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Turning the revolution into an evolution

The case for design thinking and rapid prototyping in libraries

As academic libraries evolve to meet the changing needs of their surrounding communities, we are beginning to engage with these communities in new ways, such as participating in efforts to transform teaching and learning. These shifts in services and roles can be challenging. As we try to figure out how to adapt and move forward, we need to apply new approaches to the way we think and problem solve. Enter the processes of design thinking and rapid prototyping.

The design thinking toolbox

Design thinking isn't at all a new idea, even though it recently has become a ubiquitous one. In fact, design thinking can be traced back to the late 1960s and early 1970s.[1] The Institute of Design at Stanford, or d.school, defines *design thinking* as a process that identifies a problem and then implements solutions, with a special focus on user needs.[2] While this definition feels fairly straightforward, design thinking is a notoriously difficult concept to pin down. Most discussions surrounding design thinking focus on the elements of using a collaborative or team-based approach to define complex problems and to create and test solutions.

Design is a distinguishing characteristic of many fields, including architecture, engineering, industrial design, graphic design, and instructional design, and offers a particular lens for viewing the work within them. The design lens emphasizes the importance of using systematic methods for understanding end users and their needs. Non-design fields, like librarianship, have begun to embrace design thinking as a process for improving the impact of library work, as exemplified by IDEO's partnership with the Chicago Public Library and Aarhus Public Libraries in Denmark to create the Design Thinking for Libraries Toolkit.[3] This toolkit emphasizes that design thinking is a mindset that allows even nondesigners to use design methods for solving problems and transforming the role and reach of libraries.

In his 2015 *Library Journal* article, Steven Bell describes design thinking as a tool for solving problems.[4] It also might be helpful to view design thinking as an entire toolbox of methods for solving complex problems, with a variety of tools that can be used in different situations or at different points within the design thinking process. Some of the methods, or tools, in this toolbox include interviewing, card sorting, brainstorming, and prototyping. Rapid prototyping, in particular, is a tool that librarians can use to facilitate fast and impactful change in every area of work, including instruction, spaces, and services.

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Rapid prototyping

The main benefit of rapid prototyping is that it puts the product or service in the hands of the user at an early phase of development with the goal of identifying problems before too much time and money is invested.

The concept of *rapid prototyping* comes from the world of manufacturing, as the increased miniaturization of computing technology and manufacturing equipment in the late 20th century made it possible to fabricate working models from computer designs. This built on the long tradition in architecture and engineering of creating prototypes, smaller models of a finished product, for design and testing purposes. This new technology enabled the creation of prototypes to be both faster (rapid) and automated, sometimes with laser cutting or additive printing. Using computer designs allowed for changes to be made quickly, and automated "3-D printing" could produce a model to be tested immediately. The original computer programs required a high level of skill, and the printers were enormous and difficult to operate.

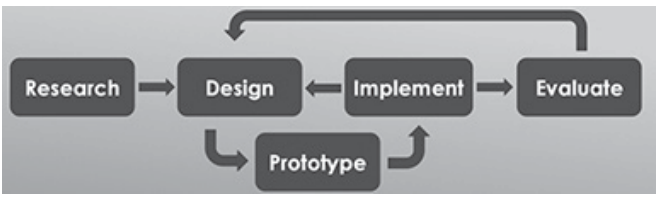

Figure 1. The rapid prototyping process.

The result was a change in the manufacturing design process. Since prototypes were no longer costly or time consuming to produce, many more versions could be tested before the manufacturing process was finalized. Figure 1 shows how the rapid prototyping process proceeds. The design team outlines what the product needs to do or what the users want. Then, a first design is created quickly with the goal to see how it works under testing, rather than having an ideal initial design. Next, a prototype is created and tested immediately with the results used to inform the next design. The cycle continues, acting as an iterative design process of small steps toward the ideal product.

The key to success with rapid prototyping is that the cost of failure is low, so you can try a great diversity of ideas, even if some might fail. The goal is to create a product that will not fail in the final version. The process avoids focusing on perfection in the design phase, which can slow or halt progress to the goal. At some point the product is no longer considered a prototype, usually after design tests and when large scale implementation or distribution begins. Ideally, the process will repeat, as it is important to continuously improve designs or address new problems.

Putting rapid prototyping into practice

Rapid prototyping outside of the manufacturing environment looks a little bit different, even though the goal of failing early to succeed sooner is the same. In the library environment, library instruction, spaces, services, and assessment all provide opportunities for applying rapid prototyping.

Rapid prototyping for library instruction

For library instruction, rapid prototyping is an obvious fit. In her 2015 presentation for the ACRL Distance Learning Section, Joelle Pitts argued that rapid prototyping offers advantages over traditional instructional design frameworks, such as the ADDIE model, because of its agility and focus on continuous improvement.[5] Rapid prototyping allows librarians to discover problems before too much time is invested in perfecting a research guide, tutorial, or lesson plan that may not actually meet our learners' needs in the way that we think it will.

In many cases, we already have "prototypes," or existing lesson plans and activities that we can use in our efforts to build high-impact learning experiences. These are

perfect for rapid prototyping, since they can be tested with student workers or even students in one-shot classes.

