PROCEEDINGS
Creating_Making

NOVEMBER 5 - 7 2014

THE UNIVERSITY OF OKLAHOMA
DIVISION OF ARCHITECTURE
COLLEGE OF ARCHITECTURE

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FOREWORD

Everything must be improved.

This position serves as the *raison d'être* for the 2014 Creating_Making Forum and for our Division of Architecture's ongoing considerations about creating and making. It also captures what makes the practice of architecture so exciting, challenging and vital for us as teachers and architects and, more importantly, as citizens in our communities.

The underscore in Creating_Making infers that our work here in central Oklahoma proceeds as a continual dialogue. Pairings, oppositions, and adjacencies define our existence on the wide-open prairie and foster a unique existence. The forum topics coalesced as dialectics of tools and intention; of service and empowerment; of us and them, old and new, together and alone, pencil and mouse, and idea and artifact. These topics reflect local concerns and have global implications. These were also themes that the architect Bruce Goff embraced, just as we continue to embrace the light of his creativity, and benefit from his legacy.

Without new ideas, we cannot build well. The opportunity for us as practitioners, teachers, and students to explore new ideas in a university setting is one we engage with criticality and with purpose. The Creating_Making Forum reflects this activity, is inherently sustainable, and suggests a performance-based architecture that will serve our communities well over time. Yes, we are pragmatic, but we approach this with unfettered inspiration. Our pragmatism guides our vision for an evolving and *improved* architecture.

The 2014 Creating_Making Forum is another step along this aspiring trail that we blaze for ourselves. Participants from across the continent have now infused our curricular framework with new perspectives, and have offered critique on our shared histories, intentions and aspirations. We here at the University of Oklahoma Division of Architecture will continue to ruminate on the beauty of the new ideas generated at this forum. Wonder unsettles us in the most positive way as we move forward in our mission to create and make better places for people. See you next time.

Photo by Timothy Hurley

Hans E. Butzer, AIA, LEED AP BD+C
Director of Architecture and A. Blaine Imel, Jr. Professor
Mabrey Presidential Professor of Architecture and Urban Design
The University of Oklahoma
Principal, Butzer Architects and Urbanism

PREFACE

It has been my great pleasure to chair the 2014 Creating_Making Forum for the Division of Architecture, made possible by funding from an endowment set up in the name of the visionary architect Bruce Goff, who was chair of the Division of Architecture here from 1943 to 1955. Goff's tenure was unfortunately short, but the legacy of his approach to architecture continues to inspire us. This legacy has been sustained in great part through the work of Jerri Hodges-Bonebrake, Goff's secretary, who is recently deceased. Our students were always foremost in Jerri's thoughts, and it was she who led the effort to establish the endowment that has allowed us to bring so many brilliant talents to work with our students in the College of Architecture over the past thirty years. In November 2010 Goff's work was celebrated in a retrospective at the Fred Jones Jr. Museum of Art on the University of Oklahoma campus, and the first Creating_Making Forum was conceived. That 2010 Forum was a great success, an experience that the committee for this year's Forum hoped to repeat.

We believe that we succeeded. Our keynote speakers were chosen for their award-winning creative work and engagement with user communities. Robert Fishman, professor of architecture and urban planning at Taubman College of Architecture and Urban Planning at the University of Michigan, has authored several books on the history of cities and urbanism. E.B. Min is a principal of Min I Day Architects and is especially interested in client interaction and design based on human behavior. Kristin Murray is a principal of Olson Kundig Architects and her work often engages with local communities in optimizing neglected urban space. Andrew Freear is the director of Rural Studio in Alabama, and his work serves as a model for design-build methodology within poor rural communities. Finally, our own Hans Butzer exemplifies the benefits of the public process in his work for communities in the state of Oklahoma.

We enhanced this year's Forum by including a greater range of interdisciplinary work. This time, faculty from all the divisions in our college served as session chairs, so that the papers covered issues relevant to architecture, interior design, construction and building science, landscape design, and urban planning. In response to our call for participants, we received papers and posters from over thirty schools around the United States and several from abroad. We ensured student engagement in providing a service-learning workshop in which architecture students designed improvements for a local non-profit arts organization. As before, we offered tours of local sites of interest, but for the first time we utilized social media to leverage publicity and to sponsor an Instagram contest. And for the first time we offered licensed architects continuing education credits for attending lectures and sessions. The Forum closed with a discussion panel moderated by myself and including four of the keynote speakers: architects Butzer, Freear, Min, Murray, and our dean, Charles Graham. Thus we concluded with a summation of what we had learned from the Forum and with inspiring words for the future.

The three days of the 2014 Creating_Making Forum events were the culmination of more than six months of preparation, and many people contributed to making the Forum a success. First to be thanked is Angela Person, presently a PhD candidate in geography at OU. She was the coordinator of the 2010 Forum, and happily for us agreed to fill this position again. Her excellent organizational abilities, untiring efforts to ensure that events flowed smoothly, and creative ideas for play resulted in the constant happy "buzz" that emanated from our attendees. Next I thank the committee, which is composed of students, faculty, and practitioners – their names may be found on page 188. The students, especially Grant Bankston and Jenni Chung, donated great amounts of time to make sure the Forum ran smoothly during its three days.

I thank the dean of our College, Charles Graham, who provided his unqualified support, opened the Forum with a welcome speech, and introduced our director at our banquet. I thank our director, Hans Butzer, who graciously agreed to be the keynote speaker at our banquet and provided the audience with an inspiring speech that reminded us about the wonderful diversity of our Forum topics. I thank the keynote speakers, the widely admired authors and architects listed above who communicated their energy and enthusiasm for the built environment to our students. I especially thank E.B. Min and Kirsten Murray for leading the student service-learning workshop with nineteen students, I thank the client, Amber Clour of Dreamer Concepts, for joining in the process, and I thank the students who worked so hard to help generate interest in her non-profit community arts project. I thank the administrative and support staff of the College of Architecture, who ensured that everything was in the right place at the right time. I thank all the OU support groups, especially facilities management and catering at the Oklahoma Memorial Union.

And finally, I thank all the participants who contributed the papers and posters you will read and view on the following pages, for without their participation, there would be no Proceedings. The Division of Architecture and the College of Architecture have been enriched by your participation in our Forum, and we encourage you to participate again in three years when we host the 2017 Creating_Making Forum.

Dr. Catherine Barrett, AIA
Chair of the Bruce Goff Chair of Creative Architecture
Assistant Professor of Architecture
College of Architecture
The University of Oklahoma

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KEYNOTE SPEAKERS

Hans Butzer, AIA, AK NW, LEEP AP is passionate about legacy building, through both his practice-based creative research and university work with students and faculty. As director of the University of Oklahoma Division of Architecture, he seeks to empower faculty and students to continually redefine the potential of the program's Creating_Making curriculum. His teaching focuses on ethics and sustainability, and community-engaging advanced architecture and urban design studios.

An award-winning practice allows Butzer to offer ideas on architecture, landscape, sculpture and urban design that help shape the lives of Oklahoma families and communities. Building on his educational experiences at the University of Texas at Austin School of Architecture and Harvard University's Graduate School of Design, and by life experiences in both the United States and Germany, Butzer is intent on creating exceptional educational environments and living for all of our students.

Dr. Robert Fishman, professor of architecture and urban planning, teaches in the urban design, architecture, and urban planning programs at Taubman College of Architecture and Urban Planning at the University of Michigan. He received his Ph.D. and A.M. in history from Harvard and his A.B. in history from Stanford University.

An internationally recognized expert in the areas of urban history and urban policy and planning, he has authored several books regarded as seminal texts on the history of cities and urbanism including: *Bourgeois Utopias: The Rise and Fall of Suburbia* (1987) and *Urban Utopias in the Twentieth Century: Ebenezer Howard, Frank Lloyd Wright, and Le Corbusier* (1977). His honors include the 2009 Laurence Gerckens Prize for lifetime achievement of the Society for City and Regional Planning History; Walker Ames Lectureship, University of Washington, Seattle, 2010; Emil Lorch Professorship at the Taubman College, 2006-2009; Public Policy Scholar, Wilson Center, Washington, D.C., 1999; Cass Gilbert Professorship, University of Minnesota, 1998; and visiting professorships at the University of Paris, Nanterre; University of Pennsylvania; and Columbia University. He is currently working on a history of sustainability.

Andrew Freear, from Yorkshire, England, is the Wiatt Professor at Auburn University Rural Studio. Educated in London, he has practiced in England, Italy and the United States, and taught at the University of Illinois at Chicago and the Architectural Association in London. After the untimely death of Samuel Mockbee, he became the director of the Rural Studio in Newbern, Alabama, in 2002. He is also project advisor to fifth-year undergraduate students there.

Rural Studio has been established in Hale County for twenty years and prides itself on being a good neighbor. It has established close relationships with local municipalities. It practices a hands-on architectural pedagogy that offers students the opportunity and responsibility to design and build charity homes and community projects to improve living conditions in west Alabama.

Freear has designed Rural Studio exhibits in Chicago, Cincinnati, Vienna and Barcelona; and for the 2002 Whitney Biennial, 2005 Sao Paulo Biennal, 2008 Venice Biennale, and at the Victoria and Albert Museum in London and Museum of Modern Art in New York City in 2010. He has also lectured across the United States, Europe and Australia.

In 2006 Freear received The Ralph Erskine Nordic Foundation Award from Sweden, which recognizes urban planning and architecture that is functional, economical and beautiful, and which helps underprivileged and deprived groups in any society. He is the first American-based architect to win this prestigious award.

E.B. Min, AIA is the San Francisco-based principal of Min | Day. Established in 2003, Min | Day draws on the backgrounds of Min and principal Jeffrey L. Day in art, landscape, and architecture to provide informed flexible design for a wide range of clients, sites, and projects. The practice explores opportunities for innovation in program, materials, and fabrication through a diverse set of project types and scales of intervention, coaxing nuance and specificity from the unique opportunities of the site and project at hand.

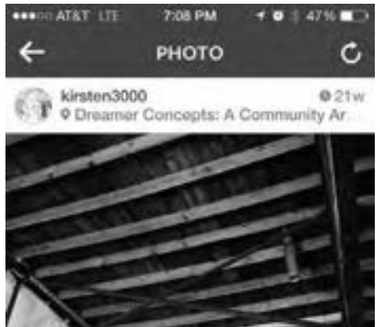
A graduate of Brown University with dual concentrations in art history and studio art, Min received her master of architecture from the University of California, Berkeley. She has taught at Berkeley and is an adjunct professor at California College of the Arts in San Francisco. Min has served on the board of the AIASF and currently serves on the board of the AIACC. Min | Day has received numerous awards, including AIACC's 2007 Emerging Talent Award and *Residential Architect*'s 2010 Rising Star designation, as well as being featured in *Architectural Record*'s Design Vanguard (2010).

Kirsten R. Murray, AIA is a principal and owner at Seattle-based Olson Kundig Architects. For over two decades, she has focused on a broad range of project types, including mixed-use, private residential, adaptive reuse, workplace and urban design. Her work has been published in such national and international media as *The New York Times*, *Architectural Digest, Interior Design,* and *Architectural Record*.

Murray's work has garnered national recognition for such projects as Outpost, Tye River Cabin, 1111 E. Pike and Art Stable, which received local, regional and national AIA Honor Awards. Her current projects include the Kirkland Museum of Fine & Decorative Art in Denver, a gallery addition to the Tacoma Art Museum, Paradise Road student housing at Smith College, and a master plan and expansion of Heritage University, as well as several urban mixed-use buildings in Seattle, Vancouver and Los Angeles.

In addition to her design work, Murray developed the firm's international internship program. She also co-directed and curated the firm's experimental work space, [storefront].

FORUM WORKSHOP



CREATING_MAKING STUDENT WORKSHOP: PROPOSALS FOR DREAMER CONCEPTS, A NON PROFIT ARTS ORGANIZATION IN NORMAN, OKLAHOMA

Student Participants:
Willy Burhan
Haven Hardage
Josh Jeffers
Michael Koch
Davis McDaniel
Conor McMichael
Kamyar Movaffagh
Casey Murray
Kory Myers
Nicholas Norsworthy
Michelle Oliphant
Chris Perez
Charlotte Robert
Caty Townsend
Mihn Tran
Yvan Tran
Victor Trautmann
Laney Vela
Victoria Waggoner

Workshop Leaders:
E.B. Min, AIA
Kirsten Murray, AIA

Nineteen College of Architecture students focused on designs for the gallery and work space of Dreamer Concepts at 428 East Main Street in Norman as part of a charrette/workshop led by two of the keynote speakers, E.B. Min and Kirsten Murray, during the Creating_Making Forum. This project was chosen as a service learning project, as the client operates a non-profit arts organization and was looking for help in making improvements to this historic 7,000-square-foot structure.

The project was launched Thursday morning, November 6 with a site visit, and concluded just 26 hours later with a slide presentation at noon on Friday, November 7. The students produced their designs in the Joe and Jayne Buskuhl Gallery in Gould Hall, where Min and Murray offered them design critiques Thursday afternoon. The students then worked through the night to meet their presentation deadline of noon on Friday. Their presentation was made to a crowd of over 50 people, including the client, Amber Clour, in the Scholars Room of the Oklahoma Memorial Union Building, and was received with much enthusiasm.

The students addressed issues related to all parts of the gallery, workspace, and adjacent parking lot. They made proposals to enhance the street presence and entry sequence of the space; they designed a flexible panel system to facilitate display and retail sales; they proposed ways to open up the structure to allow for flexible partitioning, acoustic enhancement, and better circulation in the workshop space; and they proposed a modular system of furnishing and planting to improve the parking lot.

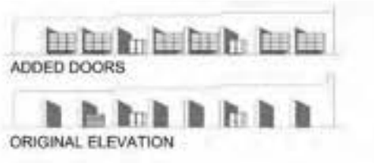
Subsequently, the students' designs have been on display during public events at Dreamer Concepts, and have generated considerable interest among the general public.

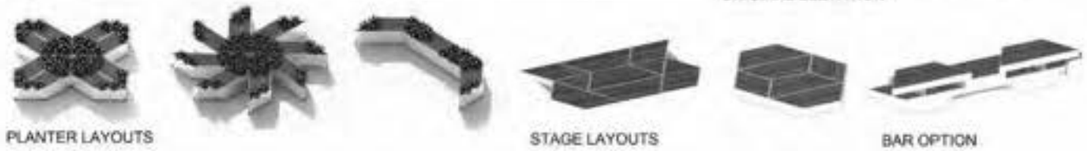
CREATING_MAKING
DREAMER CONCEPTS_THE LOT

SITE PLAN

STAGE ORIENTATION

FORUM WORKSHOP





PLANTER LAYOUTS

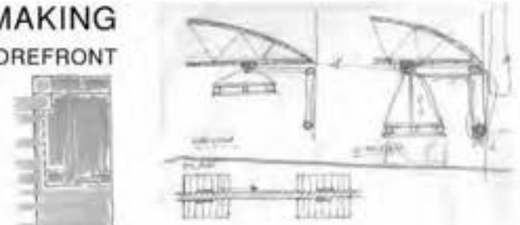
STAGE LAYOUTS

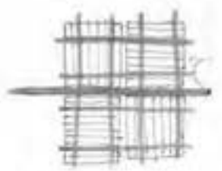
BAR OPTION

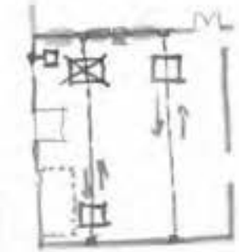
THE STAGE AND THE PLANTERS ARE MODULAR, BASED ON THE GEOMETRY ESTABLISHED FOR THE PROJECT. THE INTENTION IS TO ALLOW MAXIMUM FLEXIBILITY FOR THE NEEDS OF THE CLIENT. THE MODULARITY OF THE STAGE ALSO PROVIDES OPPORTUNITY TO DEFINE SPACES WITHIN THE SITE.

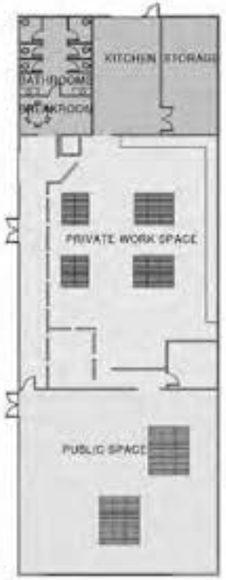
JOSH JEFFERS, BIG DADDY MC D, CONOR MCMICHAEL, KORY MYERS, CHRIS PEREZ, CHARLOTTE ROBERT, MINH TRAN, VICTORIA WAGGONER

CREATING_MAKING
DREAMER CONCEPTS_STOREFRONT









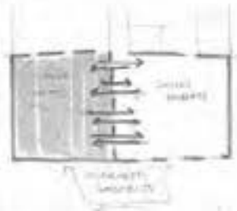
Plan

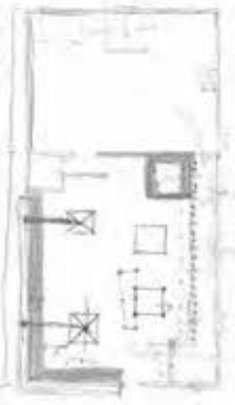
Panel Pulley Details

Interior Wall Detail

Workspace Interior and Exterior Wall

Workspace View





Gallery View

PAPERS

SESSION 1:
Do the Tools Matter?

Session Chairs:

Dr. Suchismita Bhattacharjee, University of Oklahoma
College of Architecture Division of Interior Design

Tammy McCuen, LEED AP, University of Oklahoma
College of Architecture Division of Construction Science

Elizabeth Pober, IDEC, IIDA, University of Oklahoma
College of Architecture Division of Interior Design

With the goal to further explore the new technologies available for the building design team and the impact of technologies on building design and construction processes, this session invites papers and discussions focused on how technology can and will assist the future building design and construction industry.

An increase in demand for better buildings led to the emergence of new strategies and technologies aimed at improving the performance of buildings with respect to functionality, comfort, aesthetics, cost and environmental impact. The increased number of available options for a given design problem have made the creative and innovative decision making processes more difficult and challenging for designers. The design process for a high performance building is best accomplished through a holistic lifecycle approach by a collaborative team of design and construction professionals. Advances in information technologies and the continuous improvements in computing power have led to the development of several computer-based tools that have significantly impacted the building design development and collaboration process. Today, the design process is dominated by the use of technology, from the programming and schematic design phases through design development, construction documents, and into building construction and operation phases. Since the adoption of computer-aided design in the 1980s, computer technologies have dramatically changed from simple drafting tools to complete building design decision-making, simulation and communication tools.

Integrated Digital Design Process: First Glory Church

Seung Ra, AIA
Assistant Professor
Oklahoma State University

Abstract

First Glory Church, a community-based religious facility in Seoul, Korea, was completed in 2014. The project added 150,000 square feet to the church's existing building and satisfied the goal of incorporating more community space for the growing congregation and surrounding neighborhood. A challenge for the church was to integrate past, present and future; as a place of worship, it had an important history to maintain while assimilating new technologies.

Contemporary religious architecture in Korea is largely based on prescriptive imagery. This project provided a thought-provoking opportunity to see how cultural influence could be addressed differently in the face of globalism. In lieu of conventional design, this project took a more novel design approach to realize a provocative facility design for one of the most conservative church denominations in Korea. The client ultimately favored the more innovative design after passing over previous emblematic designs for the church, raising the possibility for influencing a move toward the less familiar in Korea.

Our main objective was to promote cultural sustainability while departing from the preconceived notion of church design and to create a work of architecture that would reflect the nature of the future client and cultural needs for a modern facility. We re-envisioned functional possibilities for interior spaces to create more adaptable community spaces for the life of the facility. Conceptually, we sought to provide an uplifting space, while delighting worshipers with a new experience. This inspired our design of a new image for the church in modern-day Korea.

The project utilized digital technology to aid in the complex task of integrating the constraints of the existing building and structural layout with the proposed new shell design. It also became a critical tool for client participation and visualization, as well as contractor coordination. This session will present the integration of digital technology into the design and construction processes for First Glory Church.

Full paper withheld at author's request.

Image provided by author

Customized Repetitive Manufacturing in Architecture: A Case Study

Dana K. Gulling
Assistant Professor
North Carolina State University

Abstract

In recent years, computer numeric controlled (CNC) machines have made it easier to customize the tools for repetitive manufacturing. CNC milling machines, electrical discharge machines (EDM), and hot-wire foam cutters are used to create tooling (e.g. molds, patterns, and jigs) for repetitive manufacturing. With the use of CNC equipment, repetitive manufacturing can be cost effective for small-volume productions and thus makes customizing repetitive manufacturing a viable option for architectural applications. Today, architects and manufacturers are working together to customize repetitive manufacturing for unique building components.

Through my scholarship and teaching, I have compiled a list of case studies of customized repetitive manufacturing in architecture. There are a few historic examples, such as Frank Lloyd Wright's cast concrete blocks for his series of textile blocks (c. 1923) and Harrison & Abramovitz's stamped aluminum panels for the Alcoa Building (1953). However, most of the gathered case studies have been completed in the past 15 years. Those include REX's slumped glass windows for the VAKKO Fashion Center in Istanbul (2010); Francisco Mangado's extruded terracotta column covers for the Spanish Expo-Pavilion in Zaragoza, Spain (2008); and Tom Phifer's contact-molded fiberglass ceiling coffers for the North Carolina Museum of Art in Raleigh (2010).

This paper uses Foster and Partners' Walbrook Office Building in London (2010) as case study of customized repetitive manufacturing in architecture. The Walbrook's exterior louvers are made from bladder inflation molded (BIM) glass-fiber reinforced plastic (GFRP). The louvers were designed and manufactured specifically for this project. The selection of using BIM GFRP solved many problems that the project faced. This paper presents the specifics of the manufacturing process used and the particulars of the process for the case study and explores lessons learned by the architect.

Customized Repetitive Manufacturing, a Definitio

Manufacturing is to make similar products from raw materials, especially when done systematically. Repetitive manufacturing reuses its tools (e.g. jigs, molds, and patterns) to produce a run of similar products. Production runs for repetitive manufacturing can be varied, ranging from

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flickr srgpicker 14 June 2008, cropped

Image provided by author

Fig. 1. Examples of Customized Repetitive Manufacturing in Architecture. *From top to bottom:* VAKKO Fashion Center by REX (2010), Spanish Expo-Pavilion by Francisco Mangado (2008), North Carolina Museum of Art by Thomas Phifer Architects (2010).

prototypes and small-batch productions to production runs over one million units. In repetitive manufacturing, the tools are static – where a tool forms a shape. The tools may be adjusted or partitioned in such a way that different portions of the mold are used for forming differing shapes. Additional changes in the produce units can be done through manufacturing speeds, manufacturing conditions, or changes in media.

In repetitive manufacturing, the production run length is dependent on the process, the material, the labor, and most often the cost of the mold. For example, because of the low capital costs to make a pattern, sand casting can be used for small batches. Conversely, injection plastic molding, which typically uses a mold made from tool steel, has moving parts and embedded cooling lines, and is more appropriate for high-volume production. A product's production run offsets the production costs, so that high production runs are necessary for processes that have high tooling costs. For example, if a mold costs $50,000 but produces 100,000 units, the added cost of a custom mold would be just 50 cents per unit.

Customized repetitive manufacturing combines the value of repetitive manufacturing with the flexibility for customization. For architectural application, this means that a repetitively manufactured building component is customized on a per-project basis. For each of the examples offered in the paper's introduction, the manufactured component is specific to each project and is not available commercially (see Fig. 1). The case studies gathered include repetitive processes with a range of production runs. There are over 360 contact-molded ceiling coffers for the North Carolina Museum of Art and over 27,000 terracotta pieces for the Spanish-Expo Pavilion. Despite the broad range of production runs, most customized repetitive manufacturing processes in architecture are those manufacturing processes that can accommodate small and medium length production runs.

Image provided by author

flickr Lauren Manning 7 August 2009

Fig. 2. Flexibility of Customized Repetitive Manufacturing. *From top to bottom:* 3.1 Phillip Lim Store, Seoul by Leong Leong Architects (2009); Mulberry House by SHoP (2013).

For architectural applications, customized repetitive manufacturing can be flexible in its execution to meet the needs of the designer (see Fig. 2). First, tools may be created out of inexpensive materials so that multiple tool shapes may be made to make multiple shapes of repeated units. For example, Leong Leong Architects' 3.1 Phillip Lim Store in Seoul (2009) makes use of eight different fiberglass molds for the production of the precast concrete tile. Second, tools may also be subdivided to make different shapes using one tool. For example, SHoP's Mulberry House (2013) uses only one shape of rubber mold and subdivided that mold to make all of the project's different precast, composite concrete wall panels.

Walbrook Office Building, a Case Stud

This paper's particular case study of customized repetitive manufacturing is the Walbrook Office Building by Foster and Partners (2010). The Walbrook was built for a London-based British developer and property company, Minerva plc. The building includes the headquarters for a major corporation and additional leasable office

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Fig. 3. Walbrook Office Building by Foster and Pa tners (2010).

spaces. The Walbrook is located in London's central, historic core. It is next to Christopher Wren's Church of St. Stephan and near St. Paul's Cathedral. Since the building is located in a historically sensitive site, it had to adhere to a number of protected view corridors and the design team needed to be particularly sensitive to site context. Foster designed the project's bays, setbacks, and height so that it fit with surrounding buildings.

The Walbrook is over 640,000 sf (or 60,000 m^2) and is approximately 165 ft (51m) tall. It includes retail and restaurant space on the ground floor and an enclosed, inner-block courtyard in the back. The building is a series of repeated bays in plan. The bays are articulated with round structural column enclosures and exterior louvers that form gentle convex curves in plan as they span from column to column. The louvers' outer edge is vertically aligned at the base of the building, creating a subtle cornice line that matches its neighbor at 103 Cannon Street. Above the cornice line, the louvers' outer edges are progressively stepped back in plan; this creates traditional attic stories for the building's penthouse offices.

Manufacturing Process, Bladder Inflation Molding

Bladder inflation molding (BIM) is used to create hollow objects out of fiber-reinforced plastics (FRP). BIM is an extension of contact molding. The FRP can be applied to the mold by either traditional hand lay-up or the spray-on method. Hand lay-up is more labor intensive than spray-on, but typically results in better consistency, allows for woven fiber mats in the interior of the composite, and therefore has greater material strength than spray-on. The outside surface of the BIM object is the finished surface; the interior surface, which is in contact with the bladder, is not. The inflation of the bladder places pressure on the composite, ensuring a proper distribution of resin throughout all the fibers.

BIM includes a number of steps it the manufacturing process (see Fig. 4). A composite of fiber and resin is applied to both faces of a closed mold.[1] For each mold half, the fiber laminates are laid out according to the laminate plan. The laminate on at least one side of the closed mold extends over the mold edges for an overlap when the mold is closed. An internal bladder is placed inside the mold. The bladder is often custom-shaped to match the inside face of the object; this ensures even pressure on the composite. The bladder is slightly inflated prior to the mold being closed. When closing the mold, the manufacturer takes care to ensure that the FRP overlaps are kept inside the cavity before fully closing the mold. Clamps or mechanical fasteners may be used to keep the mold halves in place. Once the mold is closed, the bladder is inflated to a prescribed pressure. The bladder is kept inflated until the resin cures. In this process, the two halves of the composite layup are fused together. After the resin cures, the mold is opened. The bladder and any residual flashing are removed.[2] The outside of the BIM object is in contact with the inside face of the mold. Thus care should be taken to ensure that mold's inside surface is clean, smooth, and free of defects.

Step 1: Prepare the closed mold.

Step 2: Lay-up resin and fiber mixture on each pa t of the mold. Make sure there will be an overlap between the lay-up when the mold is closed.

Step 3: Place bladder inside of mold.

Step 4: Close mold, taking care to push the layers of fiber and resin into the mold. Clamp the mold and inflate the bladder. Keep mold closed until FRP cures.

Step 5: Open mold, deflate, and remove bladde .

Step 6: Remove completed object from mold

Fig. 4. Steps in bladder inflation molding (BIM

Even though BIM uses a closed mold, at least one side of the molded object will be left unfinished or open. In the example given in Figure 4, the left side of the molded object is open to both inflate and remove the bladder.

Because the bladders are inflated at relatively low pressures, the closed molds for BIM can be made from a variety of different materials, including high-density milling foams, fiberglass, or metals such as aluminum or tool steel.

The durability of the mold materials is directly proportional to the mold's cost. For examples, milling foam is the least expensive mold material, but typically it can only support a short production run of 10 units or less. Conversely, tool steel is the most expensive, and can support a production run up to 1 million units.

There are very few size limitations to this manufacturing process. Contact molding is often limited only by the size of the shop and a worker's arm length; however, as there are now more robotic sprayers, there is almost no limit to the size. BIM is slightly restricted in size compared with contact molding, because BIM requires additional space to close the mold and to insert and remove the bladder. Larger bladder sizes would also require a larger compressor than smaller molds, but the low pressures associated with BIM often do not make this a problem.

The Walbrook's Louvers

The Walbrook's louvers were custom designed and manufactured for this project. The louvers are spaced over three feet (about one meter) apart, which allow for unobstructed horizontal views from the inside. The louvers are elliptical and hollow in cross section. They come in three different widths –approximately eight inches, fourteen inches, and twenty inches (200 millimeters, 350 millimeters, and 500 millimeters), respectively. In total, there are 7.78 miles (12,525 meters) of the GFRP louvers on the Walbrook. Individual lengths vary, with the longest measuring approximately twenty-three feet (7 meters).

The louvers' material strength was engineered so that they would be self-supporting. They were designed to carry their self-weight, as well as loads from wind and snow. The resin was selected so that the louvers would be fire resistant in accordance with the British Standard System. The louvers are painted with a glossy, reflective, metallic grey paint. Because of their painted surface, the louvers block direct sunlight and reflect light into the building's interior. Their reflective coating also reflects changing light conditions, so that the building can appear to be glowing orange and pink in the evenings.

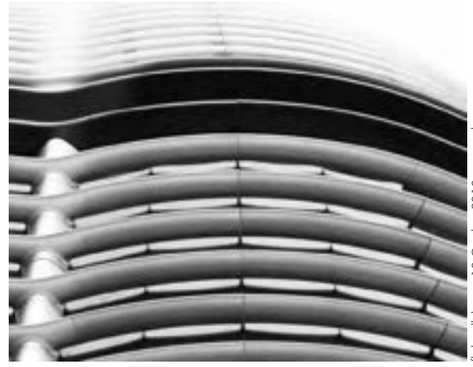
The molds for the Walbrook's louvers were manufactured with a two-step process. A five-axis computer numeric controlled (CNC) milling machine milled a plug from high-density milling foam. FRP molds were then made from the plug via contact molding. The milled plugs are durable enough to produce several FRP molds, and the FRP molds are durable enough to produce more than 100 units before needing repair. Two FRP molds were then clamped together to create the closed mold. The ends of the mold were left open to inflate the internal bladder. The louver's FRP was hand-laid on both sides of the mold. The hand-laminated process was chosen over spray-on because the design team required a particular material strength and surface quality, which spray-on could not match.

Although a CNC milling machine was used to make the molds for the louvers, economics did not allow them to be wholly made from computer-aided manufacturing (CAM) technologies. Instead, the design team and manufacturer, Fibertech Group GmbH, designed the louvers so that they balanced the design team's intentions with the reduced costs associated with repetition. This allowed the manufacturer to amortize the cost of fabricating the molds over more louvers.

For the Walbrook's louvers, there are only three cross sections, all of which remain consistent along the louvers' length. However, each louver's length was customized as it was made. Fibertech adjusted the louvers' length by applying different lengths of resin and fibers to the mold before closing it.

The horizontal runs of the Walbrook's louvers are made by BIM, while traditional contact molding was used to form the column casing, integrated brackets, and internal bracket connectors. The integrated brackets connect the louvers visually and structurally to the column casings by an organic, T-shaped, complexly curved unit. There are additional hidden metal brackets that align with every other glass curtain wall mullion. These hidden brackets are mechanically fastened to the internal bracket connector made from contact-molded GFRP. The connector inside the hollow louver is perpendicular to the louver's curve in plan, and is chemically adhered to the louver's inside face.

FRP was not the original material choice for Foster and Partners. According to Grant Brooker, senior executive partner for the project, the firm had originally envisioned clear anodized aluminum for the louvers.[3] However, to make the desired shape for the louvers out of aluminum, it would have required a combination of aluminum manufacturing processes –casting, extruding, and bending. Extruding and bending would have been used for most of the louver's length, while casting would have been used to connect the louver to the column casing. Using aluminum would have resulted in two problems. First, the cost of producing the louvers was considered to be too high. Second, the different aluminum manufacturing processes would have required different aluminum alloys and produced different surface finishes. The most notable would have been the difference in the finishes



flickr trilli bogus 10 October 2010, cropped

Fig. 5. Louver detail image.

between cast and the extruded aluminum. To achieve a consistent finish in aluminum, the louvers and brackets would have to be painted, but the painted finish was rejected by the design team.

The change from aluminum to FRP was recommended by Josef Gartner GmbH, the project's cladding contractor. The benefits of FRP included lightness and strength, thus requiring few supporting brackets for the louvers. Next, unlike aluminum, the FRP would be consistent in color and finish between the molded, complex-curved brackets at the columns and the simple curved runs of the remaining parts of the louver. This enabled the louvers to have the finish desired by the design team. Two design prototypes were made – one from aluminum and the other from FRP – for evaluation of design and performance. From those prototypes, FRP was selected as the final material.

The louvers are manufactured with a standard gel coating, which is typical to most contact-molded GFRP objects. The Gelcoat is a high-gloss resin with an integrated color. It is applied to the mold by a spray gun, and the wet lay-up is applied after the Gelcoat has cured. The louvers are then lacquered with three layers, with sanding between each layer. The final finish is a silver, high-gloss metallic. The coating was specially developed by Fibertech. The finish protects the GFRP from small impact loads that can damage the surface, ultraviolet light that can degrade the resin, and humidity that can cause warping.

According to Brooker, Foster and Partners learned lessons through this project that could be applicable for other architects. The first is that if the design intention is paramount, then the architect should consider building materials beyond the typical architecture palette. By making the change from the initial selection of aluminum to FRP, Foster and Partners was able to achieve the desired look for the building within an acceptable cost. Second, they discovered that there are additional advantages to using GFRP on buildings: GFRP is repairable with patching, and, because mold costs are low and most FRP manufacturers manufacture small batches, if replacement louvers are ever required, a new louver can be manufactured quite easily.

Conclusion

Production runs for repetitive manufacturing can be varied, ranging from prototypes and small-batch productions to production runs over one million units. The tools may be adjusted or partitioned in such a way that portions of the mold are used for forming differing shapes. Customized repetitive manufacturing combines the value of repetitive manufacturing with the flexibility for customization. For an architectural application, this means that a repetitively manufactured building component is customized on a per-project basis.

This paper uses Foster and Partners' Walbrook Office Building in London (2010) as case study of customized repetitive manufacturing in architecture. Foster and Partners specified glass-fiber reinforced plastic (GFRP) for the Wallbrook's exterior louvers, and Fibertech Group GmbH manufactured them using hand lay-up in a combination with bladder inflation molding. The project's economics required that certain parameters, such as the louvers' cross-sectional dimensions, remained consistent, while the louvers' lengths could be easily customized within the hand lay-up process.

Originally conceived as being made out of aluminum, the aluminum louvers' quality was lower and the costs were higher than originally anticipated. By following the suggestions of the project's cladding contractor, Foster and Partners investigated using a non-traditional building material and manufacturing process to make the louvers. This resulted in finishes, details, and costs that were acceptable to the design team. Since the louvers were the primary element for the Walbrook's exterior, the quality of the final building would have been diminished had they not used bladder inflation molding.

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[1] A closed mold is a mold that comes in two or more parts and encloses the manufacturing medium.

[2] Flashing is extra resin that often seeps out between the seams of the closed mold. If the mold is tight enough, the flashing can easily be knocked off by hand or cut by a knife. The formed object is then lightly filed or sanded to remove any remnants.

[3] Grant Brooker, phone interview by author, 22 August 2014

Acoustic Formations

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Abstract

The project is best summarized as the formation of a process manifesting a listening device that taps into the embedded properties of sound energy and fabrication processes to shape architectural space. The research development process used parallel methodologies and authentic bottom-up systems to achieve procedural connectivity between design and fabrication during the creation of an urban sound experience pavilion. Positions for listening, defined by and trained on contextual points of aural interests, are focused geometrically, and are reliant upon on acoustic reflectivity precisely positioned by physics and mathematics. Individually unique doubly curved architectural surfaces, adaptably and efficiently formed on site, are the intermediaries between the idea of focusing sound and its manifestation. Results of the work yielded novel contributions of spatial logic, form finding, mechanical locking, mold surface material advancements, panel aggregation strategies, and commercial viability.

Full paper withheld at author's request.

Simulation of Developable Geometries: The Craft of Software Manipulation

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Abstract

Embedding the geometrical logic of building materials and methods of assembly into the design process is a prerequisite for constructability. A direct relationship between representation and the act of making results in structures built as intended and assigns control of design. Historical drawing techniques could mimic the movements of physical tools that shape building materials and their aggregated conditions. Breakdown in this relationship represents a loss of design agency, as translation of design intent is relinquished to craftsmen. Whether drawing stone, brick, steel frame or concrete formwork, the act of design is an act of material simulation.

The relationship between representation and making often appears to endure with digitally generated forms. Sophisticated digital modeling tools produce complex three-dimensional geometries, which are realized as physical artifacts. However, the ease of digitally generating doubly curved geometries does not always have a direct corollary in material reality, as construction is often executed in inextensible sheet materials that cannot stretch into compound curvature. This necessitates a rationalization process, to translate design geometry into constructible form. Discretization strategies may divide the surface into an aggregation of components that are planar or ruled surfaces of simple curvature. Developing flat patterns for these ruled surfaces results in further distortion of form. Surprisingly, current 3-D modeling techniques are incapable of generating curved ruled surfaces directly, thus rationalization results in adjustment to design intent.

This paper describes a design process utilized for an architectural installation constructed exclusively of complexly curved surfaces. The design workflow sought to minimize rationalization by directly composing with digitally generated ruled surfaces that can be flattened without distortion. The resulting methodology recognizes software as a tool that exhibits characteristic behaviors, actions and outcomes. Software can thus be wielded with skill and intuitive manipulation that comes from deep knowledge of its underlying principles and protocols.

Full paper withheld at author's request.

SESSION 2:
Lessons From Home

Session Chair:

Dr. Dawn Jourdan, Esq., University of Oklahoma
College of Architecture Division of Regional and City Planning

For the first time in history, more than half of the world's population lives in urban areas. The global transformation from rural and agrarian life to urban living has happened rapidly. A dramatic and worldwide revolution in our relationship to the natural and manmade environment is unfolding in our midst. The vast majority of this urban population growth is occurring in developing countries: cities such as Dhaka, Kinasha and Lagos are now 40 times larger than they were in 1950. Migrants to urban areas often find the only available housing in makeshift dwellings, slums and shantytown settlements on the peripheries of exploding megacities. Too often these settlements lack clean water, paved roads, sewage infrastructure and other basic necessities. In spite of these harsh conditions, these settlements remain productive environments in the global marketplace. We seek a range of papers that examine contemporary conditions in urbanizing areas as well as precedents in housing policies and practices in order to begin to develop a better understanding of the issues at stake and imagine a range of models for success.

Providing adequate housing for populations moving from rural to urban environments is a challenge that planners and designers must confront in the 21st century. Yet this challenge is not entirely new. What can we learn from earlier experiments in social and public housing that might inform how to begin to address the global housing crisis? Failures, successes and the range of solutions in between offer valuable lessons for contemporary policymakers and practitioners. Questions and topics might include: informal settlements in the developing world, housing designs that reflect the tension between the agency of the state and that of the individual inherent in public housing projects, innovative financing structures for public housing, new approaches to urban planning and design, or assessments of housing legislations, such as Hope VI.

Architecture and Social Problems: Lessons from Pruitt-Igoe

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Photo by U.S. Department of Housing and Urban Development Office of Policy Development and Research.

Demolition of Pruitt-Igoe.

Abstract

As populations around the world continue to move from rural to urban areas, architects and city planners must conceptualize architecture's relationship to community development and social problems. Luckily, successes and failures of past urban planning efforts and public housing projects can inform architecture's future role in battling social problems that often accompany rapid urbanization.

In his book *Down Detour Road*, Eric Cesal argues that in recent years architects have undermined their own importance by focusing on formal design and acclaim from the architectural community rather than architecture's role in daily life and the power buildings have to improve or detract from daily activities. For architects to regain their former prestige, explains Cesal, they must embrace the role of "citizen architect" and think about how to use architecture to solve problems affecting everyone rather than just those pertaining to architects and their clients. The high-profile failure of St. Louis's Pruitt-Igoe public housing project in the 1950s and 1960s muted architects' desire to use architecture for social change, but Cesal argues that the philosophical backlash against modernist optimism has gone too far. It is unrealistic to expect architecture to singlehandedly solve social problems, but it is equally problematic to ignore architecture's relationship to its communities.

This paper examines the socioeconomic context of Pruitt-Igoe's failure and explains how a better understanding of this context can shape future decisions about architecture's role in addressing social and economic problems.

Introduction

In recent years architects have seen a decline in status, evident in public perception of the profession and in the way clients interact with architects. In his book *Down Detour Road*, Eric Cesal argues that architects have undermined their own importance by focusing on formal design and acclaim from the architectural community rather than architecture's role in everyday life and the power buildings have to improve or detract from daily activities. For architects to regain their former prestige, explains Cesal, they must embrace the role of "citizen architect" and think about how to use architecture to solve problems affecting everyone rather than just those pertaining to architects and their clients.[1] The high-profile failure of St. Louis's Pruitt-Igoe public housing project in the 1950s and 1960s muted architects' desire to use architecture for social change, but Cesal argues that the philosophical backlash against modernist optimism has gone too far. It is unrealistic to expect architecture to singlehandedly solve social problems, but it is equally problematic to ignore architecture's relationship to its communities.

Architecture's Role in Addressing Social Problems

Cesal defines citizen architecture simply as an increased awareness of the implications of a project.[2] Citizen architecture often evokes ideas of small-budget green projects out in the woods, but Cesal's definition connotes none of that. He describes citizen architecture as a focus on community.[3] In his argument, Cesal starts by noting that altruism has fallen out of favor among architects, in part because of the perceived failure of Pruitt-Igoe and the modernist utopian ideals associated with it.[4] However, a lack of altruism is not in itself a problem, because it is easily conceivable that a project could be both beneficial to the community and profitable to the client. The problem is that, too often, architects and clients do not recognize how important a successful community is to the long-term vitality of a project, and so they do not place enough importance on making sure their projects supports their communities. Architects and clients need to stop thinking of architecture-community relationships as altruistic – in reality they're symbiotic. Cesal explains that in the past architecture was seen as a vehicle for social problem-solving, but contemporary architecture chooses to view such problem-solving as altruism rather than as a core part of the profession.[5] Pruitt-Igoe's demolition, a symbol to many of the death of modernism, was a major factor in this unproductive shift in thinking.

The story of Pruitt-Igoe reveals much about belief in architecture's power to solve social problems. When the project opened in 1954, it was touted as a solution to social disease.[6] But when it was demolished in the mid-1970s after a troubled existence, it seemed obvious: Architecture was not the answer to social problems. Worse, architects largely ignored these problems altogether after Pruitt-Igoe's failure, leaving issues of poverty and health to social workers and urban planners.[7] This is problematic.

Just because architecture cannot solve cultural and societal problems in and of itself does not mean it has no role in them.

