2011, the Office of the Provost initiated the IMPACT program (Instruction Matters: Purdue Academic Course Transformation). IMPACT's mission "is to improve student competency and confidence through redesign of foundational courses by using research findings on sound

The authors would like to acknowledge the entire ALC Participatory Design team: Nancy Fried Foster, Teresa Balser, RaeLynn Boes, Dianna Deputy, Will Ferrall, Michael Fosmire, Jeremy Garritano, Amanda Gill, Vicki Killion, Monica Kirkwood, Clarence Maybee, Kristen Twardowski, Jane Yatcilla, and Tao Zhang.

student-centered teaching and learning."[1] Cohorts of faculty across the university are brought together each semester as part of a Faculty Learning Community and assigned an IMPACT support team consisting of members from either Purdue's Center for Instructional Excellence, Educational Technology division, or the Libraries. The support teams guide the faculty through the redesign process and help create curricula that are more student-centered by incorporating appropriate pedagogies, technologies, information resources, and assessments. A popular model used in course redesigns is the flipped classroom, in which students learn new content by using videos and other resources before they come to class and then work on homework problems or other activities in the classroom, where the instructor and teaching assistants are available for consultation. Other transformation models include problem-based learning and team-based learning, and the use of active learning techniques such as "think-pair-share" and the "one minute paper." In addition, the Purdue Libraries has been participating in the course redesigns through the creation of three active learning classrooms for IMPACT faculty to use in the Hicks Undergraduate Library.

Almost simultaneously, Purdue began planning for a core curriculum, something the university had not previously had. The core includes a number of foundational and embedded outcomes that are adapted from the AAC&U Core Value Rubrics.[2] Since one of these outcomes is information literacy, a library faculty member represents the Libraries on the faculty senate committee that approves the core curriculum courses. The core curriculum went into effect with the 2013 fall semester.

Because of these two initiatives, both librarians and library spaces have become further integrated into the curricula across campus, and it was only natural that a new building should serve two complementary purposes: to house a state-of-the-art library, and to showcase the latest spaces and services related to active learning.

Currently, the ALC is planned to occupy approximately 97,000 square feet. The six libraries that will be consolidated now occupy about 69,200 square feet, but the new library space in the ALC will occupy only 38,000 square feet. The classrooms that will occupy the remaining 59,000 square feet will replace about 35,259 square feet of outdated classroom space that is slated either for destruction within older buildings or for loss through renovation. There will be no net increase in the number of classrooms on campus; rather, the expanded square footage in the ALC is due to an increase from 18 assignable square feet per student (used for a traditional classroom) to 24 square feet for the purposes of creating an active learning space.

The Purdue Libraries is describing the ALC as an *ecotone*, a term also used to describe our newly renovated library devoted to business, economics, and management:

[1] http://www.purdue.edu/impact/.

[2] http://www.aacu.org/value/rubrics/.

> In ecology there is a term—ecotone—used to describe where two ecological zones overlap or meet such as prairie and forest or plains and mountains. Each ecological zone has plants and animals that thrive in its specific environment. However, it has been observed, that where two zones meet or overlap, the flora and fauna take on characteristics that enable them to thrive in both environments.
>
> The Parrish Library is an ecotone that combines the traditional role of the library as a place to study and reflect and the role of the classroom and laboratory as a place for instruction. By combining the best and inherent qualities of both, we have created a place more dynamic than either of its component parts—an ecotone (Mullins 2012).

In this way, the ALC will also become an ecotone: a dynamic space between a newly envisioned STEM library of the future and cutting-edge active learning classroom space.

Design of the Purdue ALC Project

The purpose of the participatory design study at Purdue was threefold:

- to hear, acknowledge, and address at the project level the highest hopes and deepest fears of Libraries' faculty and staff;
- to develop a shared picture of what library spaces will be and what librarians will do in relation to the new pedagogy and new ALC library spaces; and
- to assess existing IMPACT spaces and identify requirements for new ALC library spaces.

To accomplish these goals, four data-gathering methods were used across five areas:

Reply Cards 1,176 reply cards	**Observations** Over 700 people observed
Spot Interviews 58 undergraduate students	**Design Workshops** 15 faculty 32 undergraduate students
Shared Vision/Picture 20+ Libraries staff drawings from design workshop 8 interviews conducted by Nancy Fried Foster	

The project team consisted of 13 Purdue Libraries staff members and Nancy Foster:

- Co-chairs: head of Health and Life Science Division (HLS) and head of the Physical Science, Engineering, and Technology (PSET) Division; they represented the two divisions directly affected by consolidation into the ALC and they also sit on the Active Learning Center Academic Program Committee.

- Eleven faculty members, administrative/professional staff, and clerical staff came from HLS and PSET, and from our Humanities, Social Sciences, Education and Business (HSSE-B) Division; the latter had already experienced redesign and restructuring, including managing the active learning IMPACT classrooms in the Undergraduate Library.

The timeline of the project was as follows:

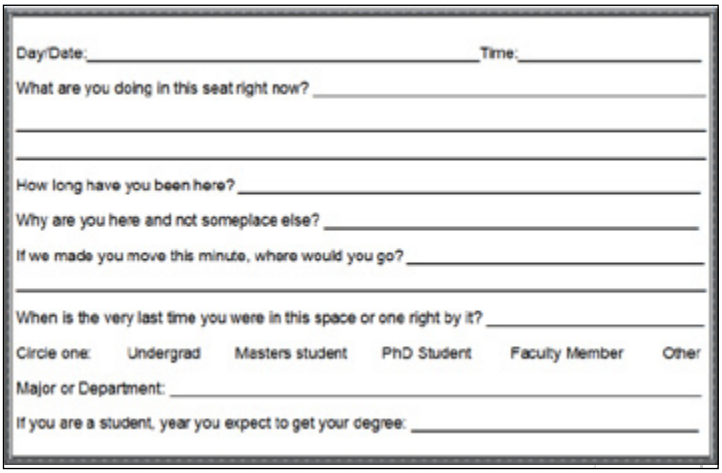
January: Launch project team
February: Conduct initial training in methods
February–March: Conduct ethnographic research
March: Conduct training in data analysis
March–April: Analyze data
May: Submit project report (Foster et al. 2013)

Description of Methods Used

Reply Cards

Reply cards were created to gather data from library users at the time of library use. Reply card data help build a picture of who is using a space, what they are using it for, and how long they use it. Such data also give an indication of other factors, such as why they chose this space, and what their second choice of space would be.

The reply card sub-team distributed more than 1,000 survey cards to people working in each of the libraries that will be affected by the creation of the Active Learning Center, and to users of the Hicks Undergraduate Library. The reply cards asked respondents to provide short answers about what they are doing and why they came to the library, as shown in Figure 1.


