LIBRARY LEADERSHIP & MANAGEMENT

I could have told you that wouldn't work: constraints in design

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Introduction

Maria looked at the consultants' invoice and wanted to cry. Money for her small college library was so tight, she was surprised that her request had actually been funded. She knew the library needed help with its efforts to modernize and become competitive with similar schools. The consultants recommended a number of changes in the library's systems and services and everyone jumped in wholeheartedly to embrace them, or so Maria thought. But now, six months later; it was as if nothing had changed at all. Once she overheard two librarians complain about the changes and how they had to relearn tasks they had been doing for years. The new technology had a steep learning curve, doubling their workload. Maybe everything would workout at some point, but right now they were asking each other, 'Why can't we do things the way we did them before?' The IT team swept in one day, installed a new program, and that was that. 'Why hadn't anyone asked them about how they worked? What were their priorities? What resources did they use to get their jobs done? Maria sighed. She wanted to blame this disaster on the quick talking consultants, but she knew she had not been talked into anything. Things just weren't working out the way she had expected. But why?

Systems

How many times have you, your department, or your organization decided to institute some new system or service that was going to change your world, only to have the project fall apart or be underutilized? I think that a major cause of these failures is the inability to see the constraints on design of these new systems or services. Let me explain.

In basic terms, a system is a collection of parts or components that work together to accomplish a goal. For example, the organization in which you work is a system. This system has identifiable elements that, in a library, might look like this:

1. It has a *goal* to provide information, usually to a specific community or type of patron.
2. It operates in an *environment* which includes things that cannot be changed during the design, such as budgets and government regulations.
3. It uses *resources* such as databases or consortia to perform tasks.

4. Those resources are made up of *components* that allow the task to be done. Databases provide access to journals, for example, and consortia help libraries to spend their budgets wisely and promote library interests to governments, vendors, and organizations
5. *Management* or control determines when and where to intervene in the system - where changes should be made.
6. *People* - staff, patrons, friends of the library, etc. are also part of the system and use its resources to accomplish its goals.

A system has boundaries – you know where your organization ends and others begin – but you can frame the boundary as you wish. For a public library, you may see yourself as part of the system of city or county government. In a big city with many library branches, you may define your boundary as all of the branches. The system boundary for an academic library may be the university or may also be a consortium of other university libraries. If you think about it, you can probably see how your organization is a part of multiple systems. Now take it a step further and think of yourself not only as a librarian in a system, but as a system designer who can determine where and how to make changes in the system.

Constraints

Now back to constraints. By constraints on design, I mean the forces that exert control on behavior. In this context, constraints are neither good nor bad, they just exist. For example, a constraint for a public library may be taxes. Taxes provide a budget for the library, but they can only be raised so far before the public begins to resist or before other needs, such as rebuilding after a natural disaster, cause funds to be reallocated. For an academic library, a constraint may be student workers. They benefit the library by providing low cost labor, but they can also strain the library's resources with their high turnover and the need to continually train new workers.

I don't think that constraints are hidden, they are there if you look, however, they are often ignored, either on purpose or because the people trying to implement change don't know how to ask the right questions so that they see can actually see what is in front of them. As you start to examine the workplace, as you start talking to people about how they do their jobs, you will find various constraints in operation, unfortunately, many of them come directly from management. Consider these scenarios that you might come across while interviewing and observing as part of planning your design.

- *What You See or Hear is Not Always What You Get* – In an interview, staff may tell you what they think you want to hear or what they think management wants them to say, while reality on the job may be very different.
- *What You Get is Not Always What You Were Supposed to Get* – When you observe people at work, you may see that staff performs in a way contrary to or outside of their job description. They may not be doing this out of malice, but because it is how they can get the job done.
- *Who Does What vs. the Job Description* – In the fantasy, the librarians spend all of their time serving patrons and adding wonderful materials to the collection, while the reality is that they fix the copy machine and try to keep noisy teens from driving away the other patrons.
- *How Work Gets Done May Be Unknown to Management* – Those outside of libraries, but who control library budgets (such as city councils or university financial officers), may have no idea how librarians work – to the extent that (stop me if you've heard this before) they may wonder if librarians are even needed anymore, now that we have the Internet. They have little knowledge or understanding of librarians' educational background or day-to-day work responsibilities.
- *Human Factors Constraints* – What is it physically like to do the job? Is it comfortable? Do people complain of eyestrain or backache? Are the library web pages hard to navigate because they are not intuitive or too 'busy'?
- *Structural Design* – Design may be constrained by the system's physical details. Is there room to spread out or up? Will you need to spend money on making the building more accessible rather than on that new OPAC you want? Are you going to be constrained by someone else's idea of good library design when trying to redesign spaces for your particular patrons?
- *Implementers* – Even people who want change in the system can impose constraints. People with the final say on a project may prefer Windows over Apple products and 'suggest' that you use Windows, even if another platform would be better. As the designer, it is up to you to determine how much that 'suggestion' will influence your design.
- *Customer* – Constraints may be imposed by customer/patron needs. Perhaps you need to be open later at night or on the weekend to service working patrons, even if staff would prefer weekends off or that you staff the desk with students on the weekends.