Postmodernism and Architects' Insensitivity to Social Problems

Before combing Pruitt-Igoe's history for clues about how architecture should address social problems, it helps to understand architects' reaction to Pruitt-Igoe's failure as a roadmap for how *not* to address these problems. When Pruitt-Igoe was demolished and it appeared that modernists' quest to alleviate social problems through architecture had failed, many architects decided to ignore social issues altogether. Postmodern experiments, like Michael Graves' Portland Building, provide evidence that, despite the impracticality of modernist utopian ideals, architects should not ignore social problems.

Architectural critic Ada Louise Huxtable noted in 1980 that it is easier to criticize specific failures than to respect general intents and principles,[8] and this was certainly the case in early postmodern criticisms of modernist idealism. When architects were released from modernism's strict design principles, they often, in their excitement over their newfound freedom, overlooked architecture's essential relationships to its occupants and its contexts. With modernism's utopian vision of architecture as a vehicle for social change firmly in the rearview mirror, postmodern architecture emphasized irreverence for tradition, acceptance of contradiction, and "rejection of fixed notions of reality."[9] Sunderland University's Elizabeth Atkinson argues that postmodernism and social change are not mutually exclusive, but concedes that postmodernism may work better as a thought device than an action plan for change.[10] In architecture, where practicality is paramount, postmodern wit and irony can become dangerous distractions. Graves' Portland Building is the most famous example of this misstep.

In the 1970s, Portland's government wanted to create visually interesting, pedestrian-friendly streets, so stark white modernist walls were discouraged in favor of more articulated surfaces that defined streetscapes on a human scale.[11] Portland's departure from modernism was inspired by concerns for people and a desire to control how architectural space influenced building occupants, not by a philosophical search for abstraction or a need for architectural acclaim. It is interesting, then, that desire for architecture that engaged the community led to a landmark postmodern building that became famous for drawing the ire of its city.[12] Huxtable described postmodern architecture as "witty" and "ironic,"[13] and lamented postmodernism's lack of social focus. These criticisms are certainly true of the Portland building: It was so insensitive to the spatial needs of its occupants and its community that only two years after its opening, there was talk of reworking its public spaces.[14] The building's focus was on dialogue, wit, and reference, not on its occupants. The building put postmodernism at the forefront of architectural discourse, made Graves a celebrity, and briefly turned Portland into "a hotbed of progressive artistic activity,"[15] but it did not meet the needs of its users. There is nothing inherently wrong with being ironic or starting a philosophical discussion, but when novelty replaces function as the focus of a project, occupants and communities suffer. Irony should not preclude sensitivity to social context.

It is clear that architects should not wholly ignore social problems. But postmodernists' reactions to modernism were not baseless. Modernism's failures, Pruitt-Igoe among them, demonstrate that architecture is not a foolproof solution to all social issues. What role, then, should architecture play in social problems and community development? A closer look at the life and death of Pruitt-Igoe reveals some of the ways architecture can help alleviate social problems in urban America.

Lessons from Pruitt-Igoe

Optimism and idealism defined the early years of the Pruitt-Igoe housing project. It was seen as a "symbol of St. Louis's rebirth," and former residents remembered their initial experiences fondly.[16] One resident said the project had an "electric, engaging life,"[17] something any architect would love to hear about his or her work. But it is important to remember that the problems Pruitt-Igoe and public housing in general addressed were not basically architectural. The disadvantaged people who moved to Pruitt-Igoe did leave behind shockingly inadequate housing, but that was and still is a symptom of poverty, racism, and racial segregation. To assess how architecture might avoid Pruitt-Igoe's example and correctly address these issues, as Cesal argues citizen architecture should, it helps to look at some of their causes and forms in American cities.

Structural Segregation and Poverty in Urban America

In their influential book *American Apartheid*, Douglas Massey and Nancy Denton describe a ghetto as an area "exclusively inhabited by members of one group, within which virtually all members of that group live."[18] The word is usually associated with early twentieth century African-Americans or with pre-World-War II Jews, but it still applies emphatically to urban America today. It certainly applied to St. Louis in 1940, when the city had a 92.6 index of dissimilarity (a 0-to-100 measure of racial segregation),[19] one of the highest in the nation.

There were many reasons for this high level of segregation. Legal factors and whites' desire to avoid living near blacks funneled southern blacks moving north into existing black neighborhoods.[20] Whites subsequently used racial violence and discriminatory real estate practices to maintain color lines within cities and plan ghetto expansion.[21] Once blacks were established in the inner cities, it was very difficult for them to leave. Many of these new city dwellers were poor, uneducated former sharecroppers,[22] and the decline of manufacturing created a "spatial mismatch" between jobs and skills that made it difficult for low-skilled blacks to gain employment and the financial means necessary to flee cities.[23] Again, it is important that none of these problems are inherently architectural or seem to beg for an architectural solution. Pruitt-Igoe may have been facing systemic factors too large to be reversed by a housing project, since the low-income black community had been functionally barred from participation in broader society through both real estate discrimination and the threat of violence. Years of social isolation cannot be reversed by a housing project, no matter how well designed it is.

In addition to segregation and racism, inner cities, including that of St. Louis, faced problems of poor education and health. In *Savage Inequalities*, Jonathan Kozol describes East St. Louis as a place where "there is no right or wrong side of the tracks."[24] Poverty and violence were everywhere, beginning when poor rural blacks migrated north towards jobs and continuing even through Kozol's late 1980s visit. Chemical runoff from nearby Monsanto and Pfizer plants polluted the water, and inadequate hospitals failed to treat the resulting health problems.[25] In this case, these are factors that good architecture could have prevented if the architects and building owners had more carefully considered waste and its effects on surrounding communities and designed to minimize those effects.

Kozol explains that school funding is driven by taxes, and since inner cities are poorer, because affluent whites fled to the suburbs taking the tax base with them, and often house large tax-exempt entities like museums and universities, urban schools are usually badly funded, denying education to children who need it most.[26] Kozol describes one inner-city school building as doing "everything an inanimate object can do to keep children from being educated."[27] He cites leaky roofs, broken windows, uncomfortable ceiling heights, minimal natural light, and dilapidated walls as detrimental to the learning environment. This *is* an architectural problem and is an area where good citizen architecture can make a difference in society. Educational buildings need to be able to serve their users, and in many poorer areas, they do not.

Reactions and Explanations for the Pruitt-Igoe Failure

When people criticize Pruitt-Igoe, they often overlook the factors like race, poverty, and education that contributed to its demise. They unfairly blame architecture for failing to reverse negative trends for poor black Americans that have existed since the Revolutionary War. Critics like Ada Louise Huxtable argue that Pruitt-Igoe's large-scale, vertical architecture encouraged crime and antisocial activity.[28] Others say that poor people didn't react to architectural space the way "sophisticated" people would or that the architecture failed its users.[29] Both arguments overlook the fact that biased attitudes and systemic factors in the United States had already failed poor urban blacks. Elizabeth Birmingham says that blaming design failures or modernism in the Pruitt-Igoe case only draws discussion away from the real issues of segregation and racism.[30] Birmingham does say that perhaps modernism and public housing projects like Pruitt-Igoe are forms of elitism that reinforce segregation,[31] and this makes some sense because architects' clients are typically wealthy and the profession's "social loyalties" lie with the upper class, not with the poorer people most affected by social problems.[32] This is concerning, but it is more of a philosophical criticism than a formal, architectural one. In Chad Freidrichs' documentary *The Pruitt-Igoe Myth*, one theorist asserts that whites consciously used projects like Pruitt-Igoe as instruments of segregation,[33] and this claim is reasonable considering the evidence presented in Massey and Denton's *American Apartheid*.[34] When critics say that Pruitt-Igoe became a "center of social hopelessness,"[35] they fail to realize that all Pruitt-Igoe did was relocate that hopelessness from the existing St. Louis black ghetto.

Many former residents cited poor maintenance and understaffing as factors that led to the deterioration of the initial optimism among residents of the housing complex.[36] In general, this kind of problem may be an architect's fault if a project is over budget and forces the client to reduce the upkeep budget to get the building built. But this was not the case at Pruitt-Igoe, since different parties were paying for construction and upkeep.[37] Still, bad maintenance was clearly a factor in Pruitt-Igoe's failure.

Criticisms of Pruitt-Igoe on a purely architectural level fail to realize the enormous amount of negative social capital the project was up against: decades of segregation, poverty, health issues, and poor education. Pruitt-Igoe did not fail because modernism was wrong or because the design was flawed, and architects should not view its failure as a reason to ignore social problems or to assume that architecture can be of no use in solving them. What Pruitt-Igoe should do is show that architecture is not a universal solution to all social wrongs. Architecture can be used to help alleviate social problems if architects carefully examine social contexts and identify specific areas with architectural needs: for example, inner city schools that need more supportive learning environments or chemical plants that need to dispose of waste without harming nearby communities. If this sounds familiar, it is because sensitivity to social context and carefully chosen battles against social problems are important elements of the citizen architecture Cesal describes.

Conclusion

Cesal worries that architects' lack of engagement in social problems after modernists' perceived failures to alleviate those problems contributes to the architecture profession's declining prestige. Throughout his book, he cites obsession with form and postmodern abstraction as valid reasons architects are losing influence. But the basic problems architects are trying to solve – like how to make an efficient hospital or a comfortable coffee shop – are still relevant to people outside architectural circles, which gives architecture lasting importance.[38] If architects can increasingly focus on how their projects impact communities, they do not need to strive for altruism or world-changing utopian visions. Huxtable explains, "Like all ideals, those of the modernists have been elusive and impossible to realize … it seems rather sad, and even arrogant, that the present

generation does not bother to wonder what the excitement was all about."[39] As the failure of Pruitt-Igoe demonstrates, utopian aspirations are unlikely to solve social problems, not because those aspirations are misplaced, but because of how broad and deeply rooted social problems are. Too often we remember modernist idealism the same way we regard a child's wide-eyed notions of how the adult world should work: patronizingly, maybe nostalgically, but not respectfully. Architecture has the power to influence society, and this should not be forgotten simply because it cannot swiftly and dramatically correct all social evils.

Architects cannot single-handedly solve social problems, and they cannot sit idly by while these problems permeate the communities using the buildings they design. As the story of Pruitt-Igoe shows, and as Cesal argues in his book, thoughtful awareness of architecture's role in people's daily lives and design decisions based on that awareness are the best ways to strike a balance between the arrogance of believing architecture is the solution to social problems and the intellectual elitism of denying it has any impact on them.

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[1] Eric Cesal, *Down Detour Road* (Cambridge, MIT Press, 2010), 191.
[2] Ibid., 192.
[3] Ibid., 191.
[4] Ibid., 190, 194.
[5] Ibid., 193.
[6] Chad Freidrichs, *The Pruitt-Igoe Myth* (New York, NY: First Run Features, 2011), DVD.
[7] Cesal, 195.
[8] Ada Louise Huxtable, "The Present: The Troubled State of Modern Architecture," *Bulletin of the American Academy of Arts and Sciences* 33, no. 4 (1980): 26.
[9] Elizabeth Atkinson, "The Responsible Anarchist: Postmodernism and Social Change," *British Journal of Sociology of Education* 23, no. 1 (2002): 74.
[10] Ibid.
[11] Meredith Clausen, "Michael Graves' Portland Building: Power, Politics, and Postmodernism," *Journal of the Society of Architectural Historians* 73, no. 2 (2014): 252.
[12] Ibid, 266.
[13] Huxtable, "The Present," 31.
[14] Clausen, 264.
[15] Ibid, 250.
[16] *The Pruitt-Igoe Myth*.
[17] Ibid.
[18] Douglas Massey and Nancy Denton, *American Apartheid* (Cambridge: Harvard University Press, 1993), 18.
[19] Ibid., 21.
[20] Ibid., 28-29.
[21] Ibid., 30.
[22] Ibid., 29.
[23] Donald Houston, "Methods to Test the Spatial Mismatch Hypothesis," *Economic Geography* 81, no. 4 (2005): 407.
[24] Jonathan Kozol, *Savage Inequalites,* (New York, Broadway Paperbacks, 1991): 24.
[25] Ibid., 24-26.
[26] Ibid., 56-57.
[27] Ibid., 96.
[28] Ada Louise Huxtable, "A Prescription For Disaster," *New York Times*, Nov. 5, 1972.
[29] Elizabeth Birmingham, "Reframing the Ruins: Pruitt-Igoe, Structural Racism, and African American Rhetoric as a Space for Cultural Critique," *Western Journal of Communication* 63, no. 3 (1999): 291-292.
[30] Ibid., 293.
[31] Ibid., 293.
[32] Friedner Wittman and Milton Wittman, "Architecture and Social Work: Some Impressions About Educational Issues Facing both Professions," *Journal of Education for Social Work* 12, no. 2 (1976): 53.
[33] *The Pruitt-Igoe Myth*.
[34] Massey and Denton.
[35] *The Pruitt-Igoe Myth*.
[36] Ibid.
[37] Ibid.
[38] Cesal, 193.
[39] Huxtable, "The Present," 26.

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From Wroclaw to Prague: Lessons from the Eastern-European Ferroconcrete Residential High-rise Experiments

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Abstract

At the end of World War II the rise of nationalism introduced centrally planned economic models to some Eastern European countries. That process, coupled with a significant need for urban reconstruction, provided an opportunity for waves of in-migration to larger cities like Wroclaw, Poland, and Prague in former Czechoslovakia. In response, the growth and sprawl occurred mainly around the perimeter and consumed adjacent towns and rural regions. Furthermore, the invention of ferroconcrete prefabrication techniques at the turn of the twentieth century, particularly the modular residential high-rise building model or "kit of parts" studied by Gropius and advanced by LeCorbusier, became the staple design pattern rapidly spreading behind the "Iron Curtain."

Such economy of scale provided housing for millions of inhabitants previously lacking access to running water, sewage systems, and space conditioning. However, it also laid the foundations for a number of future social and urban design problems. For instance, the increase of individual mobility reinforced by the introduction of inexpensive public transportation systems and, later, personal transportation options put a significant strain on the social/recreational spaces carefully designed by city planners. Additionally, changes in consumption patterns rendered the centrally planned apartment sizes obsolete as families grew and acquired more personal property. Lastly, the communal services became insufficient due to significant heat losses from inadequate building construction, lack of maintenance, and a desire for an increase in quality of personal comfort.

Based on the examples of modular ferroconcrete plate construction located in parts of Wroclaw and Prague, this paper identifies fundamental issues related to Eastern European governance structures, their short- and long-term influence on the built environment, particularly in the light of substantial changes that followed the fall of the Berlin Wall, and extrapolates these findings to current and future developments in architectural design and practice.

Fig. 1. Typical 1970s high-rise building. Socialist large block estate in Wroclaw, Poland.

Complex Past, Convoluted Presence, Uncertain Future

A survey of various implementations of the ideas that, in part, resulted from the deliberations of the International Congress of Modern Architecture in 1933, and culminated in the publishing of the Athens Charter by LeCorbusier, reveals the origins and the convergence of values underlining contemporary sustainability and social justice movements. These principles, combined with today's for-profit and not-for-profit economic models, simultaneously stimulate and regulate the activities necessary for appropriate stewardship of the natural environment: competition, research, and development. In that spirit, the early modernist qualities of "functionalism, existential minimum, and maximum healthiness"[1] were later represented by: universal access to sunshine and cleansing winds, the ability to use "open green space" for improved wellbeing,[2] and the idea of a "tabula rasa" in urban development.[3] The clean slate approach produced large urban complexes on the outskirts of existing cities. Additionally, instances like the shifting of administrative boundaries in post-World War II socialist Poland that forced migrations from rural regions to recovering and rebuilding cities resulted in a limited, albeit occasionally selective, social stratification[4] among the newly erected large block estates. Comparable situations occurred in former Czechoslovakia. It is estimated that currently in the Czech Republic "almost one third of the population lives in socialist high-rise buildings."[5] (See Fig. 1.) These social patterns, but not necessarily architectural design strategies, commonly referred to as cross-income and mixed social-status housing, are presently desired in many developed countries operating under free-market economic conditions. However, the social diversity has been recently overshadowed by a significant increase in the rate of demographic aging, especially common in bedroom communities serving larger agglomerations.[6]

As noted by Kimberly Zarecor: "Few building types are as vilified as … the apartment buildings of the planned economy … notorious from problems such as faulty construction methods, lack of space, nonexistent landscaping, long-term maintenance lapses, and general ugliness."[7]

The future of socialist estates is being called into question because, recently, many of the high-rise buildings began approaching the fifty-year life span that was assumed during their design phase. Experts are divided on the issue of the construction safety of large urban complexes and individual buildings. However, most of them agree that specific components of the building envelopes will pose, in the future, an increased number of problems due to their layered construction; the internal structural elements might be intact, thermal insulation has most likely deteriorated, and the exterior veneer panels are difficult to inspect because they have been covered with a variety of insulating materials over the last two decades.[8] This situation keeps the residents confused and worried.

The variety of problems and the notion of disappointment with the construction of these prefabricated housing estates, serving literally millions of inhabitants,[9] should be examined through several sets of converging lenses to reveal the underlining causes of failures and some successes that parallel the evolution and subsequent collapse of a particular socio-economic model.

The following issues should be examined to estimate the future potential of existing socialist housing estates:

- Did socialist housing estates fulfill the initial purpose of providing favorable and equitable living conditions to a large number of residents?
- Did socialist housing estates adapt to changing political and economic conditions?
- Is there a potential for future adaptability?

It is also important to compare the outcomes of this review to the present trend of industrialization in architectural practice.[10] Just like at the turn of the twentieth century, when the technological advancements steered design in new directions, the beginning of the twenty-first century promises significant innovations that will once again disrupt the architectural status quo.

The Past: Economic System vs. Social Order

The convergence of political and economic systems that formed the foundations of socialism provides the most rudimentary and overarching perspective, influencing the development of housing estates behind the "Iron Curtain."

On the one hand, there are the economic measures of central planning, strict control of natural and human resources, and allocation of the means of production, along with the policy of an extremely limited private sector employment, which characterize the economic systems of former socialist Poland and Czechoslovakia.[11] In the long run, these processes contributed to the scarcity of construction resources, low quality of building products, and generally restricted the diversity of building materials. While virtuous in its initial reasoning, the centrally planned economy did not withstand the test of time. However, it left in its wake a substantial number of properties that provided a considerable upgrade to the living conditions for many who otherwise would not be able to afford them; World War II left the real estate of both countries significantly destroyed.[12]

On the other hand, there are the factors of political control linked to the outcomes of the socialist doctrine of equity, which resulted from opposition to liberalism which failed "to address social concerns of poverty, social oppression, and gross inequality of wealth"[13] among the citizens. These attributes of real socialism introduced standardization of design processes to meet the demand for housing in rapidly growing cities[14] and justify the process of implementing the new social order. Priority was placed on: the speed of construction, the number of units built to accommodate the requirements of nationally adopted five-year plans, and the economy of scale that selectively served the ideals of social equity[15] popularized by the ruling party. Consequently, the Polish "wielka plyta" and the Czech "panelak" refer to mass-produced modular buildings that are rooted in the ideas popularized by Gropius, LeCorbusier, and Mies van der Rohe, but were designed and built under very specific socio-economic circumstances.

The Past: When the Whole is Less than the Sum of the Parts

While the above-mentioned independent assessment of the political and economic systems reveals their strengths and limitations, it is the particular combination of the central planning and the insistence on social equity that in the long run proved damaging to Poland and former Czechoslovakia. However, it is also true that the same ideologies generated very fertile ground for the development of the technology of ferroconcrete prefabrication. A variety of open and closed flat plate construction systems had been developed between the 1950s and 1980s. Unfortunately, the socio-political system tamed the possibility of full implementation and further development of the ideas postulated by Modernist Architects.

In that context it is important to compare at least one successful example of early modernist social housing that withstood the test of time, including socio-economic perturbations, to a typical flat plate socialist estate built in 1970s socialist Poland. The examination of the following projects reveals many similarities and several important distinctions:

- a three-story set of row houses erected in 1927 in the famous Weissenhofsiedlung in Stuttgart, Germany, designed by Ludwig Mies van der Rohe, and
- a five-story set of multiple row houses on Popowicka Street in Wroclaw, Poland, located in a large socialist housing estate called Popowice, designed by Witold Jerzy Molicki (see Fig. 2).

Despite the over forty-five-year time frame separating the construction of both buildings, the similar use of modernist design language on their exterior elevations and the overall building forms is striking; flat roofs, long bands of flush mounted windows with sheet metal formed window sills, flat plate covered entrance ways, day-lit cellars, flush mounted downspouts, and simple, shallow and barely functional balconies that improve daylight access and increase capacity for cross-ventilation.

Fig. 2. Popowice estate, Wroclaw, Poland. Five-story set of multiple row houses. Constructed in the early 1970s. Photo 2014.

However, these characteristics had significantly different roots. Mies' design reflected his belief that in the building of rental units the "economic considerations … demand rationalization and standardization of production" and need to be combined with the "flexibility in the use" to "satisfy every reasonable [future] dwelling need."[16] His ideas of flexibility and adaptability worked in tandem with the ideology of rationalization that influenced the housing industry after the failed attempts of recovery from the horrors of World War I and served as the foundation of the Weissenhofsiedlung. All national efforts were geared toward the greatest economic revival and significant improvement "of the quality of life in general."[17]

On the contrary, the work on the Popowice estate sprung primarily out of the need to serve the social order of the country that has already been in the state of an attempted economic recovery for several decades. Families have been compartmentalized according to their initial size and unable to expand into larger flats because in the view of the socialist doctrine – the future ceased to exist. Moreover, socialism subjugated the needs of an individual to the higher good of the entire society. Thus the old vertical layering of traditional inner city architecture, which favored the use of the ground levels for mercantile and business purposes, immediate upper floors for the owners of the properties, and the top floors for rental purposes and servants, was seen as an antithesis of modern urban design. Instead, the new form of mixed-use architecture preferred state-owned and -operated stores at ground level and diverse social housing above (see Fig. 3).

Therefore, the modular flat plate system that was utilized in the construction of the Popowice estate accommodating nearly 17,500 residents,[18] and provided considerable flexibility in the initial design phase, was highly desirable and quickly implemented by the ruling class. It allowed for a mixture of studio, one-bedroom, and two-bedroom flats ranging from 297 to 528 square feet in size in the five-story building. Taller structures consisted of some three-bedroom and four-bedroom flats in addition to the smaller units. However, despite this initial design flexibility, the need for achieving an economy of scale significantly restricted the flexibility in the arrangements of the adjacent units of the row house structure. In the late 1960s and early 1970s, shortages of construction resources that resulted from the failures of socialism, and the nationally implemented mandatory standardization of apartment sizes, limited the diversity of individual unit layouts.[19] Additionally, the relatively short span of the ferroconcrete module has diminished the opportunity for future reconfiguration of the unit layout. This was contrary to Mies' proposal of a post and beam structure that allowed for a flexible floor plan and the highly diversified arrangement of each unit.[20]

Fig. 3. Mixed-use modular construction in Prague, Czech Republic.

The failure of socialism was that, instead of recognizing its transcendent nature for better, yet undefined future, it saw itself as both: the means to an end and the end in itself. This ideology impacted the architecture of residential high-rise estates by subjugating the creative processes to the centrally controlled doctrine of social equity.

As a result, the five-story building on Popowicka Street suffers from a "multiple identities disorder" due to a variety of interventions rooted in: the basic needs of individual residents to differentiate their dwellings, changing energy efficiency requirements affecting the "skin" of the building, and aesthetic consideration that included the color palette and signage (see Fig.4). The structure can easily be described as worth "less than the sum of its parts" despite its relatively good overall condition. At the same time, Mies' design still stands proud of its modernist origins: absent of modifications, well-sited among the estate, and not overrun by a sea of automobiles.

The Past: Architecture vs. Building

The next set of "converging lenses" responds to analysis of the distinction between the processes of architecture and building, practices that evolved from the tradition of a master builder who simultaneously served the functions of "an architect, an engineer, and a contractor."[21] This examination offers a different look at the reasons why most socialist estates built in Poland and former Czechoslovakia between the 1960s and 1980s are seen by many as a vivid example of a failed totalitarian system and largely a disappointment of architectural design.

Flat plate modular design, when introduced in Poland and former Czechoslovakia, seemed initially like a significant upgrade to the early modernist ideology. The ability to build "big, tall and fast" and create entirely new forms of urban expression resulted in some unique construction solutions. Additionally, some original designs, like the highly acclaimed, but not realized to its fullest potential, high-rise estate with modular, semi-circular façade treatments by Jadwiga Grabowska-Hawrylak, appeared in very prominent locations. Unfortunately, the centrally controlled economy collapsed less than three decades after the end of World War II. This, in turn, placed significant limitations on the architects' ability to balance their designs within the reasons of human health and comfort (qualities emphasized in the Athens Charter) against the mandate to control rising costs and the amplified scarcity of building materials. Additionally, similar to the earlier occurrences in Czechoslovakia, the nationalization of design practices,[22] combined with almost all vital decision-making occurring at the national level, left architects acting in the capacities of draftsmen. They simply executed five-year plan directives to fulfill social housing needs, instead of creating environments that would foster healthy living habits in future generations. In fact, this managerial process stifled creativity and innovation and led to the inevitable industrialization of social housing design methodologies.

The "typification" and standardization based on nationally implemented directives, including establishing maximum as opposed to the more common minimum apartment sizes,[23] made the objectives of cost and quantity of completed flats more important than the attributes of human comfort and the needs of growing families. These processes also disregarded the aesthetic values of architectural expression and led to spirited discussions among professionals and academics alike about the importance of scale, repetition, and lack of ornament as substitutes for traditional design practices. After all, the new role of an architect was meant to be a public servant devoid of any artistic qualities that supported the former ideals of liberalism. In some ways, socialism tried to hijack the qualities of Bauhaus philosophy to promote a narrowly understood ideology of social equity. As a result, architecture became equivalent to the process of building.

The Present: Simple and Uninteresting vs. Beautiful and Complex

Typical studies of large block socialist housing estates in Poland are longitudinal and examine a significant number of properties to generalize specific findings across a variety of urban patterns and locations.[24] While many findings support universal applications, certain conclusions depend on numerous issues and cannot be easily assessed without taking a closer look and surveying the occupants. In 2003, Iwona Borowik compared two large socialist estates constructed in Wroclaw a few years after the Popowice estate completion. Her study provides very comprehensive and detailed answers to the question of quality of these human habitats.[25] The most interesting findings suggest that in 2003 "more than 1/3 of the residents of the [analyzed] estates expressed their happiness about the flats they occupy, more than half were used to the habitat they live in, and over 3/4 felt safe in their environments."[26] These results extrapolate to the situation presently occurring at the Popowice estate and are largely supported by the type and tone of articles found in the community newsletter, "Nasze Popowice." Published beginning in December 2005, the circular discusses the usual issues of parking availability, trash removal, remodeling of apartments, energy efficiencies, aesthetic, overall quality, and maintenance.[27]

The last four topics mentioned above are significantly interconnected and directly related to the following outcomes of socialism:

- the positive – leveraging of resources and technologies for the good of the society, and

- the negative – short-term thinking about the quality of individual living quarters and narrowly understood ideology of social equity.

At the time of construction of the socialist estates, issues of energy efficiency were not addressed directly through the continuity of the thermal envelope, proper levels of insulation, or air-tightness. However, advancements in industrial technologies have introduced district-heating plants to supply the estates. This allowed for the delivery of steam and hot water to assure proper comfort in individual apartments, thus reducing the need for basement storage of coal and freeing the occupants to work "passionately" for the good of the nation. In contrast, some of the inner-city traditional buildings still do not enjoy access to municipal heating, and their occupants use coal or other even more air polluting energy sources for space heating needs. Naturally, the energy efficiency of large block housing estates has been called into question within the last decade. Thin ferroconcrete plate construction that lacked sufficient thermal insulation did not compare well with the thick, solid brick walls of seventeenth- and eighteenth- century structures. Additionally, air infiltration through inadequately finished joints between plates, cracking of the concrete, and improperly installed windows exacerbated the deficiencies of their current thermal performance.

Fig. 4. Environmental signage applied to an end elevation of a five-sto y row house building.

Within the last two decades, various five- and eleven-story buildings located in the Popowice district underwent several modernization phases dedicated to the improvements in the thermal comfort of their occupants.

- The first phase was a product of concrete shrinkage and differential building settlement, which caused cracking on virtually all building elevations. Through the application of caulking and patching, some of the infiltration was reduced; but, in addition to the giant "spider web" appearance of the buildings, the sealing material slowly deteriorated and stained the pale-colored elevations. This in turn contributed significantly to the general "ugliness" of the estate.

- The second phase was connected to window replacement and window flashing improvements. This was due to the low quality of window frames and lack of proper maintenance. Replacement windows have improved thermal comfort and significantly lowered noise transmission from the outside. Unfortunately, in some cases the new units reduced the amount of air infiltration from the outside, thus rendering the natural ventilation of the flats obsolete.

- The last phase consisted of the application of thermal insulation materials to the exterior elevations. South and north walls received the Exterior Insulation Finish System (EFIS), which consisted of several inches of Styrofoam covered by a textured surface and painted in accordance with the original specifications (see Fig.5). The end walls consisted of a Styrofoam layer covered with prefinished, corrugated metal sheets.

These upgrades and reconditioning have improved the general appearance and thermal comfort of the buildings while leaving the entire estate true to its original design intent. The ferroconcrete modular design with its modest architectural expression have proven to be more flexible and responsive to the immediate needs of the changing economy than the traditional eighteenth- and nineteenth-century architecture, at least in the realm of thermal comfort and general maintenance. In that context, the beautiful and distinctive architecture of the inner city became less adaptive due to its complex form in elevation and large amount of architectural detail.

The Present: LeCorbusier's Dream Fulfilled?

In the socialist estates, natural cross-ventilation that actually worked proved a stark contrast to traditional urban courtyard designs. The inner city architecture did not allow for proper air circulation, often causing moisture management problems and fine particulate pollution from individual homeowners' coal-burning furnaces.[28] Additionally, the reliance on building orientation toward the street within the traditional urban grid, which was absent from the new large block housing estates, allowed for proper positioning throughout the year for winter sun exposure and summer sun shading.[29] Despite the linearity of modern urban planning that looked somewhat uninteresting as compared to the natural "randomness" of the inner city, each occupant of the estate enjoyed access to these fundamental climatic elements and significant visual privacy from neighboring buildings. Initially, the space between buildings was quite empty with the exception of a few existing trees that survived the intense construction period. However, in time the vision of LeCorbusier, who dreamed of large building "vessels" sailing within a green sea of landscape, became closer to reality (see Fig.1).

Fig. 5. The results of thermal insulation upgrades on adjacent elevations.

The Future: Uncertainty vs. Optimism

What saved some of the socialist estates from becoming a complete failure was the combination of the following factors: location, lack of social stratification, large expanses of green space between individual buildings, and the ability to transition from state ownership to communal possession. In the case of the Popowice estate, its short distance to the city's center and availability of an extensive public transportation system, along with convenient access to municipal heat, waste removal, natural gas, and electrical power services, positioned the property for a potentially prosperous future. The social diversity of the residents provided an additional benefit that postponed gentrification and segregation, and mitigated vandalism – problems that affected many other large housing projects, including the Pruitt-Igoe[30] project, which was demolished during the same time that construction of the Popowice project was finalized. Additionally, the availability of public space to accommodate the "skyrocketing" usage of personal automobiles after the fall of the Berlin Wall contributed to an expansion of the originally planned, very limited parking capacities. However, perhaps the most important factor that allowed for the initial survival after the collapse of socialism, further operational continuity during the transition period, and creation of a vision for the future was the initiative of the new democratically elected national government that did not privatize the estate but, instead, allowed for its communal ownership by the residents.

Lessons and Speculations

The early modernist ideals, implemented to some extent in socialist estates, can be divided into two broad categories:

- *human ecology* that borders on current sustainability movement and manifests itself through the emphasis on the overall human comfort and spatial attention to the quality of urban environment, and

- *social equity* that lays foundations for the current social justice movement and manifests itself through controlled diversification of apartment sizes to minimize social stratification.

Unfortunately, these qualities relied heavily on the ideology of socio-economics that claimed to fight the old system but failed to recognize its own limitations. The Popowice estate functioned fairly well in the late 1970s and early 1980s because the material situation of the vast majority of the society was comparably low. However, in the early 1990s, shortly after the fall of the Berlin Wall, people were allowed to travel freely to the western countries and the period of excessive material culture ensued. For example, the amount of vehicles imported from Germany in the 1990s and early 2000s quickly filled the number of available parking spaces at the estate, and the residents found themselves encroaching slowly on the open green space designated for parks and recreation. Additionally, the flats became too small to accommodate the new consumption habits facilitated by the free market economy and rapid aging of the population.

Perhaps the most important lesson from the development of socialist estates is the level of influence of the political ideology on architectural and urban design. It manifested itself mostly in the design practice that was driven by a specific and predetermined outcome, rather than by philosophies of design. While Modernism created a philosophy of design and to a large degree successfully implemented it in Western Europe, socialism concerned itself with an attitude of value engineering towards the creation of human environments.

Despite the availability of modern technologies that allowed for the creation of significant economies of scale, a cadre of creative and experienced designers eager to implement modernist architectural ideas, and the ability to learn from Western economies experimenting beforehand with modular ferroconcrete buildings, the socialist system continually impeded the actions of architects who were eager to innovate and think critically. The top-down political structure and the interpretation of the social equity ideology led not only to the creation of many estates suffering from a "multiple identities disorder," but more importantly failed to secure an appropriate continuity of their existence. On the other hand, the inner city dwellings have been significantly restored and modernized, revealing their historic aesthetics in full splendor. These structures survived numerous socio-economic perturbations and tremendous devastation during several armed conflicts engulfing the region over the last three centuries. They most likely will stand for generations to come, while even the most successful socialist estates are in danger of disintegration in the next few decades due to their structural conditions, developing social stratification, and significant aging of the society.

Lastly, the trend of industrialization of architectural design that currently bears similarities to early fascinations with the automobile and airplane industries at the turn of the nineteenth century has the potential to (once again) abandon the humanistic side of architectural aesthetics and function in favor of purely scientifically and sociologically driven solutions. This process gives a new meaning to the expression coined by LeCorbusier – "The house is a machine for living" – and might produce the new architecture of "living machines" subjugated to a specific trend of the moment; i.e., micro apartments, super-insulated homes, vertical farming, shipping-container dwellings, self-healing structures, and so on. All of these concepts, while having scientific merit, place the universal values of architectural aesthetics and function at a distant second to technological innovation, and just like in the case of socialist estates, might have to resort value engineering in the future in order to respond to the socio-economic conditions of the moment.

Images provided by author.

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[26] Ibid., 146.

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Drawing on Context: Social Housing in Postwar Italy

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Abstract

Postwar housing projects have been widely criticized for exacerbating social problems, and architecturally for being banal and monotonous. Experiments into providing low-cost housing for the masses have been cited as examples of how even the most well-intentioned government interventions into the housing market often led to disastrous results. The housing projects constructed under the Italian Ina-Casa plan (1949-1963) provide a powerful counterargument to this overarching narrative of failure. The Ina-Casa plan succeeded in doing what so many other initiatives could not: The plan built quality neighborhoods grounded in their local contexts that have not only lasted but have made the transition into the private market in the decades since their construction.

The Ina-Casa plan was created in the aftermath of World War II to address the elevated demand for jobs and homes. The plan built nearly 400,000 units of working-class housing in its fourteen-year life span. Roughly two-thirds of Italian cities have an Ina-Casa project and some, like Rome, Naples and Milan, have tens of thousands of Ina-Casa homes. The neighborhoods built by the plan are characterized by their relationship to the diverse local contexts in which they were constructed: The designs draw on regional building traditions, forms and materials. The quality and architectural diversity of designs stem from the design guidelines created by the Ina-Casa Projects Office led by Adalberto Libera.

An overview of the Ina-Casa theory of design reveals some of the reasons why the Ina-Casa plan succeeded where so many others failed. These guidelines articulated a contextual theory of design: Architects were instructed to take account of the natural landscape and climate, the existing buildings and vegetation, as well as the quality of light on the site. Designers were even encouraged to take the daily habits of life in a particular place into account to make the home loved according to the people of the place.

Full paper withheld at author's request.

Photo by author.

Incremental Architecture at Quinta Monroy

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Abstract

Three billion people currently live in cities, with nearly one billion living in slums. In fewer than twenty years, the number of people living in slums is expected to double. Application of basic math to this urban growth equation adds up to new housing needed for a *million people every week for the next twenty years*.

One approach that could be used as a template toward solving this global housing crisis is incremental architecture. In this model, construction is not completed all in one phase; instead, it relies on its residents to complete the building of their own homes. A particularly innovative example of incremental architecture is Quinta Monroy, a social housing development located in Chile, built in 2004, and designed by the Chilean architecture firm Elemental.[1] Since only part of the structure was designed by architects and constructed by professionals, the architects made very deliberate decisions regarding *what was* and *what was not* included in the structure they did provide. This paper examines the factors that impacted the form of Quinta Monroy, resulting in the inclusion of certain features and the exclusion of others.

The overarching factor driving the design decisions at Quinta Monroy was the finite budget mandated by a new housing policy that relied largely on a small government subsidy. For $8,500 per dwelling unit, Elemental provided structurally sound housing, with running water and a sewage system, without overcrowding. Through thoughtful design, it also provided a context in which the properties at Quinta Monroy rapidly *appreciated* in value. Elemental has since completed several additional projects using regionally appropriate variations on the incremental typology. Its repeated successes in using incremental architecture, with well-planned designs, show promise as models for improving the living conditions of millions.

History of the Site

Quinta Monroy is named for Ernesto Monroy, an associate of a private corporation that took ownership of the site in Iquique, Chile, in the 1970s. Until that time the site had been used only for farming. Through the next two decades, with Monroy's permission, temporary housing was erected on the site. But during this time it also deteriorated into a slum. There was no sewer or running water anywhere on the 1.4-acre site. Monroy died in 1995, and legal battles between rightful heirs and occupants ensued. In 2000 the government intervened and compensated the estate owners. In purchasing the land, the goal was to provide a housing project for all of the occupants.[2] At the time, a subsidy from the Chilean housing ministry worth US $7,500 could be granted to each family. This subsidy had to be used to pay for the land, the infrastructure, and the dwelling unit.[3] The subsidy of $7,500 was increased to $8,500 shortly after the Quinta Monroy project was launched.[4]

The Decision Not to Relocate

One decision Elemental made very early on that influenced all subsequent design decisions was *not to relocate* the occupants to cheaper land available outside the city limits, such as Alto Hospicio, the suburb where other social housing projects typically purchased more affordable land. This was done to allow the occupants to retain their social ties to the community. They were also able to keep their current jobs, as relocating to Alto Hospicio would have placed the undue burden of a forty-five minute commute. Elemental spent three times the amount that Chilean social housing budgets ordinarily allow for the purchase of land. It was able to do this because it was testing a new housing policy put forth by the housing ministry, la Vivienda Social Dinámica sin Dueda (VSDsD), which translates as dynamic, debt-free social housing. VSDsD provides a government subsidy designed to aid chronically poor people unable to borrow money to purchase a home.[5] This initial decision not to relocate placed extreme financial constraints on the project. Because so much money was spent on the land, even less money than usual remained to go toward infrastructure and housing expenses.

Decisions Affecting Form

Financial limitations became the overarching factor affecting the unique form of Quinta Monroy. A certain level of density had to be achieved to offset having spent 20 percent of the entire budget on the purchase of land.[6] For this reason, Elemental quickly rejected the detached house typology. One house per lot would result in an inefficient use of land. Elemental also knew that, due to budget constraints, it would be able to provide only very small dwelling units to each family.[7] Elemental accepted the fact that, pressed for space, the occupants would expand their houses with self-built additions. Induced by the mass migration from country to city during the last century, Latin America has developed a culture of self-building settlements *and* home additions to accommodate extended families.[8] The architects at Elemental responded to this in their design.

In an attempt to achieve greater density, they considered using the two-story row house typology. This still did not provide enough density to keep all 100 families on the site. And, if the occupants built additions, they would compromise light and ventilation due to these being located along only one axis.[9] The shared walls limit the direction in which the expansions can occur. Lastly, Elemental considered the multistory block typology. Though it very

efficiently utilizes space, this typology is an unpopular style and the shared circulation spaces require security and maintenance. Additionally, only the ground floor can safely expand laterally so it could lead to structurally unsafe upper floor expansions.[10]

The form we see at Quinta Monroy is a result of carefully considered design solutions largely determined by a finite budget. The complex rises from the ground as uniform, grey, rectangular monoliths, abruptly meeting the sky with flat roofs (See Fig. 1). It is repetitive and monochromatic with no ornament whatsoever. It lacks the warmth that appeals to most people when they are looking for a home. And it gives the impression of a very basic form, only a slight variation on "the box." However, upon closer inspection, its configuration is far more intricate and nuanced than is first apparent.

Fig. 1. Quinta Monroy before occupancy. *Tadeuz Jalocha (2004)*

Elemental developed this form with the assumption that the users would expand their own homes post-occupancy. Thus, Elemental architects had to consider what they would provide in their professionally designed and constructed portion that would be difficult for the users to design and provide on their own. At the same time, they had to design *for* it to be expanded. The design had to address questions like, "How far and in what direction would the expansions occur?" This required careful consideration because the architects did not want the additions to compromise the light and ventilation or the integrity of the existing structure.[11] By creating the distinctive form that they did, with partially enclosed voids, they pre-determined the distance and direction in which the users could expand their dwellings.

Elemental developed a new typology and called it Parallel Building, "due to its structural properties: a house running parallel to an apartment above."[12] (The voids that allowed for growth within the volume of the building defined the new concept.) This typology allows for increased density, due to stacking the apartments atop the houses. But it also allows for direct access from the second floor to the ground floor, thus eliminating the shared circulation spaces that were problematic.

The site itself is an irregular shape. It has eight corners and is located in the middle of the block. The architects initially thought they might define a large central space by placing the buildings around the perimeter of the site. But one requirement from Programma Chile Barrio (Chile Barrio Program) was that they work with the community receiving the housing.[13] The community participants actually requested many smaller courtyards as opposed to one large area. They did not consider themselves one large, extended family. The location of the dwelling units on the site forms four courtyards with vehicle access. The intention was to create semi-private communal spaces. The architects provided an arrangement that discourages pedestrians from cutting through the site, allowing the courtyards to serve as safer play areas for children. The lots are square, which allowed the architects to turn the many corners and still maintain their design.[14]

Decisions Affecting Materials and Finishes

The materials used in the construction of Quinta Monroy were reinforced concrete, concrete masonry units (CMU), wood, and glass. Since the occupants were expected to build their additions in a timely manner, the wall on the side of the building that would accept their addition was built with wood, while the other sides were constructed with CMU, visible in Figure 1. The concrete wall between neighbors is structural, acoustically insulating, and provides a fire barrier.[15] For budgetary reasons there is a complete lack of architectural finishes in this project. The architects rightly assumed that the occupants could and would apply finishes over time as their budgets allowed. Interestingly, this approach provided a nice visual balance with the unadorned, repetitive, yet unifying nature of the architect-designed portion of the building. For the same reason, the interiors have no architectural finishes either. Fig. 2 is quite striking in this regard.