Day/Date:_____ Time:_____

What are you doing in this seat right now? _____

_____

_____

How long have you been here? _____

Why are you here and not someplace else? _____

If we made you move this minute, where would you go? _____

_____

When is the very last time you were in this space or one right by it? _____

Circle one: Undergrad Masters student PhD Student Faculty Member Other

Major or Department: _____

If you are a student, year you expect to get your degree: _____

Fig. 1: Sample of reply card

Undergraduate students filled out most of the reply cards, but master's degree students, doctoral students, and faculty members were also represented.

Direct Observations

Direct observations were conducted to reveal usage patterns for current spaces. The direct observations sub-team did observations twice a day for one week in several Libraries spaces, including classrooms inside libraries, and two non-Libraries spaces in an academic building that had been identified during a trial run of the reply cards. The team either acquired copies of floor plans or drew diagrams for the selected spaces (see Figure 2). Direct observations were non-interventional. Sub-team members noted numbers of people in each space, the kinds of things people appeared to be doing (homework, computer work, relaxing), what kinds of technologies were being used, and whether people were working individually or with others.

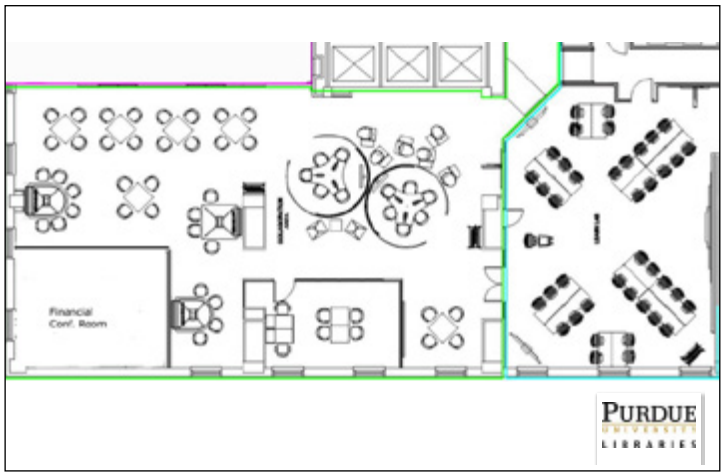


Fig. 2: Example of observation sheet

Design Workshops

Design workshops were held to probe the feelings and thoughts of the subjects, and to focus on the kinds of activities they anticipate doing in the Active Learning Center and the supplies, furniture, technologies, services, and other materials they would need to be successful. The design workshop sub-team conducted workshops for disciplinary faculty, undergraduate students, and Libraries faculty and staff. Participants were given a scenario related to the Active Learning Center and asked to use the art supplies provided to draw an ideal space (Figure 3). Participants were then asked to narrate their drawings to a sub-team member, explaining what they expected to do in the space and what equipment they expected to use.

Design workshop sessions were scheduled to accommodate IMPACT faculty who have experience teaching in a flexible classroom that can support student-centered learning activities. Students from both IMPACT and non-IMPACT courses were also recruited to submit drawings. During debriefs, the sub-team members asked participants to describe *what they need to do* in the space, rather than *what they want.*

Design workshop participants were encouraged to be creative and not to worry about perceived cost or availability of furnishings

Fig. 3: Example of a design workshop drawing

or technologies. The data collected would then be passed on to the architects, and designers would devise a plan for suitable spaces, furnishings, and technologies to meet these needs.

Spot Interviews

Spot interviews were conducted outside the library to collect data about the kinds of coursework-related tasks students had done, regardless of where the work had taken place. The objective was to build a broader picture of what kinds of spaces students prefer for doing coursework and why, whether they prefer to work individually or with others, and additional factors that affected their reported productivity and success.

The spot interviews sub-team approached students in a variety of settings outside the Libraries and asked for short answers to questions about a recent experience the student had doing coursework (Figure 4).

Recall the last time you did coursework.

When was it? How long did you work on this?

What class was this for?

What were you supposed to do? What did you actually do?

Where were you? Why were you there and not someplace else?

Were you alone? If not, who was with you?

What would have made your time more productive?

PURDUE UNIVERSITY LIBRARIES

Fig. 4: Questions for spot interviews

Results from Libraries Faculty and Staff

Some common themes quickly emerged from the design workshops conducted for Libraries faculty and staff. Both faculty and staff were concerned about the loss of personal workspace that might occur when several libraries are consolidated into one space. Some faculty and staff expressed concern that they would lose an individual office in favor of working in an open, multiple-person workspace. And both faculty and staff who worked in departmental libraries expressed concern about losing their connections to the faculty and staff of their academic departments. Faculty and staff also showed interest in current office trends, such as treadmill desks or having a treadmill in a staff break room.

Overall, the drawings of Libraries faculty focused on their individual space needs, including places to work quietly and without distraction, as well as places to consult with small groups of faculty members or graduate students (Figure 5). The drawings of Libraries staff tended to focus on the "library" as a whole, including not only individual and group workspaces for staff and student workers, but also areas for library services and collections, as well as individual and group study spaces for students.

Fig. 5: Example of a faculty drawing showing required flexibility in space (movable furniture, soundproof curtains to divide the room, and related features)

Results from Disciplinary Faculty

Faculty members involved in this project were almost exclusively those who had participated in the IMPACT program. The primary data-gathering method used with faculty was the design workshop. In most cases, when asked to draw the ideal space for themselves and students, the disciplinary faculty focused on drawing only classroom space. Some did draw external space related to library space, study space, dining space, and so on. However, even in the classroom setting, faculty members described a variety of spaces within that single setting. The desire was to have the space accommodate

and support a variety of activities, such as the ability for students to break into small groups to work, but then come back together to report to the larger group (for example, a "campfire" space or movable furniture was described). The same ideas were also used to describe the technology in the classroom. The instructor wanted full control of the technology, while still allowing students to contribute and use the technology. An example of this would be using smart boards or white boards to report on group activities and then capture that output to be digitally distributed to the entire class for further use.

Results from Students

The project aimed to gather as much data as possible from undergraduates. After analyzing the data from the various methods used, a few characteristics emerged to describe undergraduates at Purdue University. The students were overall pragmatic about the space they wanted. Few drawings had elaborate architectural elements, grandiose features, or deliberately expensive qualities (such as mahogany furniture, leather seating, and so on). However, there were many drawings where atmospheric elements were described that were meant to calm or invigorate the students while carrying out their scholarly work. Quiet space, the ability to control sound (both from others and generated by the students themselves), and places to refuel (dining, relaxed furniture, and so on) were often present in the drawings from the design workshop (Figure 6). The students also focused on elements that would make them productive and meet their need for convenience. These elements came out in multiple data-gathering methods as will be described below.

