Tactile Libraries: material collections in art, architecture and design

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Phenomena exist in the material world.
Material makes thoughts tangible.
Materials manifest the world. (Viray, 8)

What is a materials collection

A materials collection is "a body of physical items and samples acquired across various industries to be utilized as objects for inspiration and in project specification by architects, designers, artists, and researchers in the practice of those and allied fields" (Pompelia, 2013, 1). Like all library collections, materials collections are as varied and unique as the institutions they serve. While these collections have long been found in design firms, recent decades have seen an increase in their presence in academic settings (Jost, 2011). By offering materials samples for exploration by students, faculty, designers, artists and practitioners, materials collections provide an intimate and tactile means of exploring the physical vocabulary of the built environment.

For patrons, materials collections offer opportunities to engage physically with samples. Tactile interactions can promote creativity and innovation in ways that viewing materials online or in texts cannot. For artists and designers, the experience of an object or space is of paramount importance and is deeply affected by the selection of materials. Through direct physical contact, one can come to better understand a material and be inspired by its possibilities. The browsability of these collections frees visitors from exploring via search boxes and facets and allows for serendipity. Researchers in a materials collection frequently pick up a material because it looks interesting, or shiny, or bright, or translucent. They dismiss labels that indicate that a sample is marketed as flooring, or insulation, or for erosion control. As they hold, bend or peer through a material, it transforms and inspires—physical contact catalyzes the design process.

The role of materials in design has been well documented in scholarship and theory (Schröpfer, 2010; Bylerian and Dent, 2007; Kolarevik and Klinger, 2013). Scientific advances have led to a proliferation of new materials that are available for provocation, use and "misuse" by designers. As Manuel Kretzer notes in his discussion of the changing nature of materiality, "applying the right materials...represents a truly demanding task and requires not only knowledge and experience on the various material properties, but also sensitivity and intuition in anticipating their meaning and value over time" (2016, 26). Physical interaction with materials is essential to this process.

The value of materials collections to academic institutions

Academic departments can use materials collections to contribute to the satisfaction of accreditation requirements. For example, the National Architecture Accreditation Board (NAAB) requires that "Graduates from NAAB-accredited programs must be able to comprehend the technical aspects of

design, systems, and materials and be able to apply that comprehension to architectural solutions." They further state that knowledge of "building materials and assemblies" should include "Understanding of the basic principles used in the appropriate selection of interior and exterior construction materials, finishes, products, components, and assemblies based on their inherent performance, including environmental impact and reuse." The National Association of Schools of Art and Design accreditation standards likewise make multiple references to material literacy. For example, an "understanding of the possibilities and limitations of various materials" is one of eight competency standards for the bachelor's degree in sculpture (NASAD, 2016, 111).

Material collections provide experiential learning that is critical to success in art, architecture and design disciplines in which a deep understanding of materiality is required. Sourcing and evaluating materials is a routine requirement in associated professions. Graduate students and alumni without access to materials in their education are at a disadvantage as they launch their careers as practitioners and makers. Students who have the opportunity to work with materials collections as researchers or employees can be inspired to pursue alternate academic and career paths. Students have even adjusted the focus of their study to be material-based following employment and research assignments utilizing the materials collection (Wagner, 2013).

Beyond contributing to departmental learning outcomes and accreditation standards, materials collections also respond to larger institutional priorities. As administrations look to develop and strengthen pan-university research initiatives and cross-disciplinary centers to foster collaboration across fields of study, materials collections have the potential to connect researchers. The lifecycle of a material, from development to its commercial or artistic use, engages materials scientists, engineers, fabricators, designers, marketers and even social scientists. However, the experience of materials is universal and has relevance to nearly every field of study. At the University of Michigan, the Materials Library supported the research of an interdisciplinary course exploring touch-sensitive coloring technology for children with autism (Michigan Engineering, 2015). A materials collection creates a physical and intellectual space to bring researchers together. As collaborations around design-thinking, incubation, and entrepreneurship expand, materials collections are well positioned to assist in these endeavors.