Fig. 2. View of interior before occupancy. *Tadeuz Jalocha (2004)*

Decisions Affecting Interior Spaces and Amenities

The layout of the interior spaces is designed with the assumption that the users will expand their living quarters. Therefore, it had to be designed for immediate occupation but with various possible future modifications in mind. The "house" was located on the ground floor, with an "apartment" above. The house had an initial size of twenty feet by twenty feet, with a slab extending to a total of thirty feet by thirty feet to allow for post-occupancy lateral expansion to the side and rear, as shown in the first construction model in Fig. 3. [16] The apartment above the

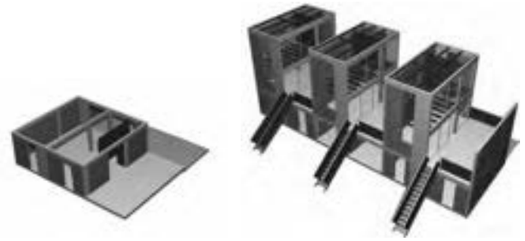

Fig. 3. Construction models. *S.A., Elemental (Circa 2003)*

house is two stories with an initial footprint of ten feet by 20 feet and the capability of expanding laterally on both levels to a total of twenty feet by twenty feet. Each level is just over eight feet high.[17]

It was important to the architects to design in a way that would allow the greatest versatility and ease in expanding the rooms. Some rooms are far more difficult to design and construct than others. For example, kitchens and bathrooms are more complicated than are bedrooms or living rooms. The architects were going to have to leave out some features usually included in the design of a home because the budget simply would not allow it. Tough decisions would have to be made. By engaging in a dialogue with the future occupants, the architects made the decision not to include bedroom partitions but rather to allocate the limited resources to the kitchen, the bathroom, and the safety of the structure that is essential in a seismic region such as Iquique. Also, these dwelling units were given to their owners without a water heater, though they were designed to accommodate the installation of one in the future. The community knew this from the outset and accepted the circumstance in exchange for being able to remain in the same location. They were accustomed to living without running water altogether, so they accepted the "temporary" arrangement of having no hot water.[18]

Elemental considered several different modifications that, post-occupancy, the client might choose. By doing this, they provided a flexible design that could accommodate the various changes that would be implemented by the users. The architects intentionally placed doors and windows to allow for the rooms to be expanded to a size in keeping with a "middle-class standard."[19] To minimize future costs for occupants, the architects specified the width of the

Fig. 4. Quinta Monroy Post-Occupancy. *Cristóbal Palma (circa 2006).*

void to be the exact size of a standardized length of Chilean lumber, while the length of the void was equal to exactly two pieces of lumber.[20]

Alterations and Reception by Users

At first glance, the effect of the owners' additions (Fig. 4) is startlingly incongruous with its previous incarnation. Quinta Monroy has become warm and friendly. The residents have added their own unique designs and construction to the whole. The vivid colors provide a contrast to the gray, monolithic original structure. Yet the architect-designed portion provides a needed unifying element to a façade that would otherwise lack cohesion. Interestingly, the owners have less agency over their additions than is readily apparent. Elemental held workshops with the community to promote "harmonious growth and structural safety." The reasoning behind the workshops was to raise awareness "regarding their responsibility in the value appreciation of the complex."[21] An example of a suggestion made at the workshop was to create a porch at the entry to the upstairs apartment. Iquique is located in a desert, and the architects knew that in implementing this technique the owners would be providing shade to the interior living space on the second floor. Looking again at Fig. 4, it is evident that every owner whose dwelling is pictured followed these recommendations. Some of the topics covered in the workshops were not optional, but were required due to joint-ownership regulations. There have been three official cases of noncompliance. In each instance, community members who had not attended the workshops were responsible for the transgressions. And all have been held accountable, resulting in several demolitions.[22]

An interesting aspect of this project is that some alterations were expected. Throughout history buildings have been modified in ways that were not originally intended by the architect.[23] In this case, although the architects planned for alterations, the fact remains that after Elemental finished the project, the owners were able to insert their own design ideas as long as they complied with building codes. Even with legal regulations and professional design solutions suggested by the architects of Elemental, Quinta Monroy still exhibits the unique style of its owners. One example of this is the unit belonging to the Quispe family, whose unit faces out from the courtyard toward the busy street of Pedro Prado. The Quispe family deviated more than most from the design recommendations by of the architects *and* ornately decorated their façade, yet they still complied with all code regulations.[24]

The owners' personal style is readily apparent in the interior of the units, because they are less concerned with compromising the structural integrity of the building or other legal issues such as noncompliance. Even more so than the exterior, the use of color indoors is fantastic. Fig. 5 shows a ground floor unit that was painted pink post-occupancy.

Arguably the best measure of success in this project is the occupants' evaluation based on their personal experiences. Elemental conducted a satisfaction survey in 2006, after the residents had been living in their new homes for eighteen

Fig. 5. Post-Occupancy pink interior. *S.A., Elemental (Circa 2006)*

months. There were three main categories that owners were asked to evaluate: the neighborhood, the courtyard, and the home. Different aspects of each category were rated on a scale of one to seven. The neighborhood was rated a 6.5, the courtyard a 5.8, and the house 5.8 out of seven.[25] The fact that the neighborhood received the highest rating is very telling. It supports the architects' original decision not to relocate the tenants. They like where they are.

At the same time, Elemental surveyed the residents about the cost of their additions.[26] The average amount each family spent on expanding its home was $1,000. Interestingly, these homes are valued much higher than the $8,500 originally budgeted to build them. After only five years, each was worth at least $20,000.[27] The thoughtful design considerations of the architects allowed for the low figure of $1,000 for additions. Otherwise, the residents would have had to invest more money in the expansion of their homes. And it is conceivable that, without the guidance offered in the workshops, self-built additions might have been so haphazard (and hazardous) as to curb any value appreciation in the market price of the properties.[28]

Future Usefulness of this Information

Currently, three billion people live in cities, with one billion living in slums. In less than twenty years, the figure is expected to rise to five billion living in cities, with two billion people living in slums. It is now known that it would require about $10,000 per dwelling unit to provide structurally sound housing, with running water and sewage systems, but without overcrowding. As mentioned earlier, this works out to new housing being needed for a million people every week for the next twenty years.[29] Considering this prognosis, maximizing resources to be able to serve more people becomes critical. The architects at Elemental go one step further to maximize "the use of public resources to create a value much greater than the sum of its parts."[30] In the case of Quinta Monroy, the rapid appreciation of the homes is actually helping to lift the owners out of poverty.

The architects of Quinta Monroy do not mention environmental sustainability as a design consideration. However, sustainable building practices were implemented. Though the primary motivation for using minimal resources was financial, the fact remains that Quinta Monroy used far less material than is typical for standard homes. Compounded with this is the fact that many of the owner-built expansions were completed with reused or recycled materials. The resulting structure is a testament to true environmental sustainability. With the current trend toward an increased awareness of and response to the environmental damage caused by humankind, the Quinta Monroy project should be hailed as successful in this regard.

Since Quinta Monroy, Elemental has completed several additional projects using regionally appropriate variations on the half-a-house typology. It has successfully repeated the process of using social housing coupled with well-planned design and incremental architecture to provide owners with a way out of poverty. While the primary motivating factor for many of the design decisions was the meager budget, many decisions were also the result of collaboration with prospective owners. Through a participatory design process, a model of client engagement was used that broadens the traditional role of the architect. This new dialogue between architect and client results in high levels of user satisfaction and utilizes social housing as a means to overcome poverty.

Images provided by author.

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[1] Alejandro Aravena and Andres Iacobelli, *Elemental: Incremental Housing and Participatory Design Manual* (Ostfildern: Hatje Cantz, 2012), 82-83, 103.
[2] Ibid., 82-87.
[3] Ibid., 92.
[4] Ibid., 139.
[5] Ibid., 31, 91-92.
[6] Ibid., 82. The cost of the site was US$150,000 and the construction budget was US$750,000.
[7] Ibid., 83, 92-93, 105. Chilean housing policy states that the final dwelling size of social housing should be at least (converted from m^2) approximately 600 $ft.^2$, but Elemental only had a budget to provide approximately 300 $ft.^2$ per dwelling.
[8] Julián Salas and Patricia Lucas, "The Validity of Previ, Lima, Peru, Forty Years On," *Open House International* Vol. 37 no. 1 (March 2012). PREVI (Proyecto Experimental de Vivienda) in Lima, Peru, in 1968 was the first attempt at using (what came to be known as) incremental architecture in a social housing project: "The pressure exerted by migration from the country to the city and the appearance of spontaneous, primarily self-built, settlements, was a clear indication that the users of the new housing would very likely enlarge their new homes with time. The inhabitants had already proven their construction skills in the informal sector."
[9] Aravena and Iacobelli, 94. The density achieved with two-story row houses would only allow 60 of 100 families to remain on the site.
[10] Ibid., 96. Referring to the multistory block typology, the architects say "the families threatened us with a hunger strike if we even dare to consider this type."
[11] Ibid., 94.
[12] Ibid., 37.
[13] Ibid., 38, 106. The Chile barrio program was created in 1996 by the Chilean housing ministry. They hired Elemental to design Quinta Monroy. Elemental continued to adhere to the financial requirements established by VSDsD.
[14] Ibid., 100, 108.
[15] Ibid., 70, 126, 39.
[16] Ibid., 112. I have converted meters to feet. In doing so I have rounded to the nearest foot. I have rounded every 3 m to 10 feet.
[17] Ibid.
[18] Ibid., 109-11.
[19] Ibid., 76.
[20] Ibid., 70.
[21] Ibid., 126.
[22] Ibid.
[23] Philippe Boudon, *Lived-in Architecture: Le Corbusier's Pessac Revisited*, trans. Gerald Onn (Cambridge, Massachusetts: The MIT Press, 1972).
[24] Aravena and Iacobelli, 184.
[25] Ibid., 186-89. The one-to-seven scale is familiar to most Chileans because it is used in their schools.
[26] Ibid., 186.
[27] Alejandro Arevena, "Elemental: A Do Tank," *Architectural Design*, May/June 2011. In 2006, a separate subsidy of $3,000 above and beyond the $8500 was added, specifically for the purchase of land. The original amount would prove to be too low to build a house, but not too low for half a house (Aravena and Iacobelli, 371).
[28] Aravena and Iacobelli, 190-91.
[29] Arevena, "Elemental: A Do Tank"; Aravena and Iacobelli, 24-27.
[30] Aravena and Iacobelli, 191.

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SESSION 3:
Open Session

Session Chair:

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The Dash of Theory: Making Room for Studio Theory Practice

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Abstract

Central to the creating-making pedagogy is the connection between the creator's idea and the formally constructed expression. Thought and outcome bond in tension through the connection of theoretical evidence. Synthesized theory comes together within the studio environment. Studio education has also long held the educational process of learning by doing where instructors share information with students in a mentor-apprentice style.[1] One problem that quickly becomes apparent in the mentorship-apprentice model is that students seek to reflect the individual instructor's inclinations, resulting in wide variance of student-learning outcomes. Learning to please one other person instead of developing unique critical thinking processes translates rapidly into professional practice. Thrust into professional practice, the former student responds to issues of time and money as constant drivers of final design solutions. This reactive pattern is held in place by a lack of development of critical thinking skills involving theoretical knowledge that is reliant upon personal design skills, creativity, and preference.

Incorporating theory into the design process ensures that students develop critical thinking skills that serve to enhance their creative process, resulting in both a unique and appropriate final solution. By expanding the apprentice-mentor studio model to include theoretical models from outside the studio throughout the entire studio experience, the design student has an opportunity to carry into the workplace tools that bridge the gap and become the dash between theory and professional practice.

Introduction

Design decisions needed to execute fully developed design solutions do not happen at defined points, as milestone philosophy would suggest. Milestone philosophy suggests that objectives are met at project-specific points. Anyone practicing design for any length of time would quickly admit that, while there are milestones in any project, all projects are different from one another. Decisions are continuous over the course of a project and, by this logic, arguably so should the integration of theory be over the project's duration. Evidence-based behavioral practice commonly found in current medical practice is rapidly also being seen in architectural and design practice.[2] Clients want to know that presented designs will have grounded and well-considered solutions. Design practitioners can no longer rest upon their best-guess approaches of the past and be successful. By expanding the pedagogical design to include a theoretical instruction framework that touches over the entire process ensures final design congruency. Repeated application and requirements of evidence-based research into the studio learning objectives will allow the opportunity to develop second-instinct abilities in the student. In the 1990s, the Americans with Disabilities Act (ADA) arose as a set of guidelines to improve constructed environments for those with special needs. As the design field worked rapidly at learning a new set of guidelines to integrate into final solutions, the end results were often superficially applied. As time progressed, solutions became second nature to most practitioners and students. In this same way, the design profession is seeking to better address theories that improve the built conditions.

Light, color, design, and human behavior theory instruction have long been design course staples outside the studio, but these theories are often quickly set aside the moment a student receives his or her first studio design project in favor of ungrounded and subjectively based solutions. Like the practitioner who has limited timelines and ever-increasing accountability demands, the student seeks to solve the problem through his or her strongest skill sets. The use of research-based evidence is not second nature to most people practicing design, but, with repeated practice, students can develop life-long skills of considering the way people experience the designed environment. Holding to an integrated theory method within the studio environment can generate a perception for faculty and students alike of limiting the student's creative development instead of the creative-enhancing component that theoretical evidence can provide.

Instructors and students may resist due to the contentious nature of paradigm shifts, but resistance is welcome when seeking positive change. As with the model of creating-making, final design solutions benefit from theoretical framework connections. Bridging the creative and constructed results with theory can be fertile ground instructionally and beneficial toward graduating well-grounded new practitioners. Through the connective platform of theory, an enhanced theoretical-innovative education benefits students, instructors, and ultimately, project clients. Congruent with the practice of evidence-based design, studio objectives can multi-platform and form the basis of the dash (see Fig. 1).

Theoretical Framework

Theory integrated pedagogy is a concept commonly held central in the creation of architecture and interior design studio instructional objectives.[4] Many academics would assert that their students understand and integrate theory in their studio projects, particularly at beginning or programming project stages. However, time after time students migrate to the workforce and quickly eschew theory at the first hint of project deadlines and budgets.

Fig. 1. Evidence-based practice in psychology[3]

Therefore, while students and practitioners recognize theoretical understandings, intrinsic use of theory in studio projects is often sidelined by issues such as time, resources, conceptual paradigm, methods, and goals.[5] The interjection of systematic analysis, along with theories of environment and behavior and organizational learning into a reflective analysis encourages students to seek out specific information connections for their work and pair the findings with their design solutions. Expanded studio objectives would challenge students to investigate properly gathered findings to support their final solutions.[6]

Environment and Behavior

Environment and behavior research is a theoretical branch stemming out of many disciplines, including psychology. As an outgrowth of the humanist movement that occurred in the 1960s, design practitioners and educators have sought to provide a body of credible information that could be applied to design solutions. Founders of the Environmental Design Research Association (EDRA) came from an early group known as the Design Methods Group (DMG). Today, practitioners are embracing a practice known as Evidence Based Design (EBD). Through the "process of creating, exploring, and testing physical options to accomplish a given set of objectives," design theory can also test the creator's "experience, skill, and knowledge."[7] Farbstein and Kantrowitz explain that the design-research process often calls upon the individual to remain in a neutral or outside-the-ring position. The distance created by standing outside the process and peering in is akin to a consultant's practice in which the consultant participates during specialized processes such as programming and post-occupancy evaluations. A significant question would center on the commonalities and differences between research and practice. Understanding the common ground and why there are differences would lay the groundwork toward bridging the disciplines.

Environment and behavior theories provide guidance for architects and interior designers to shape the way environments improve people's lives and fully embrace the theories of organizational studies and congruency, with the person-environment fit connected through a systems approach understanding. The theories of organizational culture and person-environment connect with systems theory through their contribution to environment and behavior research and associated constructs. As Rapoport states, "humans live in systems of settings" and it is the effect of these complex systems upon people that is the central challenge for today's students and tomorrow's practitioners.[8] The perspective provided by systems research contributes profoundly through environment and behavior (E&B) studies. These contributions embrace the physiological perspective provided by a built space and share people's mental perception for the same space. Environment and behavior personal-level constructs seek to understand the way a person experiences the built environment.

The scientific nature of environment and behavior ideas are complex and highly interdisciplinary. At a practice level, the design process used by architects and interior designers integrates problem identification and solution application. Environment and behavior study contributions embrace the physiological perspective provided by a built space and share people's mental perception for the same space. Borrowing from environmental psychology, consider the work environment to be "patterns of information."[9]

Organizational Learning

Many within the field of architecture and design, either in practice or instruction, would argue that talking about the importance of research-integrated design is passé, old-school, and yesterday's news, but that very statement causes one to pause upon the theories presented by Donald Schon and Chris Argyris. Argyris and Schon provide the generic definition for the theory of organizational learning as inclusive of different elements such as informational content, a learning product, a learning process, and storing information.[10] Theories of reflection in action and single- and double-loop learning are hallmarks within both design and organizational academic and practice arenas. Learning theories are relevant to the transfer of information from instructor to student, from student to practitioner, and within the academic learning environment as a whole.

Learning, in terms of organization development, is the detection and correction of error. When an individual or a group within the organization experiences any type of error, there is the opportunity to learn. The group then makes inquiry into the nature of the error and learning occurs for the organization. Acknowledging that academics are in a steadfast position to prepare students for the world of practice, through their mimicking those in charge of the curriculum, is a first step toward change. As educators put forth student learning goals and objectives, student autonomy should be in the mix. Autonomy has its roots in mimicry, experience, and theoretical integration. Studio pedagogy has the opportunity to intervene in the problem and provide a holistic and sustainable solution. People are amazingly adaptive and are always seeking to design their actions to respond to difficult situations. Final designs can respond to many influences, some desired and sometimes shaped by outside influences. Because of the governing variables in the organization and through action strategies that suppress the idea of confronting something that has gone wrong, the organization maintains its original goals, thoughts, and actions. Ignoring problems and remaining rooted in old processes and beliefs results in single-loop learning. If the resultant actions taken to correct the error are to not only achieve the original goal but also to openly inquire into the organizational goals, thoughts, and actions (governing variables), then double-looped learning is evident.

Considering the ways that individuals and organizations systematically learn, think, and grow communicates to us the knowledge that one has never truly arrived at his/her/its final destination. By definition, an organization is a group of entities coming together to achieve a common goal with each entity having a distinct and unique function. It is collaboration and an orchestration of effort. The very idea that one is whole and formed presents the argument that people always have the opportunity to review any known process. Following this logic path, there will always be room to revisit our design processes. Nevertheless, often the practice of design prefers to believe that research evidence.

Focusing upon the primary differences between researchers and designers is fundamental toward learning in an educational model. As students are trained by professors, so too were professors once students. Successfully integrating theoretical models is dependent upon organizational learning and change theories. While design educators will argue that discussion of theory integration is a settled matter, many writers will counter that there is a sharp need for change.[11] Offered design solutions remain presented in subjective formats that lack rigor and have a profound abundance of unexplained creativity.

The theoretical field of environment and behavior draws on the disciplines of sociology, psychology, and organization studies. Organizational behavior embodies a broad spectrum of disciplines including psychology, management, sociology, organization theory, social psychology, statistics, anthropology, general systems theory, economics, information technology, political science, vocational counseling, human stress management, psychometrics, ergonomics, decision theory, and ethics.

Relevance

The provided background demonstrates the practice of research-based design and recognizes the importance of moving beyond a designer's best-guess philosophy of practice. Architecture and interior design educational groups declare that situating theory in studio education is of primary consideration, yet there continue to be practitioners running to solve a problem in a reactive and subjective manner. What are the major reasons for this occurrence? Altman declares that there are major differences between those that conduct research and those in the practice field. Included in this list are the models of "mechanistic, perceptual-cognitive-motivational, behavioral, and ecological-social systems approaches."[12]

Higher education provides the perfect opportunity to ensure that practice and theory come together. The first difference that presents distance between the two groups centers upon the way that the two camps communicate or understand each other. Much in the same way that organizational learning provides a guided process to consider all stakeholders, understanding the underlying values that researchers and practitioners hold dear is critical. Gaining skills to migrate across a range of creative problem-solving with research evidence sets up students to contribute toward elevation of practice. Differences center upon approaches in which designers deal with a specific point or project type and researchers focus upon a broad study unit. The final dimensions that Altman details regards the area of the design process. The design process considers programming, design, construction, and evaluation. Researchers and designers hit roadblocks when working directly together during this time due to major language path differences. As mentioned previously, designers are working on a specific challenge, focus, or problem and research is considering a broad spectrum or range. As a practitioner wants to understand specific, focused answers, a researcher wants to lay out the problem from multiple perspectives, study the problem from multiple directions, and end up at a generalizable answer.

As the challenges of focus and process unfold, it is easy to understand how matters of time and money begin to affect the two camps. The practitioner, much as the student in the design studio, needs to solve a problem in a short time frame and the luxury of time to consider all the angles is a deterrent. Due to the limited period, the one practicing design is apt to declare the show must go on and that, while research is nice, the problem must have a quick solution. Even so, interjecting research goals into the overall design process that inform the practitioner or student would aid toward developing theoretically based solutions.

Practitioners find themselves in the place of putting everything together in a design solution. Ranging from ideas centering upon the architectural design, mechanical, electrical, and plumbing coordination to codes and construction, these concerns can occupy a great deal of time for the designer. To make matters more complicated, designers address issues of psychological and sociological project factors. Synthesis of these matters happens in a short period with limited budget constraints. While students and practitioners are both asked to address project analysis, these activities typically happen at the information-gathering period known as programming. Research works toward generalization and not a particular solution resulting in information that does not seek to answer the specific need of the designer. Students will hit this roadblock frequently when asked to integrate a particular theory into their final project solution. When asked to integrate the theory of third place into a coffeehouse project, the student wants to know how that solution would appear. Frustration typically ensues and the student falls to the default position of places he or she has experienced or something that looks "cool."

These differences point to the approaches that can divide practice and theory. It is important to understand that differences do not have to separate, but they can be useful to consider for the mission of coming together.

Knowing these two ways that design can be approached, through practice or research, can create the designer-researcher who is prepared to answer the call of the client with accountability. As it becomes increasingly evident from a practice wanting and creating evidence-based design research, the importance of creating academic opportunities for students with theory-based project objectives is evident.

Summary

Educators seeking to ensure that students learn design theory will find merit in creating learning model objectives centered upon social system theories. Current Evidence Based Design practice demonstrates the importance of greater theoretical involvement in studio instruction. Greatest merit centers upon the social systems, ecological model of research theory.[13] Systems theory focuses on the interconnection of people and the environment in that not only does the environment affect people, but also people affect their environment. The dual-nature model would serve as a crucial studio instruction model because it considers multiple levels of behavior fit into an inclusive system and can be adapted to a great range of behavioral models for students to practice within their design solutions.

Theory and its integration into design solutions have the opportunity to deliver a contextual solution integrating spatial, temporal, sociological, and cultural parameters. Commonly, theoretical coursework is instructive outside of the studio experience with the intent that students will interject components of lighting, color, design, and behavior-related theoretical courses at defined points. The interjection of a holistically applied theoretical framework throughout the entire design process, from conception to completion, will prepare students as they move from instruction into practice. Rethinking the process of how theoretical evidence can raise the level of the design practice as a whole is the dash – or connection – between creating and making.

Theory-to-practice application creates the opportunity for ordinary design solutions to move toward final results that can be understood, evaluated, discussed, modified, and finalized for the design team. Design theory benefits from field and academic contributions. In particular, environment and behavior research benefits greatly from ongoing dialogue between research and practice. The communicative atmosphere between design practice and academic theorists creates new ground for theory building. Many believe that theory benefits only the science and research community, when in reality the research can be applied to everyday life and used by all.

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How Advanced Building Systems Can Offset Water Infrastructure Needs

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Abstract

Water infrastructure requirements will be reaching crisis proportions in the coming years. Increasing urban populations, drought conditions due to climate change, and increasing EPA rule limits for drinking water contaminants set the tone for diminishing water resources.

The American Society of Civil Engineers' 2013 Report Card for America's Infrastructure gives a grade of "D" for much of America's drinking water infrastructure. The report states that capital funding has not kept pace with the needs for water infrastructure and that state and local governments will continue to assume the bulk of investment requirements in the coming decades. If we think holistically, however, many of these water infrastructure needs can be offset by how we address the historic view of buildings' systems.

The current premise is that buildings should simply "plug in" to existing water infrastructure. The expectation is that a new building connects to a municipal water main and clean water flows and wastewater is flushed away and disposed of at a municipal treatment plant. This belies our growing institutional knowledge of holistic building design and urban development. Rather than becoming a point source load on water infrastructure, buildings are capable of becoming water resource generators.

Precedent models for building-based rainwater harvesting, reuse, and treatment systems already exist, such as in the new San Francisco Public Utilities Commission building. This 277,500-square-foot office building houses more than 900 employees, utilizes rainwater harvesting, and has an onsite "Living Machine" that reclaims and treats all of the building's wastewater to satisfy 100 percent of the water demand for the building's low-flow toilets, urinals and irrigation. If we couple these advanced building systems with model water conservation ordinances such as Tucson's rainwater harvesting and gray water stub outs, we will rethink how buildings can actually offset water infrastructure needs.

Introduction

Climate change and population growth are driving the Southwest toward the edge of water shortage. The US EPA states in its report on "Climate Impacts in the Southwest":

> The climate of the Southwest is changing. Over the last century, the average annual temperature has increased about 1.5°F. Average annual temperature is projected to rise an additional 2.5-8°F by the end of the century. Warming in the Southwest is projected to be greatest in the summer.
>
> Warming has already contributed to decreases in spring snowpack and Colorado River flows, which are an important source of water for the region. Future warming is projected to produce more severe droughts in the region, with further reductions in water supplies. Future water scarcity will be compounded by the region's rapid population growth, which is the highest in the nation.[1]

It has already been noted that populations are increasingly urbanized. While in our rural and suburban areas agriculture and industry use the lion's share of water, within the confines of our cities we must realize that the single largest usage of water usage growth is within our buildings.

Because of the link between water and energy usage, the US Department of Energy tracks water usage within the building sector. The statistics are startling:

> In 2005, water use in the buildings sector was estimated at 39.6 billion gallons per day, which is nearly 10% of total water use in the United States.
>
> From 1985 to 2005, water use in the residential sector closely tracked population growth, while water use in the commercial sector grew almost twice as fast.
>
> In 2005, between 27 billion and 39 billion kWh were consumed to pump, treat, distribute, and clean the water used in the buildings sector, accounting for 0.7 to 1% of net electricity generation.
>
> In 2005, an estimated 410 billion gallons per day (bgd) of water were withdrawn for all uses in the United States. This total includes fresh and saline water from ground and surface sources. Domestic (residential) water use was the third largest water use category after thermoelectric power generation and irrigation, with an estimated 29.4 billion-gallons-per-day (bgd). Another 10.2 bgd were used in commercial buildings, for a total of 39.6 bgd in the buildings sector as a whole.
>
> From 1985 to 2005, water use in the residential sector closely tracked population growth, while water use in the commercial sector grew almost twice as fast … All other water uses taken together were unchanged. As a result, total water use over those two decades increased less than 3%, while water use in the buildings sector increased 27%. The buildings sector's share of total water use increased from 7.8% to 9.7%.[2]

With increasing urbanization, municipal water supply and treatment has struggled to keep pace but infrastructure needs and funding for expansion have fallen drastically behind. The last 10 years have seen regulatory changes that provided funding for corrections to outdated combined

sanitary and storm water systems. These systems were "solved" by having sanitary systems take over existing infrastructure and stormwater being "daylighted" to surface flow. New sources of freshwater have been identified, but, as indicated earlier, drought conditions are limiting availability. Furthermore, wastewater treatment systems are becoming overloaded as more and more building sources are brought on line.

Every four years, the American Society of Civil Engineers releases a Report Card for America's Infrastructure that depicts the condition and performance of the nation's infrastructure. In its 2013 report, ASCE gave the nation's wastewater treatment system a D+, stating that:

> Wastewater infrastructure in the United States is aging, and investment is not able to keep up with the need. State and local governments incur approximately 98 percent of the capital investments annually to maintain and improve the infrastructure. In 2008, state and local governments estimated their total expenditures at $93 billion annually for wastewater and drinking water infrastructure.
>
> The Congressional Budget Office, EPA, and other groups have estimated that it could take more than $300 billion to address the nation's sewage collection and treatment infrastructure needs over 20 years to keep our surface waters safe and clean. This is twice the current level of investment by all levels of our government. Congressional appropriations have declined over the five-year period 2008 to 2012, totaling only $10.5 billion—an average of $2.1 billion annually or $42 billion over 20 years.[3]

The report further states that capital funding has not kept pace with the needs for water infrastructure and that state and local governments will continue to assume the bulk of investment requirements in the coming decades. If we think holistically, however, some of these water infrastructure needs can be offset by how we address the historic view of buildings' systems.

Fig. 1. Living Machine at the SFPU[5]

The current approach to design development is that buildings should simply "plug in" to existing water infrastructure. The expectation is that a new building connects to a municipal water main and clean water flows and wastewater is flushed away and disposed of at a municipal treatment plant. This belies our growing institutional knowledge of holistic building design and urban development. Rather than becoming a point source load on water infrastructure, buildings are capable of becoming water resource generators.

The San Francisco Public Utilities Headquarters Building

While more than half of California is under the most severe level of drought for the first time since the federal government began issuing regular drought reports in the late 1990s, the City of San Francisco has been developing plans to implement recycled water programs on multiple scales with centralized facilities, building scale incentives, and district scale opportunities.

Seeking to set the example for water conservation and reuse, the San Francisco Public Utilities' new headquarters facility was programmed to integrate building water systems from a building scale catchment and treatment perspective.

The 277,500-square-foot headquarters houses 950 employees and contains two non-potable water systems: a Living Machine and a rainwater harvesting system.

According to the *San Francisco Public Utilities Commission*,

> The Living Machine treats all of the building's wastewater, up to 5,000 gallons per day, and then distributes the treated water for toilet flushing. The system reduces the building's potable water consumption by approximately 65% and provides an annual potable offset of approximately 1,500,000 gallons. The system utilizes a series of diverse ecologically engineered wetlands, located in the sidewalks surrounding the headquarters and in the building lobby, to treat the wastewater. This unique treatment process blends function and aesthetics – the wastewater is treated to San Francisco Department of Public Health reuse standards while providing a high-profile pilot project for on-site water reuse.[4]

While the water conservation and reuse function is truly remarkable, what is striking from the designer's perspective is the streetscape associated with and expressed by the Living Machine.

The planted strip that serves as a functional wetland separates the pedestrian walkways from vehicular corridors like a textbook image. This natural environment not only serves as an aesthetic amenity and structural separation but also as a functional wastewater treatment system. The application is profound.

Making the Business Case for Integrated Natural Environments

While the SFPU has definitively shown how integrative natural systems can function, it does beg the question, "How much did it cost?" The Living Machine, rainwater harvesting system, and their distribution piping cost approximately $1 million. The non-potable water systems increased the building's total construction costs of $146.5 million by less than 1 percent.

It is important to note that first costs belie the extensive benefits that are successive to its installation. Impacts at street level and increasing urban walkability come to mind at first, but, internal to the building, additional benefits are quantifiable.

The desire of the human condition for some association with the natural environment has always been recognized. While in Rome with a group of students during the spring, I witnessed the sigh of relief when we escaped to the beach in Ostia, or when one student fell to his knees on the well-manicured lawn of the American Academy. However insightful, intuition falls short of explanation and is difficult to support. The academy of architecture is well versed in drawing inference from precedent, theorizing by applying philosophical metaphors, or seeking inspiration from allied arts and literature. But from a scientific basis I had not uncovered much research. I had read *Biophilia*[6] and other readings from environmental psychology, but these were reflective accounts or summaries of "successful" design precedent.

> Architectural theorists spend a great deal of time talking about "prospect – refuge" theory. Hildebrand is a great proponent of this attitude and uses it to establish a "sense of place" arguing that Hadrian was "drawn" to his Villa site in Tivoli. Searching for any sort of defensible science that supports this "prospect refuge" component led me to an article titled "Methodological Characteristics of Research Testing Prospect–Refuge Theory: A Comparative Analysis."[7] This article describes prospect-refuge theory as follows:
>
> Prospect–refuge theory proposes that environments which offer both outlook and enclosure provoke not only feelings of safety but also of spatially derived pleasure. This theory, which was adopted in environmental psychology, led Hildebrand to argue for its relevance to architecture and interior design. Hildebrand added further spatial qualities to this theory – including complexity and order – as key measures of the environmental aesthetics of space. Since that time, prospect–refuge theory has been associated with a growing number of works by renowned architects, but so far there is only limited empirical evidence to substantiate the theory. This paper analyses and compares the methods used in 30 quantitative attempts to examine the validity of prospect–refuge theory. Its purpose is not to review the findings of these studies, but to examine their methodological bases and biases and comment on their relevance for future research in this field.

This article also cites thirty separate quantitative attempts to examine the theory. One of those cited "Is Love for Green in Our Genes? A Critical Analysis of Evolutionary Assumptions in Restorative Environments Research."[8] In this article, I believe I found I have found the necessary research to make the business case for integrating ecological systems:

> Within the field of restorative environments research, it is commonly assumed that restorative responses, triggered by exposure to natural elements and settings, are ultimately adaptive traits originating from our species' long evolutionary history in natural environments. The aim of this article is to critically investigate the viability of this evolutionary view on restoration. In doing so, we specifically focus on Stress Recovery Theory (SRT), as this theoretical framework has most extensively elaborated on the supposed evolutionary origins of restoration."

Furthermore, the article "Architectural Lessons from Environmental Psychology: The Case of Biophilic Architecture"[9] states:

> A review of findings from the field of environmental psychology shows that humans are aesthetically attracted to natural contents and to particular landscape configurations. These features are also found to have positive effects on human functioning and can reduce stress. However, opportunities for contact with these elements are reduced in modern urban life. It is argued how this evolution can have subtle but nontrivial adverse effects on psychological and physiological well-being. These can be countered by integrating key features of natural contents and structural landscape features in the built environment. Several practical proposals are discussed, ranging from literal imitations of natural objects (such as plants) to the use of nature's fractal geometry in an architectural context.

Cognitive psychology presents the case for the persistence of integrated natural environments. The studies indicate that they were conducted under varying conditions and measured stress using such measures as skin resistance and cortisol levels, which is typical in the medical community. Subjects were given stressful testing tasks or were in hospital environments experiencing stressful situations and then exposed to a natural environment, sometimes using just a picture. It is important to note that the pictures/scenes were of a savannah style, not of dark forests or wilderness areas. These savannah-like environments are much like the suggested designs of our walkable streets.

It is important to draw the connection and point out that the success of the business case for the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) standards rests on increased sales, increased test scores, *and* increased *productivity*. With increased productivity there are economic gains that support the

investment in a system and/or methodologies that produce them. This is the economic model that has been used to make the case for sustainability and LEED standards for the past twenty years.

The American Psychology Association publishes "Psychologically Healthy Workplace Program Fact Sheet: By the Numbers" with the following data:

- Sixty-nine percent of employees report that work is a significant source of stress and 41% say they typically feel tense or stressed out during the workday …
- Fifty-one percent of employees said they were less productive at work as a result of stress …
- Fifty-two percent of employees report that they have considered or made a decision about their career such as looking for a new job, declining a promotion or leaving a job based on workplace stress …
- In 2001, the median number of days away from work as a result of anxiety, stress, and related disorders was 25 – substantially greater than the median of 6 for all nonfatal injury and illness cases …
- In a study of a large, multi-employer, multi-site employee population, healthcare expenditures for employees with high levels of stress were 46% higher than those for employees who did not have high levels of stress …
- Job stress is estimated to cost U.S. industry more than $300 billion a year in absenteeism, turnover, diminished productivity and medical, legal and insurance costs … .[10]

Obviously, the dollar value associated with even minor stress reduction would lead investors to support studies utilizing restorative environments that can be provided by integrated natural environments.

Conclusion

Climate change is inevitable. Responses to increasing population and urbanization are being made on a global scale. In the US, California is not the only state to respond to the water issue. According to the organization Green Cities California,

> Recognizing that Tucson, as a desert community, faces a drastic need for water conservation in order to prevent drought conditions, the City of Tucson has passed an ordinance that makes it easy for homeowners to reuse their gray water for landscaping. Gray water is recycled water from clothes washers, bathtubs, showers, and bathroom sinks. Beginning June 1, 2010, all new construction of single-family homes and duplexes in Tucson will be required to include plumbing to distribute gray water for outdoor irrigation.[11]

Rethinking how a building interacts with its environment and how its systems function with regard to water systems can expand the definition of how buildings can contribute to the urban experience. Instead of looking at landscape/streetscape as external to the building, we should be looking at the water equation and meld the systems as a holistic expression of symbiosis as a building seeks to contribute to its environment instead of just taking from or merely existing in its surroundings.

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The Origins and Legacy of Oklahoma's Most Extraordinary Architect – Bruce Goff

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This paper is dedicated to Professor Eugene Ray, who pronounced the surname Goff as only a New Orleanian can, and to my husband, Michael Price, who has never met a greater architect than Bruce Goff.

Abstract

"In the 1950s, when Goff was head of the University of Oklahoma School of Architecture, Oklahoma emerged as the nation's most daring, avant-garde training ground in the discipline." [1]

Acts of architectural individuality erupted in the mid-twentieth century heartland in small cities and towns and on the rural, wind-swept prairie. The regional vernacular of what is now Oklahoma was as much landscape as small town buildings in a place inhabited by nomadic peoples without the infrastructure of Western civilization before the Land Run.

With challenges as deep as establishing statehood, and life during the Great Depression and the Dustbowl, Oklahoma was still engaged in creating itself when these expressions of architecture blossomed on the prairie.

Influenced by one of the great architects of the twentieth century, Frank Lloyd Wright, the work of a Midwestern prodigy, Bruce Goff, was unconventional and startling. His education intensified the probability that his work would be regional and iconoclastic. He was self-taught.

The peculiar vision that shaped his individual creations was the product of an unassuming genius influenced by life on the prairie, music, the availability of materials, and his personality. His buildings were as much a part of nature and the landscape as sculpture to be lived in, as exemplified by the Eugene Bavinger House of 1950.

Goff's work was holistic, economical, indigenous, and site specific. His buildings were of the time and the place. As these creations passed into the public sphere, the response to them was admiration around the world, and consternation at home.

Why was Bruce Goff so different from other architects of his time?

As much of his work suffers the ravages of weather, time, gravity, public indifference, and human frailty, what is the legacy of Bruce Goff at the University of Oklahoma? It is hoped that this paper will be instrumental in a renewed interest in that discussion.

Bruce Goff's Philosophy and Practices Which Serve as a Legacy in Teaching

Below is a list of 20 of the most important philosophies and practices of Bruce Goff that serve as an aid in teaching.[2]

1. Develop the Individuality of the Student
2. Foster Imagination
3. Use the Principles and Elements of Design
4. Provide an Adequate Foundation in Physics
5. Guide Rather Than Criticize
6. Provide an Inspirational Physical Environment
7. Encourage the Honest Use of Materials
8. Explain the Organic Tradition
9. Integrate Interior Design from the Beginning of Every Project
10. Welcome Technology
11. Exploit Prefabrication
12. Teach to Compose With Materials
13. Design in Three Dimensions
14. Employ Geometry and Pattern, Not Abstraction
15. Reference the Earthly Constants
16. Understand the Value of a Disciplined Team is to Develop the Individual Vision
17. Good City Planning Recognizes More Than Three Dimensions
18. Take Responsibility for the Outcome
19. Good Faculty Should Be Paid Handsomely
20. Strive for "Pure Architecture"

Some Observations about Bruce Goff That May Not Contribute to a Legacy in Teaching

Below are five observations about Bruce Goff that may be interpreted as problematic to his teaching legacy, as viewed from the present:

1. He did not integrate himself well, socially or physically, in his community. It is also argued that he did not integrate his buildings well with their places.
2. "Pure Architecture" of "The Continuous Present" may not be economically feasible.
3. Perfect Fit is increasingly difficult to achieve as the present more quickly becomes the past.
4. The Client is usually more than one person.
5. It may be difficult to persuade commercial clients that utility is subservient to vision.

Origins

We Belong to the Land

The regional vernacular of what is now Oklahoma was as much landscape as small town buildings in in a place inhabited by Indian tribes without the infrastructure of Western civilizations before the land runs and lotteries that began in 1889.[3] Integral to this discussion of

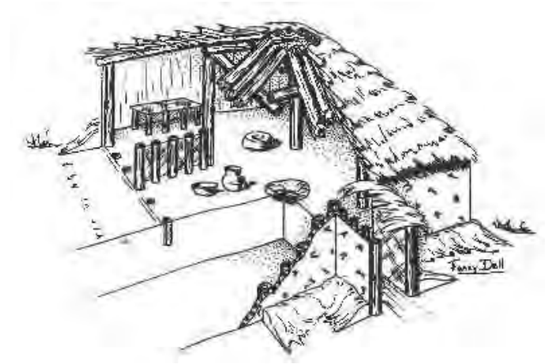

Fig. 1. Square construction during the late period of the Habiukut Era. *Drawing by Fanny Dell,* Of the Earth *(Oklahoma City, Oklahoma Historical Society, 1980), 17.*

Creating_Making at the College of Architecture in Oklahoma, an investigation into the earliest known vernacular response to the environmental conditions should be made.

Indigenous structures were built between the ninth and fifteenth centuries, when a prehistoric culture flourished, then disappeared from eastern Oklahoma.[4] Domestic and other structures exploited local materials, primarily relying on the straight trunks of cedar posts taken down with stone axes, about twelve feet long and twelve inches in diameter arranged in a rectangular configuration averaging 700 square feet, of up to 100 posts and post holes. Larger posts supported a ridge beam (see Fig. 1).

Each rot-resistant cedar post was placed in its own hole, a method suitable to the expansive prairie soils.[5] The exterior of the cane- lathed posts was plastered with plentiful, fire-resistant clay. The roofing was likely made of three or four layers of native grasses tied to a hip roof. Building entrances faced east or southeast, sheltered from strong prevailing winds.[6] Large earthen mounds were used to define regional centers, on which public buildings rested, Spiro Mounds in LeFlore County, being the best extant example.

After the Indian Removal Act of 1830, northeast Oklahoma was inhabited by the Cherokee, Choctaw, Chickasaw, Creek, Yuci, and Seminole, who brought building traditions from the southeast United States. Added to these traditions were those of the Ottawa, Wyandot, Miami, Seneca, Mohawk, Peoria, Shawnee, and Delaware, whose homes were originally north and east of the Ohio River.[7]

Vernacular tribal structures imported to Oklahoma varied. One commonality was the use of different structures according to the winter or summer season. These structures included the conically-shaped, earth covered lodges, recessed one and a half feet into the soil, with wood post frames, used by the Cherokee and Pawnee. Chickasaw winter houses spanned three feet below the ground (farther below the frost line) to five to six feet above the ground.[8] From the northern and eastern forested tribes, bark or unrolled mats covered wood frame or bent sapling structures. Building shapes and structures varied by tribe from rectangular to round, some in tension and some in compression. Among the most elegant of Native American vernacular structures, which have occupied the imagination of people all over the world, are the Plains Indian tipis, which exemplify sustainability and harmony (see Fig. 2).

Legend was that most tribes stated that the construction techniques of their homes were revealed to their ancestors by God.[9] The concept of "God" was probably different for each tribe and may have meant something more like the design was revealed to the tribe by nature.

National "public domain" was established by Congress in 1785, which "provided for the survey and sale of the lands under a system of townships measuring 6 miles square and subdivided into 640-acre sections."[10] As described by Hildegard Binder Johnson, the process of:

> Assigning land by coordinate systems and planning cities on a rectangular grid are ancient and pervasive practices … The grid pattern is the simplest form for equal assignment of land, taxation, design or irrigation … in short, for initiating ... control of land.[11]

The pervasive right-angled planning defined the shape of states, counties, townships, farms, and buildings. In the novel *Main Street* by Sinclair Lewis, Midwestern towns are characterized by:

> the excessive breadth and straightness of the gashed streets, so that there is no escape from gales and from sight of the grim sweep of land, nor any windings to coax the loiterer along, while the breadth which would be majestic in an avenue of palaces make the low shabby shops creeping down the typical Main Street the more mean by comparison.[12]

Fig. 2. Plains Indian Tipi, *OklahomaHistory.org*

The effect of the grid system on the mid-west cannot be overstated. Nathanial Owings wrote,

> There was one main consideration – distance. On the plain roads could run straight, and they did … The straight line became the dominant motif … What began as a reaction to a dramatic new challenge became a habit of mind.[13]

Fig. 3. "Fleeing a Dust Storm", Cimarron County, Oklahoma. *Arthur Rothstein, photographer, April, 1936. (Library of Congress)*

Paradoxically, per Wilcomb Washburn, "The more rapidly and violently was Nature exploited, the more insistently did American philosophers, poets, and painters seek to identify the true American with the virtues of Nature, pure and undefiled."[14] One cannot ignore the effects of over-farming on the region, resulting in blowing soil. Though wealthy oil drillers may have eased the financial blow, Bruce Goff's firm failed (see Fig. 3).