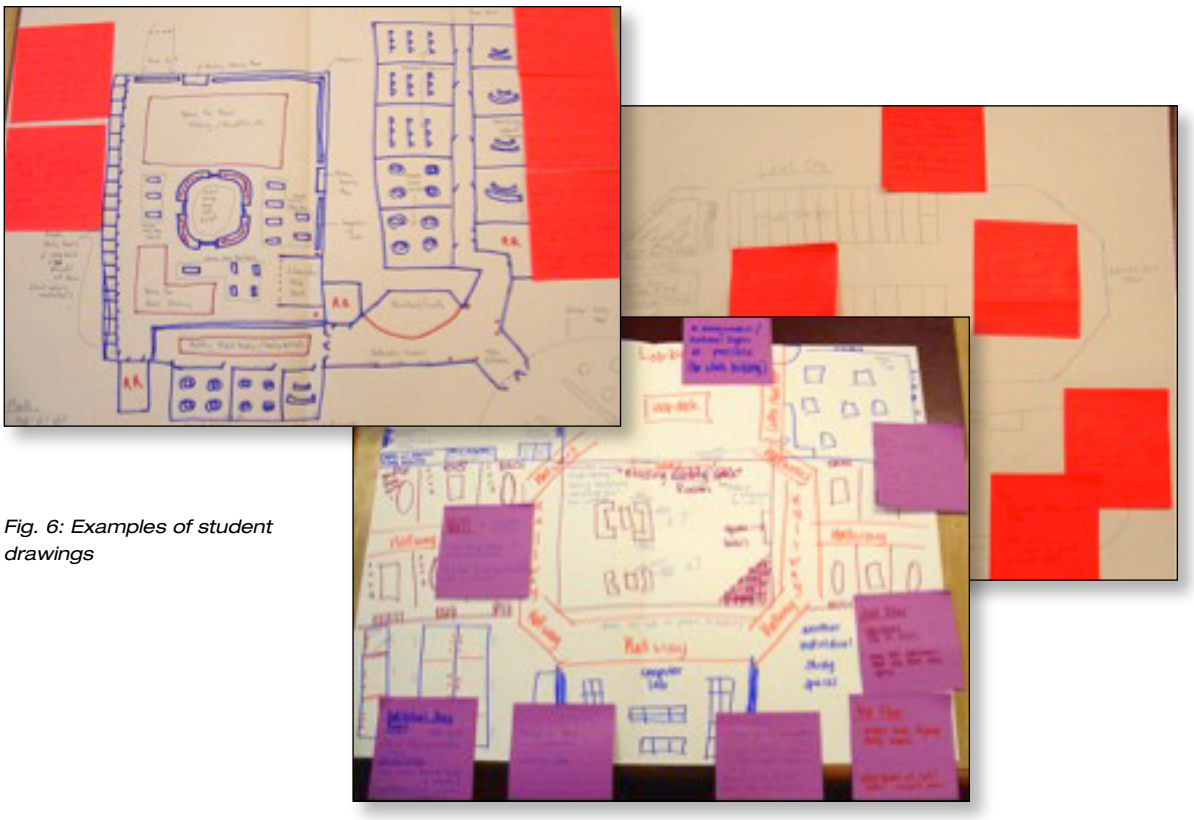


Fig. 6: Examples of student drawings

Looking at data from the reply cards, it is clear that students who are currently in the library, if forced to move, would seek out another academic setting (see Figure 7). Their focus is on completing their work and 66 percent said that they would go to another academic space, whether a library (30 percent), another space in the same building (19 percent), or space in another campus building (17 percent); an additional 6 percent would go to a computer lab. Only 25 percent stated that they would go home.

When talking to students during the spot interviews (students interviewed outside the Libraries), it became clear that convenience played a key factor in their choice of study location (see Figure 8). Notably, if the report of last study was during the day while classes

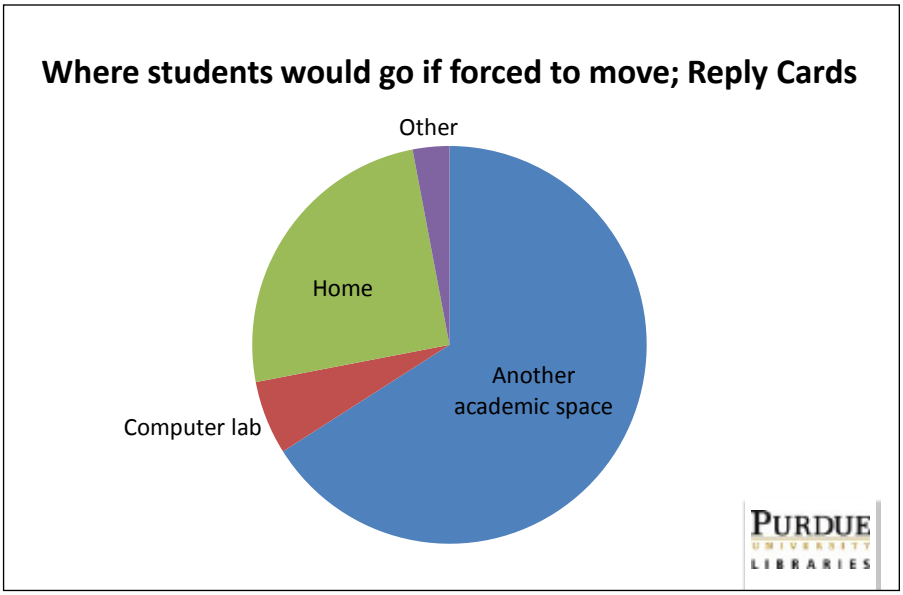


Fig. 7: Reply card data: where students would go if forced to move

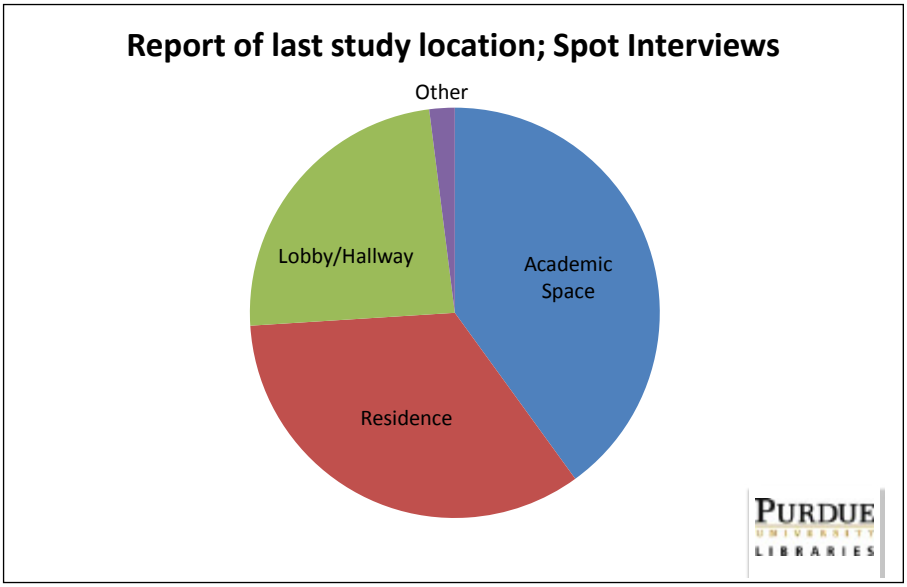


Fig. 8: Reply card data: last study location

were in session, there was a tendency to study close to where their classes were. On the other hand, during the evening hours, the choice of location to study was driven more by proximity to their residence. Convenience of pathways was important. In multiple settings, students mentioned the need for several entrances and exits to the building, including convenient paths to simply enter the building, grab a bite to eat or cup of coffee from an imagined dining service, and be on their way through a different exit.