Building a materials collection

In her Material Library Research Report, Kai Alexis Smith (2015) identifies three methods by which material libraries build their collections—donations, samples obtained by request from manufacturers, and purchases. Each of these methods provides opportunities and challenges.

Many materials collections get their start through donations. The collection at the University of Virginia, for example, was seeded with samples collected from faculty who had been gathering and storing materials for use in their own studio classes. Donated materials can be very welcome additions to a collection—both because they are free and because they are inevitably closely tied to the research and teaching needs of the department or school, having been selected by faculty and/or students. However, donations can also be problematic. Donated materials may not fit within the prescribed scope of the collections policy. A clear review procedure for donations that can be communicated to patrons should be in place and operate in tandem with existing library gift policies.

Material samples can also be acquired by request through many manufacturers. Often seen as a cost of doing business, samples may be sent free of charge or for the cost of shipping. Requesting samples, however, can be a hit-or-miss means of acquisition. Most companies put their resources into large sales of their materials and may not send samples, or else send them after long delays. Other materials are simply not available in this way due to high costs or limited production and therefore must be purchased. In libraries where faculty and students are used to quick purchasing models for text resources, patrons may be frustrated by the indefinite timelines of materials acquired by request.

Material brokers provide an opportunity to purchase samples, sometimes in bulk packages or subscriptions. Material ConneXion is probably the best-known provider of “out-of-the-box” materials collections. While more costly, using a vendor like Material ConneXion can save on time and effort for a small staff. With a focus on innovation, Material ConneXion and other such brokers provide access to materials that are on the forefront of design industries. While manufacturers may not understand the mission of academic material collections, or may not prioritize requests from librarians, brokers are often more responsive and timely in fulfilling orders. Brokers are often able to provide materials that individual requests to the manufacturer have failed to secure.

Most importantly, collections should be built through collaboration. Librarians and curators need to involve faculty and students to determine acquisitions that respond to institutional and curricular priorities. One way this can be achieved is by engaging students in acquisitions as part of a course requirement. Students can research a material, identify a source, and procure a sample for the collection. Assignments of this nature prepare students to source materials successfully for their design work while simultaneously engaging them deeply in the existing collection.

The best method for gathering samples will be determined by the unique goals, scope and policies of each collection. In developing acquisitions policies, librarians and curators should consider the information needs and priorities of stakeholder researchers, the space available to hold (and grow) a collection, and whether the collection will house materials no longer in production (or whether those materials will be deaccessioned). Policies should also describe what will be excluded from the collection, such as historic materials, commonly available materials, systems, materials larger than a certain size, or multiple brands of a similar material. The New York School of Interior Design Materials Library, for example, shares its collection development policy online at http://ibrary.nysid.edu/library/about-the-library/materials-libraries and encourages donations of various materials that are “current or not older than 3-4 years” and of limited size. Reviewing acquisition priorities and policies frequently will ensure that the collection remains highly relevant and highly valued.

The acquisition of books, journals, and databases related to materials can facilitate deep research related to material samples. Research guides, such as the one assembled by University of Michigan librarian Rebecca Price (http://guides.lib.umich.edu/c.php?g=282771&p=1884154), can collocate these information sources virtually with free resources from around the web.

Organizing a materials collection

Art- and design-based materials collections lack a unified controlled vocabulary that can keep pace with innovation and address the various ways art and design users seek materials. They also resist easy organizational and classification schemes. In the art, architecture and design professions in which creativity and inspiration are primary motivators, materials are approached expansively. This is unlike the fields of material science, construction, and engineering in which material consideration is focused and exact, and material application legally cannot go beyond intended uses.

Given this unique profile of design-based material collections, the vast majority are organized by composition (metal, wood, glass, etc.) and then subdivided per local needs. A composition-based organizational approach accomplishes many goals: it provides points of access with which users are generally familiar; it facilitates discoverability through browsing; and it enables collection development. No librarian should expect, however, that composition could satisfy all inquiries. Librarians should position the collection to allow for multiple approaches: properties, uses and applications, experiences, personalities and emotions (yes, emotions), etc.