More Social Diversity and a Growing Population

"Because of its nature and location, Oklahoma has always been more eclectic than provincial."[15]

With the arrival of immigrants, international building traditions followed - "Oklahoma is the nation's great mixing bowl."[16] Structures included a wide variety of styles and methods, from log cabin residences to brick, Greek revival boarding schools.[17] "The lure of 'black gold' brought oil men and their families to 'The Oil Capital of the World.'"[18] The building styles – "German, Czech, Mexican, Russian, Italian, African, Jewish and Greek"[19] and others, were imported by newcomers via roads, canals, steamboats, and railroads. "More languages are spoken in Oklahoma today than on the entire European continent"[20] it was said. Daniel Webster said, "The railroad directors are no enthusiastic lovers of landscape beauty. Their business is to cut and slash, to level and deface a finely rounded field, and fill up beautifully winding valleys."[21] And so the parceling of the Indian Territory became part of the Oklahoma's disconnect with its history, and its awkward identification with its present.

In 1949 Angie Debo, Oklahoma's respected historian, wrote, "Oklahoma is more than just another state … For in Oklahoma all the experiences that went into the making of the nation have been speeded up. Here all the American traits have been intensified."[22]

What was the effect of this environment on Bruce Goff? Did he object to living in a box, inside a box, within a grid of boxes? Was his eventual claim to "Organic Architecture" by himself and others a reaction to building for an exploding population? Was their work organic, or was it just building?

An intriguing paper by Robert Kotka, a professor in the Department of Art at the University of Illinois, said of Bruce Goff, "His roots are firmly in the Oklahoma prairie. Its complex natural forms are scattered in wide and expressive space, still the Indian's image of man in relationship to the forces of the earth itself."[23]

His Mother and His Father

In 1910, Bruce Goff began school in Skiatook, Oklahoma. In 1920, his father was a traveling salesman for a scale company, and his mother was a seamstress for a furniture store (see Fig. 4). According to statements given to the U.S. Census, both parents were educated to the eighth grade level. Is it possible that essential information about Bruce Goff has been overlooked due to previous bias about the influence of a father over a mother? On the surface, it would seem Bruce Goff was more similar to his mother, a seamstress creating interior environments, than his father, a salesperson.

"As a boy, Goff built a rock garden in the loft of the family home. It grew, was embellished and became a water garden, at which point the ceiling collapsed."[24] Goff's father decided to apprentice him in an architectural firm at the age of twelve.

Fig. 4. U.S. Census, Tulsa, Oklahoma 1920

Though the surname "Goff" is often an indication of Welsh ancestry, and much is often made of the coincidental birthday of June 8 that Bruce Goff and Frank Lloyd Wright shared, it may not be known if they recognized this common heritage – or maybe they did and it influenced their friendship.

Legacy

"Bruce Goff's primary contribution to architecture took two forms: his work and his teaching … from 1947 to 1956 … at the University of Oklahoma, he utilized them to develop the curriculum for his own unique school of architecture."[25]

Many of his students are still alive and speak of the wonderful example he provided.[26] Former student James Gresham said, "At Oklahoma in the fifties we learned the joy of building. We learned what a thoroughly satisfying experience it was to create architecture. We focused on the essentials of design … and, above all, the discovery of what made each design challenge unique and befitting our most creative response."[27]

Among the many important things Herb Greene has suggested about Goff that bear further investigation is, "The ideas of free association and plumbing one's pre-conscious experience were appealing to him and should definitely be considered in an evaluation of his method."[28]

In a recent opinion piece, Roger Cohen reminds us, "When you are not told what to do you begin to think what to do. You begin to see without distraction."[29]

Conclusion

With challenges as deep as establishing statehood, life during the Great Depression, and the Dust Bowl, Oklahoma was engaged in creating itself when Bruce Goff's expressions of architecture blossomed on the prairie.

Influenced by one of the great architects of the twentieth century, Frank Lloyd Wright, the work of the Midwestern prodigy Bruce Goff was unconventional and startling. His education intensified the probability that his work would be regional and iconoclastic. He was self-taught.

Acts of architectural individuality erupted in the mid-twentieth century heartland in small cities and towns and the rural, wind-swept prairie in the work of Bruce Goff. The peculiar vision that shaped his individual creations was the product of an unassuming genius influenced by his family, life on the prairie, the times in which he lived, and his personality.[30]

Very little has been written about the impact of negative life experiences on Bruce Goff or negative reactions he may have influenced from others.

Goff's work was holistic, economical, indigenous, and site specific. His buildings were of the time and the place. Goff worked in originality. In his essay "Originality and Architecture" can be found information about his process and very good advice for those teaching in his legacy:

> Any genuine work of art is necessarily original. It is the first and last, of its kind, in the order of existence. It has not been copied from anything and is produced for the first time with freshness and authority … it is the result of a natural growth of ordered ideas. There is no beginning, for no one knows, even its creator, the many sources that nurtured it, and no one can know its effect, so it has no ending. It has emerged in the ever-continuous present as a unique and valuable contribution to all men by man's own creative spirit …[31]

Contrast the small architectural, Midwestern practice engaged primarily in highly original residential work with the more common large-firm model of today. As early as 1968, the prophetic Buckminster Fuller knew that "The architect 'has no real control,' no original design initiative, for he must design the kind of building the client already has in mind."[32]

It has been thirty-two years since the passing of Bruce Goff (see Fig. 5).

The exhibition "Bruce Goff: A Creative Mind" at the University of Oklahoma Fred Jones Jr. Museum of Art closed January 2, 2011.[33] In April of 2011, Donald Price and I visited the Bavinger House with a group of OU students. Bob Bavinger called the State Historic Preservation Office in June, 2011, to report "the demise of the Bavinger House." He had told us he might destroy it to fulfil a promise to his father.

As much of his work suffers the ravages of weather, time, gravity, public indifference, and the actions of at least one owner, what is the legacy of Bruce Goff? It is hoped this paper will be instrumental in a renewed interest in that discussion.

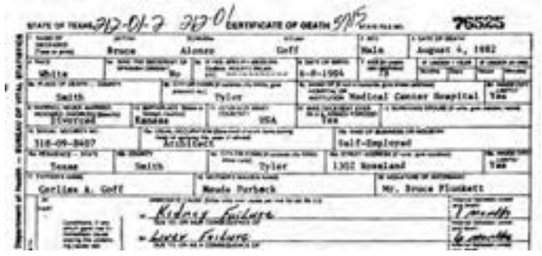

Fig. 5. State of Texas Certificate of Death- Bruce Go f

All images provided by author.

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SESSION 4: Fabricating Political Capital

Session Chair:

Dr. Stephanie Pilat, FAAR, University of Oklahoma
College of Architecture Division of Architecture

The ways in which political power is constituted in the environment has changed dramatically over time as political structures and their relationship to the landscape have evolved. Ancient emperors once built defensive structures, temples and villas as symbolic and physical representations of power. In the Early Modern era, noble families expressed wealth and taste through their patronage of religious structures as well as family palaces. After World War II, modern architecture emerged as a vehicle through which American corporations communicated their identities in a developing global market. During the Cold War, the landscape of state power became less visible and yet ubiquitous; "battlefields were everywhere and nowhere … filtered down to backyards where homeowners studied government-supplied plans for bomb shelters." Moreover, domestic designs for the working class became representative of the power and wealth of a nation; political power was no longer expressed primarily through monumental and symbolic state building campaigns.

This session considers how power has been constructed and reflected through material productions including architecture, design and urbanism. How, for example, has architecture served operationally as a vessel for exercising power? Questions of interest might include: the relationships among physical, bodily and symbolic power; how traditions have been used to define national identity; the influence of global tourism on preservation agendas; how communities express grief or memorialize events through building; or the ways in which architecture and urbanism are used to create community identity by defining a sense of "us and them." Potential topics could range from ancient sites and religious architecture to contemporary sites such as the Green Zone in Iraq, refugee camps or Cold War missile silos.

Fort Maurepas: Five Manifestations of Power on the Mississippi Gulf Coast

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Abstract

In 1699, men led by the French explorer Pierre LeMoyne, Sieur d'Iberville, built a fort on the Gulf Coast in what is today Ocean Springs, Mississippi. Seeking to secure the mouth of the Mississippi River for France but not able to find a suitable site in southern Louisiana, d'Iberville settled on a plot of relatively high land 67 miles to the east for a wooden stockade named Fort Maurepas – a physical manifestation of colonial power. Garrisoned by 86 men, Fort Maurepas proved to be an inhospitable place, far from fresh water and infested by alligators, insects, and snakes. The fort was abandoned in 1702 when the French moved further east to what is now Mobile, Alabama.

Gone but not forgotten – due to the power of memory – Fort Maurepas was the subject of excavations by amateur archeologists and the Mississippi Department of Archives and History. In the 1960s, local activists began calling for the construction of a Fort Maurepas replica, both to celebrate the Coast's French history and to remind the city across the bay (Biloxi) that Ocean Spring is the older community – asserting the power of heritage. The replica fort was completed in 1981, but by 2005, Fort Maurepas had become a problem for the City of Ocean Springs. Underutilized and dilapidated, the fort was more eyesore than point of pride. The future of the fort was the topic of local debate, but those conversations were rendered moot on August 29 by Hurricane Katrina, which flattened the replica fort – evidence of the power of nature. Again, the fate of Fort Maurepas was debated, and the resulting design solution respects the past while accommodating the present and the future – a result achieved through the power of democracy.

This paper examines the history of Fort Maurepas via the aforementioned five manifestations of power.

A physical manifestation of colonial power

Fort Maurepas was part of the epic struggle for North America fought among England, France, and Spain. Built in 1699 and abandoned in 1702, the original Fort Maurepas existed only three years. However, during that three-year period, several key events occurred, including further explorations with the fort as a base and negotiations with Native Americans, often using the fort as the site of the negotiations. These and other activities eventually led to the successful settlement of Louisiana, which still identifies with its French heritage today.

Thomas Grob / Shutterstock.com

In 2005, Hurricane Katrina devastated the Mississippi Gulf Coast.

France's endeavors in the New World came in fits and starts, as responses to European court affairs, opportunities for individual glory, or quick get-rich schemes – looking for the next gold mine or, barring that, the best set of pelts.

The first European known to see the Mississippi River is the Spaniard Hernando de Soto, who discovered the river on May 8, 1541, crossing from what is today the state of Mississippi into Arkansas. More than a century passed until the next substantive exploration of the region, this time by the French explorers Louis Jolliet and Father Jacques Marquette, who travelled from the Great Lakes as far south as the Arkansas River in 1672. In 1682, René-Robert Cavelier, Sieur de La Salle, discovered the mouth of the Mississippi River and claimed for France all lands drained by the river and its tributaries.

France's late 17th century adventures in the northern Gulf fit its standard pattern of sporadic action and reaction – in this case reacting to moves by Spain. The Spanish king ordered the Viceroy of Mexico to build a fort on Pensacola Bay, the northern Gulf Coast's best natural harbor. A Spanish force from Mexico arrived in Pensacola on November 17, 1698.

As the Spanish were securing Pensacola Bay, the French, under the leadership of the Minister of the Marine, Louis Phélypeaux, comte de Pontchartrain[1], made plans to secure the Mississippi River. Louis XIV selected the Canadian adventurer Pierre Le Moyne, Sieur d'Iberville, to lead the expedition.

With two frigates and two supply ships, d'Iberville left France in October 1698 for the Gulf Coast. After a brief sojourn in Léogane, Haiti, d'Iberville arrived at Pensacola Bay on January 26, 1699, where he found the Spanish flag, fort, and frigates. Although d'Iberville appreciated the attributes of the bay, he decided to avoid a direct conflict with the Spanish forces there and sailed west, eventually arriving at a deep-water anchorage off Ship Island. Leaving the frigates at Ship Island, d'Iberville continued west in his smaller boats, passing Cat Island and Lake Borge. Eventually, he sailed into the North Pass, which took him into the Mississippi River. He traveled north, encountering the Houmas and other Native Americans. Doubting whether he

was in the Mississippi River, d'Iberville continued north. He reached a large, red pole (i.e., Baton Rouge) which marked the border between the Houmas and the Bayougoulas. From the Native Americans, d'Iberville obtained a letter from a member of La Salle's 1682 Mississippi River expedition, confirming that indeed he had "rediscovered" the Mississippi River, fulfilling one part of his mandate.

With the Mississippi found, the question for d'Iberville was securing France's claim to the mouth of the Mississippi River. To modern eyes, d'Iberville's choice of location, 67 miles to the east in modern Ocean Springs, looks ridiculous. If he was trying to claim the Mississippi River, why did he not locate his fort on the Mississippi River?

In 1699, the delta[2] of the Mississippi River was much larger than it is now. Approaching land, explorers would have encountered low sandy beaches, salt water marshes, and large areas of fresh water swamps. Insects, snakes, and alligators were abundant. Subtract modern infrastructure and land reclamation projects, and the landscape of the river delta was uninhabitable. Concerning the relatively high land bordering the Mississippi that would later become the French Quarter of New Orleans, d'Iberville himself wrote:

> In descending, M. de Sauvol observed a place, thirty leagues from the sea, that was not inundated.[3] There was another, about twenty or twenty-five leagues distant, where the land extended back a league or more; but he had not time to explore it; for the borders of the river are covered with such a thick growth of canes, that much time is necessary to advance a league to the interior, nor can much be seen immediately around you.[4]

A person alive today, even one familiar with the lower Mississippi River, would not be familiar with the landscape seen by the French explorers. As historian David Lowenthal noted, modern eyes have difficulty seeing the past, which he famously called a "foreign country."[5]

D'Iberville was anxious to return to France with news of the rediscovery of the mouth of the Mississippi, and he needed to establish a fortified settlement quickly. Of the territory d'Iberville had explored, the Mississippi Gulf Coast offered the best location for the initial settlement. The channel in Biloxi Bay was relatively deep, allowing supplies to be delivered to shore. Moreover, the east side of Biloxi Bay –present-day Ocean Springs – has some of the highest land fronting the coast. Thus, d'Iberville located his fort on Biloxi Bay. Typical of French colonial forts, Fort Maurepas consisted of a wooden stockade with four bastions, embrasures for guns, a dry moat, and cannons.[6]

Leaving a garrison of 86 men behind, d'Iberville set sail on May 4, 1699, having concluded France's most successful reconnaissance of the northern Gulf region to date. Historian Jay Higginbotham wrote, "When Iberville returned to France, he was able to report that he had succeeded in his objectives: He had rediscovered the mouth of the Mississippi River and France now possessed a small but stable fortress, sufficient for the time."[7]

Fort Maurepas was abandoned in 1702 when the French moved further east to what is now Mobile, Alabama. Although the physical presence of Fort Maurepas was fleeting, it was the beginning of a century of French sovereignty in the region, which continued until the Louisiana Purchase in 1803.

The power of memory

Why would a small, wooden fort, built in 1699 on the edge of the known world and torn down (or possibly burned down) just three years later, be remembered, much less celebrated in books, carefully documented, and later "reconstituted," to use Lowenthal's term?[8]

One likely explanation is the 1869 publication of B.F. French's *Historical Collections of Louisiana and Florida*, which contains English-language translations of original French documents dating from the late seventeenth and early eighteenth centuries. Suddenly, the Anglo-Saxon world had easy access to the thoughts and insights of its former New World foes, including d'Iberville himself. The importance of such documents is critical. As Pierre Nora reflects, "Modern memory is, above all, archival."[9]

In addition to the B.F. French text, a local dilettante named Schuyler Poitevent was key to keeping the memory of Fort Maurepas alive.

The Poitevents, a family of Huguenot descent, moved to Mississippi around 1836. Schuyler Poitevent's father, June Poitevent, fought in the Civil War, was captured by Union forces, and was held prisoner in New Orleans until 1865. June Poitevent married May Eleanor Staples in 1866, and Schuyler was born in 1875.

Schuyler Poitevent attended Tulane University in New Orleans and the University of Virginia in Charlottesville, Virginia. In 1906, Poitevent married Thomasia Hancock, and afterward, he and his bride moved to Mexico to join June Poitevent, who had bought a ranch there. Forced to leave Mexico during the Mexican Revolution, Schuyler Poitevent returned to Ocean Springs, where he dabbled in archaeology; wrote numerous unpublished essays, short stories, and poems; and corresponded with well-known historians. Fifty-five boxes of Poitevent family documents were donated to the Mississippi Department of Archives & History by Schuyler Poitevent's descendants.[10]

As a boy, Schuyler Poitevent liked to explore the beaches and woods surrounding his family's home on Lover's Lane. When he was 12 years old, Poitevent found an arrowhead on the beach, leading to his eventually collecting 3,000 objects.[11] The Poitevent estate has long been suspected as the location of Fort Maurepas, but this has never been proven.[12]

The memory of Fort Maurepas was not limited to a single individual, however. During the twentieth century, a distinct series of events kept the memory of Fort Maurepas alive and eventually led to its reconstruction. Speaking in 1920 to the Daughters of the American Revolution during the dedication of a monument commemorating the settlement of the Mississippi Gulf Coast, state historian (and infamous segregationist) Dunbar Rowland commemorated the French explorers, arguing they were the forerunners of Mississippi's current "Anglo-Saxon achievement."[13]

In 1937, Ocean Springs citizens began talking about creating a "national shrine" to commemorate the 1699 French landing.[14] In 1949, markers were placed on Highway 90 and Front Beach to commemorate Fort Maurepas.[15] The markers, as physical claims to Ocean Springs' heritage, were flimsy things, and two episodes from years past had taught the people of Ocean Springs that relatively small items and the heritage associated with them can disappear.

In 1910, Robert Rupp, Sr., discovered an old stone on Front Beach that apparently marked the 1699 landing. The stone bounced around town, eventually finding a more or less permanent home in a drugstore window. In 1937, a reporter from New Orleans saw the stone and reported his find to James A. Fortier, the curator of the Louisiana heritage museum in the Cabildo in New Orleans. Fortier took the stone back to New Orleans for "more detailed examination and research."[16] Apparently, the examination and research was highly detailed as the stone still resides in the Cabildo today.

Some question the authenticity of the colonization stone.[17] While it might not qualify as history, the stone does qualify as heritage. Lowenthal wrote, "The unadulterated past is seldom sufficiently ancient or glorious; most heritages need ageing and augmenting."[18] Emphasizing the importance of the collective sense of heritage, Lowenthal also argued that "[h]eritage should not be confused with history" but "[d]epartures from history only distress a handful of highbrows."[19]

Likewise, several cannons that were found in a sunken ship in Biloxi Bay were prominently displayed for years in front of the Santa Maria retirement home in Biloxi, across Highway 90 from the Small Craft Harbor.[20] Ocean Springs' loss of heritage to New Orleans was aggravating, but losing it to Biloxi was anathema.

The 1699 stone and the cannons were lost to other communities, and the historical plaques were relatively flimsy markers of memory. The citizens of Ocean Springs desired a permanent, visible, and evocative structure to commemorate their French heritage.

The power of heritage

A replica fort was desired by Ocean Springs as a way of cementing the town's claim as the oldest community on the Coast. Biloxi *Sun Herald* columnist Kat Bergeron neatly encapsulated the rivalry between Ocean Springs and Biloxi and the importance of Fort Maurepas to that rivalry:

> Ocean Springs, as France's first post, has much to crow about, though people haven't always listened because of a quirk in naming. Iberville called this first site "Biloxi," after a friendly tribe of Native Americans. Later, when "New Biloxi" was built across the bay in what is present-day Biloxi, the original Fort Maurepas site became "Old Biloxi." That was eventually changed to "Ocean Springs" to reflect abundant spring waters. It's easy to see how this name game set the stage for confusion.
>
> To reaffirm its place in history, Ocean Springs built a replica of Iberville's Fort Maurepas, but could not do so at the original site, which likely is underwater and in an exclusive neighborhood.[21]

The people of Ocean Springs understood that their claim to the events of 1699 – their cultural memory of the European settlement of the region – would be best confirmed and anchored by a physical monument with prestige and presence.

Pressure for a reconstructed fort led to a 1973 report that reviewed the known documentation of the fort, examined potential sites, and provided cost estimates. Reflecting the contagious enthusiasm of the upcoming national bicentennial, the report says, "It should be stated that historical research will remain as a continuing function of the proposed national shrine in the fulfillment of its purpose – service through preservation of the American heritage, for the people, now, and in the future."[22]

The report made six recommendations, including the suggestion that the reconstructed fort be located as close to the 1699 site as possible. Most problematic to this proposition, the location of the 1699 site was never found. The suspected site, the old Poitevent property, is located in a hard-to-access, upscale neighborhood. Thus, a Front Beach site about a half mile east of the suspected 1699 site was chosen. When the "inauthentic" site was selected, the Mississippi Department of Archives and History withdrew its support of the project, forever damaging the respectability of the replica fort in the minds of the public and the legislature.[23]

One would suspect that an apostle of authenticity, such as Ruskin, who said that "the greatest glory of a building … is in its Age,"[24] would be appalled by the proposal. Recognizing that the reconstructed fort would not have age nor, apparently, dignity, the authors of the report recommended siting the fort among the Coast's famous live oaks, so the reconstruction would at least the "**aura** of age and dignity"[25] (emphasis added).

Although some would question the value of a reconstructed fort, not everyone views rebuilding an object from the past negatively. Lowenthal noted that:

> The wider public, however, unabashedly enjoys reconstructions. Few have the taste or the training to appreciate the past simply from fragmentary remains. Heaps of fallen stones convey nothing to the ordinary spectator; only reconstitution makes them coherent and evocative.[26]

Because they are tangible and visceral, reconstructions provide an imaginative framework that ruins or empty sites cannot provide.

In their sympathetic treatment of reconstructed archaeological sites, Peter Stone and Philippe Planel

make the following point: "The past in fact cannot be re-constructed as it actually happened, but rather it is continually constructed by individuals or groups who, for whatever reason, choose to interact with it."[27] Stone and Planel note that modern tourists enjoy and expect visible and tangible exhibits.[28]

The danger of a reconstructed – or in Stone and Planel's terms, a "constructed" site – is that a student or another visitor would leave with a false impression of what is original and what is newly constructed. However, these authors saw "constructed" sites as being potentially advantageous:

> By making students aware that the sites are *experimental*, and that they are not definitive models of what it was like in the past, teachers at all levels of education can develop discussion on the nature of evidence and on the nature of the past itself.[29]

Stone and Planel saw the opportunity to work with "experimental" archaeology as potentially "life-enhancing," particularly for young students.[30]

Likewise, Marion Blockley saw the educational potential of reconstructions:

> Reconstructions are an invaluable way of reaching and inspiring different sections of the community – whether for commercial, political or didactic reasons. However, they are a powerful tool and need to be used with integrity and imagination."[31]

Echoing Blockley's warning, Ocean Springs historian Ray Bellande expressed concern about the integrity of the some of the annual 1699 Landing activities, arguing they are conveyed as historical, when in fact they are largely fanciful.[32]

In 1973, the Mississippi legislature passed a bill that secured $300,000 to purchase land for the Fort Maurepas reconstruction.[33] In 1975, the project was designated a "Mississippi Bicentennial project."[34] Additional funds were provided, and the basic stockade was completed in 1981.

Unfortunately for Fort Maurepas enthusiasts, Mississippi went through a period of budget cuts in the early 1980s, which essentially ensured that the fort would never be completed. Fort Maurepas was caught in a financial Catch-22. As an incomplete shell, it was not enough of an attraction to bring tourists, but without tourists, it would never be financially viable.

The power of nature

By 2005, Fort Maurepas had become a problem for the City of Ocean Springs. Underutilized and dilapidated, the fort was more eyesore than point of pride. The future of the fort was the topic of local debate, but those conversations were rendered moot on August 29, 2005 by Hurricane Katrina, which flattened the replica fort.

On a typical day on the Mississippi Gulf Coast, one has trouble imagining the power of nature as manifested by Hurricane Katrina. A monster storm, covering much of the Gulf of Mexico, Katrina unleashed Category 3 winds and a tremendous storm surge, which was greater than thirty feet high at its highest point and approximately eighteen feet high at Fort Maurepas. Along the shore in the velocity zone, the storm surge was topped by waves. Considering that a single cubic yard of water weighs a half ton, it is not surprising that Fort Maurepas was crushed.

The Fort Maurepas Foundation was created before Katrina to raise funds to complete the fort. After Katrina, the foundation advocated for the reconstruction of the fort with FEMA funds, in effect arguing for a duplicate of a replica. However, other voices prevailed, and rather than rebuilding the fort, Ocean Springs opted to create a park on the site.[35] The new plan was presented as more "user friendly" and more accessible to the public.[36] As a concession to the fort's supporters, the footprint of the fort was marked by a lawn edged with stone walls.

The power of democracy

Today, Fort Maurepas Park is more used and appreciated than the replica fort ever was and is part of a living, dynamic city. Instead of a rarely visited tourist attraction, Fort Maurepas Park is an integral part of the town. Ocean Springs Board of Aldermen meeting minutes show some of the uses of the park, including a concert series.[37] The minutes also show the democratic process in action, with the board discussing regulations for concert vendors and a policy for nonprofits that wish to rent the park.[38]

The "foundation walls" outlining the park are the same size as the footprint of the replica fort. The material is stone, however, which was not present in the original fort or its faithful duplicate. Interestingly, the form is most clearly viewed from the air, as confirmed by the remarkably similar pre- and post-Katrina Google Earth images of the site.

In addition to the lawn, which serves as seating during concerts, Fort Maurepas Park includes a boat-shaped playground for young children, a splash park, seating facing the Gulf, access to a public pier across the street, and restrooms. A bronze statue of d'Iberville quietly surveys the scene.

Ocean Springs is a town of festivals. The most important are Mardi Gras, the Peter Anderson Festival, and the 1699 Landing. Each of these festivals has qualities of what Rahul Mehrotra calls the Kinetic City, which "is perceived not as architecture, but in terms of spaces which hold associative values and supportive lives."[39] Each festival physically modifies the city, whether with the moving floats of Mardi Gras, the display booths of Peter Anderson, or the costumed pageantry of the 1699 Landing. Spatially, these festivals are very democratic, with the most important events accessible to the public, often at no charge.

The 1699 Landing is typical of Gulf Coast festivals, consisting of a collection of events very loosely connected to local French heritage. Past events include a ball, a block party with music and entertainment, a 5K run, a mass at St. Alphonsus Catholic Church (with "Landing participants in full dress attire"), a two-day regatta, a children's pet parade, an art contest, the Landing reenactment, and fireworks.[40] After a brief post-Katrina hiatus, the 1699 Landing takes place every April along Front Beach in front of Fort Maurepas Park, giving the citizens of Ocean Springs the opportunity to celebrate their shared heritage.

Conclusion

The history of Fort Maurepas can be examined as the history of five manifestations of power: a physical manifestation of colonial power, the power of memory, the power of heritage, the power of nature, and the power of democracy.

Fort Maurepas proved to be more powerful as an idea than as a physical entity. The original fort was occupied only three years before being abandoned in 1702. But, thanks to d'Iberville's writings, Schuyler Poitevent's amateur archeological explorations, and the efforts of countless others, the memory of Fort Maurepas was kept alive over the centuries, culminating in the construction of a faithful replica fort in the early 1980s. These first two incarnations of Fort Maurepas stood for a total of 27 years out of the fort's 315 years of history. After Hurricane Katrina destroyed the replica fort, the City of Ocean Springs – through the democratic process – made the wise decision not only to celebrate its past but also to address the present and future needs of the city with its new Fort Maurepas Park.

Its memory preserved by the foundation walls of the Fort Maurepas replica, Fort Maurepas Park is now an important part of Ocean Springs' landscape and a reminder that a city's heritage can also be part of a living, dynamic city.

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[1] The namesake of Lake Pontchartrain. Although he is commonly referred to as "comte de Pontchartrain," Louis Phélypeaux also held the title comte de Maurepas. Fort Maurepas is named in his honor.

[2] That is, the true river delta, or mouth, of the Mississippi River, not to be confused with the misnamed "Delta" regions of northwest Mississippi and southeast Arkansas, which are actually flood plains.

[3] Identified by the editor, B.F. French, as New Orleans.

[4] M.P. Le Moyne D'Iberville, "Narrative of the Voyage Made by Order of the King of France in 1698, To Take Possession of Louisiana," in *Historical Collections of Louisiana and Florida*, B.F. French, ed., translated by B.F. French (New York: J. Sabin & Sons, 1869), 28-29.

[5] David Lowenthal, *The Past is a Foreign Country* (New York: Cambridge University Press, 1985).

[6] J.E. Kaufmann and H. W. Kaufmann, *Fortress America: The Forts that Defended America 1600 to the Present* (Cambridge, MA: Da Capo Press, 2004), 26.

[7] Jay Higginbotham, Fort Maurepas: *The Birth of Louisiana* (Mobile, AL: Griffice Printing Co., 1968), 14.

[8] Lowenthal, *Past*, 278.

[9] Pierre Nora, "Between Memory and History: Les Lieux de Mémoire," *Representations* 26 (1989): 13.

[10] Poitevent Family Papers, Mississippi Department of Archives & History, accessed December 14, 2011, http://opac2.mdah.state.ms.us/manuscripts/z1751.html.

[11] Ray L. Bellande, "Fort Maurepas & French Colonial 1699 – 1811," accessed November 3, 2011, http://oceanspringsarchives.net/node/201.

[12] Ibid.

[13] Dunbar Rowland, *Old Biloxi: The First Settlement in Mississippi.* (Jackson, MS: Hederman Bros., 1920), 6.

[14] Bellande, "Fort Maurepas."

[15] Ibid.

[16] Margaret Roe Caraway, "The Cornerstone of Old Fort Maurepas," *The Journal of Mississippi History* (1951): 104.

[17] Ray L. Bellande, telephone interview by author, December 16, 2011. Circa 2009, Ocean Springs historian Ray Bellande was told by a niece of Captain Frederick A. Schreiber that Schreiber and/or his father-in-law, Robert Rupp, Sr., fabricated the colonization plaque.

[18] Lowenthal, *Past*, 325.

[19] Lowenthal, David. 1998. "Fabricating Heritage." *History and Memory* 5-24, 7 & 13.

[20] The Santa Maria was damaged by Katrina and is scheduled for demolition.

[21] Kat Bergeron, "Ocean Springs, please shoot those cannons," *The Sun Herald*, April 4, 1999: E-1.

[22] Volney J. Cissna and Ralph Hode, *Reconstruction of Fort Maurepas* (Gulfport, MS: The Gulf Regional Planning Commission, 1973), 19.

[23] Bellande, "Fort Maurepas."

[24] John Ruskin, *The Seven Lamps of Architecture* (Mineola, NY: Dover, 1989), 186.

[25] Cissna and Hode, *Reconstruction* (note xxii), pp. 23-24.

[26] Lowenthal, *Past*, 280-282.

[27] Peter G. Stone and Philippe G. Planel, *The Constructed Past: Experimental archaeology, education and the public* (London: Routledge, 1999), 1.

[28] Ibid., 6.

[29] Ibid., 7.

[30] Ibid., 12.

[31] Marion Blockley, "Archaeological reconstructions and the community in the UK," In *The Constructed Past: Experimental archaeology, education and the public*, 15-34 (London: Routledge, 1999), 31.

[32] Bellande, author interview.

[33] Bellande, "Fort Maurepas."

[34] Ibid.

[35] Bellande, author interview. Ray Bellande attributes the idea for a park to Mayor Moran.

[36] Joshua Norman, "Ft. Maurepas site will be redesigned," *The Sun Herald*, April 28, 2006: A7.

[37] Shelly Ferguson, "May 25th 2011 minutes," City of Ocean Springs website, accessed December 20, 2011, http://ci.ocean-springs.ms.us/minutes/minutes-may-25-2011-830-a-m-special-call-meeting-5754/.

[38] Ibid. and Shelly Ferguson, "July 5th 2011 minutes," City of Ocean Springs website, accessed December 20, 2011, http://ci.ocean-springs.ms.us/minutes/minutes-july-5-2011-600-p-m-regular-meeting-5849/.
[39] Rahul Mehrotra, "Negotiating the Static and Kinetic Cities: The Emergent Urbanism of Mumbai," in *Other Cities, Other Worlds: Urban Imaginaries in a Globalizing Age*, edited by Andreas Huyssen (Durham: Duke University Press, 2008).
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Built for Believers: Archaeological Reconstruction and Community Power in Postwar Banja Luka, Bosnia and Herzegovina

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Abstract

From 1992 to 1995, the Bosnian War led to the destruction or damage of 70 percent of mosques in Bosnia and Herzegovina. In the northern city of Banja Luka, Bosnian Serb paramilitary forces razed sixteen mosques and threw the stones of one of the most historic structures, the Ferhadija Mosque, in the city landfill. Such acts of terror caused many Bosniak community members to flee, leaving behind only 4,000 of the pre-war population of 40,000 individuals. Since the end of the war, the Islamic Community and the recovering Bosniak population have unwaveringly pursued the reconstruction of the Ferhadija Mosque to reassert their presence through the built environment and summon displaced community members back to the city.

This paper will explore methods of the Islamic Community, a religious organization working in Banja Luka, to use the reconstruction of a beloved mosque to re-gain a place in the cultural and social landscape of the capital city of the Republika Srpska. It will consider the role of the reconstruction project as a "linking object," which helps the community confront the loss of its pre-war identity and as a tool to connect with far-flung community members. While typically assigned to inanimate objects, this paper suggests that the whole reconstruction project, namely, material recovery, archaeological reconstruction, and communication of its progress, serves as a linking object, which aids in the collective mourning process after traumatic experiences. The project creates an opportunity for the community members in Banja Luka and abroad to participate in the re-making of the mosque and the recovery of the community. Historic preservation has increasingly become viewed as an essential part of the long-term recovery from war and conflict.1 Within the Bosnian context, scholarship on the topic has focused on the importance of historic preservation to facilitate the return of displaced community members and start the process of recovery.2 Important questions remain about how reconstructed historic structures function and take on new meanings in minority communities still significantly diminished in size due to displacement and relocation almost two decades after the war. This analysis asks preservationists to reconsider where power lies in the archaeological reconstruction in the postwar setting. It is not only in the stones but also in the interactions and exchanges that make up a reconstruction project and contribute to the healing of the community. "This place built for believers," ends the inscription on the entry portal of the Ferhadija Mosque. The reconstruction project of the mosque demonstrates the power of a community that believes in maintaining connections despite the distance.

The Ferhadija Mosque and the Reality of Return

After 74 years as a republic of Yugoslavia, Bosnia and Herzegovina (BiH) declared its independence on March 3, 1992. This act of independence, the subsequent recognition by the European Council, and the tension of ultra-nationalism in the region led to a four-year war involving BiH, Croatia, and Serbia. The war came with a heavy human cost. Over 100,000 people lost their lives and more than 2.3 million people – over half of the country's pre-war population – fled or became displaced by the conflict.[3] Approximately 1 million displaced persons settled in another part of BiH, where their ethnic group represented the majority, and the other 1.3 million became refugees in other countries of the former Yugoslavia and around the world. The massive migration transformed the country and created zones of ethnically homogeneous populations in direct contrast to the multicultural, heterogeneous character of much of pre-war Bosnia.

The war also resulted in the extensive destruction of monuments, religious structures, and historic infrastructure and housing. Andras Riedlmayer, a scholar on cultural destruction from the Bosnian War, characterizes the assault of the war as having two clear features: "mass expulsion of civilians [for being] of the 'wrong' ethnicity and religion" as well as the "deliberate tagging and destruction of cultural, religious, and historic landmarks by nationalist extremists."[4] As nationalist paramilitaries crossed the land, they cleansed it of signs of unwanted ethnic groups. This cleansing resulted in the shelling, burning, and dynamiting of over 1,000 mosques, hundreds of Catholic and Orthodox churches, and countless other historic buildings, cultural institutions, and archives.[5]

The hard ethnic lines that emerged due to the massive migration remain evident in the country's social and political geography. The peace agreement forged at Dayton Air Force Base by representatives of the three dominant ethnic groups divided the country into two autonomous entities – the Federation of Bosnia and Herzegovina and the Republika Srpska. The entities remain ethnically divided, with the Republika Srpska dominated by Bosnian Serbs and the Federation dominated by Bosniaks (Bosnian Muslims) and Croats.[6] Although it swelled with displaced Serbs and became the political capital of the Bosnian Serbian entity during the war, prior to the war Banja Luka held only local importance and touted its multi-cultural heritage, including the Ferhadija Mosque.[7]

The grand Ferhadija Mosque, completed in 1579, and its unique construction stemmed from a historically important moment. The newly appointed Ottoman provincial governor settled into his new role in Banja Luka and installed an extensive endowment of urban infrastructure that included the Ferhadija Mosque and its complex. Typical Bosnian stone mosques of the time had a large central dome, which covered the entire central prayer space, and then three smaller domes over the porch. Importantly, the design of the Ferhadija Mosque elaborated on this form and followed more closely architectural trends originating in Istanbul. In addition to a central domed prayer hall, the structure included two side annexes covered by half domes, which created a more elaborate form and profile (see Fig. 1). The unique structural system and high-quality ornamentation made the mosque architecturally significant and the recipient of international recognition from the United Nations Educational, Scientific and Cultural Organization (UNESCO) prior to the war.

While Banja Luka did not see conflict during the war due to the proximity of a major Bosnian Serb army installation, another kind of violence affected the city. Attacks by mobs and soldiers armed with explosives led to the destruction of the sixteen mosques, eleven Catholic churches, and other cultural heritage sites related to minorities. On the evening of May 6, 1993, nationalist Bosnian Serb soldiers placed explosives and blew up the Ferhadija Mosque and surrounding structures. In the days after the bombing, city officials ordered the site razed, and workers removed the burned stones and broken ornament. The bombings in the spring of 1993 led to the largest wave of the Bosniak community members fleeing the city. Of the pre-war population of 40,000, only 4,000 community members remained behind.

After the war, minority returnees and visitors to Banja Luka faced political obstruction, harassment, and violence. In 1999, minorities attempting to regain their property faced resistance, which caused the Office of the High Representative (OHR), the resident watchdog of the International Community in BiH, to issue an order to the municipal government. After OHR's intervention, more minorities regained their property, and estimates suggest the fulfillment of 81 percent of minority property claims by 2005. However, the number of ethnic minorities who actually returned remained limited.[8] According to a member of the Ferhadija Mosque project, the number of Bosniaks in the city totaled approximately 10,000 in 2013, and he noted that most families only returned for part of the year.[9] The remaining individuals represent only a fraction of the population of Banja Luka reported to be over 199,000 in 2013.[10]

Fig. 1. The rising walls of the Ferhadija Mosque with the minaret under construction. *(Photograph by author, August 2011)*

Many different factors contributed to the low number of Bosniak returnees to Banja Luka. Research conducted in 2005 found that Bosniaks returning to the city faced discrimination in the labor market and that the Bosniak community did not have strong enough social networks or enough capital to create new jobs and businesses.[11] Additionally, returnees faced bureaucratic obstruction when attempting to reconstruct the destroyed mosques. Immediately after the war, the Islamic Community, the religious organization sponsoring the project, tried to acquire permits for construction work and faced intransigence from the municipal planning office. In 1999, it took a mandate from the Office of the High Representative to force the municipal government to cooperate with the project and to approve appropriate construction permits.[12] Despite the request, the mayor at the time refused to grant permission. The mayor supported his decision by calling the mosque "not a national monument of any of the three nations of Bosnia, but a monument to its Turkish conquerors who treated the indigenous inhabitants of this region more cruelly than the fascists."[13]

In the midst of ongoing resistance, the Islamic Community finalized its reconstruction plans for the Ferhadija Mosque, and arranged for foreign dignitaries, former residents of the city, and leaders in the Bosniak community to join together for a high-profile cornerstone ceremony on May 7, 2001.[14] Ultranationalist Bosnian Serbs organized a demonstration of several thousand people, which violently interrupted the ceremony. The mob also burned a Muslim religious flag, stoned the car of Bosnia's foreign minister, and set fire to the buses that had transported Bosniak visitors to the ceremony. The attack killed one elderly man and trapped the participants, including United States Ambassador Thomas Miller, in the adjacent Islamic Community offices for hours.

Because of challenges faced by many Bosniak returnees, the Ferhadija Mosque gained new meanings and narratives in the city and abroad. The mosque became a symbol of the heterogeneous, pre-war Banja Luka for the Islamic Community and for the foreign sponsors and officials. The Islamic Community held a second cornerstone ceremony on June 18, 2001. The participants successfully positioned the cornerstone, but with a backdrop of 150 demonstrators held back by tear gas and water cannons. Despite this stark background, the message at the ceremony was one of hope when one speaker said, "Let this mosque be a bridge of reconciliation between Bosniaks and Christians."[15]

The reconstruction project, which follows UNESCO standards, places a heavy emphasis on the materiality of the historic mosque. In 2004, a tip from an informant led the reconstruction team of historians, architects, and Islamic Community leaders to the burned stones of the mosque buried in the city landfill and resting at the bottom of the city reservoir. Over a few years, the salvage effort recovered two-thirds of the original stones. A team of architecture students and professionals cleaned and documented each stone and used photogrammetry to create a 3-D model to aid in returning the stones to their original position in the structure. Geochemical testing allowed the team to identify the signature of the stone and find the original geological source to quarry new stones. The project even employed masons schooled in traditional techniques of masonry to place the stones. This devotion to the authentic material nature of the mosque amounts to a form of reconstruction called archaeological reconstruction. The enormous effort demonstrates the reverence for the physical trace of the beloved mosque and the understanding of the stones as witness to the thriving pre-war Bosniak community. When asked about simply building a new mosque, the leader of the reconstruction team, Muhamed Hamidovic, formerly of the University of Sarajevo, said, "Look at this stone … this stone has been listening to the call to prayer, to the text of the Qur'an, five times a day for 500 years. And you want me to throw this stone away and make a new stone?"[16]

While the materiality of the mosque remains the heart of the reconstruction project, the mechanisms used by the Islamic Community to share the progress of the reconstruction reveal the importance of the immaterial. Throughout the whole process, the project has maintained a website that includes academic reports, news updates, and an extensive photographic archive of the project. While it is unclear when the team began posting photographs, it is important to the project to photograph thoroughly every event and milestone, from 2004 to the present. Updates written up about new developments onsite often include a sentence noting that "everything was documented, photographed" and often sketched or described in a journal.[17] The extent of the archive, maintenance of the images, and professed interest in documenting through photographs demonstrate that this record of the mosque and its reconstruction is an important part of the project's online presence.

The website also provides a particularly important tool for connecting with displaced community members, and the project anticipates the curiosity of the absent believers and community members. In a welcome letter to visitors to the website, the Grand Mufti of BiH at the time, Mustafa Ceric, states the website's purpose: to deliver information "accurately and truthfully" [to the] Bosniaks of Bosnia and Herzegovina as well as our dear Diaspora."[18] He even describes the reconstruction project as a possible motivation for people to return to their hometown and assures readers that "we are awaiting them." This reference suggests the project anticipates an audience not only "out of place" but still actively returning to "their place" through the virtual portal of the website. The Islamic Community also receives evidence of this attention. According to the president of the Islamic Community in Banja Luka, over the years, both celebratory expressions of support and malicious expressions of opposition have reached the project through the website's contact feature.[19] Although it is not always clear whether they come from people in Banja Luka, BiH, or abroad, these communications confirm that members of the community do engage the project through the site (see Fig. 2).