The aim is for the ALC to respond to these preferences once it is built. First, the entire ALC would be "academic space," fulfilling students' need for a space that allows them to focus on completing coursework, research, and related endeavors. Second, the library space in the ALC would be available and convenient to those classes that are held in the ALC during the day. After classes are finished for the day, the entire ALC will become "open," including the classrooms, so there is additional academic space for students to study.

A major question that was analyzed from the data was "What do people do when they are in the library?" Assumptions had been made among some of the library staff that a lot of group work was going on; however, the observations data did not support this. Nearly 75 percent of students observed were alone regardless of what they were doing (see Figure 9). When space looked "packed" it was in reality often only at 50 percent of seating capacity. And even groups were small. Two-thirds of the 54 groups observed comprised just two people. This finding points to the need to support individual study and research as much as (if not more than) group study and research when designing and constructing the ALC.

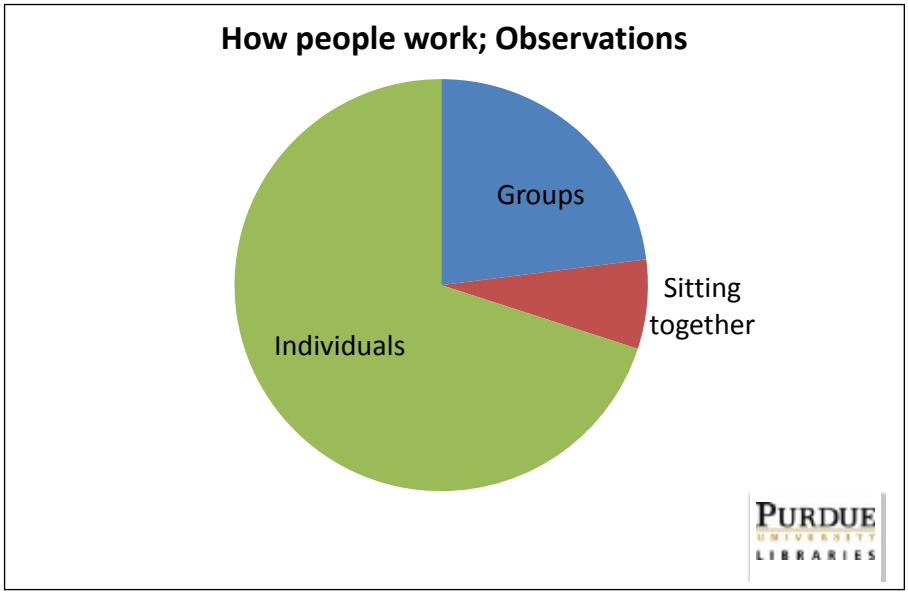


Fig. 9: Observations: how people work

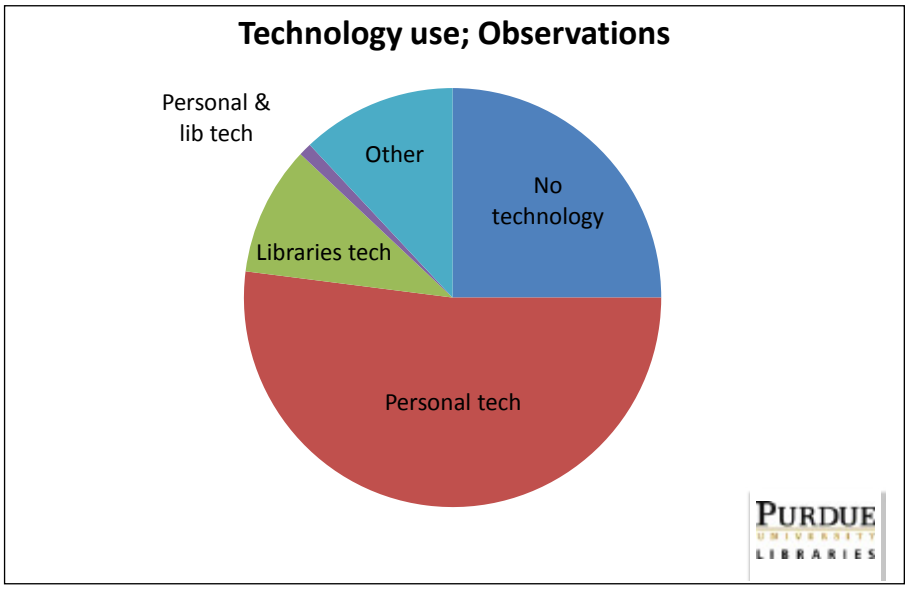


Fig. 10: Observations: technology use

One observation targeted during the study was what kinds of technology people used in the space (see Figure 10). Over half of those observed were using some sort of personal technology and in some cases they were using multiple devices at once. Only a small fraction were using both personal and library technology. From these data and data gathered from the design workshops, it is clear that there is a need for chargers, access to electricity, and space to spread out, because of this type of use.

Summary: Advice to Designers and Architects

As the ALC moves toward becoming a reality, the data gathered from this participatory design study will be used to inform the administration, designers, architects, and others involved with creating the ALC. Some advice:

- **A variety of flexible spaces are needed.** Students want to accomplish several goals in one visit and require different spaces to be successful at each. For example, a student may prefer to begin with a quieter space for doing individual work, transition to a group space with others, and then move to a space for eating or taking a break, all within the same visit. This variety of desired space also includes "non-academic" space: places to sit, rest, relax, regroup, or eat.
- **Individual space is as important as group space.** Many of our observed and interviewed students were working alone. Creating a space that favors only group work would be a disservice to how our students behave and prefer to work.
- **Accommodate personal technology.** It is important to have an abundance of power outlets, prevalent Wi-Fi, and even ethernet to accommodate the personal technology tools that students use in addition to Libraries-provided technology.
- **Consider the "full" class vs. "full" library concept.** When students are studying, they often spread out or leave space between

each other, so a space might be "full" but only filled to half-capacity. That means a classroom that provides 100 seats for a class might be used by fewer than 50 students outside of class.

- **Students need to know when classrooms are accessible and available.** Our data seem to show that classrooms get more use outside of class when it is easy for students to determine what is going on inside without risking embarrassment by walking in. Therefore, digital signs or other methods (lights, schedules, and so on) should be used to indicate when a classroom is in use, and to inform students when a room will be in use in the future, so they know how long they can stay without being interrupted.
- **Sound control is important to all who use the library.** Students and faculty were concerned about sound control—not only to avoid being distracted, but also to avoid distracting others.
- **Incorporate the convenience of pathways.** Faculty and especially students want the ALC to be a convenient place to attend classes and do work, with multiple entrances making it easy to pass through on their way to another class or home.