A material collection in an architecture or engineering department/school will be well served by adopting an organizational scheme based on the Construction Specification Institute (CSI) number, an approach that will prepare the student for employment in those fields. In addition to CSI, a UK-based data model by Granta Material Intelligence (MI) can provide an organizational framework.

Material collections that support the fine arts and design disciplines are likely to provide access, both physical and digital, that cuts across compositional categories. For example, a search for wood may actually be an inquiry based on rigidity or sustainability— in essence a search for certain properties that can cut across composition. Investigating the materials collection based on properties such as luminosity or conductivity will provide a broad and meaningful set of materials far beyond one material composition.

In addition, artists and designers will approach materials based on how they make a person feel. Thus, materials are rendered through an emotive and psychological lens. A material can be happy, warm and inviting, or distant, cold and unfriendly. Representing these qualities in physical arrangements or digital search tools can illustrate just how limiting traditional library classification schemes and controlled vocabularies can be when applied to design materials. Browsability is of utmost importance for material collections and the researchers they serve.

Although new materials are being invented and created at an increasing rate, innovative materials utilize already-existing materials but in new and effective ways. In parallel, most students will not create a new material, but they may use materials in interesting and compelling ways. An architect may repurpose insulation as a wall covering or explore the use of aluminum foam in the design of furniture. The design-based materials collection should allow and encourage this stage of inspiration.

Programming a materials collection

Material collections offer libraries both traditional and innovative opportunities for programming. Whether located in a central or subject library or as part of an academic department or school, material collections can benefit from a combination of programming approaches from both realms. Keynote speaker Chris Lefteri advised at the 2013 IMLS-funded symposium *Materials Education and Research in Art and Design: a new role for libraries* that schools should not have a materials collection in a static sense, that they must feature an intentional and forward-thinking approach to activating holdings. Regardless of staff or budget limitations, a programming plan will propel collections to new levels of creative and scholarly engagement.

Because most material collections are organized primarily by compositional categories, librarians have found great success with exhibitions of materials that pull items out of their bins or from their shelves to be presented in a manner and association that was otherwise not apparent. This type of arranging engages patrons through factors such as properties —color or translucence, for example. A “new arrivals” display can present acquisitions before they disappear into their destination bins. “Recently circulated” can also be a point of discovery and generate interest to know which materials faculty and student colleagues have considered useful. Exhibits of various types may also be displayed outside the space that the collection typically occupies. At the University of Virginia, where the materials collection occupies a windowless room somewhat hidden from view, small exhibits in the library lobby allow patrons to engage with materials in passing, whetting their appetite to explore the broader collection.

Partnering with departments and offices on campus with the goal of supporting or supplementing their programming can be an effective means to reveal the holdings of the materials collection. A lecture on economic supply chains or a symposium on environmental impact can be supported by materials that illustrate the topic, lending hands-on impact to concepts addressed.

Schools with a museum or art gallery can call upon the materials collection to stage a supplemental display with items that mimic those contained in the museum object. The exhibition of a fragile 17th-century armoire, for example, could be enhanced with an interactive display from the materials collection of the same wood, silver, and inlay process used in the museum piece. This can work also in the contemporary gallery where pieces are more conceptual with the handling of a material that replicates or is reminiscent of a property. Museum education departments and local arts education departments can be among the most enthusiastic of materials collection patrons in their drive to enhance understanding of art through haptic experience.

Vendor or distributor representatives can offer students a discussion panel from their perspective inside industry. Far from being a sales pitch, these speakers have an interest in presenting real-world examples of how to approach companies with the most informed questions to minimize wasted time for both company and client. Students and faculty alike may not otherwise keep pace with industries that have

faced incredibly rapid changes—with regards to environmental impact, for example—and will benefit from this type of programming.