Fig. 2. The material and immaterial sites of the Ferhadija Mosque work together to connect people around the world to the project. *(Photograph taken by author, August 2011)*

Leaders of the reconstruction project view the mosque as a symbol of the health of the Bosniak community and the state of ethnic relations in the city. By sharing the progress of the reconstruction, they hoped to summon far-flung community members back to Banja Luka. However, as research has shown, other economic and social factors contributed to the low number of actual returns. In light of the reality of return, with the majority of community members located somewhere else in the world, the whole reconstruction project, the act of reconstructing not just the mosque, gains a new meaning and sources of power for the local community.

Linking Objects in the Postwar Context

In the tense postwar atmosphere of Banja Luka, the act of reconstruction becomes a way of organizing the uncertainty of the world – an uncertainty that includes the transitional economic and social state of affairs in Banja Luka, as well as the unknowable fate and decisions of the Bosniak diaspora. The growing walls of the mosque, online news digest, and expanding visual archive connect the mosque to a wider political and social context and demonstrate progress, stability, cooperation, and control. During the reconstruction, the non-functioning building acts like a blank slate, which gives the community a place to project positive meanings onto the incomplete structure. It remains to be seen if the mosque can recapture or foster the vibrancy of the pre-war community, especially with the memory of that lost community still fresh.

It can be argued that this act of reconstruction performs the function of a collective "linking object" – a theoretical mourning device conceived by psychoanalyst Vamik Volkan. The reconstruction could allow the former Bosniak community to negotiate not only the loss of individuals, sacred religious buildings, and homes during the war, but also the loss of their pre-war community and identity.

In the 1970s and early 1980s, Volkan developed the concept of "linking object" while working with individuals facing issues related to a complicated mourning process. Uncomplicated mourning goes through predictable phases: shock, anger, bargaining, and adaption. According to Volkan, complicated mourning emerges when the loss causes massive change, and the mourner can become fixated on one of the phases.[20] The linking object becomes a magical mechanism that connects the mourner to the lost object, environment, or person. As highly symbolic artifacts that create an "external bridge between the representations of the mourner and that of the lost person or thing,"[21] Volkan came to recognize that linking objects could be part of the healing process.[22]

Volkan also developed the concept of the linking object for the shared mourning experiences of collectivities of people such as refugees or populations recovering from conflict or natural disaster.[23] In his research on Turkish refugees in Cyprus, Volkan applied the concept of the linking object to scenarios of extreme change to the community and environment.[24] Despite living as free men and women in a new village, he found the Turkish migrant community mourning the loss of its former village and harboring a strong need to maintain continuity with it. He referred to this phenomenon as the community giving up its "attachment to ground."[25] In later work, he found that objects, especially elements of the built environment, could connect the mourners to lost loved ones as well as to each other.[26] These objects create a space that washes away difference and reinforces the shared experiences by creating an unconsciously agreed-upon meaning.

For the project of the Ferhadija Mosque, the act of reconstruction provides a method to mourn the loss of the pre-war community members and also to negotiate the instability and unfamiliarity of the postwar city. The materiality of the rebuilt mosque connects the present-day community to the legacy of the structure, including the trauma of the bombing. The reconstructed mosque also resurrects an image of both the pre-war and postwar community that the Islamic Community and its constituents can control. In a postwar Banja Luka in which its existence is contested, the Bosniak community participates in an act that recreates the pre-war cityscape, and one with which it hopes to attract the attention of the displaced and encourage their return. With this image, the community gains an attachment to familiar ground, to use Volkan's terminology. Its members gain a visual, tactile connection to a familiar time, place, and community, though it has undergone extensive change.

Additionally, the project provides various avenues to facilitate participation in the reconstruction. Individuals interact and participate with the project in conventional activities such as traveling to the cornerstone ceremony or visiting the reconstruction site. The project hosts visiting dignitaries and officials frequently, and the entrance to the construction site encourages curious passersby to watch the work. One can also participate virtually. The website empowers displaced community members to offer words of praise and support. Community members can also access its extensive photographic archive which documents the progress of the reconstruction project. The website also documents visits of foreign dignitaries, community meetings, and academic conferences held in the mosque and progress made on other projects around the city.

In the reconstruction project, the forms of participation create the impression of activities shared by the community – the whole community, both in place and displaced. With every stone, with every email of support, with every visitor, with every photograph documenting the progress, the act of reconstruction ties these two groups together and gives them a place where they act against the social and economic instability of the postwar city. In this way, the instability becomes contained and controlled. For the present and former Bosniak community members of Banja Luka, the reconstruction project thus acts like a linking object – it creates a place where the trauma of war and the flux of the postwar condition can exist but not overwhelm them. As the president of the Islamic Community in Banja Luka, Kasim Mujicic, noted during a conversation, the project does not have a political agenda; instead it focuses on establishing a sacred space for members, giving strength to the community, and helping to facilitate the process of return.[27]

Archaeological Reconstruction and Building Community Power

Despite the Islamic Community's intent to stay out of the political arena, the project nonetheless reflects political change in the region. The president of the Republika Srpska, Milorad Dodik, visited in 2010 with a delegation of the entity's government and pledged more funding for the project. Since the community faced erasure, its growing strength manifests in the mere act of being present and free to act upon one's own agency. Evidence of progress shows up in the updates on the website. One post remembers the 2001 cornerstone ceremony in which 300 community members faced violence from a mob of extremists. It shares the announcement and photographs of a recent ceremony marking the completion of a reconstructed historic tomb in Banja Luka. One photograph captures 200 community members gathered together after the ceremony for an enormous iftar, an evening meal shared during Ramadan.

While the community of Bosniaks in Banja Luka remains diminished in size, the project captures the vitality and growing power of the community by connecting with members living around the world and creating opportunities for all individuals to participate in the reconstruction project and, by extension, the reconstruction of the community. The success of this project does not stem solely from the authenticity of the mosque, but from the project's capacity to foster community – an ability that contributes to the community's adaption to the changed circumstances in the city, such as the lack of returnees and ongoing economic struggles.

For preservation professionals, the reconstruction project of the Ferhadija Mosque highlights the importance of looking beyond the materiality of the structure to the immaterial aspects of a reconstruction. The project imparts a critical lesson for reconstruction projects in communities devastated by the loss of their members. It exposes the danger of relying on the return of displaced community members and contributes tools for incorporating an extended definition of community into reconstruction projects. It is important to check the definition of constituents and community members and consider designing a project that allows for engagement from all stakeholders – one that is truly built for all believers.

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[1] A discussion in Sultan Barakat, "Postwar reconstruction and the recovery of cultural heritage: critical lessons from the last fifteen years," in Cultural Heritage in Postwar Recovery: Papers from the ICCROM Forum held on October 4-6, 2005, ed. Nicholas Stanley-Price. (Rome: ICCROM, 2007).

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[3] Ibid., 99.

[4] Ibid., 98-99.

[5] Ibid., 99. In his work *Islamic Architecture in Bosnia and Herzegovina*, Amir Pašic includes an extensive matrix of Islamic cultural monuments including the level of destruction inflicted on each site up to 1994.

[6] Noel Malcom, *Bosnia: A Short History* (New York: New York University Press, 1996) 268.

[7] Tadeusz Mazowiecki, Special Rapporteur, *Situation of Human Rights in the Territory of the Former Yugoslavia*, United Nations Commission on Human Rights, 52nd sess., 1995, 1.

[8] Anders Stefansson, "Homes in the Making: Property Restitution, Refugee Return, and Senses of Belonging in a Postwar Bosnian Town," *International Migration,* vol. 44, no. 3(2006): 123.

[9] Ferry Biedermann, "Banja Luka Bosniaks harbor no illusions of return to life before Yugoslav wars," *The National*, May 28, 2013, http://www.thenational.ae/news/world/europe/banja-luka-Bosniaks-harbour-no-illusions-of-return-to-life-before-yugoslav-wars.

[10] Agencija za Statstiku Bosne i Hercegovine, *Preliminarini Rezultati: Popisa stanovnistva, domacinatva i stanova u Bosni I Hercegovini 2013*, 2013, 7.

[11] Stefansson, 123.

[12] Branko Peric, "Rebuilding Ferhadija," *Institute for War and Peace Reporting*, http://iwpr.net/report-news/rebuilding-ferhadija. Andras Riedlmayer, 2008. "News and Analysis: Banja Luka's Ferhadija Mosque rises again." *Bosnia Report of the Bosnian Institute*, March 3, http://www.bosnia.org.uk/news/news_body.cfm?newsid=2373.

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[15] "The Ferhadija Cornerstone Laid in Spite of Demonstrations," *Office of the High Representative – Bosnia and Herzegovina, Media Round Up, June 19, 2001* http://www.ohr.int/ohr-dept/presso/bh-media-rep/round-ups.

[16] Jeb Sharp, "Rebuilding a Bosnian Mosque," *Public Radio International - The World,* August 21, 2008, http://www.pri.org/theworld/?q=node/20341.

[17] "City Waste Dump- Ramici," *Ferhadija Mosque 1579,* accessed May 12, 2009, www.ferhadija.ba.

[18] Dr. Mustafa Ceric, "Welcome Letter," *Ferhadija Mosque 1579*, accessed Apr. 15, 2010, www.ferhadija.ba.

[19] This information came from the author's conversation with president of the Islamic Community Kasim Mujicic and a translator Zahida Baštic Dakin on August 7, 2011.

[20] Vamik D. Volkan, "Mourning and Adaptation After a War," *American Journal of Psychotherapy* 31, no. 4 (1977): 568.

[21] Vamik D. Volkan, "Individuals and Societies as 'perennial mourners': Their linking objects and public memorials," in *On Deaths and Endings: Psychoanalysts' Reflections on Finality, Transformations and New Beginnings*, ed. Brent Willock, Lori C. Bohm, and Rebecca C. Curtis (New York: Routledge, 2007), 50-51.

[22] For an essay which uses Volkan's concept of the linking object to explore the non-pathological role of the Vietnam Veterans Memorial in mourning processes, see: Jeffrey Karl Ochsner, "A Space of Loss: The Vietnam Veterans Memorial," *Journal of Architectural Education* 50, no. 3 (1997): 156-171.

[23] Volkan, "Mourning and adaptation after a war."

[24] Ibid., 562.

[25] Ibid., 568.

[26] Ibid., 561.

[27] This information came from the author's conversation with president of the Islamic Community Kasim Mujicic and a translator Zahida Baštic Dakin on August 7, 2011.

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The Autonomy of Architectural Form in the Building Type: *Casa del Fascio*

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Abstract

This paper is concerned with the autonomy of architecture form in the building type of *Casa del Fascio*. Since the beginning of its existence, the modern fascist movement propagated the idea of a building type recognizable as *Casa del Fascio*. It had to be transparent, against the old and opaque buildings of the past. It had to be present in every center of the Italian Kingdom, for it directly linked the governing fascist party to the political body.

Mussolini rose to power with the promise of eliminating the apathy that had captured the Italian nation. It is under these circumstances that the building type, dominated by political absolutism, demonstrated whether the architecture form manifested itself successfully. This is the stage on which the central dialectic argument between *Casa del Fascio* in Como, Italy, and *Casa del Fascio* in Tirana, Albania, takes place.

In *Casa del Fascio* in Como, Giuseppe Terragni embraced values offered in the fascist proclamation of the building type. This building had no passive symmetry, hierarchy, dominating volumes, or hidden agenda. Conversely, Gherardo Bosio placed *Casa del Fascio* building in Tirana on a plenum, composed it of two flanking lower structures, and a dominating *torre littoria* in the middle. Bosio applied classical Roman features in the symbolic use of facing stone and frontal arcade. All the architectural elements placed together resulted in a composition, an image of a building, rather than demonstrating architectural form.

Analogies, diagrams, ideograms, and images in this paper show on one hand the characters involved in a formal dialectic argument, facing one another, and bound in equilibrium in the *Casa del Fascio* in Como. On the other hand, they show the imperial vest of fascist Rome depicted in *Casa del Fascio* in Tirana.

Introduction

Architectural form presents itself autonomously in built form when in its essence it is identified analogously with the political form. In this paper, I introduce the new building type of *Casa del Fascio,* discuss the political form that takes place on the urban form of Tirana and Como, and then address the question of autonomy of the architecture form in the *Casa del Fascio* in Como, Italy, in opposition to *Casa del Fascio* in Tirana, Albania.

The *Casa del Fascio* became an integral part of the urban form that acted as a necessary set for political form to take place. The confronting of such forms reveals the autonomy of architectural form in the *Casa del Fascio* in Como and, furthermore, sheds light on facts regarding lack of form in new urban conditions in Tirana.

Casa del Fascio – A New Building Type

Considering that Fascism started as an underground movement, the new building type of *Casa del Fascio* was the last step in the course of legitimacy of fascist government's own existence. The fascist government used the periodical *L'Assalto*, among other means of information, to propagate the idea about the new building type of the *Casa del Fascio*. One article proclaimed:

> All that takes place in the Casa del Fascio, needs to be observed from the outside, because Fascism has nothing to hide: so big spaces that give the idea of a glass house instead of a tomb, contrary to the masonic palaces and lodges, charged with decorative masks and symbols, punched with a small number of windows and many little service doors opening in alleys of the ghetto, heavy and unwelcomed like tombs, true dwellings of men busy in mysterious dirty affairs.[1]

In a March 12, 1932 article, *L'Assalto* announced a competition inviting architecture students throughout the Italian Kingdom, to offer ideas for the *Casa del Fascio*.

Meanwhile, Mussolini envisioned the new building type of the *Casa del Fascio* as being able to stand upright, confronting other types such as church and local government buildings, and distinguished from other existing buildings. Its configuration had to rely on volumetric relationships (see Fig. 1) that would lead to a hierarchical building in appearance, both literally and figuratively. Programmatically, the *Casa del Fascio* had to include meeting spaces, a chapel, and offices.

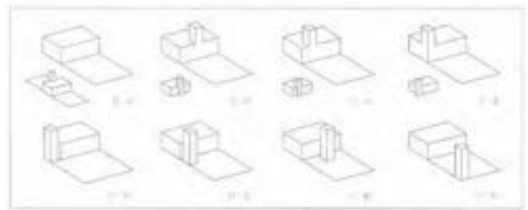

Fig. 1. Ideograms. Mangione, Flavio. Le Case Del Fascio in Italia E Nelle Terre D'oltremare. Pubblicazioni Degli Archivi Di Stato. Roma: Ministero per i beni e le attivita culturali, Direzione generale per gli archivi, 2003. p 72.

Political, Urban, and Built Form

The modern fascist movement in Italy offered a highly nationalist program that promised to be anti-dogmatic, innovative, and anti-prejudicial. It considered existing conditions of the Italian state as overtaken by apathy and promised to address bureaucratic, administrative, juridical, scholastic, and colonial concerns soon after creating a leading class. The movement maintained that necessary changes would be achieved only through a revolutionary war.

The fascist movement was Mazzinian[2] in nature. It considered the State to be at the very foundation of every individual value and right. In the Italian liberal socialist movement, on the other hand, the individual preceded the state. The individual found in the state something that controlled and suppressed liberty. The fascist movement started with the removal of all opposing political groups in 1925. It secured the position of an absolute government in the Kingdom of Italy in 1928. Within Italy, Mussolini's government moved quickly with plans of societal renewal, where the fascist ideal prevailed.

Outside Italy, due to dissolution of the Austro-Hungarian and Ottoman Empires, Mussolini's government took a bigger role in exercising its influence in the neighboring geographic areas of Dalmatia and the lower Balkans, including Albania.

Tirana, Albania

A country extracted from the Ottoman-ruled provinces[3] of Ioannina, Monastir, Scutari, and Kosovo, Albania declared its independence on November 28, 1912.[4] In the following years, political form was constituted internally, by diametrically opposed liberal and conservative forces, which were acting under constant external pressure from the Austro-Hungarian Empire and the Kingdoms of Bulgaria, Serbia, Montenegro, Greece, and Italy, which foresaw a possible overturning of the independence and re-distribution of the Albanian territories. In 1920, the relatively unknown town of Tirana was chosen to be Albania's capital city, in part because of its central location between the northern Gegs and the southern Tosks,[5] and also to meet Italy's demand that the capital city be near the port of Durres,[6] if not the port city itself. Consequently, the conservatively governed republic, later the self-declared Kingdom of Albania, found strong economic support in Mussolini's fascist government.

As the newly selected capital of Albania, Tirana presented itself as a settlement lacking urban formality. The only equilibrium could be seen in the religious representations and the positioning of their respective structures. Tirana was situated in a valley surrounded by mountains on the north, east, and south. It opened up west towards the port city of Durres. Lack of an urban past was countered by the importance of Mount of Kruja and the *castrum*[7] town of Kruja[8] on the northeast and the *castrum* of Petrela[9] on the south. The choice of the valley town of Tirana as the new capital city formally embraced the modern notion of moving forward, through revolutionary means, toward a peaceful future. Clearly, the city didn't belong to the idea of *polis*, or to that of *urbs*. The initial regulatory plans considered superimposing of the Roman *templum* to the local existing pattern. North-south (*cardo*) and east-west (*decumanus*) axes crossed in Piazza Scanderbeg (see "1" in Fig. 2). Italian architects Armando Brasini and Florestano Di Fausto were commissioned by the Albanian government to design comprehensive regulatory plans for Tirana. Brasini suggested a Baroque plan in which radiating streets sprung off the center, with the north-south axis acting as the principal artery. Di Fausto's plan preserved the idea of north-south axis. The round center was duplicated, and one of the circles was translated farther south along the principal axis. Di Fausto's plan was sensitive to a number of existing conditions in the form of building structures and streets, which were included in his proposal. The northern section of the center allowed access for the inward-directed roads from the northeast, northwest and east-west axis. The east-west axis did not assume major importance. Di Fausto's plan foresaw the government buildings erected around the southern portion of Piazza Scanderbeg (see "a" in Fig. 2.). Differing from Brasini, Di Fausto worked in Neo-Renaissance fashion, integrating local symbols in the form of decorative elements throughout the government buildings.

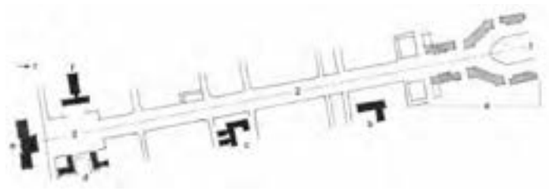

Fig. 2. North-South Axis, Tirana, Albania. Korkuti, Arian. "Diagram of North-South Axis, Tirana, Albania." 2014.

Implementing Di Fausto's regulatory plan concluded with the construction of the government buildings. From its beginning, the Albanian government had been very reliant on Italy's fascist government. Annexation of Albania by Italy on April 7, 1939 completed the full cycle of its total dependency. A few days later, Vittorio Emmanuele III, king of Italy, accepted the Albanian crown. Subsequently, the Italian undersecretary of state in charge of Albanian affairs, Zenone Benini, assigned Gherardo Bosio the position of leading the Albanian Central Office of Building and Urban Planning. Bosio revised the previous regulatory plan of Tirana and focused mostly on the main north-south axis turned into *Viale dell'Impero* (see "2" in Fig. 2). Bosio, assisted by several other architects, designed and oversaw completion of the Dajti Hotel (see "b" in Fig. 2), *Uffici Luogotenenziali* (see "c" in Fig. 2) along the *Viale dell'Impero*, and construction of the *Viale dell'Impero*. Bosio's use of a rationalist tone in the buildings he proposed was in contrast to his classically oriented predecessors.

Como, Italy

In the early 1930s, Como, a city in continuous expansion, faced many urban problems that required immediate solutions. Historically, Como could be traced to an early settlement of Etruscans, who had built a fortified camp in the form of an *oppidum*.[10] The Romans took over permanently and founded the *castrum* form of the city. The Milanese armies had destroyed the Roman walls, together with the city, during the Ten Years War (1868-1878). The existing walls, built in medieval times, stand approximately twenty-five yards outside the Roman walls. Rapid development of the neighborhoods outside the old city walls allowed for a dissociation between the two parts of the city.

In accordance with the central fascist government, the local government organized a competition with the objective of achieving a broad regulatory plan for the city. In 1934, the Italian rationalist architects known as *Gruppo 7*,[11] acting under the name of C.M.8, entered the competition and were awarded first prize. The members of the group were Piero Bottoni, Luigi Dodi, Gabriele Giussani, Piero Lingeri, Mario Pucci, Giuseppe Terragni, and Renato Uslenghi.

C.M.8's plan proposed re-arrangement of north-south and east-west communication inside the *castrum* city of Como and preserved its urban characteristics. The goals were to improve the connection of the outside neighborhoods with the center and to organize the light-rail transportation network throughout the city. The plan offered to design new industrial quarters with housing to be situated in close proximity. The regulatory plan included reorganizing the public buildings in Como by relocating the *Palazzo del Governo* from *Via Volta* to *Via Rodari* toward *Via Lecco* (see "G" in Fig. 3) near the Duomo. The proposed plan suggested construction of a new *Palazzo dei Sindacati* in *Via Pessina*, presumably behind the *Casa del Fascio,* and removal of railway side guard railings in *Via Lecco*.

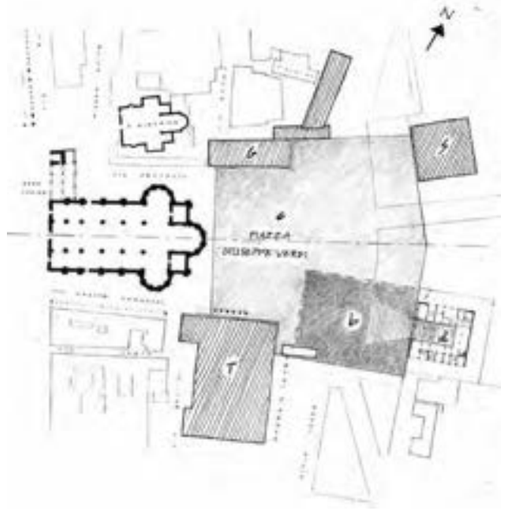

Fig. 3. Site plan of Casa del Fascio and adjacent buildings, Como. Eisenman, Peter. Giuseppe Terragni Transformations Decompositons Critiques. *New York: Monacelli Press, Inc., 2003: 30.*

C.M.8 addressed the problem of rail tracks passing through *Piazza dell'Impero* between the Duomo and *Via Lecco* by proposing the Como – Nord[12] train station be relocated at the same elevation as the *Teatro Sociale* (see "T" in Fig. 3). C.M.8 formally redefined the center of the city with the site plan where *Casa del Fascio* (see "a" in Fig. 3), *Palazzo del Governo*, and the *Teatro Sociale* formed a square at the edge of the Duomo. The proposed center at the edge of the Roman Como was to include the parts previously outside the city walls.

Casa del Fascio in Como

In 1932, Giuseppe Terragni was commissioned to design *Casa del Fascio* for the city of Como. Its site was located across the Duomo, at a slight angle on the side of the central axis. Terragni's proposed site plan suggested that the *Casa dei Sindacati* (see "S" in Fig. 3) mirror the *Casa del Fascio* on the other side of the axis (see Fig. 3). They both speak tothe *Teatro Sociale,* the Duomo, and the proposed *Palazzo del Governo* located on the opposite side of the *Piazza dell'Impero*.

The situation and orientation of the building were in agreement with the proposed site plan of the *Piazza dell'Impero* and the pattern of the original *castrum* Como. *Casa del Fascio* in its *genere* belonged to the Palazzo governing type – a city with its own covered piazza. Its geometry constituted a volume that measured in each equal side twice the height. The symmetry at the entrance followed inside, in the covered piazza. The symmetry of the *Palazzo* presented in its built form a balanced play of vertical and horizontal beams. It transformed in dynamic symmetry its four elevations. Terragni chose the form of a cube for the appearance of the building and structure. The geometry is given physical presence by virtue of concrete. Dematerialized in its structure, *Casa del Fascio* in Como sat weightless on its site, ready for the political play to be staged.

The sets of steps that led to the front and rear entrances of the *Casa del Fascio* were detached from the mass of the building. They matched the width of the entrances and acted as a threshold mediating passage between outside and inside. *Casa del Fascio* was not closed off, but rather open to the public. The footprint of the building repeats itself in the form of a piazza in front of the *Casa del Fascio*, which allowed for gatherings of supporters. For mass meetings, Terragni considered using the larger piazza (see "c" in Fig. 3), whose borders were defined by the *Casa del Fascio*, the proposed *Casa dei Sindacati*, the proposed *Palazzo del Governo,* and the *Teatro Sociale*.

No out-of-place additional elements were allowed. The tower, present in the initial designs, had been suppressed. The tower belonged to hierarchy in Mussolini's terms, but not in the cube. The plasticity of concrete allowed for the dynamically symmetric front to present itself to the crowd with not one balcony, but carved-out masses leaving places for twenty volumes. Then there was the question of monumentality. Where should Mussolini stand? No plenum, no [one] balcony extruding from the tower. Is the tower suppressed? Had the tower become one with the cube? There seemed to be a set of contradictions in place. The fascist movement demanded renewal of all sorts, in a way; it demanded moving away from the buildings of the past. Meanwhile, it asked for hierarchy.

Terragni offered no reason for the missing elements of hierarchy. To avoid them, he turned to dynamic symmetry, using it throughout the four elevations of the building. They were in agreement with the principles of axial symmetry in the governing *Palazzo* type, coming forward in the form of symmetrical equilibrium internally. Externally, in the front elevation, symmetry opened to let the political body in. It also opened up high toward the sky (see Fig. 4).

Casa del Fascio in Tirana

In his regulatory plan of Tirana, Gherardo Bosio placed the *Casa del Fascio* (see Fig. 2.e) on the *Piazzale del Littorio*[13] (see "3" in Fig. 2) facing *Viale dell'Impero* marking the end of the *Viale*. A building dedicated to after-work fascist activities was erected on each side of the *Piazzale del Littorio*. The *Casa della Gioventu Littoria Albanese* (see "d" in Fig. 2) was built on the right of *Casa del Fascio* (see "e" in Fig. 2) and the *Opera Nazionale Dopolavoro di Tirana* (see "f" in Fig. 2) on the left. The three buildings were completed in 1940.

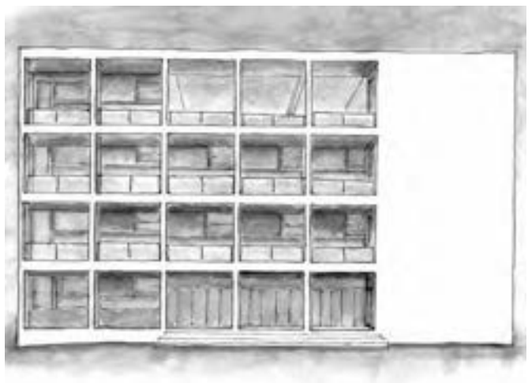

Fig. 4. Casa del Fascio in Como. Korkuti, Arian. "Front View of Casa Del Fascio in Como." 2014.

In Bosio's final scheme *Casa del Fascio* was placed on a plenum comprising two flanking lower structures and a dominating *torre littoria* in the middle (see Fig. 5). The structure was erected using cast-in-place concrete. Bosio applied classical Roman features in the symbolic use of facing stone and frontal arcade. He had worked with a number of design alternatives, all of which had the hierarchical volumetric relationships in common, in agreement with Mussolini's and the fascist government's requirements. The fascist movement in Tirana seemed to have been accepted very mechanically; therefore anything accompanying it was mechanical in nature.

Fig. 5. Casa del Fascio in Tirana. Korkuti, Arian. " Front view of Casa del Fascio in Tirana." 2014.

Hierarchy was symbolic in its nature. Any other so-called architectural elements that emphasized it worked in favor of the image hierarchy needed to convey. Bosio concluded the *cardo* with a monumental image of imperial fascist Rome in the *Casa del Fascio* in Tirana. Its built form was far from autonomous.

Conclusion

Terragni worked out several schemes of the *Casa del Fascio* in Como. Each one included at least an element of hierarchy from what the fascist government sought to include. The built form of the *Casa del Fascio* in Como did not carry any of those elements. The fascist movement had genuinely requested renewal of the values that belonged to the future, away from the darkness of the past. Giuseppe Terragni embraced that call. *Casa del Fascio* di Como was autonomous. The autonomy of the building was to be reflected in the urban form of *Piazza dell'Impero* as well, where the *Casa del Fascio* in Como was to be counterbalanced by the *Casa dei Sindacati*.

Casa del Fascio di Tirana, on the other hand, depended on the composition form to show that it existed. Composition form worked along the lines of the bureaucratic fascist government. Lack of autonomy didn't stop at the building scale. It grew to the proportions of urban scale of the city. Tirana was in dire need of a new beginning. Whether in terms of work commissioned by the Albanian government or under fascist occupation of Albania, the Italian architects worked along the lines of the fascist image.

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[1] Author's translation., Flavio Mangione, Le Case Del Fascio in Italia E Nelle Terre D'oltremare, Pubblicazioni Degli Archivi Di Stato (Roma: Ministero per i beni e le attivita culturali, Direzione generale per gli archivi, 2003), 66.
[2] After Italian Philosopher Giuseppe Mazzini (1805 – 1872).
[3] In Turkish, known as *vilâyets*.
[4] First Albanian independence from the Ottomans was declared in November 28, 1443, by George Kastriota-Scanderbeg.
[5] Two major Albanian ethnic groups.
[6] *Dyrrachium* in Latin, *Epidamnus* in Greek.
[7] *Castrum* - A fort or camp enclosed by walls.
[8] Center of the Principality of the Kastriota family.
[9] Known as *PetrAlba* in Greek.
[10] *Oppĭ dum* – Etruscan fortified city.
[11] *Gruppo 7* – CIAM Italy.
[12] Municipio di Como, Ufficio Urbanistica - Piano Regolatore, "Progetto: Piano Regolatore E Di Ampliamento Della Citta" (1937), 88.
[13] *Littore* – cleared the way for the Roman judge.

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Expressions of Power: The Legacy of Fascism in the Built Environment

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Abstract

Mussolini's nearly two decades of rule ended when the Fascist Grand Council voted him out of office on July 25, 1943. Following Mussolini's dismissal, the newly formed government headed by Marshal Pietro Badoglio initiated a legislative process intended to cleanse the Italian nation of the discredited regime. This included the liquidation of the National Fascist Party and the formation of a government agency charged with overseeing the transfer of party-owned property to the state. At the same time, private individuals and informal networks began to occupy the buildings and spaces associated with fascism for their own purposes.

Taking Fascist Party headquarters, or *case del fascio*, as my primary example, I explore the processes – official and unofficial – through which the party's holdings were adapted to serve new functions with the aim of clarifying fascism's legacy in the built environment.

The endurance of a remarkable quantity of buildings constructed during fascist rule has attracted the attention of scholars, particularly those interested in tracing continuities between interwar and postwar Italian culture, memory and identity. However, within this literature, Fascist Party headquarters – the buildings most intimately identified with fascism – are rarely mentioned. This paper argues that their history during the final years of the regime and the tumultuous years between Mussolini's dismissal and establishment of the Italian Republic in 1946, particularly in northern cities like Milan, reinforced their functions as centers of command and as symbols of political power. By the 1950s, the vast majority of these buildings were designated to serve as headquarters for local police forces or for various branches of the Italian military – functions they continue to maintain.

Among the questions this paper seeks to address are: How and to what extent does the history of *case del fascio* parallel the limited and symbolic purges of fascist collaborators and the marginal reworking of government institutions that occurred after the collapse of the regime and during the establishment of the Italian Republic? How and to what degree does the persistence of these buildings in the landscape, often with their fascist iconography intact, continue to shape notions of political power and civic identity?

Full paper withheld at author's request.

Former Gruppo Rionale Fabio Filzi, Eugenio Faludi, Via Filzi, Milan, 1936–1938. *Lucy M. Maulsby c. 2000.*

SESSION 5: Working Within Others' Walls

Session Chair:

Ronald. H. Frantz Jr., AIA, University of Oklahoma College of Architecture Division of Architecture

Bruce Goff practiced the principles of "green design," "sustainable design," "LEED" and "adaptive re-use" long before the terms were part of our architectural language. He used materials that were available locally. Sometimes these materials were cast-off objects: goose feathers, old oil field pipes and equipment, dime store ashtrays, tiddlywinks, turkey insemination tubes and the signature material: chunks of colorful glass slag. With these materials, he created amazing new structures, both commercial and residential.

In the United States, as of 2009, we had an existing stock of nonresidential buildings that measured 65 billion square feet of space. Some 83 percent of this building stock was built after the end of World War II with 55 percent of the stock having been built from the 1950s to the 1980s. Between 2009 and 2030, more than 54 billion square feet of this nonresidential stock, or about 84 percent of the buildings, will undergo substantial rehabilitation.

In everyday terms, four of every five existing buildings will be rehabilitated. (All facts are from Norman Tyler's *Historic Preservation* book.)

Green design, sustainable design, LEED and adaptive re-use will be terms associated with the rehabilitation of existing building stock. Most likely, the next generation of architects — our students — will work with existing buildings more than they will new buildings.

This session is a call for architects who are "Working within Others' Walls." These architects, like Mr. Goff, see the potential of common, existing materials and understand how to transform existing spaces into exquisite new architectural places.

Architectural Design for Adaptability and Deconstruction

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Photo by Jürgen Rubig, available under Creative Commons attribution-Noncommercial license.

Abstract

The adaptive reuse of existing buildings for new purposes represents a highly sustainable approach to architectural design. By reusing existing building stock for new projects, the amount of energy used over a building's life is greatly reduced. But while the preservation of embodied energy through the adaptive reuse of existing structures is widely discussed within sustainability discourse, and broadly supported by groups such as the United States Green Building Council (USGBC), the purposeful design of new buildings in a manner that facilitates future adaptive reuse is lacking. This paper proposes that a purposeful Design for Adaptability and Deconstruction (DFAD) approach to the design of new buildings, which incorporates principles of Design for Future Adaptive Reuse (DFAR) and Design for Disassembly and Deconstruction (DfD), is equally important to the reuse of existing buildings in achieving built environment sustainability.

Design for Adaptability and Deconstruction is a forward-thinking design process that emphasizes the design of new buildings for future reuse and/or the recycling of building materials and components. Typically used by industrial designers, this approach may translate to the built environment to more freely allow the renovation of existing buildings to serve new purposes. This paper will broadly consider the potential for DFAD as a means for embedding new buildings with future reuse potential.

Introduction – Sustainability and the Built Environment

The environmental impact of the built environment has been widely reported and discussed. According to the United Nations Environment Program, the built environment accounts for 30 percent of global greenhouse gas emissions and consumes 40 percent of all energy annually. Forty-five percent of global CO2 emissions can also be traced to building construction and operation.[1] The built environment additionally consumes 40 percent of global resources[2] and generates a proportionate amount of waste.[3] The U.S. Environmental Protection Agency reports that building construction, renovation, use, and demolition constitutes approximately two-thirds of all non-industrial solid waste generation in the United States.[4] Of this waste, 92 percent results from renovations (44 percent) and demolitions (48 percent), while the remaining 8 percent is attributed to new construction.[5] [6]

Recognition of this negative environmental impact has resulted in sustainability efforts that typically focus on a building's initial design, construction, and operational phases, while failing to consider end-of-life scenarios.[7] This reduces opportunities to lower the building industry's environmental impact through the renovation of existing buildings[8] which, when upgraded to modern energy standards, have been found to be more environmentally friendly than the construction of new energy-efficient buildings.[9]

The built environment's environmental impact can be greatly reduced by taking better advantage of existing building stock for new projects; however, while the reuse of existing structures is widely discussed within sustainability discourse, the purposeful design of new buildings for future reuse is lacking. This paper proposes that a purposeful Design for Adaptability and Deconstruction (DFAD) approach to the design and construction of new buildings is as relevant as the reuse of existing buildings in achieving the full sustainability potential of the built environment.[10] In making this proposal, the paper refines key definitions of DFAD concepts, summarizes and proposes DFAD design guidelines, and ends with suggestions for how DFAD principles can be further promoted within built environment industries.

Embodied Energy

The built environment has tremendous potential to reduce its environmental impact through the adaptation and reuse of existing buildings. It is often said that the greenest building is the building that is already built. This sentiment is widely accepted as true for the simple reason that greenhouse gas emissions and natural resource consumption associated with the construction of existing buildings has already taken place, i.e. their embodied energy[11] is already accounted for.

This embodied energy, associated with a building's construction and found in its materials and components, represents a significant portion of a building's total energy consumption;[12] therefore, buildings with greater levels of embodied energy, due to their higher levels of greenhouse gas emissions, energy consumption, and natural resource use, are generally seen as having a greater environmental impact[13] than buildings with lower levels of embodied energy.[14]

While the ability to measure the embodied energy inherent in the built environment is not an exact science, research has found that approximately 20 to 50 percent of a building's embodied energy is committed to its structure, whereas a much larger portion, 50 to 70 percent, is found in building areas that are subject to periodic replacement and renovation. The portions of the building that have the shortest lifespans – the façade, services, and internal finishes (fit-out) – are also those that hold the greatest levels of embodied energy.[15] When a building is renovated[16] or demolished at the end of its operational life, much of this embodied energy is lost.[17]

One approach for reducing embodied energy loss associated with the construction and maintenance of the built environment is through increased rates of building material recycling, material and component reuse, and, most effectively, through the direct adaptation and reuse of buildings that have reached end-of-life scenarios. By designing new buildings with the preservation of embodied energy in mind, rather than demolition, a major portion of the embodied energy inherent in the built environment can be maintained, reducing its environmental impact.[18]

Building Reuse, Component Reuse, Material Reuse, and Material Recycling

In reviewing literature associated with reducing the built environment's environmental impact through increased building reuse and material/component recycling, one finds a variety of terms and phrases used to describe key concepts. This diverse and often conflicting use of terms leads to confusion and difficulty in understanding fundamental principles related to building reuse and material/component recycling. To promote clarity and facilitate a better understanding of these ideas, this paper proposes the following refined hierarchy of terms to describe strategies used in designing buildings to facilitate the future reuse of existing buildings, their components, and materials:

Design for Adaptability and Deconstruction[19] (DFAD) represents an umbrella term that includes all things associated with the reuse of buildings, building components, and materials. As an umbrellas term, it includes each approach below:

1. *Design for Future Adaptive Reuse* (DFAR)[20] includes the direct reuse, adaptation, or relocation of an existing building or its structure. This constitutes the highest form of built environment adaptability, as it preserves the most embodied energy and has the greatest environmental impact.[21]

2. *Design for Deconstruction and Disassembly* (DfD) represents a broad term that includes multiple topics related to the reuse and recycling of building materials and components but not buildings themselves. This includes the two following DfD subcategories:

   - *Design for Deconstruction* includes the direct reuse or relocation of building components or assemblies within a new or existing building.[22]

   - *Design for Disassembly* involves the recycling of existing building materials into new materials or components.[23] Recycled goods are used as raw material in the manufacture of new products.[24] This approach is the least environmentally friendly as it preserves the smallest amount of embodied energy and requires additional energy to produce new materials.

This delineation is important as reuse and recycling are neither interchangeable strategies, nor are they equally desirable from a sustainability standpoint. For example, Design for Deconstruction is generally preferable to Design for Disassembly because building component recycling requires less energy and resource consumption than material recycling.[25] Furthermore, Design for Future Adaptive Reuse is considered the most desirable because it more significantly reduces waste, diminishes demand for virgin natural resources,[26] and results in greater reductions of energy consumption. Because of this, when developing specific design strategies to guide architects in the DFAD process, it is important to delineate these terms and their associated approaches. This need to clearly define and refine strategies within DFAD does not, however, suggest they should be considered in isolation.

While it is important to consider each strategy independently, they should also be considered simultaneously when designing a building according to DFAD principles. This becomes clear when revisiting the embodied energy numbers associated with existing buildings discussed above. In these figures we find a building's structural frame accounts for 20 to 50 percent of its embodied energy, while its envelope, fit-out, finishes, and services account for the remaining 50 to 70 percent. This suggests the majority of a building's embodied energy is found in the areas that have the shortest lifespan.[27] If an architect plans strictly for the future adaptive reuse of a building, she risks losing a significant portion of the building's embodied energy through renovations. Likewise, if a designer only plans for the future recycling of renovated materials, and/or the reuse of building components, she runs the risk of failing to take advantage of the embodied energy inherent in the building's core and structure. By thoughtfully considering all three strategies described above, future buildings are well prepared to significantly reduce their negative long-term environmental impact through the preservation of their embodied energy.

In spite of the significant environmental benefits, building design and construction industries have been slow to adopt changes promoting widespread use of DFAD principles. This is partly due to the fact that historically, experience and intuition alone have been available as guides for making design decisions that embed a building with reuse potential; however, there is increasingly professional consensus regarding best practices associated with DFAD principles.[28]

With the goal of facilitating a deeper understanding and better industry integration of DFAD principles, these practices are summarized and integrated below into design strategies associated with their corresponding DFAD principle.

Design for Future Adaptive Reuse (DFAR)

Building adaptive reuse is typically seen as the reuse of an existing building in a manner that retains as much as possible of the original building while updating its performance to meet modern codes, standards, and new user requirements.[29] Notwithstanding the clear environmental benefits associated with adaptive reuse, building longevity raises many technical problems associated with building construction and design.[30] It is therefore important, through the consideration of DFAR principles, for adaptive reuse to be planned from the beginning of a new building project.[31]

While there are widespread discussions of DFAR principles in academic and professional literature, there are few recommendations for how to best embed adapted reuse potential into specific building projects. One notable exception is work undertaken by researchers at Bond University in Australia. Research presented by Langston, Conejos, Smith, and others seeks to develop a set of useful criteria to aid in designing future buildings with "embedded adaptive reuse potential as a useful criterion for sustainability."[32] Their work has led to the ongoing development of adaptSTAR,[33] which is a weighted checklist, similar to the USGBC's Leadership in Energy & Environmental Design (LEED) standards, consisting of design strategies that promote the successful future adaptive reuse of new buildings. In a review of literature conceptually associated with DFAR, adaptSTAR represents the most formal attempt at promoting and integrating DFAR into mainstream architecture and construction practices. While this paper does not specifically represent a review of adaptSTAR principles, adaptSTAR provides a starting point for a conceptual summary of DFAR design strategies. This summary, based on a broad review of DFAR associated literature, is compiled into the following DFAR design principles:

Design for Future Building Adaptive Reuse Design Principles:[34]

1. Anticipate change – Anticipate change is the golden rule of designing for adaptive reuse. Design buildings to easily accommodate change. Even at the level of individual rooms, designs can anticipate and allow for future changes of use.[35]

2. Climate and site – Building design is responsive to local climatic conditions and utilizes passive technologies where possible to facilitate unknown future building uses.

3. Foundation – Foundations are designed in a manner that allows for differential settlement over time. In addition, foundation designs allow for building scalability both vertically and horizontally.

4. Design awareness – Building design promotes future adaptability or reuse while reducing potential for functional and social obsolescence.

5. Building layout – Building design considers zones of similar functions. Service areas and connections between rooms are strategically positioned to allow and anticipate change.

6. Structural integrity and scalability – The design and selection of structural elements considers future building uses and scenarios. Structural systems are scalable, allowing a building to be enlarged either vertically or horizontally.

7. Workmanship – Building design, drawings, and specifications promote quality craftsmanship applied to structure and finishes, promoting extended life and future adaptability.

8. Material selection – Building materials are selected for their durability and potential to age in a manner that facilitates an extended building lifespan.

9. Maintainability – Building design and material selection reflect the need for regular maintenance and the conservation of operational resources to extend a building's functional life.

In addition to these principles, summarized from academic literature, two additional requirements are proposed by the author.