- *Management* – You don't really have to think about this one, do you? From the CEOs to department heads, managers almost always have something to say about how a project will be done. Whether it is excluding you from choosing the consultant team or requiring that you implement a manager's favorite project first, there's nothing like management to mess up your well-planned project. I'm not talking about properly considered input from stakeholders, I'm referring to the personal whims and desires, the unrealistic expectations, that management often layers onto a project and that contribute to project failure.

Locating constraints

How do we learn about constraints as we develop changes in the design? For me, the best way to find out what is needed to improve systems in the workplace is to use Cognitive Work Analysis (CWA).[1] This is a multifaceted approach to analyzing human information behavior. It stems from human factors engineering and is most often used to aid in the design of systems such as airplane and ship controls or power plant controls. It was then adapted for use in library and information science and applied to information work in organizations.[2] CWA examines the actions of *actors* (persons acting in a context, not simply users of a system) who are affected by constraints.

For our purposes, I'm going to suggest a somewhat slimmed down version of CWA, focusing on 1) what do people like about their work, 2) what don't they like about it, 3) how would they ideally like to do the work, and 4) what organizational forces constrain how the work is done.

Your staff works in an environment in which their behaviors are affected by workplace social networks, hierarchy, conflict, and institutional pressures that force them to act, or not act, in ways that are not directly responsive to the task at hand, but address some other need that must be filled.[3] I maintain that you cannot know how people really work (and therefore, you cannot design a functional system or service) without considering the constraints they have to deal with in order to get the work done. Questions that help you learn that information fall into these parameters:

Background. Don't just go in and ask workers about the job. Learn about them as people. Ask about their educational background, length of time working for the organization, length of time working in the current position, how they see themselves – as novices? Experts? Why do they see themselves that way? Do they have an area of expertise?

Task Situation. Ask them to describe the work. Do they have to do it a certain way? Are there 'degrees of freedom' in performing certain tasks – can they do the work in any way that gets it done, or do they have to stick to a set of rules? Can they choose some of their own tasks or does someone else tell them what to do? Do they share information about their work? In what formats? With whom? What are their priorities – and did they create them or did someone else determine them? Have they created any procedures or routines for this work? Can they show you examples?

Ask if how they do the work now differs from how it was done in the past. What do they think about these differences? Does the way you work now differ from how this type of work was done previously? What tools/resources do they use to get the job done? How do they know they've done a good job? What do they like best about the job? What do they like least?

Organization. Ask about the history of the department, its responsibilities within the larger organization or system, and its reputation in the organization. How is work assigned to the department?

Social Organization and Management Structure. How does staff describe the department's culture? Do they have relationships with people in other departments? Are their ideas and suggestions encouraged and respected by management? Do they socialize with people outside of the department, such as going to lunch together? You may also ask them to make a chart showing the people with whom they regularly interact in the department or the organization so that you can see the hidden networks among staff.

Do you see how these questions differ from those that might be asked by IT (if any questions are asked of staff at all) or outside consultants? Do you see how the focus is on the work in a particular place with a particular set of people? There is no attempt to find one solution for every situation. Can you see that the focus is on the *people* who will interact with the system or service your design will create?

Warnings and Limitations

Because everything is connected, change in one part of the system will result in changes in other parts. You may not be able to address them, but you should be aware that they will develop and that these changes may present new problems. This is why you must be observant of your system. When you make changes, you can't just make them and leave them

alone, you have to watch for what other changes may occur and need tending. Sometimes, the changes may occur in places we didn't even expect. It is important to revisit your design, though it is rarely done in practice. Lack of time and money usually means that there aren't regular reevaluations and revisions. You should know that the changes you make are unlikely to be optimal (if they ever were) forever. Don't be afraid to revisit, to stop, to change. Don't say 'That change worked fine for three years, but it doesn't work now, therefore it was no good.' Yes it was good – it worked for three years. Be happy with that, then go in and reevaluate and make another change. If you don't, your 'new' changes will make your system as stale and inefficient as when you first started.

Conclusion

When our eyes are opened to constraints in the workplace and we consider those constraints when we design systems and services, we create better designs. When we listen to the people who do the work, and use that information to inform our design, we help to create buy-in with those workers, reduce sabotage and work-rounds, and get fewer failed projects.

Notes

1 J. Rasmussen, A. M. Pejtersen and L. P. Goodstein. *Cognitive Systems Engineering*. New York: Wiley-Interscience., 1994.

2 R. Fidel and A. M. Pejtersen, "A Multi-Dimensional Approach to the Study of Human-Information Interaction: A Case study of Collaborative Information Retrieval," *Journal of the American Society for Information Science and Technology,* vol. 55, no. 11, pp. 939-953, 2004.

3 W. Powell and P. DiMaggio. *The New Institutionalism in Organizational Analysis*. Chicago: University of Chicago Press, 1991.

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