Lectures by designers, including alumni, are another smart way to program the materials collection. Visiting artists, architects and designers will speak effectively from personal knowledge and use of materials, possibly in ways that are not communicated by the collection. Designers, especially alumni, can directly speak to the critical curricular benefits of material collections during their studies because they did—or did not—have one at their institution.

Collaboration opportunities for a materials collection

Surveys conducted in the past decade have been quick to note the lack of shared resources and practices for materials collections (Hindmarch and Arens, 2009; Smith, 2015; Akin and Pedgley, 2016; Munro, 2016). Recent efforts seek to change that. Material libraries are heterogeneous in nature, reflecting the specific and unique programs related to the courses and degrees offered by departments at a given institution. The mission and scope for any one materials library may resemble those from other material libraries, but, in effect, each collection presents a different profile from the next. How, then, can collections work together for the benefit of scholars and designers?

Collaboration was a primary motivator for the formation of the Materials Special Interest Group (SIG) under the auspices of the Art Libraries Society of North America (ARLIS/NA). Founded in 2011, the group has met regularly each year at the ARLIS/NA annual conference. The SIG maintains a blog titled *material|resource* (http://materialresource.wordpress.com) that offers collection profiles and industry resources and, with its nearly four hundred subscribers, could serve as a locus for collaboration.

This question of collaboration was the focus of a workshop held as part of the 2013 materials symposium. Forty-five librarians attended thematic presentations by colleagues on taxonomies, collection development, collaborative research and funding, before concluding with an open discussion on next steps that included building community and identifying opportunities for collaboration. The workshop's session on collaboration explored the possibility of partnerships with material science as a model for project/platform development and grant funding. As part of this discussion, Laura Bartolo highlighted the partnerships that the Center for Materials Informatics at Kent State University has developed with public and private research organizations focused on the advancement of materials development and adoption.

Others see a research-driven partnership with local industry as a collaborative model whereby the academic-based material collection serves the creative and project-specification needs for small- and medium-sized firms that do not have such a collection in-house. The Material Resource Collaborative at the University of Houston coordinates programs and services that appeal to local firms, including offering consultations on LEED v4, sustainability, and carbon footprint analysis. Collaborative

programming has led to grant funding and provided students with real-world research opportunities within their local community (Kacmar, 2013).

Cooperation between collections is only recently gaining momentum. Emerging from the IMLS workshop was the desire for collaboratively derived and shared solutions for taxonomy and collection organization. Librarians also lamented the lack of expertise and resources to create unique database platforms at their home institutions and expressed the need for an "out-of-the-box" solution that could be easily adopted. Already in partnership toward a joint catalog and shared solution for their catalogs, librarians from Harvard University Graduate School of Design's Frances Loeb Library and Rhode Island School of Design's Fleet Library were motivated by this collective interest to think beyond their two schools.

The official collaboration, with Harvard University and RISD as organizing members, has resulted in two outcomes, both called Material Order: 1) a shared, open source, cloud-hosted cataloging utility via the LYRASIS CollectionSpace platform for object collection management, and 2) a member-driven consortium among participating schools that provides a current- and forward-thinking taxonomy and organizational schema (Pompelia, 2016). Front-end development of the shared file using a Wordpress customization is planned for 2017 and will be on the open web, allowing visitors to see holdings of participating schools and enabling crowd-sourced capture of experiential aspects of materials, in addition to other research-level resources.

Conclusion

Material collections stand at the forefront of future-looking programs and services for libraries. They assert their post-digital nature through authentic, inspirational and experiential modes of understanding and as haptic learning centers with browsing as a primary mode of discovery. Digital access to material collections cannot serve as a surrogate, but rather expand functionality and augment the physical. Institutional and interdisciplinary collaborations are changing the ways scholars access and interact with materials in an academic setting, and how they interact with the broader community of makers, designers, entrepreneurs and scientists. Materials collections are catalysts. They function in an art-architecture-design sphere that is positioned adjacent to the sciences where dialog can and will occur; where material selection is a learning process informed by both success and failure; and where critical thinking/making is the hallmark of 21st-century education.

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