1. Building floor-to-floor heights – Buildings are designed with floor-to-floor heights sufficient to accommodate future uses. In the case of multi-family residential designs, this may require higher than typical floor-to-floor heights that allow for future commercial uses. In many adaptive reuse scenarios, inadequate ceiling height limits the ability of an existing building to accommodate a new, alternative use.

2. Building width/daylighting – Building design considers daylighting. Buildings with excessively wide or small widths severely limit their ability to accommodate future uses. By appropriately designing for daylighting on all sides of a building, the likelihood of accommodating multiple future uses is increased.

Design for Deconstruction and Disassembly (DfD)[36]

While the adaptive reuse of a complete building is the most effective way to preserve a building's embodied energy, it is not always practical or cost effective.[37] In situations where it is not feasible or practical to adaptively reuse an existing building, or where whole building obsolescence is likely to occur because of unique program requirements or site constraints, or for buildings with a high likelihood of repeated or major renovations, Design for Deconstruction

and Disassembly (DfD) provides an alternative to Design for Future Adaptive Reuse that helps achieve sustainability goals. By designing and constructing buildings in a manner that facilitates material recycling, material reuse, and component reuse through the act of disassembling or deconstructing a building, DfD aims to reduce the built environment's environmental[38] impact by maintaining or reducing embodied energy and associated pollution, natural resource use, and greenhouse gas emissions.[39]

A review of key literature[40] associated with DfD finds a number of reoccurring design practices that may act as guidelines or techniques for architects and designers to facilitate the incorporation of DfD into their work.[41] With the goal of facilitating a deeper understanding and better industry integration of DfD principles, these practices are summarized and integrated into design strategies associated with their corresponding DfD principle (i.e. Design for Deconstruction and Design for Disassembly as described above):

Design for Deconstruction and Disassembly Strategies

1. General Building Considerations
    a. Simplify building structure and form
    b. Use modular design
    c. Use prefabricated subassemblies and a system of mass production
    d. Use an open building system with interchangeable parts
    e. Use a structural grid
    f. Use standard, simple, and "low-tech" construction technologies
2. Material Selection – Strategies for Material Recycling
    a. Select materials using the precautionary principle
    b. Minimize different types of materials
    c. Use materials worth recovering
    d. Use recycled and recyclable materials
    e. Use durable materials where appropriate
    f. Use lightweight materials where appropriate
    g. Avoid composite materials and make inseparable subassemblies from the same material
    h. Avoid secondary finishes to materials
    i. Minimize toxic and hazardous materials
    j. Design for differential weathering and wearing of surfaces
    k. Provide standard and permanent identification of material types and their chemistry
3. Building Components- Strategies for Component Reuse
    a. Minimize the number of different types of components
    b. Prioritize the use of modular building components/assemblies
    c. Ensure all components can be readily accessed and removed for repair or replacement
    d. Use only durable components that can be reused
    e. Make chemical bonds weaker than the parts being connected
    f. Use a minimum number of wearing parts
    g. Make components and materials of a size that suits the intended means of handling
    h. Provide a means of handling and locating components during the assembly and disassembly
    i. Provide permanent identification of component type
4. Connections
    a. Design connectors to enable components to be both independent and exchangeable
    b. Provide realistic tolerances to allow for maneuvering during disassembly
    c. Minimize number of fasteners and connectors (fewer, stronger fasteners)
    d. Design joints and connectors to withstand repeated use
    e. Use mechanical fasteners (bolted, screwed and nailed connections) in lieu of sealants, adhesives, and chemical connections
    f. Simplify connections
    g. Make connections visible/accessible
    h. Design to the worker and labor of separation
5. Access and Building
    a. Allow for parallel disassembly rather than sequential disassembly
    b. Provide access to components/assemblies (windows, etc.)
    c. Separate building layers or systems
    d. Ensure that buildings are conceived as layered according to their anticipated lifespans
    e. Provide adequate tolerances to allow for disassembly to minimize the need for destructive methods that will impact adjacent components
    f. Separate the structure from the cladding, internal walls, and services
    g. Disentangle utilities from structure
    h. Separate mechanical, electrical, and plumbing (MEP) systems
    i. Carefully plan services and service routes so they can easily be identified, accessed and upgraded or maintained as necessary without disruption to surfaces and other parts of the building
6. Relaying of Information
    a. Maximize clarity and simplicity
    b. Permanently identify points of disassembly
    c. Provide spare parts and on-site storage
    d. Retain all information on the building construction systems and assembly and disassembly procedures
    e. Maintain detailed documentation of materials and methods for deconstruction
    f. Maintain detailed as-built drawings
    g. Provide labeling of connections and materials Include "deconstruction plan" in the specifications

It is important to note that within this summary of Design for Deconstruction and Disassembly strategies there will be occasions where conflicts exist among multiple principles. For example, designing to recycle or reuse individual building materials will not always be aligned with the desire to reuse building components. Designing building components intending for their repeated reuse, in different locations or different buildings, may warrant the use of composite materials that are not easily separated for recycling purposes. In such cases, having less ability to deconstruct, reuse, or recycle individual building materials may be offset by the ability to reuse larger building components without having to disassemble, deconstruct or recycle them. There may also be instances that warrant the use of durable materials with higher levels of embodied energy, if they can be reused multiple times or have longer service life.

The potential conflicts among many of these principles highlights the need to refine discussions of DfD in a manner that differentiates between strategies for designing for building component reuse and designing for building material reuse and recycling. This need is further highlighted by the fact that academic and professional literature typically discusses the two strategies interchangeably or combined under the common banner of Design for Disassembly and Deconstruction. This paper's separation (see above) of DfD strategies into the two principles, Design for Deconstruction and Design for Disassembly, is important for clarity and to elicit further discussion regarding their merits and potential.[42]

Industry Adoption of Design for Adaptability and Deconstruction (DFAD) Principles

Despite increased academic and professional agreement regarding the environmental benefits of Design for Adaptability and Deconstruction (DFAD), architectural design and construction industries have been slow to embrace the concept.[43] This is not due to the inventiveness of the strategies, as there are numerous historic examples of buildings designed and built with these concepts in mind. From nomadic tents to the Crystal Palace, or the work of designers such as Buckminster Fuller, Archigram, or the Metabolism Group, there are many examples of DFAD approaches to building design and construction. Even with this rich historical knowledge, combined with contemporary work on the subject, buildings are still generally designed and built with the mindset that they are permanent, despite the fact that most buildings are built with no more than a 50-year lifespan in mind, while the materials from which they are constructed may have useful lives spanning centuries.[44]

Two factors may contribute to this failure to implement DFAD concepts into mainstream built environment industries:

1) There are limited incentives for owners, architects, developers, and the construction industry to adopt these principles and take on the additional costs and time associated with designing and constructing buildings in a manner that integrates these concepts. Without financial incentives to do so, this complexity helps reinforce the status quo and limits widespread adoption of DFAD principles; and

2) There is a technical knowledge gap among architects who are best suited to integrate DFAD concepts into the design and construction of new buildings.

This knowledge gap is recognized by Brand,[45] who lays blame on the education system for ignoring the fact that "adaptive use is the destiny of most buildings, but is not taught in most architectural schools." While much of architectural education focuses on novelty and innovation, there is very little emphasis on how buildings adapt to change and evolve over time. This results in a lack of knowledge and an inability to take these concepts forward into professional practice.[46]

This gap in knowledge reduces architects' ability to advocate for DFAD principles, limiting their voice within the discourse of sustainability and the built environment. As the reuse and refurbishment of existing buildings becomes an increasingly important sustainability criterion, and as sustainability becomes increasingly important to clients,[47] it will be important for architects to have a deep understanding of how buildings change over time and how they can be designed with embedded reuse potential.

Further Research: The Role of Sustainability Assessments in Adoption Design for Adaptability and Deconstruction (DFAD) Principles

While the adaptive reuse of existing buildings and the recycling of building materials/components is commonly part of the sustainability discourse, the design of new buildings according to Design for Adaptability and Deconstruction (DFAD) principles is not. One suggestion for why these principles have not widely entered the sustainability debate is that mainstream sustainability assessments (SAs), such as LEED, do not include incentives for designing new buildings with embedded reuse potential, i.e., according to DFAD principles.[48]

The Integration of DFAD principles into mainstream SAs would address the two factors noted above that have slowed adoption of DFAD. Integration would bridge the technical knowledge gap by providing clear, quantifiable DFAD strategies for designers to integrate into their designs. Furthermore, by providing market assurance to owners, i.e., that they are getting what they paid for, there will be financial incentives for implementing the concepts into

building projects as DFAD-designed buildings should be worth more, easier to construct, easier to maintain, and last longer.[49]

Just as LEED helped create widespread acceptance of green building design strategies, it and other SAs have potential to similarly promote wider industry acceptance of DFAD principles. This paper ends by proposing it will be essential for DFAD to be integrated into mainstream SAs, such as LEED, if it is to be considered within broad discussions of sustainability and the built environment.[50] Additional research is needed to determine appropriate ways LEED and other SAs can incorporate and encourage widespread adoption of DFAD design principles.[51]

Conclusion

In considering methods for designing buildings with an embedded ability to adapt to change, this paper proposes that a purposeful Design for Adaptability and Deconstruction (DFAD)[52] approach to building construction and design is equally in important to the reuse of existing buildings within the criteria of sustainability. Through a refined understanding of DFAD, conceptually defined as three principles that include Design for Future Adaptive Reuse, Design for Disassembly for material reuse, and Design for Disassembly for building component reuse, it is possible to develop specific design strategies that address the broad potential of DFAD. Through the thoughtful consideration of these strategies, future buildings will be well prepared to significantly reduce their negative, long-term environmental impact.

For the built environment to meaningfully address its global environmental impact and contributions to climate change, there needs to be a recognition of the role of existing and future buildings in reducing this impact. As most buildings are not designed to maximize their future reuse potential,[53] it is important for architects, owners, and contractors to better understand how buildings change over time[54] and to plan for that change accordingly. Doing so may require a rethinking of existing approaches to sustainability within the built environment. Rather than simply building less or more energy efficiently when we do build, we will need to be more strategic with how and where we build and do so in a way that makes the most of existing resources.[55] Furthermore, we will need to be mindful of how the resources we expend today, and their associated embodied energy, will be reused, adapted, and maintained in an unknown future. To expand on the commonly expressed view that the greenest building is one that is already built, we must recognize that the most sustainable building is not one that lasts forever, but one that is most able to adapt to change.[56]

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[2] The US Geological Survey estimates that 60% of the total material flow in the US economy is consumed by the construction industry. See, Brad Guy and Nicholas Ciarimboli, "Design for Disassembly in the built environment: a guide to closed-loop design and building" (n.d.): 2, accessed August 10, 2014, http://your.kingcounty.gov/solidwaste/greenbuilding/documents/Design_for_Disassembly-guide.pdf

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[4] Environmental Protection Agency (EPA), "Buildings and their Impact on the Environment: A Statistical Summary," 2009: 34-35, accessed August 10, 2014, http://www.epa.gov/greenbuilding/pubs/gbstats.pdf.

[5] Quinn and EPA, "Buildings."

[6] Of this construction and demolition related waste stream an estimated 20 to 30 percent of debris is recovered for processing and recycling with the materials most frequently recovered and recycled being concrete, asphalt, metals, and wood. See EPA, "Buildings."

[7] Quinn.

[8] Sheila Conejos, Craig Langston, and Jim Smith, "Designing for future buildings: adaptive reuse as a strategy for carbon neutral cities," *The International Journal of Climate Change: Impacts and responses* 3, no. 2 (2012): 33, and Sheila Conejos, Craig Langston, and Jim Smith, "Improving the implementation of adaptive reuse strategies for historic buildings," (Presentation at Improving the Implementation of Adaptive Reuse Strategies for Historic Buildings, Le Vie dei Mercanti S.A.V.E. Heritage: Safeguard of Architectural, Visual, Environmental Heritage, Naples, Italy, June, 2011): 1.
[9]

[10] Quinn.

[11] A building's embodied energy consists of the total energy consumed, both directly and indirectly, in its creation. Direct energy consists of the energy used to manufacture a buildings materials and components while the indirect energy includes energy from material extraction, processing and manufacture, transportation, etc. See, Philip Crowther, "Design for disassembly to recover embodied energy," (presentation, The 16th International Conference on Passive and Low Energy Architecture, Melbourne-Brisbane-Cairns, Australia, September, 1999): 2, and Charles Kibert, *Sustainable construction: green building design and delivery* (Hoboken, N.J.: John Wiley & Sons, 2008): 37.

[12] Crowther, "Design for disassembly to recover embodied energy," 2.

[13] In the context of this paper it is important to note that durable materials can have a higher initial level of embodied energy that effectively becomes lower over time because they last longer than less durable materials with a lower degree of embodied energy which have to be replaced more often.

[14] Kibert, 37.

[15] R. J. Cole and P.C. Kernan, 'Life-Cycle Energy Use in Office Buildings', *Building and Environment*, vol. 31, no. 4 (1996): 307-317; T. Oka, M. Suzuki, and T. Konnya, 'The estimation of energy consumption and amount of pollutants due to the construction of buildings', *Energy and Buildings*, vol.19 (1993): 303-311; G. Treloar, 'Embodied Energy Analysis of Buildings Part 2: A Case Study', *Exedra*, vol. 4, no. 1 (1993): 11-13. as cited in Crowther, "Design for disassembly to recover embodied energy," 2.

[16] During the typical life span of a building, it is can reasonably be assumed the building will undergo a number of both major and minor renovations.

[17] Crowther, "Design for disassembly to recover embodied energy," 2.

[18] Ibid., 3.

[19] Quinn.

[20] Often referred to as Design for Adaptability, the process of designing buildings from the beginning with the intention of facilitating their future reuse in varied or unknown forms is often referred to as Design for Adaptability or Design for Future Building Adaptive Reuse. In the context of this paper, the term Design for Future Building Adaptive Reuse is used as the author feels it more accurately represents the intention of this principle. For these purposes the term Design for Future Building Adaptive Reuse (DFAR) is used in this to include both Design for Future Building Adaptive Reuse and Design for Adaptability.

[21] Quinn.

[22] Crowther, "Design for Disassembly - Themes and Principles." *RAIA/BDP Environment Design Guide,* (2005).

[23] Ibid.

[24] Crowther.

[25] Chris Morgan and Fionn Stevenson, *Design for Deconstruction: SEDA Design Guides for Scotland: No1*. Edinburgh: Scottish Ecological Design Association, (2005), accessed August 10, 2014, http://www.seda.uk.net/assets/files/guides/dfd.pdf, and Crowther "Design for Disassembly – Themes and Principles."

[26] Mark D. Webster and Daniel T. Costello, "Designing Structural Systems for Deconstruction: How to Extend a New Building's Useful Live and Prevent it from Going to Waste When the End Finally Comes," (Paper, Greenbuild, Atlanta, 2005).

[27] Crowther, "Design for disassembly to recover embodied energy," 3.

[28] Conejos et al., "Designing," 35.

[29] Peter A. Bullen, "Adaptive reuse and sustainability of commercial buildings," *Facilities* 25, no. 1/2 (2007): 20 - 31.

[30] Peter Bullen and Peter Love, "The rhetoric of adaptive reuse or reality of demolition: views from the field," *Cities* 27, (2010): 216.

[31] Sheila Conejos and Craig Langston, "Designing for future building adaptive reuse using adaptSTAR," (Paper, International Conference on Sustainable Urbanization: ICSU 2010. Hong Kong. December 2010): 4, and Graham Kelly, Robert Schmidt III, Andy Dainty, and Vicky Story, "Improving the Design of Adaptable Buildings Through Effective Feedback in Use (Paper, Management and Innovation for a Sustainable Built Environment, Amsterdam, June 2011), 4

[32] Conejos and Langston, 4.

[33] AdaptSTAR is similar in concept to LEED or other sustainability assessment rating systems which provide a checklist of design decisions that lead to best practice outcomes. See, Sheila Conejos, Craig Langston, and Jim Smith, "Improving," 3.

[34] While designing new buildings according to these principles is an important criterion for sustainability, it is important to recognize within this summary of DFAR principles, there will be occasions where conflicts exist between multiple principles. See, Conejos and Langston, 1.

[35] Morgan and Stevenson.

[36] Design for Deconstruction and Disassembly originates in concepts found in industrial design, automotive design, electronics, where products are often designed so their component parts can be disassembled and fully reused.

[37] Morgan and Stevenson.

[38] While DfD is often discussed as a means to achieve environmental goals, it can also be seen as a strategy to help meet social and economic goals as well. One of the greatest benefits of the principles of DfD when looked at over the lifetime of an individual building, is that they typically extend a building's useful life potentially bringing economic benefit to the owner while facilitating the while maintaining the highest portion of embodied energy through whole building reuse. The Scottish Ecological Design Association finds that by following the principles of DfD buildings are more able to adapt or change to meet evolving functions and needs over a building's lifetime. This extends a building's function life by reducing costs associated with renovation thereby making it economical to remodel. In this way, an important economic benefit associated with DfD for an owner is the future proofing of a building in terms of maintenance costs and any necessary upgrading. In relation to broader environmental and sustainability goals, as discussed above, extending a building's useful life represents the highest form of salvage and reuse – thereby conserving the greatest levels of embodied energy. See Hood et al. and Morgan and Stevenson.

[39] Guy and Ciarimboli; Michael Pulaski, Christopher Hewitt, Michael Horman, Bradley Guy, "Design for Deconstruction and Material Reuse and Constructability," (Paper, Green Build, 2003): 1.

[40] Crowther, "Design for disassembly to recover embodied energy," 5; Crowther, "Design for disassembly," *Royal Australian Institute of Architects/ BDP Environmental Design Guide*, (1999), accessed August 01, 2014, http://eprints.qut.edu.au/2882/1/Crowther-RAIA-1999.PDF; Crowther, "Design for Disassembly - Themes and Principles"; Guy and Ciarimboli.; Hood et al.; Morgan and Stevenson

[41] Crowther, "Design for Disassembly - Themes and Principles."

[42] The distinction between Design for Deconstruction (for component reuse) and Design for Disassembly (for Material Reuse and/or Recycling) is important as it is often assumed that the recycling of construction materials is as energy efficient as re-using them, which is rarely the case. Recycling does not fully address construction waste, or embodied energy problems, as it consumes a considerable amount of resources in the reprocessing and transportation of materials. Whereas the reuse of a building component has virtually no embodied energy costs, although transportation factors still need to be considered. See, Morgan and Stevenson.

[43] Philip Crowther, "Design for disassembly to recover embodied energy," 5.

[44] Ibid.

[45] S. Brand, *How buildings learn: What happens after they're built* (Penguin, New York, 1994). As cited in Kelly, et al.

[46] Kelly et al.

[47] Ibid.

[48] Webster and Costello, 2.

[49] Pulaski et al.

[50] Other sustainability assessments such as US Army SPiRiT Green Building Rating System and Green Globes do consider DFAD principles to varying degrees; however, because of their limited use within the built environment industries they have not seemed to have the impact of mainstreaming

[51] Webster and Costello, 3.

[52] Quinn.

[53] Sheila Conejos, Craig Langston, and Jim Smith, "AdaptSTAR model: A climate-friendly Strategy to promote built environment sustainability," *Habitat International* 37 (2013): 95 – 103.

[54] Kelly et al., 19.

[55] Langston.

[56] P. Graham, "Design for adaptability – an introduction to the principles and basic strategies," The Royal Australian Institute of Architects, Australia, (2005). As cited in Kelly et al.

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The Border Arts Residency: A Study of the Urban Fabric, the Arts and How to Add on to a Historical Building

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Abstract

As a teenager in the early 1980s, I remember taking the bus to downtown El Paso, Texas, to roam the streets and to enter the world of science in what was once known as the Insights Science Museum. As I explored the streets, I felt the enormity of the beautiful structures I saw, and though I knew nothing of architecture, they created an experience that remains fresh in my mind of tall grey, red, and brown colored walls defining a sense of space.

While working on my master's degree from 1997 to 2001 at the Autonomous University of Mexico, I became more informed about the downtown fabric, thanks to their primary focus on the matter and, therefore, issuance of several analytical assignments regarding the effects of urban contexts and their vernacular.

In the last decade, the City Council and the City of El Paso have stopped talking about renewing and have begun making an actual effort to revitalize the downtown by both giving incentives to owners for preserving the historic buildings and helping owners receive restoration grants. In addition, in the spring of 2014 the introduction of a Triple-A baseball team and its new stadium led efforts of a redevelopment of the downtown's residential neighborhood that is also within the area.

One of the particularly unique features of the downtown historic buildings in El Paso is the Chicago Style design that was introduced in 1892 by architect Henry Trost of Chicago, a former wrought iron detailer who worked on important structures, including those of Adler and Sullivan in Chicago, and was a member of the Chicago Architectural Sketch Club. Trost's first structure in El Paso, which was also the location of the Insights Science Museum, was the Anson Mills and, later, he worked on the addition of the Centre (nicknamed the White House) Building, which was recently renovated by In*Situ Architects.[1]

Sadly, we have also seen the destruction of our valuable history through the demolition of Trost's Union Bank and Trust Building,[2] the burning down of a French-style retail and office building that once housed an infamous law officer, John Wesley Hardin, and the demolition of other valuable blocks of historic structures, though not in the registry.[3] These changes have both negative and positive effects on our downtown's unique fabric and the environment in general. The negative is the defacing of El Paso's unique character and quality of its historical vernacular. When rebuilding, we run the danger of building a sterile "Anywheresville, USA" shopping structure or, worse, leaving the space blank for heat-gaining parking lots. On the positive side is the restoration and repurposing of the same.

This article investigates the downtown urban fabric and vernacular in which we will study the nodes, landmarks, memorable streets, and other components to raise awareness of the importance of knowing one's city and the importance of preserving the past that created the walls within which we will be working. This article also serves as a study of existing structures within the area of focus to help not only preserve the past but to also reuse and repurpose historic structures, including additions, to meet new owners' needs. Finally, this article will encompass the studies for a hypothetical repurposing of one of these historic structures and its additions, such as the Hearst Tower in New York City or Frank Gehry's Fred and Ginger in Prague.

Several cities are currently experiencing a similar type of behavior and this type of investigation is valuable, as many cities' downtown areas should not end up sterile from generic building and dead after-business hours.

Getting to Know the Walls from Without the Walls: The Urban Fabric and the Vernacular

For this hypothetical project, students are given the task of becoming familiar with the walls they are going to be working within. Through this analysis, one will discover that El Paso's downtown has changed so much since its inception, from mid-1800s adobe haciendas to two-story apartment/retail brick structures from the 1900s, three-story French Quarter-style hotels and a few 1970s and 1980s structures. But the most prominent style of architecture is the Chicago Style mixed with a flavor of the Southwest designed by Trost, who worked in El Paso between 1892 and 1930. His style of architectural design ranged from the Chicago Style to Art Deco – the two dominant styles that shaped the vernacular along with the city's superimposed Cartesian grid that has developed its fabric.

The first and primary street that runs north to south is El Paso Street, which lines up with Avenida Juarez on the Mexican side, and both meet at the international bridge. On both sides of El Paso Street are the 1930s two–story, double-wythe load bearing brick apartments; two-story French Quarter structures, also made of load-bearing brick with retail on the first floor and apartments above; a few theaters, one called the Alhambra Theater done in the Chicago Style of load-bearing concrete exterior walls; and, at the north end of the street, the Plaza Theater

done in the Mission style. El Paso Street also has tracks for a trolley that once traveled to and from Mexico. The street is nicknamed "Paseo de las Luces," the "Pass of Lights," because of the streetlights that line both sides of the street. It is the *memorable streets* and the lights that are the *nostalgia-producing instruments* to which Rowe and Koetter refer in "Collage City."

On the north of the side of El Paso Street, the road curves north to northeast and becomes Mills Avenue, which goes east. Mills Avenue intersects with and is perpendicular first to Oregon Street and then to Mesa Street. One block north and parallel to Mills Avenue is Main Street, which also intersects both Oregon Street and Mesa Street. These four streets are the outline of the *stabilizer,* the San Jacinto Plaza, nicknamed "Plaza de los Lagartos," "The Alligator's Plaza," because in the early 1900s it housed Louisiana alligators in the center of the square where a fiberglass statue done by the late Luis Jimenez now stands (see Fig. 1).

The walls that make up the plaza, or *garden,*[4] are of the Anson Mills Building at the corner of Mills and Oregon, the first Chicago Style building done in a design similar to that of the Carson Prairie Scott Building in Chicago. The interior structure is concrete, and the columns are two feet by two feet and are equally spaced at twenty feet apart. Attached to the Anson Mills going north is a recently added four-story neo-1930s warehouse designed office building with red brick facing, which meets at the corner of Main and Oregon. The structure crosses over the street with a sky bridge to a parking garage to the north of Main Street. This addition is a modern concrete structure with a red brick veneer and ill-proportioned arches at the top of the parking structure.

Across the street to the east and north of the plaza, between Oregon and Mesa along Main Street, once stood a French Quarter-style hotel built of wood called the Angelus Hotel, where visitors who got off the train just to the north of it often stayed. The railroad tracks have since been sunken about sixty feet and the train station is to the west and housed in a structure designed by Burnham and Root called the Union Depot. The block is now an empty asphaltic parking lot owned by Chase Bank. Still on the north and crossing Mesa Street to the east on Main Street is the Chase Bank, a 1970s eighteen-story modern-style bank. Because it is a modern structure, it is built of steel columns and concrete floors with curtain walls that face it.

To the south of this bank and crossing Main Street is a plain brown brick parking garage that also houses Bank of America at the ground level and is attached to a beautiful, once well-known hotel that is now an office building known as the Cortez Hotel. President John F. Kennedy stayed there two days before his assassination in 1963. This is another Trost structure done in the Chicago Style with Spanish conquistador busts that delineate the level of the first floor and the retail area and the second floor, which now houses offices but once used to be the ballroom and reception area. Its construction is similar to that of the Anson Mills. To the south and on the corner of Mills Avenue and Mesa Street was another Trost structure that has since been demolished and is now being replaced by a modern structure; because this is a recent development, it is difficult to analyze what effect it will have on the street's appearance.

Fig. 1. Google Earth image of El Paso's Jacinto Plaza and surrounding structures

Going back west on Mills, and facing the plaza, is the Banner Building, with retail on the lower level and apartments above that were once offices,[5] also designed by Trost in the Chicago Style. Its floor plan is square at the retail area and U-shaped above; concrete load-bearing exterior walls hold the structure in place. If you are not careful you will miss two structures, a tiny one-story and a two-story structure that follows the Banner building with blank façades. The façades of the two structures together only measure 46 feet wide; the one-story building has retail business, while the two-story building is boarded up.

The Kress Building follows and meets the corner of Mills Avenue and Oregon Street (see Fig. 2). The building is a beautifully designed Art Deco Moorish style structure with concrete exterior load-bearing walls whose floor plan is interesting, as it is an L-shape that goes behind the Banner Building because the Banners would not sell their property to the Kress Department Stores. Across the street and on the opposite corner is the first Hilton Hotel, also designed by Trost, a seventeen-story structure done in an Art Deco style complimenting the Kress Building. This is the location of the penthouse where Elizabeth Taylor and Conrad Hilton once lived while filming the movie *Giant* in the town of Marfa three hours southeast of El Paso.[6] There are a variety of other structures in the area but these are the prominent blocks and architectural styles one can find in El Paso's downtown and will be the area of focus.

The students' analysis also includes pedestrian traffic, vehicular traffic, green areas and the like which also make up the urban fabric. The analysis found that all of the streets are two-way streets, each corner has a four-way traffic light and pedestrian crosswalk. Vehicular traffic is blocked at the corner of Mills Avenue and El Paso so there is no longer traffic on the west of Oregon Street. There is a high volume of pedestrian traffic and the biggest attraction is the plaza, where pedestrians go for shelter from the heat under the big shade trees. The sidewalks offer a few trees that give a small amount of shade. Along the sidewalks, the pedestrian lights along El Paso Street carry over to the four streets that make up the plaza.

The Building and Within the Walls

The analysis is now turned to the structures within the walls. As has been briefly described, the majority of the structures downtown were built between 1892 and 1930 with a few exceptions, such as Texas Chase Bank and Wells Fargo Bank, which were built in the 1970s and 1980s using steel columns, beams and trusses, and concrete for their main floor structures. Those built between 1892 and 1930 are double wythe, load-bearing brick construction and were no taller than two stories, while the concrete structures were built with techniques brought from Chicago and were anywhere between four and twelve stories tall, built of reinforced concrete columns and floor slabs and with the façades demonstrating the beginnings of a curtain wall.

The wood and adobe structures in the downtown area no longer exist; they have burned down, weathered away, or been demolished. Researching this allows one to understand how one can reuse and repurpose the buildings. One can also learn the mechanics necessary to have a proper understanding of these structures in order to make decisions about where one can cut into the floors to create the incredible double or triple height volumes once believed impossible to do.

The focus of this case study is the Kress Department Store Building, whose floor plan is an L shape. The owner of the building loaned all construction drawings to the students. The dimensions of the façade that faces Mills Avenue is 60 feet, the length that stretches along Oregon Street is 140 feet. The length that wraps behind the Banner Building is 145 feet, which is the width of the block, and the façade that faces Mesa Street and is behind the Banner Building is 50 feet. This is a three-story structure whose exterior walls are sixteen-inch wide reinforced concrete, and it has load-bearing construction with twenty-four inch by twenty-four inch intermediate concrete columns at the intersection of the L and other areas that the structural engineer thought to be necessary. In theory, this structure is so well engineered that what the students are proposing to do would be feasible and would meet the program they were given.

The aesthetic of the building is quite remarkable; it is a three-story structure displaying Art Deco features with a tower at the corner of Mills Avenue and Oregon Street in the shape of a cube. The tower is broken up into two parts: the intermediate section displays Moorish style spires at the four corners and steps in and up a half height higher, with façades that have wonderful Anglo, Native American, Spanish, and Moorish geometric features on their four sides and a terracotta hip roof caps the square. There are details of terracotta roof tile along the parapet walls. The colors are a pastel pink stucco with a variety of the primary colored pastel tiles also in in the geometric patterns and imbedded into the façades. The "KRESS" sign is fastened vertically from top to bottom on the Mills Avenue, Oregon Street, and the Mesa Street façades.[7] Pedestrian and vehicular traffic travel in all directions as all streets are two-way streets. There are traffic lights at the corners to create a four-way stop at all corners except Mills Avenue and Oregon Street, because Mills Avenue recently has been closed off to allow construction crews to work on both the Anson Mills Building and, soon, the Plaza Hotel (once known as the Hilton Hotel). There is a bus stop on Oregon Street and one on Mills Avenue as well. There are a few trees equally spaced and growing along the sidewalks to shade weary travelers. The building is well exposed to the sun from sunrise to sunset in the north and west façades; the east façade only enjoys the morning sun. The rain

Fig. 2. Google Earth image of Kress Department Store

often travels from north to south and there is a storm drain along Oregon Street. On both corners of Mills Avenue and Oregon Street there are pedestrian lights similar to those found on El Paso Street. The area is well lit at night, as all streets in this area and the plaza have pedestrian lights.

Unfortunately, the owner of the structure does not take good care of the building, and smog is very visible on the façades as well as in the interior spaces that are also poorly taken care of. The display windows along Mills Avenue have also been altered, and this takes away from the historic value of the building.

Because of heavy pedestrian traffic and all of the other features discussed, and because the students felt strongly about saving the building, one student team chose the Kress Building for its project repurposing. There were a total of eight teams of two individuals per team in the class and all shared similar dreams of saving this beautiful downtown structure. Each team selected a structure that displayed similar features where one could find heavy pedestrian traffic and the structures were dilapidated from being unused, poorly used, or poorly taken care of. Students

contacted the owners of the structures to obtain drawings of the buildings or obtained them from the archives of the downtown library. As mentioned earlier, in the case of the Kress Building, the drawings were supplied by the owners of the building.

Repurposing the Structure and Working Within the Walls: The Project

As students began to work within the walls, the assignment evolved with the inclusion of the existing residency that was started by a local artist and former professor of art at the University of Texas at El Paso, Willie Ray Parish, and his wife, Becky Hendricks, also a professor of art at UTEP. Their vision was to provide an environment where an artist is able to concentrate on just his or her work and produce the work without worrying about having to pay the bills. In 1992, after remodeling an existing barn where he created a workspace for himself in the first level and built a second story that includes a room to sleep, cook, relax, and work, Parish created the Border Arts Residency. The El Paso Community Arts Foundation manages the Border Arts Residency and helps oversee and select the artist who will be attending the residency for the year.[10] Now that twenty years have passed since the Border Arts Residency's inception, Parish and Hendricks are planning to retire, but their vision is still very much alive and has since been carried over by the board of directors and the El Paso Community Arts Foundation. The students' proposal is to move the El Paso Community Arts Foundation and the Border Arts Residency into an historic structure to encourage them to be a part of El Paso's downtown revival. The proposal includes the introduction of new beneficiaries of the new Border Arts Residency that include not only students of art, but also students of architecture and dance.

Before designing the repurposing of an historic structure, one should encourage the studies of how other architects have added onto historic buildings, such as Norman Foster's Hearst Towers in New York City,[8] where the historic structure was restored and Foster also inserted a forty-six story steel and glass addition, juxtaposing it with the original structure to make a nice contrast between the old and the new. Frank Gehry's Fred & Ginger in Prague[9] similarly makes a contrast with a glass and steel structure that wraps around the historic structure, hugging it nicely. The structure has been given that name because the building appears to be a male and female dancing together.

After this observation, the students deal with the program, which calls for the adaptive reuse of the historic building to best fit the intentions of the new facility while juxtaposing the necessary floors to meet the program. In this case study, we are focusing on the students who were inspired by the Kress Building whose Native American geometric features were most evident to them. In their proposal, the concept on which they focused was the

Image provided by author

Fig. 3. Ground level view of the Kress with the proposed addition from Oregon Street

strong symbol of the feather, which they felt was among the strongest symbols Native Americans use continuously. As they studied it further, they noticed that the structure of the feather is a hollow structural system that could be used for the addition of ten floors to the existing three floors (see Fig. 3). The students also looked at Toyo Ito's Multimedia Center in Sendai, Miyagi, Japan whose structural system resembled that of the feather, and they felt that it would be a good system for their project.[11]

The repurposing of this building entails converting the retail window floor area that faces the plaza into the main gallery spaces, making the plaza façade the main entrance to the building. The proposal is to have the offices for the Community Arts Foundation, the Border Arts Residency administration, and the theater in the Kress Building. The proposal includes using the entrance off Mesa Street as the service entrance for the theater, and it will also become the private entrance for residents using the studios and living in the building. The proposal for the existing upper floors is that they house more offices and library spaces and studios, residences, and other necessities will be added to house 30 residents that will be using and living in the facility (see Fig. 4 and Fig. 5).

Similar to Toyo Ito's Multimedia Center and their study of the feather, the students' proposal is to incorporate the hollow structure to be the structural system holding the ten floors added to the building. The elevator is encased in the hollow metal frame and the distribution of the new

Image provided by author

Fig. 4. Roof transition between residential areas

Image provided by author

Fig. 5. Interior of dance studios

columns reinforces both the concept and the structure. The students also learn about safety issues and other code compliant issues, but because it is experimental and because of time constraints some of this is lost or limited. As an instructor, my main goal at this level is to make the students aware of means of egress, handicap accessibility, and elementary structural concerns to create an adaptive and workable design.

A Historical Accomplishment

The most incredible thing happens at the end of this project in all cases and for all teams: an appreciation for the city and for historic value. Knowledge of how to analyze the urban fabric also helps students with creating an intimacy with the surrounding features of the urban vernacular and the fabric of which they become aware. This helps in understanding that the walls we are to be working in are much more integrated with each other than they first appear to be. This is the reason for such a long courtship with the urban area rather than just assigning the project from the beginning. If we were to go straight into design, there would be a loss of value and logic related to the purpose of the walls we are working within.

Understanding the vernacular and the fabric, one can then move on to study the actual building and become more intimately acquainted with the structure that is about to be reinvented or repurposed and built upon. When one understands the structural integrity and the aesthetic makeup of the structure, the realization of the unrealized is possible in a much more sophisticated manner. If one were to just jump into the project, respect would not be given, as we have seen happen in recent history. Blocks, buildings, and history are demolished to make way for sterile "Anywheresville, USA" structures or empty heat islands.

Finally, understanding the client is important and, along with understanding the first two points – the vernacular and urban fabric, one can produce a better quality overall design of which one can be very proud. As this project is completed, one gains awareness of his or her surroundings and respect for what it is and what it can become.

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21c Hotel – Integrating Revitalization and Art

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Abstract

The existing Fred Jones Building is located at the intersection of Main Street and Classen Boulevard in Oklahoma City. The building will be renovated as a multi-use complex with the majority occupant being the 21c Museum Hotel. A future tenant will occupy a minor ground floor space at the west side of the structure. The existing building comprises a four-story building, c.1915, with a two-story addition, c.1924. This building, which was once used to manufacture Model Ts and As, will be rehabilitated into a 130-room boutique hotel and contemporary art museum.

The building is proposed to have both new and renovated elements, all of which will be located and detailed in coordination with the State Historic Preservation Office and the National Park Service. Preserved and/or renovated will be: the existing concrete frame, masonry veneer and entrance canopies, including the train shed structure. Existing exterior windows are steel-framed units and will be replaced with a new custom divided-lite system that relates to the configuration and profile of the original window systems. Special care will be taken to preserve the character of historical elements, such as the water tower and original signage.

Adaptive re-use is not new to this client, 21c, which has sought to reverse the trend of suburban sprawl by revitalizing existing building stock while also seeking to integrate art into people's daily lives.

A project of this type will truly transform an underutilized historic building into an exquisite new architectural place of which Oklahoma City can be proud.

Ford Motor Company - Oklahoma City Assembly Plant with Sales Showroom, circa 1916. *Image by The Camera Shop (Albert Kahn Associates Archives).*

Full paper withheld at author's request

SESSION 6:
Defining the Dash

Session Chairs:

Daniel Butko, AIA, NCARB, LEED AP, ASA University of Oklahoma College of Architecture Division of Architecture

Anthony Cricchio, RA, University of Oklahoma College of Architecture Division of Architecture

Current design-build projects often stir opinions and subsequently shake the trees of traditional teaching and academic policies, but one fundamental question is perhaps the most critical element: are design-build projects always a linear process: a beginning to an end? Subsequent to the perceived process, how do educators define the dash between the two words? Where does a process fit within the pedagogy of designing and building as both entities influence and navigate the other? Can the project type allow for real-time sketching and designing to occur while physically building a full-scale prototype?

Design-build learning environments offer a means to engage today's design students outside typical small-scale representations into development of full-scale inhabitable space(s). Varied in scale and disposition, opportunities focus upon deliberate and expressive inhabitable deliverables where design concepts address materials, function and scale. The reliance between design and construction phases establishes the foundation of what defines the architectural terminology "creating-making."

The union of creating and making begins when students possess a passion to bridge the roles of designer and constructor, thus recognizing that the two aspects of creating are intrinsically linked. Opportunities defined traditionally as design-build projects may be more aptly labeled build-design projects, where the activity of building is the learning component.

In the spirit of creating and making, how are architecture curricula exploring and defining integration across thinking, developing, crafting and physical building, thereby submerging students in the realm of thought and deed? This session will explore the pedagogy of varied design-build engagements and how both faculty and students are advancing the comprehensive design process.

Building on Pop [Up] Culture: Exploring the Value of Temporary Design-Build

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Abstract

Temporary, student-built interventions can serve as compelling site analyses, examples of community engagement, and powerful challenges to public (and student) perceptions of marginalized parts of communities. Without enormous up-front risk for newcomers to design-build pedagogy or the communities they serve, this type of work can transform perceptions of these vital parts of cities to provoke conversation and spark action on behalf of communities that may not otherwise have a voice.

In contemporary architectural practice, there is a pervasive privileging of the image. Academia and the profession alike often candidly participate in the obsessive production of images. While built works must satisfy very real client needs, they also perform the function of self-promotion. Now, more than ever, it is critical to shift focus from the illusory permanence of built products to the temporary learning experience of design-build.

Many design-build studios hinge their success on a final, built product – in some cases to the detriment of the learning experience and the community. A temporary intervention can mitigate the product's ability to eclipse the value of the processes of learning and making. Removing the distracting weight of an aesthetically pleasing, image-ready product, in fact, re-emphasizes the multitude of other equally valuable, less tangible learning experiences inherent to design-build.

In a series of community-based, service learning studios, faculty at the Louisiana State University School of Architecture have begun to explore the value of the temporary. The projects represented use simple materials and lighting to create temporary public spaces. Through experimentation with materials and sites at full scale, as well as first-hand collaboration with community members, students get a broad and deep understanding of making and place while giving a new vision for public places back to the city.

The City as a Site

The creative nature of an education in architecture requires students to constantly confront new ways of seeing the world – especially the places we traverse and occupy each day. We often take for granted the way cities are made and designed (or not designed). The production of urban environments goes largely unchallenged. In a prologue to *Architect* magazine's August 2012 issue titled "Spontaneous Interventions," architect Michael Sorkin challenges this notion. He asserts that the project of the city is an ongoing one – one in which we, not only as designers, but also as inhabitants, can participate.[1] His description renders the city not as a static space into which one may place architecture, but rather a dynamic, shifting constellation of forces that can be tested, manipulated, and engaged. Mid-twentieth century movement to outlying suburbs in most American cities has left behind incredible opportunities to challenge students to carefully consider the city as a laboratory through the practice of intervening – testing our relationship with place. Temporary interventions in the city – in the context of the service-learning studio – bring this phenomenon to the center of the educational experience as well as create an impetus for change in older, neglected parts of our communities.

Over the last half-century, the draw of relatively inexpensive suburban land and the convenience of the highway and the automobile encouraged many cities to surge outward. Following the Federal Aid Highway Act of 1956, interstate highways began to meander through and around most American cities[2] to accommodate significant, expansive development and meet the needs of growing, newly industrialized cities.3 Merely two decades after World War II, the United States' gross national product more than doubled to $500 trillion.[4] Baton Rouge – Louisiana State University's home town – is no exception. The work presented herein focuses on Mid City – an essential part of the urban core of Baton Rouge immediately east of downtown.

Interstate highway expansion in the 1950s and '60s and a growing population drew resources and economic strength from the core of the city while simultaneously physically severing Mid City from downtown. While this area is currently confronted with issues of poverty, crime and abandoned properties, it is a diverse, centrally located, economically valuable part of Baton Rouge and home to a fervent variety of new developments and active neighborhoods. Mid City serves as fertile ground for addressing the issues we face as a modern society. It can be characterized by scenes of empty buildings, litter and failing sidewalks, but also is home to successful new bars, public art and local businesses.[5]

Service-Learning: The Value of Community and Hands-On Experience

For architecture students, education is project-based. It happens in the context of the design studio. We work, we test, and we make things. Students are given parameters from environmental conditions to social issues and challenged to propose solutions through the representation of architecture. Community-based work, however, allows the design studio to move beyond representation and the walls of the classroom. It gives students an opportunity to envision new ideas with people in their communities that address real issues. At the same time, students engage their design skills to illustrate and test those ideas.

It is equally crucial to challenge the traditional, paper studio by engaging students in the act of making things outside the classroom. While students are challenged to propose solutions through representation in contemporary architectural education, they are rarely charged to construct or understand the full-scale implications of their ideas. While necessary to visualize and test ideas, representation also offers a false sense of control over the varied conditions and circumstances of the world. In the same way that modern culture has been seduced by the camera phone's ability to instantaneously replay reality from moments ago, we as architects have been seduced by the illusion of control granted us each time we step back behind the pencil, paper, or computer screen to indirectly 'make things.' Academia and the architectural profession, alike, often candidly participate in the obsessive production of images – often privileging their production over taking action.