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INSTITUTIONALIZING
PARTICIPATORY DESIGN
CHAPTER 10

Library Practice as Participatory Design

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The Public Services Division at Northwestern University Library recently completed a division-wide reorganization designed to enable library staff to better serve our constituents, meet the strategic goals of the university and the library, and position ourselves as innovative, forward-looking information providers. Essential to this new vision is a commitment to integrate the philosophy and practice of participatory design into the fabric of everyday library operations. This paper reports on our efforts thus far. After briefly outlining the reorganization process, itself highly participatory, we discuss some recent initiatives that provide a framework for continuous engagement with students, faculty, and staff. We then outline an activity conducted with the library's public services staff that was designed to address some of the practical challenges that grew out of the reorganization process, while also introducing those staff to some of the concepts of the participatory design process. Finally, we provide an overview of some of our more public-focused participatory design activities and conclude with some lessons learned and a look ahead.

The Environment

Northwestern University is a competitive, research-level institution. A member of the Committee on Institutional Cooperation (CIC), it is one of only two private institutions in that consortium. Founded in 1851, its main campus is located on the shores of Lake Michigan, in Evanston, Illinois; there are also campuses in downtown Chicago and in Doha, Qatar. Northwestern enrolls about 16,000 students, roughly half undergraduates and half graduate students, and has more than 3,800 full-time faculty on staff.

Timing Is Everything

A few years ago, the library at Northwestern University (NUL) was ready for change. Its outward-facing services and organizational structure were fairly traditional, retained from a time before technology allowed remote access to materials and users began to view and use the library in new ways. The main library building is a massive and complex three-towered structure that is challenging to navigate (Figure 1). With the hire of a new associate university librarian for public services (AULPS), and the formation of a strong management team of public services department heads (PSDH), the time was right to develop a new vision for how to engage library users, reenergize the staff that support their work, and redesign library spaces accordingly.

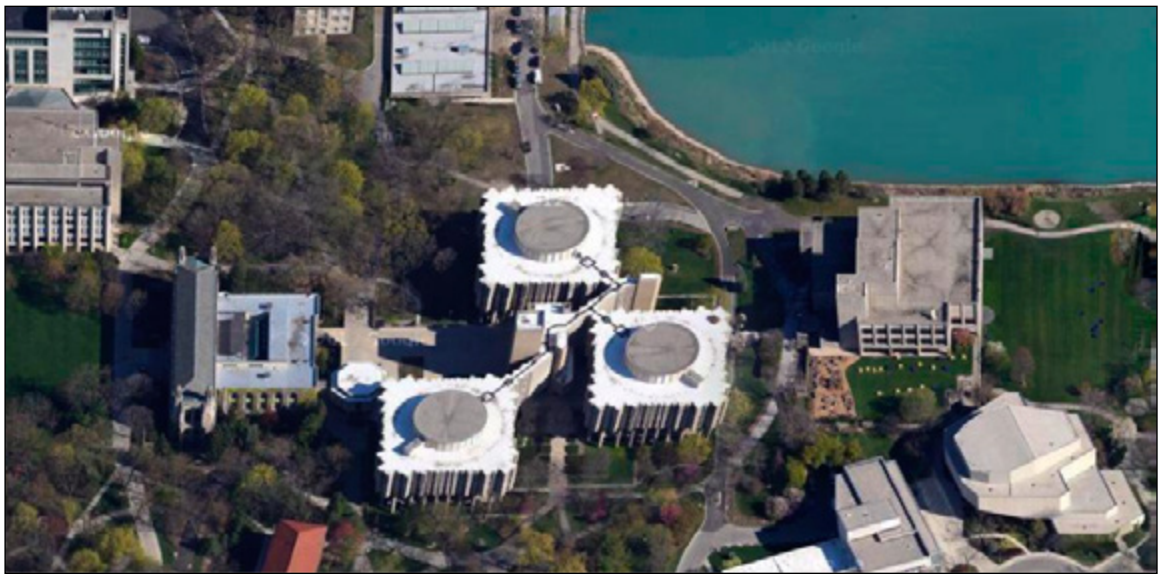

Fig. 1: Aerial view of Northwestern University's Main Library

The Restructuring Process

In response to the changing needs of users and an emerging consensus of public services staff, a determination was made to restructure NUL's Public Services Division (PSD) to better serve the library's constituents. The AULPS and the PSDH felt strongly that the only way to do this would be to involve all 70 members of PSD from the beginning, to enable them to feel a part of the process and to have a stake in the product that would emerge. The participatory reorganization process began in the fall of 2010, when the AULPS and the PSDH drafted a mission statement and goals for the division. These were then reviewed by all PSD staff, revised based on their feedback, and put in final form as the Public Services Division Mission Statement. The mission statement says:

- The Public Services Division (PSD) supports the mission of Northwestern University Library by offering convenient and innovative access to information services and resources in physical and virtual environments.

- The PSD staff helps its diverse user community discover and evaluate information; facilitates access to resources regardless of format; and prepares students for successful information-seeking and lifelong learning. The PSD staff fosters a library-wide culture of exemplary customer service.
- The PSD staff seeks to provide attractive, comfortable, and secure spaces for individual and collaborative learning.

To fulfill this mission, the PSD embarked on its work. The development process was predicated on the assumption that the PSD, already a stellar division, nonetheless needed improvement in three broad areas:

- Services must be made more seamless and intuitive to users, and efforts and resourcing de-duplicated.
- Gaps in existing services must be filled in, practically and innovatively.
- A culture of improved communication and collaboration, key to the success of the division, must be fostered.

With continuous input from all divisional staff, the PSD developed a timeline and a process that included division-wide planning conversations, educational open forums, sessions about managing change, and town hall meetings to discuss existing roles and job responsibilities and to identify the most critical needs for new ones. Staff at all levels were engaged and vested in the work.

Outcomes

This agenda produced the New Directions for Public Services Report, drafted by a representative group of PSD staff. It outlined a concept for a more streamlined and focused PSD, consolidated from six location-based departments to four defined by function: Access Services, Branch & Off-Campus Services, Research & Information Services, and User Experience (Figure 2).

To implement the recommended changes, existing departments were transitioned to new ones; department heads assumed their new roles; and collaboratively developed department-level statements of mission and goals were completed. Following this, all staff and their supervisors rewrote position descriptions to reflect changes in existing job responsibilities or entirely new roles. To the extent possible, new positions were filled internally; a timeline was developed to advertise and fill remaining new positions by recasting existing vacancies. No actual additional budget lines were given to PSD for the restructuring. A library-wide forum was then held to acquaint the entire organization with the new PSD framework.