For example, you might have a PowerPoint presentation on evaluating resources that you frequently use in one-shot instruction sessions and that you'd like to turn into an interactive, web-based tutorial. You can use the existing slides to solicit feedback from your colleagues, but also from students you teach in one-shot classes. With this feedback, you can create a basic video for immediate use and gain additional feedback that would support the development of a more sophisticated tutorial. During each step of the process, you are able to use the imperfect model of your learning object as part of your instruction, but you are also able to gain the information that you need to build a slightly better model for your next instruction opportunity.

Rapid prototyping also can be used to gradually advance entire instruction programs. As programs work to integrate the new ACRL Framework for Information Literacy for Higher Education, write new programmatic outcomes, and develop effective assessments, rapid prototyping can help librarians in these programs figure out what works and what doesn't. Programmatic change doesn't need to happen in big, dramatic shifts. Instead, it can happen incrementally and through the collaboration of many individuals working to solve these complex challenges.

Rapid prototyping a library

Library services and spaces can also benefit from the rapid prototyping model. The rapid prototyping cycle is not a strategic planning method, but rather a way to make tactical changes that improve services, workflows, and team structure for efficiency. When design thinking is applied to our operations, we can become more nimble and creative in our jobs. If every decision has a high consequence, decision making becomes slow to avoid failure and the effect is stagnation throughout the entire organization.

For example, when working in committees in our organizations, we often aim for consensus or discuss actions rather than taking them. A rapid prototyping approach encourages the team to try each idea and evaluate success, rather than over planning.

Libraries go through organizational changes that are incremental and could benefit from the rapid prototyping model. The pace of change in libraries is increasing, and there is still anxiety about change among library staff. While rapid prototyping involves frequent change, it is small change, rather than a great disruption. Anxiety about change can be alleviated by making the process an evolution rather than an revolution. Perhaps even more radically, this model allows for failure. If the goal is not achieved, the change is dropped. Libraries need to develop a culture where failure is allowed and risk-taking is encouraged.

One way to create this culture of innovation is to celebrate effort as well as success. When new ideas and approaches are highlighted, it encourages your co-workers to take these first steps. Further, it's helpful to prepare your organization for abandoning a failed prototype. Rapid prototyping encourages either discarding or adapting designs, which ultimately leads to better ideas. Finally, working to manage organizational expectations during the rapid prototyping process is essential. Librarians tend to be perfectionists, but most of our users accept that people and technology aren't perfect.

Rapid prototyping and assessment

These new approaches require more frequent assessment. Fortunately, the availability of more real-time data sources allows for data-driven decision making. Instead of assessing progress in a three- or five-year planning cycle, assessment must be done at the end of each phase of a project. For each project, keep track of this process, including any failures. The goal might be achieved after any assessment that indicates success rather than waiting for the next planning cycle.

Assessment doesn't have to be scary, there are levels of assessment and approaches. Starting with small assessments, including observation, self reflection, and short student feedback, before building into assessment of student work and impact of the library services on the community or larger organization. The key is to only gather data that will be used and to apply it immediately to redesign and test again.

Rapid prototyping all libraries

Whereas academic libraries are changing more rapidly it also behooves our profession and professional organization to reflect this. One example is the Strategic Thinking and Design work that the Association of Research Libraries (ARL) conducted in 2013-2014.[6] It was a new approach to confronting future challenges in libraries, and a key component was a plan to "assess, consider, reevaluate, and revise its actions on an ongoing basis."

It is difficult for large organizations and groups to change course, but technology has enabled us to meet and work as a profession online instead of waiting for annual meetings. ALA and other library societies face increasing pressure to be nimble and change to better benefit their members. Using online communities, smaller interest groups, and other innovations, they can rapidly test new initiatives and organizational components. Now it is important to assess each success, and failure, and let go of what no longer works.

The future of design thinking and rapid prototyping

Over the next decade libraries will intersect increasingly with prototyping in makerspaces and 3-D printing. Libraries have already been engaging and hiring design thinkers, such as instructional designers and ethnographers, but they can also reach out to experts in graphic design, architecture, and engineering. We encourage all libraries and librarians to start with something small: your favorite lesson plan, the committee you chair, or one of your library web pages. Make a small change, see what happens, and then make another change. Embrace rapid prototyping and celebrate every small success and failure.

Notes

1. Herbert A. Simon, *The Sciences of the Artificial* (Boston: M.I.T. Press, 1969) and Robert H. McKim, *Experiences in Visual Thinking* (Brooks/Cole Pub. Co., 1972).

2. ReDesigning Theater, "The design thinking process," 2012, http://dschool.stanford.edu/redesigningtheater/the-design-thinking-process/.

3. "Design Thinking for Libraries," 2016, http://designthinkingforlibraries.com/.

4. Steven Bell, "Design thinking for flexible solutions," *Library Journal* (January 21, 2015) http://lj.libraryjournal.com/2015/01/opinion/steven-bell/design-thinking-for-flexible-solutions-from-the-bell-tower/#_.

5. Joelle Pitts, "GET-R-DONE: Using a Rapid Prototyping Instructional Design Model to Build Better Learning Objects Fast," ACRL Distance Learning Section, presentation, ALA Annual Conference San Francisco, California, (June 2015), http://alaac15.ala.org/files/alaac15/Get%20R%20Done!.pdf.

6. Association of Research Libraries, "Report of the Association of Research Libraries Strategic Thinking and Design Initiative," (2014) www.arl.org/storage/documents/publications/strategic-thinking-design-full-report-aug2014.pdf.