Resisting the dominance of representation in favor of the educational experience of making is crucial to the ability of future architects to solve problems. Students are forced to deal with materials in the context of weather conditions, gravity, and other people. Even the schedule of the academic studio is challenged by the daily grind of the modern, working world. In his critically acclaimed book *Shop Class as Soul Craft*, Matthew Crawford posits "If thinking [and thus learning] is bound up with action, then the task of getting an adequate grasp on the world, intellectually, depends on our doing stuff in it."[6] Constructing ideas one to one in the uncontrolled circumstances of the city teaches students to see their surroundings as a classroom, to test ideas, and to begin understanding the contexts of urban environments in compelling ways.

It may be easy to model a pop-up theater and propose a canopy of electric lights – but what is the tensile strength of a string of holiday lights? How many strings must be broken before a new solution is proposed? Executing these things on a budget, with time constraints, and in the elements reveals a new set of circumstances that are difficult to effectively confront at a drafting table or computer. These things, in fact, begin to inform student work and reveal to them their own capability to create something bigger than a physical or digital model. As a result, student projects become less extravagant and more practical, but also begin to engage and transform constraints into generators of ingenuity and creativity.

Process

In the context of an academic semester, built interventions seem to work best as an appendage to the traditional service-learning studio, which often entails pre-professional design services for a non-profit organization or other client with limited resources. The design work is prefaced with a temporary intervention and a community event on the project site. Students are challenged to transform an important part of the site into a temporary public space and host an event with goals of gathering information that cannot otherwise be measured – often through direct interaction with residents and business owners – and gaining a strong sense of the culture and character of a given place. The event brings people together and teaches students about building community while also challenging everyone's perception of the community and the project site. Simple materials are used with a focus on the event of architecture – something that is participatory, engaged, and process-oriented. The temporary nature of the work lifts the burdens of architecture's permanence and eliminates pressure on the students to attempt to know everything before making something. One of the first lessons learned is often that mistakes are not only acceptable but also necessary stepping stones to success. Students learn quickly that what they might consider a mistake or a failure can lead to fortuitous, valuable outcomes. Students also learn how to translate their ideas into real constructions, to work collaboratively in group settings, and, most importantly, to confidently poke into the eye of the world and see what comes back. What does the act of making something reveal about the world? What does it reveal about how we are as humans? As Coleman Coker writes, "When we build [...] we are at the center of these built things. Whether they are buildings or bubble gum, we conventionally set ourselves as the focal point of all made things ... to transform the world from one that is indifferent to us to one that acknowledges how we are."[7] After processing the information gathered and discussing new insights from their intervention, students begin design work and later present that work to the project client and other community stakeholders for further action.

Projects

The goal of the projects presented herein is to offer a fundamentally unequalled learning experience that can prepare students to address the complexities confronted by the modern world in a very grounded way.

Laurel Street Firehouse

The Laurel Street Firehouse served as an active fire station for 85 years in Mid City until it was decommissioned in 2011 when a new station was constructed nearby. It was one of three stations built in 1926 in early years of firefighting in Baton Rouge. The fire department wished to repurpose the building into a museum for near-century-old fire trucks, firefighting equipment and a September 11 memorial. The facility would also serve as a venue for fire prevention education, charitable fundraising and community outreach, as well as a meeting place for the firefighter's union.

Students took inventory of artifacts, including uniforms, equipment, and fire trucks. They also met with firefighters and administrators to assess needs, understand the history of firefighting, and document the old fire station and its surrounding neighborhood.

Mid-semester, the studio and the fire department hosted Rekindle Mid City in the parking lot behind the abandoned firehouse. The event was a way to celebrate the history of Mid City and the fire department, learn more about the site, and exhibit the firehouse site as a valuable public place. It became a means to test and challenge the perception of vacant space and launch the design phase of the museum. Through the use of simple materials and lighting, a barbed wire fence can become a billboard and the back of an abandoned building transformed into a movie screen (see Figs. 1-2). Throughout the process, several mockups and field tests took place, money was raised, and people were invited. Students learned that an ample supply of zip ties and duct tape is often necessary to execute a pop-up intervention – especially to resist unexpected wind loads with plastic sheeting. The initial design also called for the removal of the chain link fence. In the end, the fence became a necessary, primary means of structural support.

Fig. 1. Laurel Street Firehouse and parking lot.

Fig. 2. Laurel Street Firehouse and parking lot during *Rekindle Mid City.*

The event not only provided an opportunity to learn about the building and its history but also challenged the public, and the students, to envision something new. While the intervention was temporary, it showed the students how the site might be used. Attendees were encouraged to bring old photographs of Mid City or the firehouse to be scanned and projected onto the side of the building. Many firefighters shared stories about their time at the station and revealed its significance to the department. City officials and members of the fire department participated, along with the Mid City Redevelopment Alliance, local business owners, and residents. The event revealed the site's potential as a valuable public venue and stirred enough interest from the Mid City Redevelopment Alliance to prompt a proposal to take on the building and implement some of the ideas explored. As the studio moved forward, students incorporated what they learned from the event into their design proposals, adding such elements as photo-archiving labs and spaces to share stories, while exterior public space replaced the existing parking lot.

St. Vincent de Paul Workforce Development Market and Café

For this project, the studio partnered with the Society of St. Vincent de Paul to expand the organization's existing shelters and counseling services to include workforce development. St. Vincent de Paul acquired the former site of a local grocery store that burned down in 2007. The project challenged students to develop ideas for a grocery and café that also would serve as a workforce development program for the area's homeless population. The proposed program would offer on-the-job training in the food service and retail grocery industries and also provide a more comprehensive support network to participating St. Vincent de Paul clients. At the same time, it would provide a fresh, healthy option for dining and grocery shopping to local residents who may not have easy access to them.

Over the course of the semester, the studio designed and constructed a series of interactive, pop-up kiosks to be strategically placed throughout the neighborhood surrounding the proposed project site. The kiosks solicited feedback about specific issues at each location by posing questions like, "What do you like about your neighborhood?" and "Where do you buy your groceries?" Students then repositioned the kiosks on the project site to host Mid City Speaks, an engagement event designed to give a voice to the residents and invite public participation in the project.

The collected feedback was shared with residents, church members, and other community stakeholders, affording community members an opportunity to share their thoughts and concerns about where they live. At the same time, the pop-up kiosks, along with a donated tent, transformed the empty lot into a shared, public space. The truly valuable knowledge, however, came from careful observation of how community members – especially children – interacted with the existing site and temporary constructions. Concrete slabs became blank canvases for chalk art while a low, flooded area of pavement was transformed into a miniature lake for paper sailboats. The microphone used for making announcements became an impromptu stage for local children to sing gospel songs and the tent became a space for local church members to gather after mass. In addition, the simple provision of chalk and a blank canvas revealed a significant need for an outlet of creative expression. These unexpected elements – places for kids to play, water features, artistic expressions, and gathering spaces – became integral to the proposed market and café designs created by the students. The construction and movement of the kiosks also proved eventful and educational. The frame was initially designed to hold a hanging panel – which,

upon construction, showed little resistance to lateral forces. Students shifted the panels to the inside of the frame to serve as sheathing and lateral support (see Fig. 3). Uplift from the wind also required the eventual addition of anchoring at the base of the structure. The free movement of the kiosks allowed students to test the structures' full-scale capability to define spaces on the site.

Fig. 3. Pop-up kiosks on the project site.

Public Pinups, Partnerships and Forward Action

Since 2012, the concept of a public pinup and participation in a local art hop in Mid City has become an annual occurrence in the studio. At the end of each semester, students host a public pinup of their design work during Mid City Merchants' White Light Night – a biannual art hop along Government Street, one of the area's major commercial corridors. The public pinup has become another opportunity to activate vacant space and experiment with public perception of the city. The first iteration took place in front of the Darensbourg Building on Government Street. Students presented proposals for the Laurel Street Fire Museum while simultaneously revealing the potential of the Darensbourg Building as an anchor on the corridor and a means to activate the sidewalk and stimulate adjacent businesses. The studio re-used some of the plastic sheeting from Rekindle Mid City along with clamp lights, plywood and rigid foam insulation to launch a pop-up gallery (see Fig. 4). It proved transformative enough to garner the attention of the local media and put the Darensbourg Building in the spotlight. Ironically, most visitors assumed the proposed designs offered future ideas for the Darensbourg Building.

The following year, a two-block stretch of Government Street around the building was selected for a Better Blocks intervention executed by the Center for Planning Excellence in Baton Rouge. Better Blocks is a national, pop-up template that began in Dallas and has spread across the United States. Temporary plantings, bike lanes and cafés filled the area, with the same goal of transforming public perception. To date, the City of Baton Rouge has taken jurisdiction of Government Street from the State of Louisiana and announced plans to redesign the corridor

Fig. 4. A reactivated Darensbourg. The first annual public pinup served as a means to re-envision public space.

to include bike lanes, plantings and street parking. The Darensbourg Building is currently being remodeled to house new businesses along with the rest of the Government Street frontage of the block.[8] While the studio cannot take credit for the incredible amount of investment and new development in the area, one can hope that the intervention helped spark interest and affected public perception of this important part of Baton Rouge.

Following the project with St. Vincent de Paul, students again set up a public pinup and presented their work for feedback. This iteration included a partnership with a local printing company, Letterman's Blue Print, which sponsored a design competition for the project and hosted the public pinup. Letterman's sponsored the studio's participation in White Light Night as well, and allowed the students to transform the company's lobby into a gallery and event space. The students dismantled and reused the pop-up kiosks from Mid City Speaks to present their work at Letterman's (see Fig. 5).

Fig. 5. Letterman's Lobby transformed. Students repurposed pop-up kiosks to present their work. Government Street corridor can be seen in the background.

Close to 500 residents, neighbors, local architects, and business owners saw the pinup as they passed through the transformed lobby. The success of the pinup prompted Letterman's to forge a new partnership with the studio to create a rotating public exhibit space in front of its Government Street façade. The project served as the fall 2014 project for the Mid City Studio and marked the first semi-permanently built work of the studio. The studio is partnering with a local art collaborative, The Walls Project, to promote the exhibit and oversee its continued use by the community. The project is intended as a modular system with removable panels that will serve as a contextual, rotating community exhibit and will allow the company to become a steward and voice for the surrounding community. The project and its first exhibit launched November 21, 2014, at White Light Night.

A Call to Action

Architects have a responsibility to carefully consider the places they work. Good architecture should be driven by a fervent relationship with its place – its culture, history, and people – followed by a belief in the ability of humans to better their communities without a blockbuster budget or unbridled new development. The Mid City Studio hopes to continue pushing students to act as socially responsible professionals by testing and engaging the places in which they live. It is crucial for students to understand the real-world implications of their future role as architects. We must not only consider buildings' impact on the environment, but also on the communities in which they are built.

Images provided by author.

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Design Making: The Iterative Design Process of a Small-Scaled Object

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Abstract

"This is the craftsman's proper conscious domain; all his or her efforts to do good-quality work depend on curiosity about the material at hand.[1]"
Richard Sennet, The Craftsman (2008)

The Bauhaus reformed art and design education to include hands-on workshops alongside classes on theory, representation, and art. At the same time, Gropius believed that artists operated on a level above the craftsmen, and the coursework was taught separately. Conversely, in *The Craftsman*, Richard Sennett describes the intrinsic value of working with one's hands. Haptic learning, which happens in working directly with materials, is as valuable as the artist's conceptual work. It is this link between design and making that design build brings to architectural education.

Traditionally, in architecture education, design build has meant students have the opportunity to design and build buildings. With the proliferation of computer numeric controlled (CNC) equipment in architecture schools (e.g., routers, millers, robots, etc.), it appears that students have additional opportunities, beyond traditional design-build studios, to link design and making through alternative full-scale, smaller-sized projects. Although some of the learning objectives between design build and design making may be different, there are still many overlaps. Similarities include the value of working directly with the material and the opportunity to assess the work directly, not only through representation. Because of these similarities, I have expanded the definition of design build to include all aspects of design making.

This paper presents the value of a small-sized, design-making exercise within the architecture studio as a means to understand how materials and design interact. In fall 2013, I assigned a short, introductory design-making exercise for my advanced architecture design studio. Through this project, students were to directly learn from their experiences of making to affect their designs. This was an introductory studio design-making exercise that served as a microcosm of the larger, more complex project the studio was to address over the remaining fourteen weeks.

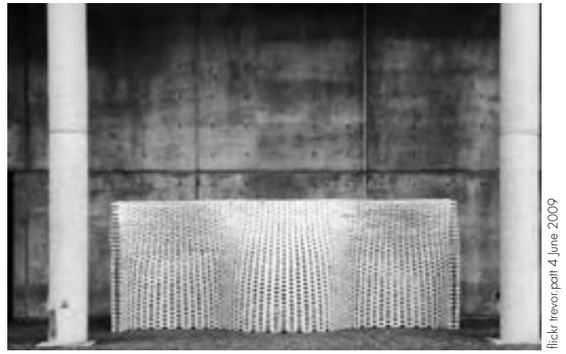
For the introductory exercise, students were to design and make a small desktop organizer from a custom-created mold. Knowing little about molds, mold materials, molded media, and working at full-scale, students were encouraged to work iteratively. They were asked to do tests and mockups to re-inform their design decisions. Through this project, students learned about materials, working at full scale, the tension between design intention and final outcome, and manufacturability. An added benefit of this particular exercise is that its small scale allowed for multiple iterations between making and design. This paper will present the results, challenges, and lessons learned from this design-making exercise.

Design Making

In architecture education, design build is the opportunity for architecture students to simultaneously be involved in both the design and making of buildings. These design-build projects may be a required course within the accredited architecture degree, such as the Yale University Building Project, which is required during the second semester of the first year of graduate school; or it may be an optional studio, such as North Carolina State University's summer Design-Build Studio. Design build also includes educational opportunities outside of accredited architecture education institutions, such as Yestermorrow Design Build School or the Ghost Architectural Laboratory.

There are additional opportunities for students to design and make outside of design-build programs. These opportunities may include building furniture, constructing installations, working with new fabrication processes and materials, or exploring CNC equipment. Examples of design making include Harvard University's Graduate School of Design's installation, "On the Bri(n)ck," where students investigated using robots to make walls; experiments into super-plastic forming aluminum by students of Heather Roberge, assistant professor at the University of California Los Angeles; and student seminar work investigating the iterative loop between digital design and fabrication under David Hill, associate professor at North Carolina State University (see Fig. 1).

There are benefits and drawbacks to both the traditional design build and this expanded notion of design making. For traditional design-build projects, students have completed an entire building and may have participated in the permitting process, collaborated with building trades, worked with various stakeholders, used a variety of different materials and assemblies, and worked in large teams. In the example of the Yale Building Project, all of these take place through the design-build studio. At the same time, because of the size of design-build projects, students must resolve the building design through representational modes (e.g., physical and digital models, sketches, and orthographic drawings) prior to construction. Students may consider concepts of making in their initial design decisions, but often cannot directly incorporate the results of making throughout all of the design process. Also, because of size, all students may not participate in all aspects of design and making within the design-build project. For example, many students may help with the rough framing, but only a small number of students do the finishing work.



flickr trevor.patt 4 June 2009

Fig. 1. "On the Bri(n)ck" at the Graduate School of Design, Harvard University.

Smaller design-making projects have different benefits and drawbacks. In smaller design-making projects, often students are able to participate more fully with making than in traditional design build projects. Therefore, all students are exposed to similar experiences of design and making through these projects. Design representation may be less important than design making. Because the design-making project is smaller, design drawings can be done at large or full scale or not at all. Next, since associated costs are smaller, students have more of an opportunity to potentially work iteratively, completing multiple tries of a design. Drawbacks to small-scaled projects are that students may have less of an opportunity to work with various stakeholders and may have no public engagement component. For example, the projects at Harvard and UCLA were both installations done within the schools. Additionally, students may be limited in the types of materials and processes they use. Instead of being exposed to many processes, materials, and assemblages, students may be limited to just one or two.

Studio and Exercise Descriptions

This paper presents a short, introductory design-making exercise that was part of an Advanced Architecture Design Studio (ARC 503) at North Carolina State University, taught in Fall 2013. ARC 503 is our topics-based studio. We typically have three to four sections of ARC 503 every semester, and the topics are designed by the individual instructors. It is a vertical studio and includes a mixture of mostly graduate students and some undergraduate seniors. Placement into each section is done by lottery with preference given to those who are graduating at the end of that semester.

My ARC 503 studio section was titled *Manufacturing Architecture*. I designed the studio to be an extension of my research into architects who have customized repetitive manufacture processes for the production of architectural components on a per-project basis. Built examples of these work include the bladder inflation molded fiberglass louvers of the Walbrook Office Building (2010) by Foster and Partners; the slumped glass windows for the VAKKO Fashion Center (2010) by REX; the explosive formed metal panels for the Theater Castellum (2005) by Kraaijvanger Urbis; and the thermoformed plastic trombe wall for the University of Arizona Solar Decathlon House (2009) in Washington, DC.[2] These examples include a range of project scale, building and practice types, and locations, and demonstrate a global application of customized repetitive manufacturing in architecture.

Customized repetitive manufacturing balances the values of repetitive manufacturing (e.g., cost, reduced material waste, and range of media) with the ability of the designer to customize a building component. Customized repetitive manufacturing can make best use of those processes that require low-to-mid volume production runs, but can also include those processes with high production runs.

The goal of this ARC 503 studio section was for students to explore different repetitive manufacturing processes, to study how architects might customized those processes, and for the students to propose projects and designs that would best use a particular manufacturing process. Students designed the project around the manufacturing process, and each student wrote a program, selected a site, and designed the building. The range within the studio was varied and included a molded, blown glass trombe wall, rotational molded plastic louvers that filtered rain water, and extruded aluminum components for disaster-relief housing.

For studios that I teach, I like to have a short exercise that introduces the overall studio objectives within a more simplified architectural problem. For this studio, we did not necessarily have the opportunity for students to work with manufacturers; however, the students needed to be sympathetic to the idea that how something is made is as important as how it is designed. Toward this end, they were challenged to design and make a desktop storage system, which was to make repeated use of tooling (e.g., molds, patterns, or jigs) for the production of the unit.

Students were able to get the support they needed to meet this challenge. The NCSU College of Design fabrication shop has a variety of equipment and knowledgeable support staff. For this exercise, the fabrication shop's most applicable processes would include plaster and concrete casting, molding plywood, and thermoforming plastic. Additional resources on NCSU's campus include the Craft Center. Here, for a small fee, any NCSU student can have access to clay molding, slumping glass, and lampworking.

Unlike most architecture design projects, which use drawings and models to represent the design, the success of the storage unit was evaluated on the actual materials, details, and craft. The project was not to make a something that *represented* a storage unit; instead it was to make the *actual* storage unit. The project description listed three characteristics that should be considered when undertaking the project: the craft of the object, the relation to its prescribed use, and overall aesthetics. All of the characteristics are interdependent on each other; one cannot fully investigate one characteristic without investigating all.

Exercise Outcomes and Assessments

Like most studio projects, the outcomes of this assignment were varied. Unlike most design-build studios, which result in the construction of one building, this studio resulted in several, smaller-scaled objects. The units were designed and made by either one or two students. This allowed for direct connections between the object that was made and the person or persons participating in the making.

Students were given three weeks to complete the assignment. In the first class, we discussed initial sketches and models. Subsequent classes were devoted to full-scale iterations. Students were encouraged to explore the manufacturability during the design process. Students experimented at full scale with different materials, tooling media, size, design, and methods of manufacturing. Most of the students completed four to five iterations of design and making, with all of the students completing more than three iterations. Making and design were completed simultaneously so that students could evaluate and link the object's design to its making.

Prior to this studio, these students had not had any experience with full-scale making. Students had to learn both how to make and how to properly evaluate what they made. That evaluation was needed so that they could learn and make again.

Concrete_Closed Mold

Hengchen Liu designed a small desktop storage unit to hold thumb tacks, rubber bands, and pencil leads (see Fig. 1). The unit is made from concrete and was cast vertically in a closed mold. Between the two mold halves was a wandering parting line. The wandering parting line follows the contours of the molded object and reduces undercuts. The unit was designed using Rhino and all of the tooling was made on a CNC machine.

Liu completed multiple iterations of this project. He investigated different sizes, finishes, and media for the unit. In the end he tested three different sizes. His different finishes were created by changing the tooling from foam to pine to bass wood. He investigated using concrete, Quicrete, and Rockite, and varying the amounts of water added to each. His goal was to get the surface of the unit as smooth as possible; the bass wood gave the smoothest surface of the three mold media tests. Liu also studied different processes, such as vibrating the mold while the concrete is poured and knocking on the side of the mold to help release the air bubbles.

There were challenges with this project. First was an intentional design of the undercut; this made removing the object from the mold without damage difficult. Second, in casting concrete, it is difficult to get the air bubbles to release from the vertical sides of the mold. The bubbles often get stuck between the surfaces of the mold and the concrete, leaving bubbles on the surface of the casting (see Fig. 3). Post-production finishing was difficult on the concrete. For example, when casting in a closed mold, the

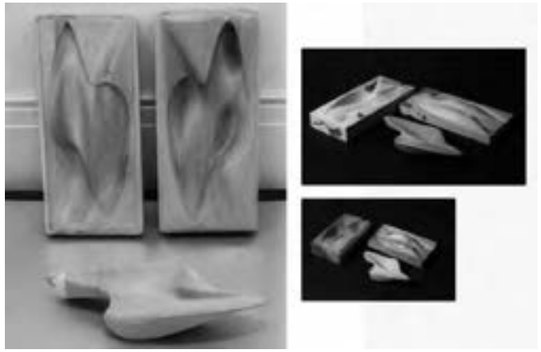


Fig. 1. Three iterations of Liu's closed-mold concrete storage unit. The three iterations are shown next to its mold and in relative size to one another. The largest size was presented at the final revie . *Photographs provided by Hengchen Liu.*

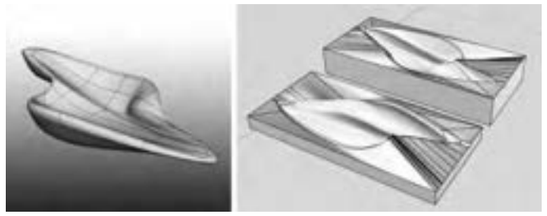


Fig. 2. The Rhino model for both the unit and the mold. Note the wandering parting line for the closed mold. *Images provided by Hengchen Liu.*

Fig. 3. A close-up photograph of the smallest iteration. Note the air bubbles on the sides of the unit due to the orientation of the pour. *Photographs provided by Hengchen Liu.*

Fig. 4. Three iterations of castings for Galloway's unit. The iteration on the left is what was presented for the final revie . *Photograph provided by Victor Galloway III.*

Fig. 5. On the right is an MDF pattern used to thermoform the plastic. On the left is the plastic mold that is formed and ready for casting. *Photograph provided by Victor Galloway III.*

Fig. 6. Galloway's iterative testing for the production of his storage unit.

sprue is cast in and flashing forms at the parting line. Both then have to be removed. Liu knocked them off by hand and used a rock to file the surface. In the end, Liu struggled with the unit's surface quality and final size.

Concrete Open Mold

Victor Galloway designed and manufactured a small desktop storage unit to hold his sketchbook, pencils, pencil sharpener, and eraser (see Fig. 4). The unit was to be finished on only one face, therefore allowing open-mold casting. The concrete was poured finished side down with the unfinished side left to self-level. Pouring so that the finish side is down minimizes the number of air bubbles on the finished surface. Through iterative testing Galloway discovered that the open mold needed to be tapped a few times to release air bubbles from the mold's surface.

Galloway wanted a shiny, smooth surface for his concrete. He did this by using plastic for the concrete mold. The plastic's surface gives a smooth, slightly shiny surface to the concrete without any additional post production processes. Galloway fabricated the plastic mold by first having a CNC mill fabricate a pattern from medium density fiberboard (MDF). He then used the shop's plastic thermoformer to form a plastic sheet against the MDF pattern. Once the mold cooled, he removed the plastic from the pattern and then cast his concrete within the plastic mold (see Fig. 5).

Incorporating the thermoformed plastic within his process meant that Galloway needed to work within both the parameters of casting concrete and thermoforming plastic. His design's parameters, such as draw angles, draw depths, and size limitations, needed to be considered for both process. His MDF pattern needed to be made so that the plastic would form to the correct shape and could be removed without breaking. The plastic also needed to be formed so that the concrete could be removed without breaking the plastic and the concrete. Galloway broke down his iterations to understand the thermoforming process, material properties of both plastic and concrete, techniques of casting in plastic, and design (see Fig. 6).

For this process there was the added challenge of tracking the finished side of the object. There are two options for thermoforming plastic. The plastic can be formed over a male mold (i.e. a positive mold) or it can be formed into a female mold (i.e. a negative mold). For both of these molds, the plastic surface that is in direct contact with the mold takes on the dimensions and surface qualities of the mold. At the same time, any mold imperfections will transfer to the surface of the plastic. If using a female mold, air holes will be necessary for the vacuuming process and will be transferred onto the plastic's surface. For Galloway's production, he used a female mold for his thermoforming process and then cast his concrete within the plastic mold on the unfinished side. By doing so, the concrete casting did not pick up the vent holes; conversely, it also meant that his casting lost much of the design's original details.

Molding Plywood

Brittany Spangler and Mollie Matthews worked together to make a storage unit out of molded plywood. The unit was to be formed from offset, curved plywood shelves to form round storage holes. The holes could be used to store rolls of paper, pencils, or similar items (see Fig. 7). The unit was designed so that a single mold could be used to form all five of the shelves. The base of the unit would be formed by using the full mold, and the remaining four shelves were formed using only a portion of the mold. The molded plywood shelves were connected by hidden dowels.

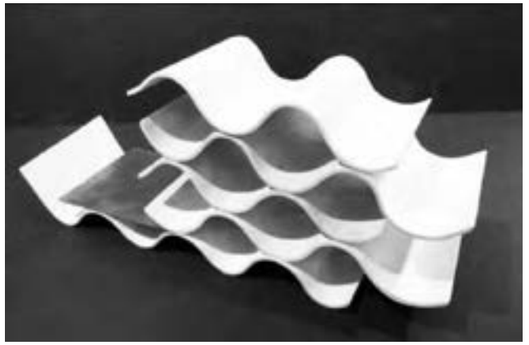


Fig. 7. The final unit, constructed out of molded plywood. *Photograph provided by Mollie Matthews.*

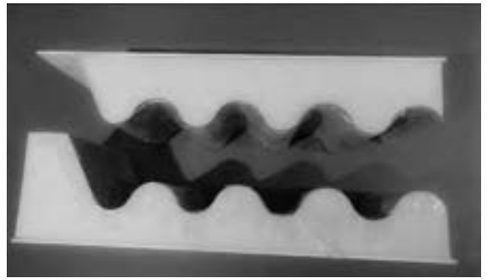


Fig. 8. The mold. *Photograph provided by Mollie Matthews.*

The molded plywood was made using a closed mold inside a vacuum bag. The mold was made from vertical layers of corrugated cardboard that had been laser cut. Clear plastic packing tape was used to cover the burned edges of the laser-cut cardboard to keep the plywood surfaces clean. The top and bottom of the mold were reinforced with plywood so that the vacuum bag did not destroy the edges of the mold. Spangler and Matthew poked holes in the packing tape and the plywood reinforcing to maintain the vacuum throughout the mold.

Spangler and Matthews did many test iterations of the design, the material, and the mold (see Fig. 9). To test the design, they made a mockup of the final design using laminated chipboard in place of plywood. This gave them a sense of scale and size and introduced them to the vacuum bag. To test the material, they investigated different materials (e.g., molding plywood and veneers) and different material preparations (e.g., laminating dry materials with glue and laminating moist materials with glue). They discovered that soaking the molded plywood overnight and then letting it dry for four hours before laminating was the best process. To test the mold, they investigated using both a closed and open mold to form the molded plywood. The open mold used the vacuum bag's surface to press the plywood against the mold, whereas the closed mold uses

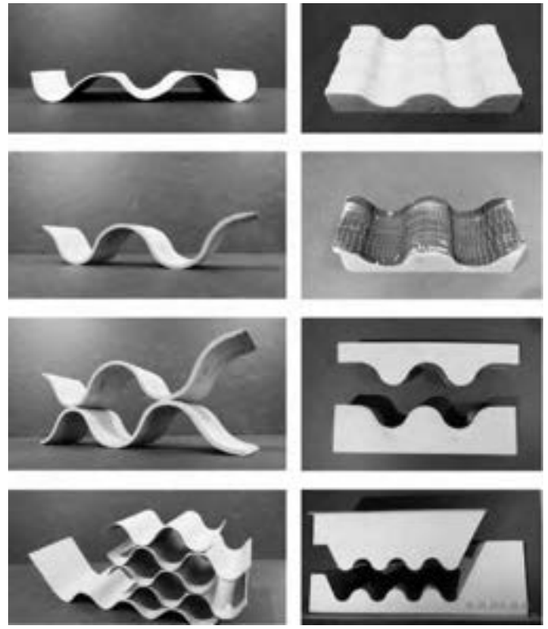


Fig. 9. Design and material testing iterations. On the left are the molded objects and on the right are the molds. Testing included foam molds and initial foam core concept model, open molds and plywood material tests, closed molds and connection testing, molded chipboard and full size mockup molds. *Photographs provided by Mollie Matthews.*

a male and female mold together (see Fig. 8). The closed mold was placed within the vacuum bag to apply even pressure. The curve dimension for the male and female molds was offset to allow for the plywood's thickness.

Both Spangler and Matthews got the most repetition from their mold – five pulls for the production of a single storage unit. However, using one mold multiple times required more production time. This team developed a production schedule to meet its final deadline. In the context of the larger studio theme, I believed it was invaluable to the students to consider time in their manufacturing processes.

There were challenges for this design. First was the connection between the plywood shelves with a hidden dowel. This connection would have been difficult for a fine woodworker, and was beyond the students' capabilities. Second, the COD shop only had one vacuum bag. The bag developed a hole halfway through their testing process and slowed down their production time. The shop was unwilling to order a replacement bag and patching the bag would have taken too much time. In the end, the shop temporarily repaired the hole with duct tape. The students were required to check on the seal every couple of hours to make sure it held.

Overall Project Assessment

Despite the time in the project's schedule dedicated to exploring materials and processes, students still struggled with learning from their making to re-evaluate their designs. Students would make assumptions about their tests and would not retest those assumptions before making the final unit. For example, when Spangler and Matthews did their bending plywood tests, they assumed that bending plywood into three consecutive curves would be as easy as bending plywood into six consecutive curves. This assumption did not work for them when they started final production. When the final review happened, it was as if the jury was reviewing a prototype rather than the final unit. This may have been addressed if more time was allowed or a jury mid-review provided.

It also proved difficult to get the students to critically evaluate what they made. These students did not have prior experience making full-scaled objects. After having done so for the first time, they took an understandable pride in their work. This pride made it difficult for them to evaluate their successfulness. This, too, could have been addressed with a required mid-review, giving the students the distance and feedback necessary to evaluate their own work.

Although all the students did multiple iterations, their iterations did not have much impact on the development of their designs. The students appeared very tentative in changing their designs. For Galloway's project, I suggested redesigning the unit's proportions, and the spacing and depths of the pencil and book holders. To address this suggestion, he only eliminated two of the pencil slots. Additionally, Spangler and Matthews struggled trying to mold the tight curves of their design. After multiple iterative struggles by changing the mold type and soaking times, they choose not to alter their design to lessen the radius. Instead, they decided to soak the plywood longer. The extra liquid thinned the glue, thus reducing its effectiveness in adhesion. In the end, this caused delamination between the layers.

Cost was an unpredicted challenge. Although some of the processes, such as casting concrete, were relatively inexpensive, molding plywood was quite costly. For this studio, students got reimbursed for the materials used in the final unit. The cost for the plywood unit was over $400 and the cost for the concrete casting in the wood mold was approximately $45. Students were not reimbursed for their iterative process studies. The cost of iterative study may have altered how many iterations students tried before making the final object. One can also infer that if the final costs were not reimbursed, that it would affect the manufacturing processes and materials selected.

The final challenge for this project was the studio size itself. Originally planned for a studio of ten to fourteen students, due to an administrative decision, the studio was reduced to four students. Having a small number of students allowed for deep and meaningful interactions between me and the students; however, it also reduced the interactions between the students themselves. I believe that if there had been more students, the projects would have been more successful.

Despite these challenges, there were a number of positive outcomes that resulted from this project. Students were able to apply lessons learned from this assignment to their final projects. Liu designed custom aluminum extrusions for disaster-relief housing. As part of his design, he fully investigated the manufacturing processes of aluminum extrusion and made a number of full-scale mock-ups of his joints. For Matthew's final project, she made a mock-up of her final design for wood-molded, blown glass spheres, using the COD shop's plastic thermoformer. I believe that without their design and making storage unit experiences would have made them less willing to take on these challenges for their final project reviews.

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[1] Richard Sennett, *The Craftsman* (New Haven: Yale University Press, 2008), 120.

[2] For more information on the Walbrook Office Building and other examples of customized repetitive manufacturing, refer to "Customized Repetitive Manufacturing in Architecture, a Case Study" in this publication.

Reference

Sennett, Richard. *The Craftsman*. New Haven: Yale University Press, 2008.

The Making of a Vertical Garden: Lessons in Collaboration, Consciousness and Craft

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Abstract

The home garden was once the backbone of American food security. However, a cultural shift away from gardening has resulted in residential properties abdicating secure garden space. Many have stressed food security as being vital to the health and welfare of the people within the United States, in particular those of low-income or located within urban food deserts.

To this end, a multi-disciplinary team of architecture, landscape architecture, water resources, and food science experts and educators was assembled to engage issues of food security through the development of the Garden Education Teaching and Training Site (GETTS). This project will act as a replicable model for home food production. One of the objectives of GETTS is to develop proposals for three scales of the family vegetable garden, of which the primary focus of this paper is the small vertical garden. A design/build methodology and pedagogy was utilized in an architecture materials course, affording students the opportunity to collaboratively design and construct innovative and affordable solutions to vertical gardening. Students worked closely with architecture and landscape architecture faculty and were tasked with developing site-sensitive designs, selecting and procuring sustainable building materials, and fabricating and constructing (on site) their proposals. Documentation sets, in the form of user-friendly construction assembly instructions, were created by the student groups for dissemination at Mississippi State University Extension Centers throughout the state.

This paper will discuss the students' increased consciousness toward societal and cultural issues surrounding food security; their development of tacit understandings of building materials, assemblies, and craft; their ability to collaborate and foster interdisciplinary working relationships; their development of project budgets, timelines, and material acquisition protocols; and their appreciation for the complexities of project management, coordination, and implementation.

Introduction

"In a world of plenty, no one, not a single person, should go hungry. But almost 1 billion still do not have enough to eat. I want to see an end to hunger everywhere within my lifetime.[1]"
Ban Ki-moon, United Nations secretary-general

"Imagine all the food mankind has produced over the past 8,000 years. Now consider that we need to produce that same amount again – but in just the next 40 years if we are to feed our growing and hungry world.[2]"
Paul Polman, CEO of Unilever

"The quest for food security can be the common thread that links the different challenges we face and helps build a sustainable future.[3]"
Jose Graziano da Silva, United Nations Food and Agriculture Organization (FAO) director-general

Hunger and access to healthy food is a world problem – not just a third-world or foreign issue, but one that confronts us here in the United States, in our rural landscapes and urban centers. The Food and Agriculture Organization (FAO) of the United Nations estimates that around 870 million people worldwide are chronically undernourished because of the lack of access to enough food required for their daily nutritional needs.[4] According to the 2012 United States Census Bureau, nearly a quarter of the population in the state of Mississippi lives below the poverty level. In areas located within the Mississippi Delta poverty levels rise to nearly 50 percent.

In addition, since the middle of the twentieth century there has been a steady decline in home food production, which has led to stronger dependence on processed and "fast" foods. According to the Centers for Disease Control and Prevention (CDC), Mississippi is recorded as having the highest per capita rates of diabetes (11.7 percent)[5] and obesity (35.1 percent)[6] in the nation.

To this end, a multi-disciplinary team of architecture, landscape architecture, water resources, and food science experts and educators from Mississippi State University (MSU) has come together to engage issues of food security, resulting in the planning, design, and development of the Garden Education Teaching and Training Site (GETTS). Located on the campus of MSU, this project will act as a replicable model for home food production and sustainable food practices.

In the spring of 2014, the first phase of the GETTS project began with the design and construction of 10 prototypes for small, modular vertical gardening. Thirty-six architecture students were placed into teams and tasked with developing, fabricating, and documenting innovative and sustainable vertical garden structures. Over the span of a month, the students worked closely with Professor Jacob Gines (architecture), Professor Elizabeth Payne-Tofte (landscape architecture), and Professor Brian Templeton (landscape architecture) through an iterative and hands-on design process.

At the completion of the Vertical Garden Project, each team was asked to reflect on the project – its process, procedures, and objectives – and respond to a series of questions in a survey[7] administered by Gines. The format of this paper is a topical narrative by the author (often responding directly to comments from students), including a list of the survey question posed to the students and a list of selected student responses.

Fig. 1. Vertical Garden prototype. Birch plywood, perforated metal, steel angle iron, and landscaping membrane. *Students: Ashton Aime, Caleb Fearing, and Brad Trevino.*

Social and Cultural Consciousness

Marilyn Schlitz, Institute of Noetic Sciences senior fellow and president emeritus, posits that there are five nested levels of social consciousness:

Embedded Consciousness: Here consciousness is shaped without our awareness by social, cultural, and biological factors. … We see what we expect to see – and can consistently miss things we are not anticipating or that don't support our belief system. …

Self-reflexive Consciousness: Here people gain awareness of how their experiences are conditioned by the social world. … In this process, we can begin to analyze our own biases and remove our perceptual blinders. …

Engaged Consciousness: At this stage, we are not only aware of the social environment but begin to mobilize our intention to contribute to the greater good. There is a movement from "me" to "we" as our awareness moves us to actively engage in the well-being of others and the world. …

Collaborative Consciousness: Here we begin to shape the social environment through collaborative actions. Within education, for example, we find an increasing focus on participatory learning, service learning, and project-based learning – each was developed to enhance the nature of collaborative social consciousness through discourse and conversation. …

Resonant Consciousness: At this stage of development, people report a sense of essential interrelatedness with others. They describe a "field" of shared experience and emergence that is felt and expressed in social groups.[8]

The range of responses from students demonstrates varying degrees of social consciousness on the topics of food security and home garden practices – not to mention vertical garden and product design. The majority of the time spent on this project was in developing *engaged* and *collaborative* consciousness among the students, and exercising that consciousness through critical dialogue with professors and among the larger body of students. As an unforeseen consequence outside of the listed objectives of the vertical garden project, many students commented on, and committed to, improving their own eating habits and seeking healthier solutions to their daily dietary needs.

How has this project helped you become more aware of societal and cultural problems/issues?

"It has brought the issue of food security to the forefront. Food security is an important issue that is commonly overlooked due to the society of America."

"We have realized the importance of gardens in modern society, an age where we are separated from our surrounding. By creating something that allows for you to easily work and grow vegetation outside, people might want to go outside."

"Cities are becoming larger and green space is becoming sparse."

"We were not aware of the number of individuals who do not have access to fresh, healthy foods."

"By putting ourselves in the mindset of a person who may not have access to a private outdoor space, save a small balcony, it has made the group more conscientious of other people's living conditions."

Tacit Understandings

Moving students out of the classroom and into a studio/lab environment allows for an "exercise" of demonstrable skills and abilities. The fabrication "fitness" of developing designers is often weak, perhaps fragile, and must be strengthened. The relocating of the student-craftsman to an active and perhaps unfamiliar setting provides a condition wherein he or she can become more intimately familiar with the object of creation. With every movement and deliberate gesture information is received, processed, and stored, then actively altered as a conscious evolution of ongoing knowledge acquisition – knowledge that cannot be taught in a lecture setting. Knowledge is taught, internalized, and then practiced, resulting in the development of new skills, enhanced design language, and amplified critical thinking.

Juhani Pallasmaa could very well be speaking to a design/construct pedagogy and ourselves as expressive, experiencing beings when he states:

> My assumptions of the role of the body as the locus of perception, thought and consciousness, and of the significance of the senses in articulating, storing and processing sensory responses and thoughts, have been strengthened and confirmed … The primacy of the tactile sense has become increasingly evident.[9]

Fig. 2. Off-site fabrication of Vertical Garden prototype.

Students learn to interpret tacit knowledge and turn it into deliberate and reactionary responses to ongoing and unforeseen challenges in the construction process, embracing imperfections and re-realizing their original intentions. Groups also develop specific process-oriented tasks that lead to an increase in personal responsibility and accountability, which many expressed as valuable to their future professional selves.

What do you think are the benefits of design/build in design education?

"By actually building our designs, we are able to fundamentally understand how things go together. While this usually alters our design, usually they change for the better. We are able to use the techniques we learned while building in our future designs."

"When we, as students, get to spend our time actualizing a design, it helps create a more pragmatic mindset for the next time we design. We can then approach design with the intentions of it becoming a real object that has thickness and creates and takes space. This will help us in our careers to think about the realities of builders and contractors."

"Design build projects help teach the process of construction and completion. You start and finish an entire project, instead of handing it off to others to complete."

"We use design/build to test our knowledge of structure. Trial and error help us learn what not to do the next time around when faced with a similar problem."

Materials Matter

> *"(The) sensual and personal relationship with stuff has fascinating consequences. We love some materials despite their flaws, and loathe others even if they are more practical.*[10"]
> Mark Miodownik, professor of materials and society, University of London

There is no doubt that material selection strongly informs, if not directly dictates, the design decision process and produced outcomes/solutions. In addition, material selection is heavily influenced by both internal and external forces, resulting in the establishment of a set of hierarchal priorities – cost, availability, design intent, ease of construction/manipulation, aesthetics, environmental impact, performance (i.e. structural, thermal), dimensionality, and so on. The establishment of this hierarchical structure can become very complex. To assist the groups in organizing their priorities they were assigned one of three categories – low cost, medium cost, and high cost, leaving a multitude of considerations to be determined and organized.

Students were also asked to be innovative with their material selection and/or the way in which that material (or combination of materials) was to be assembled or crafted.

Fig. 3. Vertical Garden prototype. 24ga. Galvalume and steel rivets. *Students: Aaron Ellzey, Jared Robinson, and Samuel Vick.*

How has the evolution of material choice, or material compromises, influenced the realization of the project?

"When choosing containers in which to grow the plants, we knew that they would dictate the dimensions and spacing of the horizontal members that protrude from the slanted surface of the garden. Also, the length of the shoe bags that we used for planting determined the spacing of the cross bracing on the vertical side of the garden. Therefore, the evolution of material choice directly affected the evolution of dimensional alterations made (and added) to the design's cohesiveness and responsiveness."

"It improved the design by creating efficiency of material (and an) aesthetically pleasing (outcome)."

"Wood and its structural integrity greatly influenced our design. In conjunction with the steel bolts, we could achieve a strong yet flexible bond between our moving members of our structure (and) the box holding the plants."

The Role of Craft

It has previously been mentioned that each of the students were encouraged to think and act as a "craftsman" – emphasizing the importance of finish quality and design detailing. But there is another level of personal development that occurs when one is dedicated to craftsmanship. In his book *Shop Class as Soulcraft: An Inquiry into the Value of Work*, Matthew Crawford examines the importance of making and fixing things, and what is at stake for a society wherein a working/making culture (with its accompanying experiences) recedes from our common lives. "The disappearance of tools (and craftsmanship) from our common education is the first step toward a wider ignorance of the world of artifacts we inhabit."[11]

The feedback from students reinforced known insecurities in our contemporary society of craftsmanship – not only the recognition of craftsmanship, but also the societal or economic value assigned to such an endeavor. This is highly disturbing. There needs to be heightened consciousness of craft. As James Clear states in his essay "The Benefits of Mastering Your Craft":

> It is only by channeling our energies into a creative task that we often discover what we are truly thinking and feeling. However, it's only when we pursue mastery of our craft that we dedicate the necessary time and energy to discover ourselves. Fulfillment does not come from perfecting your craft, but from attempting to perfect it.[12]

What role does craft play in the generation of this project?