The reorganization enabled the division to develop and deploy new types of expertise to supplement our traditional subject-based strengths in the academic disciplines. Building on the knowledge, skills, and abilities already present among library staff, we were able to recast some existing positions into a number of redesigned ones

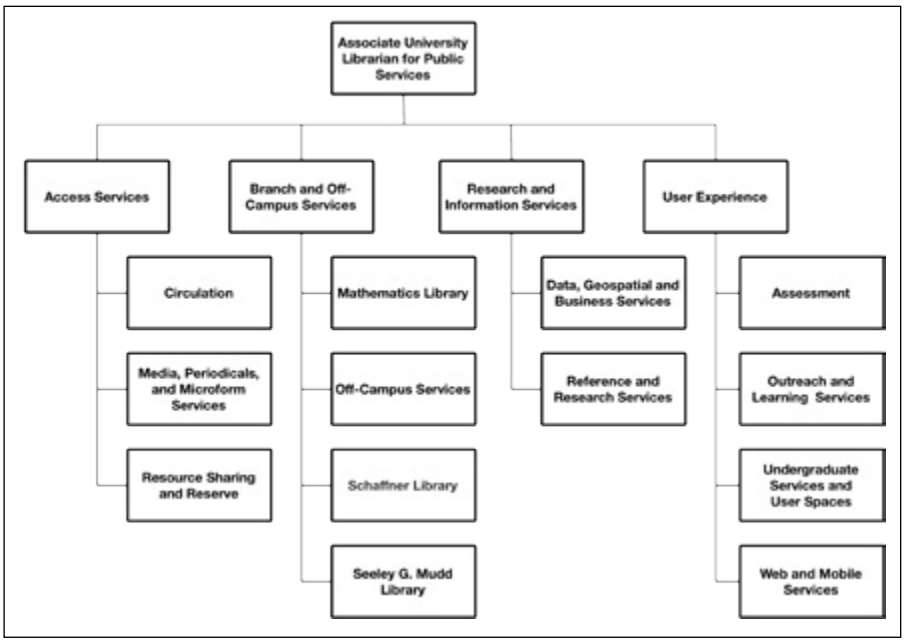

Fig. 2: Northwestern University Library's new PSD organizational structure, effective 2012

focusing on areas such as public services assessment, new approaches to both in-person and online teaching and learning, e-science, outreach and community service, the undergraduate experience, user spaces, and web and mobile services and support.

To help guide the evolving organizational structure, and to maintain our commitment to more participatory practice, we created a standing divisional council, with classified staff and librarian representatives from each library department, as well as a task force charged with developing a new model for the delivery of information services within the division. We also spearheaded the creation of library-wide committees in assessment and services to the disabled.

The original plan to implement this new organizational framework in the summer of 2011 proved to be too ambitious and did not occur until early in 2012. This pushed back the plan to do an initial assessment of the structure, which will now happen in 2014. But to all appearances, thus far the reorganization has been a success. Staff members have thrived in their new roles, embracing the fresh opportunities and challenges that have come their way. Faculty members and students appreciate the more consolidated service points and the slate of new initiatives the library began offering. With these pieces in place, it was time to address space needs.

From Collaborative Organizational Restructuring to Participatory Space Redesign

Service points, staff areas, and public spaces were also sized up and reviewed, to determine where adjustments needed to be made. Three of the existing eight PSD service points on the first and second floors of the library were eliminated; functions were folded into those at other locations.

In addition to these structural changes, we knew that for the reorganization to succeed we had to embed a philosophy of teamwork into our everyday practice. The reorganization of the division, and the need to rethink and redesign our staff spaces accordingly, offered a perfect opportunity to start building a more collaborative culture. In a divisional forum in early 2012 we introduced staff to the principles of participatory design, and challenged them with the following design problem:

> Imagine that you've been assigned a space in the library that you can adapt to fit your work needs, a space where you can efficiently accomplish your day-to-day tasks and help to further the mission of your new department, the division, and the library. You don't have a lot of money at your disposal, so major renovations are out (at least in the near-term), but you do have an opportunity to make significant improvements to the space. This can include defining your personal work area, making provisions for adjacent workrooms and common areas, and equipping the space with tables, chairs, bookshelves, and the other things you need to get your work done. Now imagine that the plan you come up with is built exactly to your specifications, and that everything works just as you'd envisioned. Show us what that space looks like.

Each staff member was then charged with creating a personal vision of individual space through drawings or verbal descriptions. These imaginings were then shared with fellow department members in moderated sessions designed to encourage discussion, analysis, and the identification of common needs. Department members were next asked to work together to create up to three drawings of departmental spaces that would meet these needs, and these drawings were then shared at another forum for discussion and analysis by the entire division. Based on that discussion, departments then drafted a collaborative space plan for the division that was forwarded to the dean of the library.

Of course, the primary goal of the divisional reorganization was to enable library staff to better serve their constituents. Here, too, we had a number of early successes in creating an infrastructure for engagement with our users. The library already had a strong academic liaison program that provided assistance to undergraduates with declared majors, graduate students, and faculty, but the existing structure was less effective in reaching those undergraduates who had yet to identify a major. Therefore, one of our first efforts after reorganization was to create a "class librarians" program, where each entering class is assigned its own personal librarian who serves as a welcoming, friendly face, always available to guide students to appropriate resources, services, and expertise. Similarly, while our academic liaison program had been successful in reaching students through their academic departments, we realized that for many students, contact with administrative or cultural units on campus, such as the athletic program, student life, or campus health services,

was equally important to a successful and well-rounded campus career. So we created a parallel liaison program that provides each non-academic unit on campus with its own liaison. This has had the added benefit of letting campus staff know that the library is theirs as well, and that our resources are not only for the benefit of students and faculty.

We have also taken steps to bring Northwestern's students, faculty, and staff directly into the process of defining, designing, and evaluating our services. This shift toward a user-centered philosophy and practice, where our users share in driving development of the library's agenda, has taken a number of forms. We have created a "library ombudsman" position that provides a single, confidential point of contact to register comments and suggestions; investigates and works to resolve grievances in a constructive way; and advocates for the user's perspective within the organization. Additionally, we will soon have in place an undergraduate student advisory council, with representation from each of the university's colleges and schools, as well as from student government. Unlike more traditional library advisory bodies that tend to serve mostly as sounding boards for library policies and procedures, this council is intended to be an active partner in rethinking and remaking library spaces, services, and technologies.

We have also made some modest forays into the participatory design of user spaces. One of our early projects was an observational analysis of how students used our signature "Core" undergraduate space at different times of the day, and this has helped us determine how that space should be zoned. But our most ambitious effort to date has been including students in the design of a new collaborative student space. This provost-funded project to transform a large, light-filled room overcrowded with shelving on the first floor of Main Library from a traditional reference room to a space supporting group study and collaborative creation had a modest budget and a short (12 weeks) timeline for planning. Nevertheless, we wanted to bring students into the design of and planning for the space. Fortuitously, we discovered that Northwestern's Segal Design Institute offers a student-centered design course that was perfectly suited to our needs. Design Thinking and Communication (DTC) is a two-term sequence required of all freshman enrolled in the McCormick School of Engineering and Applied Science. The course puts student-led design teams to work on real design problems submitted by individuals, non-profits, entrepreneurs, and industry members.

The library's application to DTC was accepted and our project was assigned two four-person teams with a goal of delivering a design for the space that met evolving student needs within the constraints of our budget. The students met periodically with the project team and the architect. They also conducted in-person and online surveys; did on-site observational studies in a variety of venues where students congregate to study, including the library's newly renovated Mudd Library, the campus student center, and a number of dorms and residence halls; and researched available furniture and

other design options. They then presented both the results of their research and their preliminary design solutions to the project team (Figure 3). Among the more useful observations that made it into the final design of the space: laptops and mobile devices were the preferred tools for collaborative work and students saw no need for hard-wired workstations; furniture groupings in the space should accommodate small groups (five people or fewer) and include a variety of furnishings to reflect diverse work and learning styles; there should be plenty of whiteboards, but smart-boards, though welcome, were not essential; and any final design should take advantage of the atrium at the center of the space. This last point even led one team to suggest including a live tree in its design (Figure 4).

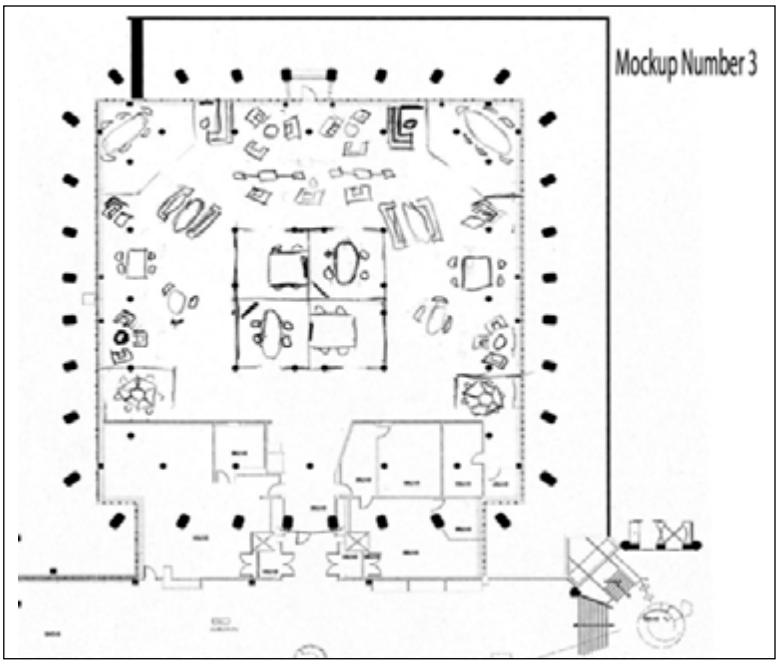

Fig. 3: Example of student mockup

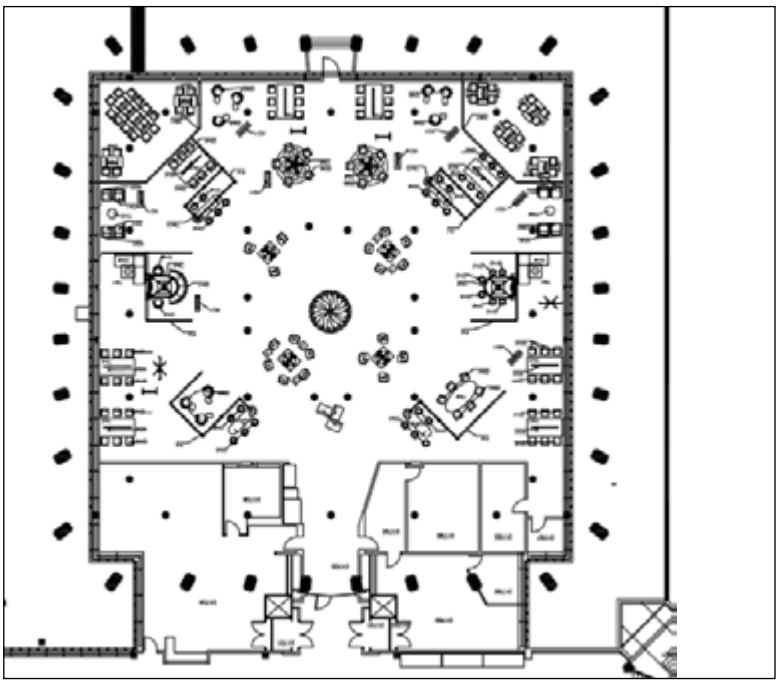

Fig. 4: Architect's rendering of student design showing live tree in center atrium

The DTC students continued to work on the project throughout the term. Unfortunately, the schedule allotted for the planning phase of the project did not leave us much time to work with them before we had to submit a final design, and this foreshortened calendar limited our ability to engage in as full a participatory process as we had originally envisioned. While some of this could have been avoided through better planning on our part, some of these time constraints seem endemic to a campus design and construction process that is not fully compatible with user-centered design. However, by asking the students to front-load the survey and analysis portions of their work we were able to glean valuable insights that had a real impact on our design for the space. We also supplemented their work with our own furniture survey (Figure 5).

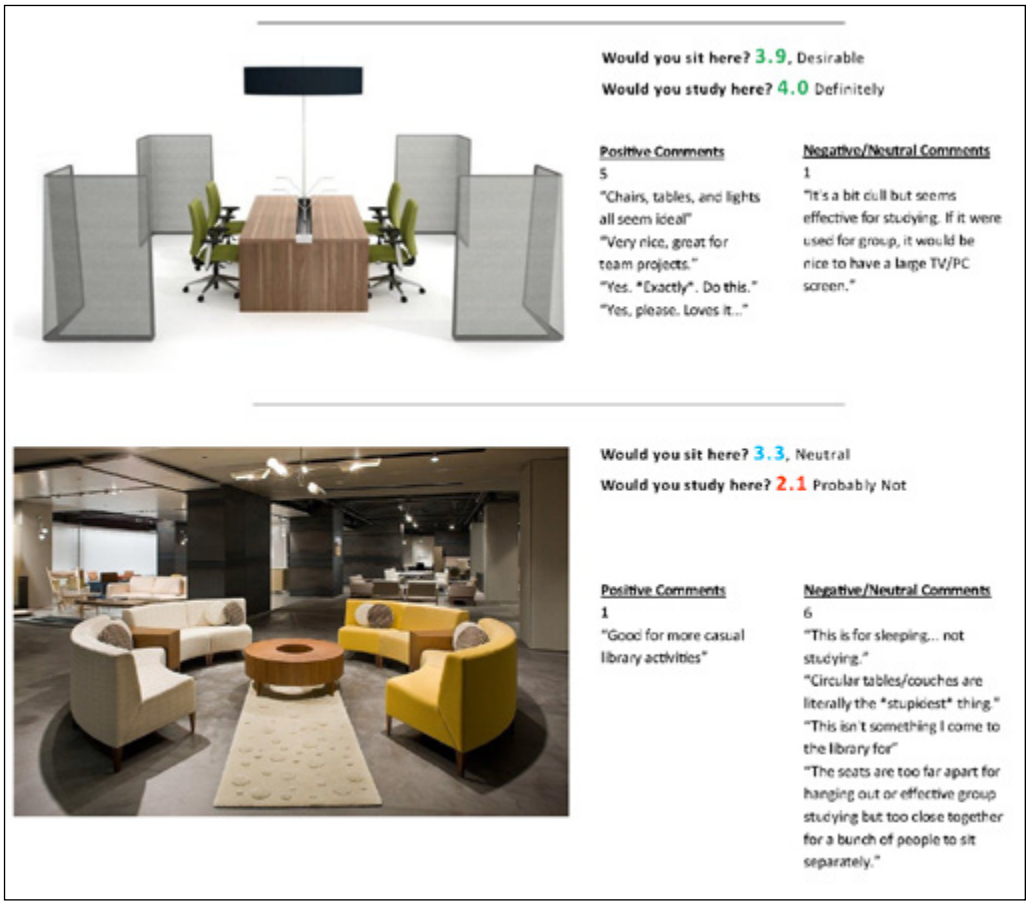

Fig. 5: Excerpt from furniture survey

In the end, the design approved by the library was very similar to the final designs submitted by the students in their end-of-term presentations (Figure 6). Perhaps not coincidentally, the student drawings echoed elements of the two conceptual designs introduced to them early in the process; in retrospect, we probably should have withheld these, so as not to influence their work. Nonetheless, we were pleased with the information the students provided and remain convinced that the resulting design is far better with than it would have been without their participation. The space opened at the beginning of the 2013 academic year and has been in constant use.

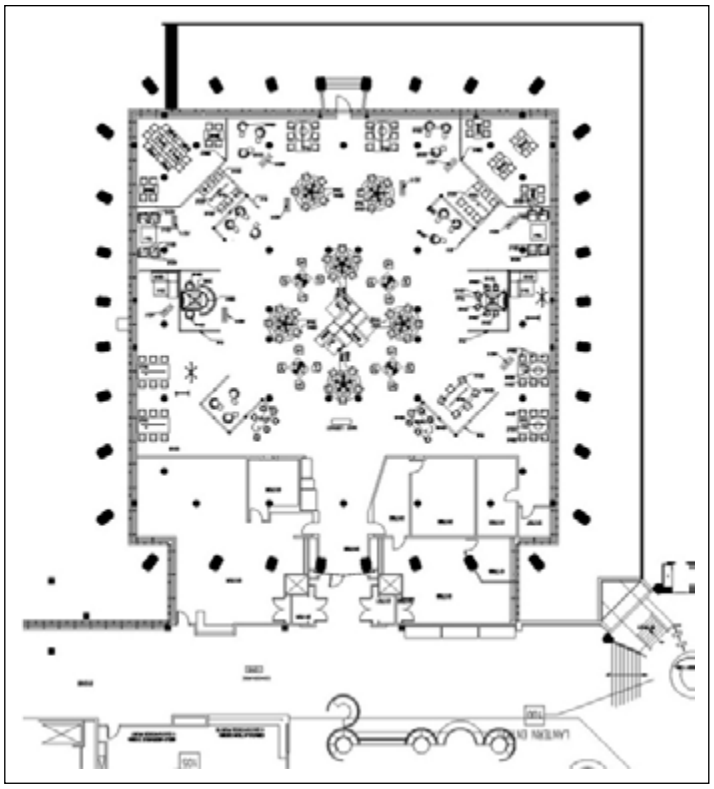

Fig. 6: Final design of collaborative student space

Conclusions and Next Steps

With these significant changes accomplished through collaboration and broad participation, we are convinced that this approach is the only way to go. At this juncture, we are filling remaining recast positions and exploring ways to enhance additional physical spaces.

Other plans in the area of participatory design include hiring a graduate student with substantive experience or advanced coursework in participant observation, ethnography, or other qualitative research methods to help us extend our activities into the evenings and weekends when most of our users occupy our spaces; expanding our research to include the activities and preferences of graduate students and faculty; and turning our attention to the way mobile devices are transforming how students and faculty go about their daily routines. We also intend to expand our assessment agenda in an effort to continuously improve our offerings and build on our initial success.

APPENDIX

Results of the Roundtable Discussions

Roundtable discussions punctuated the CLIR Symposium and gave participants an opportunity to discuss the practical applications and logistical aspects of participatory design. Here are some highlights of the discussions.

In the area of ***project planning***, participants felt that the biggest challenges were:

- Fitting the library timeline to the university timeline
- Recruiting the right participants, especially when many different groups of people are served
- Including all the people who want to be involved and arranging for staff to have the time they need to participate
- Communicating consistently
- Engaging the right stakeholders, including people outside the library, and maintaining their involvement
- Keeping to a reasonable scope
- Piloting methods
- Analyzing all the data

They also shared what helped, including:

- Getting buy-in from the administration
- Having one individual take responsibility for intensive pre-planning and tweaking during the project
- Developing a consistent process including a schedule
- Incorporating what they learned from one project into the next
- Understanding and accepting that things may not go exactly as planned

In the area of ***getting support from peers and administrators***, participants felt that the greatest challenges included:

- Knowing that the project is justified, that it will accomplish something helpful, that its value merits the expense, and that the administration understands and has reasonable expectations about it
- Overcoming skepticism and risk aversion
- Challenging people's assumptions and getting them to think differently
- Getting engagement from people with other work to do
- Scheduling and timing

They felt it helped to:

- Have some results from a small project or a "proof of concept" project to build support for additional projects
- Be persistent and keep asking, but know when to let some battles go
- Articulate the value and justification for the project
- Include administrators and peers in CLIR workshops and seminars
- Provide frequent updates on progress and results
- Solicit input and listen to all stakeholders

With regard to ***taking action based on project findings***, participants found the following to be challenging:

- Analyzing the data and coming up with the findings
- Getting administration support for making changes based on findings
- Having enough participation at meetings and during information gathering
- Finding the resources to support implementations
- Making changes in a way that others can support without feeling threatened
- Deciding whether to deal with delays in implementing recommendations, not take any action at all, or rely on others to review the findings and make their own (superseding) recommendations
- Sharing findings or making recommendations without having good documentation of the process

Participants have dealt with these challenges by:

- Using smaller-scale projects to get or keep the ball rolling
- Collecting and saving documentation of meetings, raw data, data analyses, findings and recommendations; disseminating results
- Accepting that sometimes changes will be made without considering the data collected (administrative mandate)
- Revisiting project results at meaningful intervals
- Bringing in new people to help with new projects and give veterans a breather