"It was key to create a quality version of our vertical garden to ensure stability."

"Craft is hard to achieve due to lack of experience shaping materials into forms that we first imagined. There is so much unknown since we are not personal users of vertical gardens, but craft helps in the end, especially since people will be in direct contact with these inventions."

Fig. 4. Vertical Garden prototype. Wooden hangers, landscaping membrane, wire mesh, zip-ties, and thread. *Students: Zach Busman, Yerix Morel, Cecelia Lemus, and John Mark Stumpe.*

"Craft is something that we always (pay) attention to in architecture school. While we did run into some little mistakes, we tried our hardest to create a clean and efficient garden tower."

"Craft is not a big concern with our design. The materials are cheap so if someone messes up it is not a big deal to go get more materials."

Budgets, Acquisition, and Timelines

Funding for this project came from a $50,000 Mississippi State University Extension Service (MSU-ES) Seed Grant, awarded to faculty for the establishment of the Garden Education Teaching and Training Site (GETTS). From this grant each group was allotted $150 (maximum) for the purchasing of materials. Material and budget requests were submitted via a shared online, cloud-based portal and were reviewed by faculty who organized requests to minimize redundancy and account for economized shipping and delivery.

For most, this was the first time in their lives that they had been exposed to the realities of calculating (and being responsible for) the actual costs of materials, sourcing available materials, managing the project timeline, and coordinating material delivery logistics. Most teams underestimated the time needed to perform and coordinate these tasks.

What have you learned about project budgets, material acquisition, and/or project timelines?

"It takes much more time than expected, and the original intentions of the project may change due to material, design, or time limitations."

"Since we had a low budget we had to be more resourceful with materials. We had to use materials in ways that are not normally used."

"These three things have to work together with flexibility to make the project come together."

"We learned that it is easy to overlook very essential, yet small, items that can make the overall cost rise more than expected. It is important to think about joinery, finishes, and tools in order to have a more accurate cost estimate."

Questioning Cost

It was clear early on that (at least in the minds of the students) budget ruled. Groups were very conscious of not overspending, which led to some normative material selections and design solutions, as well as conservative approaches to spending – not necessarily a bad thing. Even groups that were assigned to develop a prototype of "high" cost, found it difficult to define what high cost was

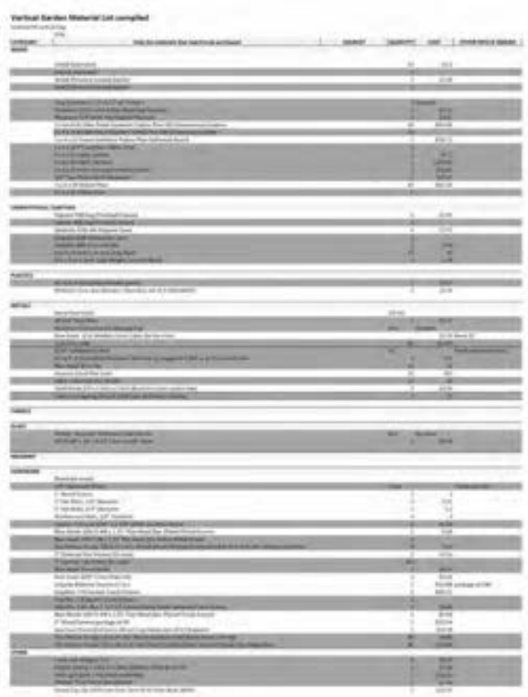

Fig. 5. Shared spreadsheet for coordinating material cost and acquisition, via Google Docs.

and challenge the budget parameters placed upon them by the faculty.

While many teams acquired new materials, there were others who sought to use reclaimed or salvaged materials to drive cost down and free up more money for a specialty material or hardware, as in the case of the team that salvaged a glulam beam that had previously been used by the Sustainable Bioproducts laboratory at MSU for structural testing and was set to be thrown out.

How is cost influencing the design?

"Our group approached this project with the mindset of a consumer, thinking practically about what we would be willing to pay to build our own garden."

"Naturally, we as a group tended to lean more towards non-expensive items if possible. We wanted our design to be simple enough in materials so anyone could go out and afford to build this garden."

"Cost was a big factor for our design. Initially we planned on using the donated material (plastic coated aluminum sheets), but we changed to a landscape fabric because it was more suitable and practical. We wanted to use household items that could be lying around the house so we chose coat hangers to hang the garden from the fence."

Coordination and Implementation

The general consensus from students was that early coordination between group members and external contributors/collaborators/vendors allows for smarter and faster decision-making, provides quicker turnaround during product fabrication, and establishes a process that embraces and supports evolutionary changes to the overall design and delivery of the project.

Call it collaboration, coordination, integrated project delivery, or what you will; the reality is that, as Ashley Wells writes in her essay "We Can Work It Out: Architecture + Collaboration":

> It takes a village to create … Just think of all the programming, concept sketches, models, renderings, etc. involved in the building process – and that's just in the design office. Of course, you also have to include engineers, builders, politicians, clients, and everyone else that all leave their mark on the final product. With so many professionals involved in the making of architecture is it any wonder that firms have begun to place an even greater emphasis on industry collaboration?[13]

Explain what you have learned concerning the complexities of project management, coordination, and implementation.

"It is very important to be as sure as possible on material choice and location of material acquisition (for) a project. These elements are things that should be decided upon early so that the proper actions (can) be taken. Having an understanding of materials and time will alter the design accordingly, and will force smarter decisions and a faster product (delivery)."

"We have learned that with early coordination and management of (obtaining) materials and supplies the design evolved."

"Implementation relies a lot on (the) coordination of group members. We have learned that it helps to delegate tasks so that different aspects of the project can be accomplished simultaneously."

Conclusion

For the most part, the "Questioning the Vertical Garden Project" survey revealed understandings of project objectives and the implementation of that knowledge. The design and construction of a vertical garden was simply the mechanism by which greater lessons could be taught and, more importantly, experienced.

Providing a learning environment wherein students could engage each other and experts in the field helped strengthen their social aptitude, communicative skills, and cognitive abilities, further developing a critical, conversive, creative, and conscious mind. It could be argued that the evolution of the consciousness of a student is perhaps more clearly observed and recognized when that student is engaged in work outside the classroom – in work that requires he or she to not act as passive absorbers of information (as in the case of lecture-based education), but as an active participant in the shaping of his or her own experience and tacit knowledge. When a project is required to be hands-on, the very nature of the project requires – no, demands – a crafted solution that seeks clarity in expression, detailing, and finish.

Images provided by author.

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Taking the Pulse of Design Build Pedagogy at Bluff, Utah

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Abstract

The School of Architecture at the University of Utah has hosted a design build program in Bluff, Utah, for ten years. The emergence of the program at the same time as the consolidation of digital technologies in architectural schools is no coincidence. Favoring the conceptual rather than the practical, modeling software and digital fabrication have introduced notions of space, materiality, and locality that take little notice of the capacity of the building industry to realize them. They have drawn a wedge between the high and low design opportunities available in the marketplace, and have created graduates alienated from the dominant conditions of the material production of the built environment.

Design Build Bluff, in contrast, is conceptualized around the desire to immerse students into the realities and exigencies of the construction industry. It encourages a more lateral relationship between the ideas on paper and "nuts and bolts" on site. Every spring a number of graduate students move more than 300 miles away from the school of architecture and form a tightknit commune to build a small single-family home for a beneficiary from the Navajo Nation near Bluff.

This paper will access the successes and failures of the pedagogy of learning-by-doing as practiced at Bluff by taking a closer look at the three most interesting houses built by the students of Utah in the past ten years. It will think through *Rosie Joe* (2004), which put the program on the map, *Sweet Caroline* (2006), a playful exploration of the geometry of a hogan, and *Rabbit Ear* (2013), the last completed expression of its teaching philosophy. Taking the pulse of the school's decade-long involvement with the reservation, the paper will argue that moving into its second decade, the critically acclaimed program needs to transcend object-centric architectural education, for it leads to an impossibly narrow, technocratic, and, ironically, market-driven pedagogy and understanding of the role of the future architect.

The Design Build Program at Bluff is the most prized child of the School of Architecture at the University of Utah. It is the brainchild of the generous Utah architect Hank Louis. Until very recently, Louis both directed and ensured the financing of the program. He has promised to continue to support the program from personal funds for another ten years as a new director takes over this fully crafted

Fig. 1. Bluff students posing inside a wood frame construction at a DesignBuildBLUFF project.

institution for learning by doing. Begun in 2000, Louis' teaching engine has created enough of a trail, graduated enough architects, inspired enough publications and generated enough publicity for the School to merit critical inquiry of its successes and failures.

First: successes

Every fall, a graduate studio of up to sixteen students designs a small single-family home for a pre-identified beneficiary of the Navajo Nation in the southern Utah tribal area. They study indigenous architecture and Southwestern vernacular. They read specifications on wood frame construction and building materials. They make working drawings and project management documents. In the spring these students move more than 300 miles away from the school of architecture, to the remote campus' small home and namesake in Bluff, close to the Navajo Nation's northernmost chapters. They spend the better part of this semester converting drawings into habitable space. As the edifice rises, so does a community of cohorts, who can boast hands-on experience of construction, teamwork, successful project delivery (in most cases), budget management, publication of their work, and an incredible amount of physical labor – all upon mere graduation (see Fig. 1). They come to appreciate the expertise of plumbers and electricians, the knowledge of vendors, and the importance of sunscreen. During the economically dark years from 2008 to 2013, should we be surprised if Bluff graduates got an edge with employers over peers who opted for the certainties of university environs and the comforts of home instead?

Participants agree that Bluff is an absolutely transformative experience for everyone who participates. It has turned idealistic students into professionals not just invested in public interest rhetoric but with an ability to execute it. It has injected the workforce with architects who know how to activate the power of humble projects over glittering spectacles. Bluff has serviced the profession with

Fig. 2. Rosie Joe House, Navajo Nation, Utah, 2004.

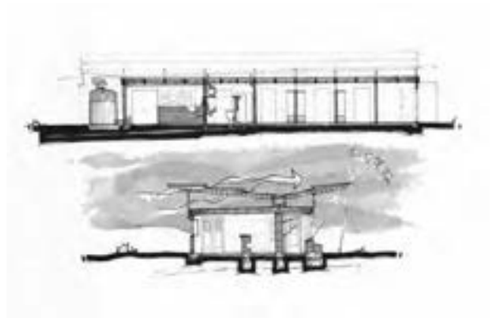

Fig. 3. Section, Rosie Joe House, Navajo Nation, Utah, 2004.

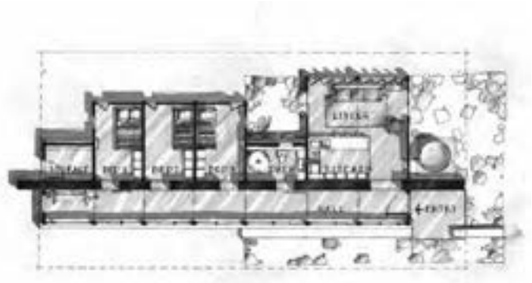

Fig. 4. Floor Plan, Rosie Joe House, Navajo Nation, Utah, 2004.

professionals capable of taking advantage of the room made by small-scale commissions for delicate gestures and sensitive details; the occasion they create with intimate knowledge of the functional needs of the client; and the time they allow for introducing small pleasures and comforts of life into a house. Bluff is a year trainees spend in the apprenticeship of the god of small things.

The graduates of this program have under their belt award-winning houses like Rosie Joe (see Fig. 2). Sitting on the ground with the delicacy of a butterfly poised for flight, Rosie Joe, the first of the Bluff houses, at once recalls the Navajo tendency to ascribe animal attributes to rock outcroppings and mountains. Its student designers

Fig. 5. Benally House, Navajo Nation, Utah, 2007.

Fig. 6. Sweet Caroline House, Navajo Nation, Utah, 2006.

demonstrated the ability to convert passive energy systems into poetic forms (see Fig. 3). They have delivered a design response for a community with reasonable resources of coal, oil, gas, uranium, and copper, but without any reasonable resources left to them to mine these. In this, and every project since it, DesignBuildBLUFF has proved itself as capable of translating this historical injustice into a call for sustainable energy solutions. They have oriented every house with a symbolically faced entrance to the rising sun as is customary among Navajo. At Rosie Joe, they converted the needs of the occupants into a three-bed, one-bath bungalow with living, kitchen, and storage room, all pushed to the north. The south face is fully glazed and has a long single-loaded circulation corridor that doubles as a thermal mass sink (see Fig. 4). Thick rammed earth walls on the interior support the passive thermal functions. The team hand-tamped sand and clay from the site into formwork for erecting these walls, producing a red face with dynamic figure and striations in various tones that mimic the surrounding landscape.

Nearly all of the single-family homes built by Bluff students on the Navajo Nation do well to enhance the photogenic ease of the desert panorama (see Fig. 5). They appeal to contemporary devices of architectural representation.

These single-family homes may have nothing of the neo-classical or neo-gothic styles. But they carry every bit of their anthropocentric attitude to the *domus*. All of them are well-made machines for living. They are functional, efficient, comfortable, poetic, economical, and

environmentally responsible (see Fig. 6 and Fig. 7). Each of them helps put and keep in motion the most fundamental pedagogic ambition of Bluff: to raise *technê* (making) to the status of *episteme* (knowing). Each of the projects keeps in check the academic preference that has grown throughout the twentieth century for the conceptual over the practical. Collectively, the annually delivered homes construct a powerful critique of the notions of space, materiality, and locality in the academy that takes little notice of the capacity of the building industry to realize them.

Beginning with the historic avant-garde (at the turn of the twentieth century), extending to the paper architects and critical theorists (in the 1970s and 1980s), and arriving all the way to the most recent modeling software and digital fabrication fever (at the turn of the twenty-first century), our educational system has fixed its attention on imagined as opposed to real space. These much-esteemed interventions in the discipline of architecture have had several adverse effects. They have drawn a wedge between the high and low design opportunities available in the marketplace. They have created graduates alienated from the dominant conditions of the material production of the built environment. The curious animosity between *technê* and *episteme* or *making* and *knowing* has daunted western architecture since the days of Aristotle and Plato. It created a huge headache for Diderot in classifying architecture in his *Encyclopédie* during a period that Europeans insist ought to be called Enlightenment. Of course, today it is a key "decider" in the fateful ratings of architectural schools. By reinstating what Freud would diagnose as the "reality principle," in the training of the architect, DesignBuildBLUFF has brought into question the social hierarchy within the building industry between an architect and a builder, a plumber and an electrician and so on.

Now: failures

Much more can be said in praise of design build pedagogy and the fine institution that is Bluff. But if one goes on, one runs the risk of celebrating the asymmetries of power that underpin the successes of Bluff. This case study situates us at a prodigious vantage point. Here we see a struggle between the Navajo's cosmocentric and our anthropocentric definition of architecture and the architect. The balance is clearly titled in our favor. After all, it is an interface between one of the poorest, most exploited and discredited communities in the United States and representatives of the American Academy, one of the most forceful cultural institutions of its day. In an interview, Hank Louis noted that this unleveled playing field was at the heart of his choice of site. He valued it for freeing design from the cumbersome building codes and building inspectors with which it is laden in enfranchised communities like Salt Lake City. He was fully cognizant of the opportunity provided by the weakness of Navajo government. It turned their land into a laboratory for affordable experiments on pedagogy and innovative architecture, in ways not possible under the supervision of the relatively representative

Fig. 7. White Horse House, Navajo Nation, Utah, 2007.

Fig. 8. A Tipi builder and author, Navajo Nation, Utah, 2013.

councils of our towns and affluent suburbs. Most valuably, it helped students envision their labor on these projects in a most charitable light. For most, the oblivion to their privileged institutional position encouraged them to see it as a service to a disadvantaged community that cannot afford a professional architect. It is difficult for the students to see it as a labor made possible by the generosity of the Navajo people. Their hosts let them try out notions of architecture that don't partake in the spirit of native-built environmentS. Native architecture thence becomes just an image, a resource for applied ornament. For the students and faculty of the University of Utah, the Bluff program was not meant for the Navajo, but the real estate market. Louis tells us that he was mainly interested in preparing

graduates for architectural practice in offices like his. It was the simple observation that entry-level architects did not know how to build their designs that led to his establishment of the program. Such are the merits of the invisibility of asymmetries of power. It makes the world go round.

We need to educate our students that this community is not disadvantaged because it does not have architects. Until the middle of nineteenth century, building was an essential life skill, like cooking, stitching, weaving, storytelling, and throwing pots. Men and women built their houses together (see Fig. 8). Instead, the Navajo are a disadvantaged community because the dominant culture, of which we in the academy are all the beneficiaries and publicists, has robbed them of all their institutions, means of sustenance, and land. They are a disadvantaged people because we have subjugated their spiritual (cosmocentric) attitude to space and time to our modern (anthropocentric) attitude. If this were a problem unique to the Bluff Program, the School of Architecture, and the state of Utah, it would not have taken us a decade to see the glaring colonial and exploitative nature of this most cherished public interest component of our architectural program. Our blindness to this prejudice is the legacy of the scientific cultural heritage with an old genealogy in the Judeo-Christian-Islamic tradition. It's not just us. The seductions of modernity, combined with the scornful attitude of the dominant culture towards non-modern, spiritually oriented architectural practices, have resulted in their abandonment by many indigenous people, too.

Scientific revolution has replaced native reverence for landscape and earth with modern instrumentality, indigenous gratitude to matter and materials with a longstanding sense of entitlement, aboriginal belief in the cyclicality of life and death with teleology, equality between animate and inanimate beings with hubris. "The fate of our times is characterized by rationalization and intellectualization and, above all, by the *disenchantment of the world,"* observed the greatest of modernistS among us, Max Weber. Navajo architecture holds a mirror to the closures and dangers of this disenchanted world. It reminds us of modernity's intolerance to anything that it cannot subsume.

Fig. 9. A Female Hogan both as womb and tomb, Navajo Nation, Utah, 2013.

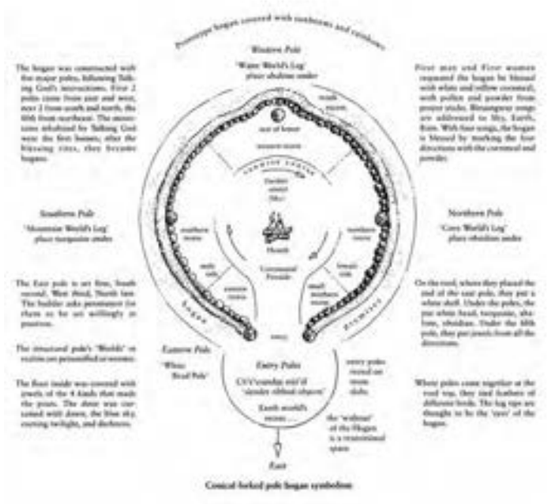

Fig. 10. Plan of Hogan

For us, the house is a rational and phenomenal space. It is a piece of property made of inert materials. It is made pleasing to the eye and the mind by the taste of its occupants and the talent of its architect. We develop sentimental attachment to it because of the memories we make there. It is the primal site for the production of self, privacy, and normativity.

For the Navajo, the house is not a commodity. It is devoid of windows not for the sake of privacy, but because it is conceived as a return to the womb of Mother earth. It is both a womb and a grave (see Fig. 9).

Regardless of the specifics of design, the plan of the Hogan does not serve to capture surrounding views. It is a model of the cosmos. Building a house is not embedded in the logic of comfort and efficiency, economy and self (though these are not entirely forgotten). It is grounded in ceremonial meaning. Modern education teaches that the Juniper or Pine poles that support the roof of the Hogan are just that, structurally rational supports, not the Mountain or the Water World's Legs (see Fig. 10). They are, therefore, disposable. Practical thinking suggests that it is nothing but mere superstition to call the north pole the Corn World's Leg, nothing but mere false consciousness to treat the plan as sacred. Devoid of modern infrastructure, it is easy to give the houses east-facing entrances, and all our Bluff houses do. It is also easy to make concessions for the colors of poles: white in the east, turquoise in the south, abalone in the west, and red in the northeast. Alas, some common ground! But it is difficult to have poles in every house. It goes against the sacred principle of innovation. And who cares if they erect east pole first, then the south, west, and north poles in accordance with the guidance of the sun (see Fig. 11)? Learning by doing should not mean that we have to learn how to build from east to south, to west to north. The east entrance should suffice. It is the beauty of economic

Fig. 11. A smoke hole in male Hogan is the only source of sunlight, Navajo Nation, Utah, 2013.

Fig. 12. Insulating Rabbit Ear House with hay, Navajo Nation, Utah, 2013.

Fig. 13. Learning from indigenous architecture

wood frame construction that ought to be introduced to the Nation, because that is what *we* need to learn. Gypsum boards are far more durable and low maintenance compared to the sod, bark, and grass that fill the gaps of the Hogan. This must count as an improvement. And what are we to do with the silly tradition of sealing and abandoning the Hogan upon the death of its occupant so it, like the owner, returns to dust?

It would be short-sighted to dismiss our call for attention to native principles of design and construction — like the following of the sun and stars and the return of organic material to earth — as romanticism. Far from being a simple disposal process it is today, the "return" of the Hogan provides a link between man and soil, and animate and inanimate existence. It partakes in the cyclicality of life, death, and rebirth. It is an intentional attempt to maintain these links, active and alive, in the collective consciousness. The native ethos has nothing in common with our salvaging of materials from demolished structures or recycling milk cartons. The Navajo's abandonment of the Hogan is an act of respect. It is a reciprocal exchange and participation in a regenerative cycle that is the opposite of the extractive actions of our capitalist economy (see Fig. 12). If we consider organic materials as "natural resources," the natives revere them as gifts of a benevolent, revered, mother. A comparison of such "environmentally conscious," "sustainable" architecture steeped in "regenerative" rituals of reciprocity with what today is called Green Economics and Green Architecture, should be instructive. Our "environmentally conscious," "sustainable" Green Architecture translates all exchanges among us, water, air, and fire, into visible externalities that can be quantified, calculated in monetary value and economic parlance. If our fall from grace after the near destruction of the planet should teach us anything, it should teach us to revisit epistemologies discredited as superstitious architecture.

Again, much more can be said about the missed opportunities, the closures and blinkers of DesignBuildBLUFF. But doing so runs the risk of dismantling an institution built over years. The question we ought to ask is: How can the next generation of educators at Bluff turn learning-by-doing into creative making? What ought to count as creative making? What can we learn from the construction techniques of the Navajo? (See Fig. 13.) We also have more fundamental questions to ask: How should we engage a people whose way of life is on the verge of extinction? Currently our interventions, even when welcome, are a form of development and service and an extension of modernity that offsets historic injustices by destroying the historic role of architecture among Navajo people of substantiating and passing on their cosmological beliefs, environmental codes, and the production of community.

This paper, it must be clear, is not arguing for disengagement. It is not recommending leaving indigenous communities to their own devices after we have destroyed almost everything that makes them who

Fig. 14. Sweet Caroline, an example of postmodern "freezing" of the Hogan by reducing its spirit to mere geometry, Navajo Nation, Utah, 2006.

they are. Nor it is an argument for reviving dead systems or preserving existing ones (see Fig. 14). These are not communities frozen in time. Linguistically and architecturally connected to tribes in Alaska. Navajo have changed and evolved, adapting to droughts and climate change. They have migrated and traded, developed astronomy, geology, and geography. They have moved from pit houses to conical and semispherical Hogans without dugouts. They have borrowed the tipi from the Plains Indians (see Fig. 15).

But we cannot throw all caution to the wind, either. We can't reproduce them in our image or their homes in the image of modern homes, or turn them into inert images of their past glory. We need to rethink how architects should be trained to intervene in informal economies. What roles can they perform in communities that build for themselves? How do we build *with* the Navajo rather than *for* them? These questions are an occasion for the opening up of modernity to alternative modalities of being that will mutate themselves and transform the dominant culture. It is time to think dialectically rather than in terms of us versus them or us crushing them into becoming us. While history

Fig. 15. Tipi, Hogan, and HUD build track housing next to Rabbit Ear House, Navajo Nation, Utah, 2012.

provides wonderful examples, in Japan, China, India, and Scandinavia, of traditions enriching the industrialized *mentalité*, we have little to show for healthy transformations of cultures that have been suppressed as much as the Navajo. This is the challenge history has left for the next generation of BLUFFERS – a history that could not have been envisioned without DesignBuildBLUFF.

Images provided by author.

SESSION 7: Mid-Century Modern & the Landscape

Session Chair:

Scott Byron Williams, IDEC, Assoc. AIA, LEED AP, University of Oklahoma College of Architecture Division of Landscape Architecture

In American's postwar optimism of the 1940s and 1950s, an exuberant vision of the future began to be expressed through imaginative architecture and design. With a readiness to leave behind the trauma of the Depression and both world wars, access to an exciting palette of pre-fabricated materials and experimental assembly techniques, and rising economic prosperity, this period proved to be an incubator of innovation. Throughout history, cumulative cultural attitudes have provided fertile ground for intellectual and artistic creativity; these manifestations can parallel and also contradict society's collective norms.

In Oklahoma, as in much of Middle America, the lack of historic constraints has allowed designers, architects and planners to see this region relatively unencumbered by a vernacular design. And, although America's interior has been perceived as the conventional cultural bedrock that, as an anchor, balances the eccentric extremes of the East and West coasts, isn't there also the perception of the rugged individualist who, born far from any metropolis on the farm or on the frontier, distrusts outside notions to survive of their own ingenuity?

At mid-century, with a people eager to embrace the promise of progress, architects replied with unique and, at times, radical concepts that could both challenge and venerate the landscape. The architectural photographer Julius Schulman documented, among others, iconic works such as Bruce Goff's Bavinger House (1953), Herb Greene's "Prairie Chicken" House (1960) and Robert Roloff's State Capitol Bank building (1962).

From whence sprang this originality? Was the isolated Oklahoma landscape itself the provocateur? How could the conservative cultural mindset associated with Oklahoma nurture concepts without precedent?

Once proudly held aloft, much of the publicly heralded architecture of that period has been forgotten, condemned to insensitive remodeling or demolition. More than a half century after these innovators brought international renown to the region, this session seeks to explore the virtues and the foibles of that work and its temporal context.

Late Modernism on the Prairie: Minoru Yamasaki and the Oklahoma Projects

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Abstract

Japanese-American architect Minoru Yamasaki was one of the foremost American architects of the twentieth century, during what we might define as the Late Modern period, from the 1950s though the early 1980s. Within the wide variety of building types designed and built by his firm from the 1950s through the 1980s, Yamasaki and Associates' achievements included the twin towers of the World Trade Center in New York City, the St. Louis Air Terminal, and the infamous Pruitt-Igoe public housing project in St. Louis, Missouri. Over the course of three decades, Yamasaki and Associates built over 300 projects in countries on nearly every continent. Yet until recently, the majority of his oeuvre remains under-examined by the scholarly public, and his designs are largely missing from the canon of historical works frequently referenced by the design community. During his career, however, Yamasaki was well known and admired, in such demand that his firm refused more commissions than it accepted. Signaling the widespread recognition of his worldwide success, Yamasaki appeared on the cover of *Time* magazine in January 1963.

Although many of his major works were constructed in coastal cities of the United States, Yamasaki was a self-proclaimed "architect of the Midwest" and his firm remained based in the Detroit metropolitan area throughout its existence. In addition to commissions in New York, Seattle, Los Angeles, and Honolulu, Yamasaki-designed buildings can be found in many major Midwestern cities – Detroit, Minneapolis, and Tulsa among them. By pairing well-known projects with those that remain largely unconsidered, this paper seeks to explore the design and reception of two of the firm's Midwestern projects, focusing on the Bank of Oklahoma and the Tulsa Performing Arts Center. In so doing, it will attempt to navigate a familiar architectural landscape in new terms, asking questions such as: What did it mean to bring a form of modernism more closely associated with the coasts to the plains region? What aspirations did the Bank of Oklahoma and the City of Tulsa seek to communicate with their choice of architect? By way of conclusion, I will also consider the broader picture of Yamasaki's critical reception, notably by Charles Jencks and *The New York Times*' architecture critic, Ada Louis Huxtable, as a means to bridge the perceived architectural divide between the coastal regions and the plains.

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Tulsa, Oklahoma's Bank of Oklahoma building (above) and Performing Arts Center (below).

Photo by Joss Kiely

Minoru Yamasaki, not a native of the Midwest region, was born to Japanese parents – a shopkeeper and a housewife – on December 1, 1912, in Seattle, Washington, where he grew up and attended college. In the early 1930s, Yamasaki began a master of architecture program at New York University, but never completed the degree. From 1935 to 1945, the architect worked for a variety of New York-based firms, working his way from draftsmen to designer to job captain,[1] before relocating to Detroit, Michigan, to take a position as architectural designer with Smith, Hinchman and Grylls – or what is today known as the SmithGroup. In 1949, Yamasaki and colleagues George Hellmuth and Joseph Leinweber left to found their own firm and soon landed a handful of major commissions, including the St. Louis Air Terminal and the Pruitt-Igoe public housing development, both of which initially opened to much fanfare and acclaim from critics, journalists, and editors across the country, although it eventually waned in the case of the latter project. Indeed, contemporary architects are most familiar with this last project in the context of historian Charles Jencks' famous assertion that the death of modern

architecture can be dated to the precise moment when the Pruitt-Igoe housing towers were demolished barely twenty years after they were completed, due to the social ills attributed to their design and to the subsequent failure of modernist utopian ideals.

Although Pruitt-Igoe might be best considered an orthodox modernist tower-in-the-park that failed to deliver on its manifold promises, Yamasaki's practice in the years that followed took quite a different turn, aiming to find "serenity and delight" in modern forms and seeking to enhance the built environment in service of humankind. This desire led his firm to gradually move away from the hard lines of modernism to embrace an aesthetic that often employed historical motifs abstracted in service of proto-postmodern design schemes. As a means to better understand the Oklahoma projects, we might consider his 1956 speech titled "The Morality of Modern Architecture," in which Yamasaki asserted, "We should bring more warmth and richness to modern architecture, but the addition of these qualities must never compromise the beliefs of our technical age."[2] This sentiment, I believe, rings true both in the World Trade Center towers, as well as in his lesser known, but significant, projects in Tulsa, Oklahoma.

The Williams Center Redevelopment

The oil boom of the 1920s and 1930s brought rapid development and prosperity to the plains region, and during this time, the city of Tulsa was considered by some to be the "Oil Capital of the World." By the 1960s, however, this industry had moved farther south, leaving Tulsa vulnerable to the urban decline of its center that affected so many other American cities. Reinvesting in its established urban core, Tulsa managed a different outcome. In a 1975 article titled "Tulsa: Realizing the Quixotic Dream," editor Phil Schreiner suggested that it was perhaps "ingenious ignorance or plain stubbornness" that kept Tulsa thriving. When "other cities were losing their central areas in a flight to suburbia, Tulsa failed to establish one. Tulsa people live in Tulsa; it's as simple as that."[3] This was achieved by early cooperation between public and private constituencies, and the widespread support of the local populace. Len Eaton, president of the Bank of Oklahoma, underscored this mutual support, explaining that "The future of the Bank of Oklahoma, like the future of Tulsa, rests with the people, and the people remain in favor of the strong, vital urban core."[4] At a time of struggling central cities, Tulsa embarked on what was one of the most expansive urban renewal projects in the region and largest privately funded urban reinvestments in the country.[5]

The result was the Williams Center, a development located on a nine-block tract along the northern edge of the central business district, theretofore known for its colorful "Skid Row" along First and Second Avenues. Given the seedier nature of the area, Jerry Sutton of Tulsa's Urban Development Department noted, "It was considered quite a coup to get Williams to build in that part of town."[6] Indeed, without the foresight of city officials in the 1960s, it might not have happened. The Urban Renewal Authority had purchased the majority of the blocks and readied them for redevelopment by removing the existing slum and blight, making an attractive 23-acre parcel available to the developers.[7] It was a success for city officials as well as the Williams Company, and, as Jerry Sutton further explains, "It turned out to be far more, even than those planners thought … it was urban development of national significance."[8]

The project was anchored by a large office tower flanked by several smaller office buildings. The project included additional retail facilities, a hotel, several multi-level parking garages above and below ground, outdoor green spaces, and the Tulsa Performing Arts Center, also designed by Yamasaki and his team. At the heart of the plan was the Bank of Oklahoma Tower, proposed as the new headquarters for its namesake and commissioned by the Williams Company in 1972.

The Bank of Oklahoma Tower

The Williams Company, a major player in the production and construction of pipelines, agricultural chemicals, and other products related to the energy and oil industries, was a vital part of Tulsa's commercial base. In the 1970s, due to its rapid expansion in the decades prior, the company was in desperate need of a consolidated headquarters from which to operate. It awarded Yamasaki and Associates the commission on the recommendation of the Michigan Consolidated Gas Company, whose headquarters in downtown Detroit were also designed by the firm in the mid-1960s. During the design development phase, the architect produced a number of design schemes, including a pair of 25-story towers that mimicked the World Trade Center in New York, albeit at a smaller scale. In fact, during one particularly engaging client meeting, John Williams remembers that, after thinking the twin tower scheme lacked visual drama, "I picked the tower models up and put them on top of each other in the center of Boston Avenue."[9] From that moment on, the design focused on a single tower that rose fifty-two stories above the prairie and the modest downtown area. Construction began in 1974 and continued at a rate of one floor per week; the first tenants moved into the tower in the fall of 1976.[10] In addition to a centralized headquarters, the company also took the move as an opportunity to complete an overhaul of its image and office design. In a recent interview, Ann Oliver, a veteran of the Williams Company added, "We left everything in our old offices behind … everything was new and color-coordinated."[11] The new cohesive look was part of the architects' ambition to bring the company together as it gained strength and prominence in the national business community.

The redevelopment was a much-needed boost to the local economy, and the tower alone brought the downtown area nearly 1.1 million square feet of new rentable office space, along with an additional 400,000 square feet of useable space at the lobby level.[12] Furthermore, at a height of 667 feet, the structure was the tallest building in the surrounding states until very recently, and it remained the tallest building in Oklahoma until the completion of Devon Tower in Oklahoma City in 2011. Much like the twin towers in New York, the lobby is a double-height space designed to admit natural light through expansive fenestration and framed by structural supports reminiscent of Roman arches, which distinguish the lower street-level elevation from the uniformly striated envelope of the tower. According to the architects, the structure responded to site and environment-based constraints and design parameters:

> Above the eighth floor, the structural frame is of steel, with the aluminum-clad exterior wall acting as a Vierendeel truss to withstand the significant lateral wind forces common to the Plains region. At that level, the forces are horizontally translated into the concrete encased steel core, while the marble-clad concrete arches, spaced forty feet on center, gather and carry the gravity loads downward.[13]

The interior lobby space was also clad in marble and featured bright red-orange carpeting that seemed to invite the plains landscape into the interior.

Tulsa Performing Arts Center

Following the success of the Williams Center commission, Yamasaki and Associates were asked to design the adjacent Tulsa Performing Arts Center, which is the only theater that Yamasaki ever designed. Known locally as the Tulsa PAC, the city-owned performing arts center was commissioned in 1973 and completed in 1976, again through a collaborative effort between the Williams Company and the City of Tulsa. The center sits on the corner of Cincinnati Avenue between Second and Third Streets, and overlooks a landscaped park and plaza area that also abuts the hotel development. The 2.5-acre park was designed to be the development's focal point and offers patrons amphitheaters, gardens, trees, waterfalls, and an open green space. To create space for parking, a majority of the parking was built underground, including a garage that directly serves the needs of the performing arts center.

The formal language of the Performing Arts Center is strikingly different than the Bank of Oklahoma tower and many of Yamasaki's previous works. According to the architect, "Though the precast concrete exterior is a simple and direct expression of the acoustical and visual instrument it contains, the interior consists of a complex, well-integrated series of highly functional spaces."[14] As is the case with many modern performance halls, the emphasis on the performance spaces is one of flexibility and adaptability. The main theatre holds 2,400 patrons, and is readily adaptable for both musical and dramatic performances. The main hall stage is a proscenium type that frames the performance and features raked seating that fans out to cover the main floor and two balconies. Much like the Bank of Oklahoma tower interior, the primary coloring of the seats, carpeting, and scrim is again the burnt orange-red that glows richly when lit. In addition to the main hall, there is a smaller 450-seat theatre that can be adapted to match the size of the production and two experimental or rehearsal spaces that have no pre-determined seating arrangements, allowing the center to best match the needs of its productions with appropriately scaled spaces.[15] This flexibility has made it an attractive space for a wide variety of events, thereby increasing its usability and adding to the vibrancy of the downtown area.

Local Reception

When the pair of projects opened in 1976 and 1977, they transformed the northern edge of the downtown area dramatically; the result, according to locals, "was like turning a junk pile into a flower garden."[16] While there were actual flower gardens as part of the development, perhaps one of the biggest public improvements was the Performing Arts Center itself, which since its opening has received much praise from patrons, performers, and technical crew alike. On the evening of March 19, 1977, The Tulsa PAC opened its doors with a performance by the Tulsa Philharmonic, featuring Ella Fitzgerald as the headlining star to celebrate the occasion. Since then, it is estimated that more than two million people have attended performances in the hall that range from small theatrical performances to major Broadway productions. It remains to this day one of the few theatres in the country able to mount and produce the technically complex *Lion King* and is often used as a testing ground for Broadway shows taking to the road.[17]

In spite of its utility and frequent use, the project was not always well received as an architectural asset to the city. According to an article published in the Oklahoma City *Journal Record* in 2009, "To some eyes it juts seven stories from the earth like a cold tan mausoleum, with little grace and no beauty … a curious stone inversion of Tulsa's glass City Hall to its north."[18] Furthermore, former Tulsa preservation commissioner Rex Ball remarked that "it's just sort of ugly," that it would not likely be much more than "a background building," and that "it kind of kills off everything around it because of its flat sides." Harsh criticism notwithstanding, Ball concedes that in fact it is a great asset to the city of Tulsa and its arts scene, noting, "I think it has probably exceeded the vision of those who were farsighted enough to do this."[19]

Similarly, the larger Williams Center development was also criticized for its employment of harsh clean-sweep urban renewal policies that date to the 1960s in cities across America. Reconsidering Tulsa's many architectural attributes in 2009, Lee Anne Zeigler of the Tulsa Foundation for Architecture considers One Williams Center among the top five "under appreciated architectural gems" of Tulsa. She notes, however, "Tulsa, like a lot of cities, has a pretty sad history when it comes to urban renewal. And while it was terrible to lose so many buildings to make way for…the Williams Center, Tulsa did end up with a very nice example of a built work that is likely to stand the test of time."[20]

National Critical Reception

To better understand how the firm's work was received, we might turn to the widely available criticism of the World Trade Center, along with the Michigan Consolidated Gas tower, both of which share formal affinities to the Bank of Oklahoma tower. As with Yamasaki's many other projects, the World Trade Center was both lauded and criticized for its monumentality, as well as its subtle decoration. Not unlike his other office buildings, the twin towers exhibited an ornamented base that took its cues from Gothic architecture, which, at the outset, did not win praise from *The New York Times* architectural critic Ada Louise Huxtable. In an April 1973 column titled "Big, But Not So Bold," Huxtable notes,

> These are big buildings, but they are not great architecture. The grill-like metal facade stripes are curiously without scale. They taper into more widely-spaced columns of 'Gothic trees,' a detail that does not express structure so much as tart it up. The Port Authority has built the ultimate Disneyland fairytale blockbuster.[21]

In other words, the design did not express the truth of its structure as a Modernist building should, but rather expressed itself decoratively. Although both Tulsa projects are a bit more reserved in ornamentation, one can see the relationship between them and the firm's more heavily decorated projects. To this end, one wonders what she might have said of the Tulsa projects.

The decorative aspects of Yamasaki's work were not accidental, nor were they superficial. Throughout his career, Yamasaki sought to imbue his late-modern architecture with a certain "humanism," a nod to the scale of a person, and this he often referred to as "serenity and delight" in built form. Indeed, the desire for beauty is echoed in his own musings that date to 1954, when he noted, "To me, beauty is the essence of all happiness. A lovely gesture, a delicate flower, understanding—these are vividly beautiful." Poetics aside, this goal, in fact, may have played a strong hand against him in the architectural press, with critics picking on the "ornamented" aspects of his works that ran counter to the austerity of Modernism, whose focus on "honesty and only honesty, was childlike" in Yamasaki's view. "Architecture," he argued, "must enhance the experience of man...it is but mere building, if it does not do so. To enhance the experience of man, it must touch his emotional or spiritual side."[22] Although this line of thinking might have proved convincing to his clients, as well as to the users, it did not ring positively in critical circles.

In Charles Jencks' 1973 *Modern Movements in Architecture*, a photograph of Yamasaki's 1964 Consolidated Gas Building in Detroit, a building that shares some visual effects with the World Trade Center and even more so with the Bank of Oklahoma tower, was captioned with a quote from Yamasaki himself:

> An architecture to implement our way of life and reflect it must recognize those human characteristics we cherish most: love, gentility, joy, serenity, beauty, and hope, and the dignity and individuality of man. This idea in its essence is the philosophy of humanism in architecture.[23]

Leaving no criticism unspoken, Jencks adds his own thoughts:

> Gothic fretwork, crown of thorns, the eternal blue flame of the consolidated gas, good High Camp. Here is an attempt to transform urban realities into a nostalgic dream of a classical past; the forms are univalent, simple, and applied. This is 'failed seriousness' at its best, most horrible.[24]

Jencks here criticizes Yamasaki for a *serious* embrace of classical motifs that perhaps accidentally produced a form of "architectural" *camp,* which one might argue is often central to high postmodernism. The silent partner in this discussion might be Susan Sontag's 1964 essay, "Notes on Camp," in which she discusses camp as a style embracing shock, excess, and frivolity – along with a certain naïveté. Indeed, camp is often, although not always, present in postmodern architectural projects whose architects, in many cases, play fast and loose with historical styles and motifs, sometimes resulting in projects that are "shocking" and full of visual excess.

In both Oklahoma projects, along with others, this was not the case in Yamasaki's work, which preferred a more subtle approach to historical references – ones that sought "serenity and delight," rather than "shock and awe." In addition to meeting clients' needs and programmatic requirements, the context in which Yamasaki designed a building was a central concern. In a 1969 interview, while he was completing the design of the World Trade Center, he noted that building a 100-story tower in suburban Troy, Michigan, where his office was based, would make little sense, whereas in Manhattan, it would become an important visual anchor for the skyline. Indeed, in Oklahoma, one recalls, it was the *client*, not the architect, that called for a single tall tower to anchor Tulsa's modest skyline.

Recalling Yamasaki's own words, ones that encouraged imbuing modern buildings with warmth and richness without compromising the technical developments of the modern age, we might understand the Tulsa projects as bringing to Oklahoma a glimpse of the coastal trends, while remaining true to the plains' own rich character. And at the beginning of an era when many American cities and corporations sought low-density office buildings at the edges, rather than reinvesting in the downtown core, Tulsa and the Williams Company took a very different approach, maintaining the density of the urban core. To this day, the pair of Yamasaki projects, coupled with the larger Williams Center redevelopment, remains a core focal point in Tulsa's vibrant city center.

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[2] Minoru Yamasaki, "The Morality of Modern Architecture," a draft of an unpublished speech given in 1956, The Minoru Yamasaki Papers, Walter P. Reuther Library of Urban and Labor Affairs, Wayne State University, Detroit, MI.
[3] Phil Schreiner, "Tulsa: Realizing the Quixotic Dream," *Buildings,* December 1975, 33.
[4] Len Eaton, as quoted in, ibid, 33.
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[6] Jerry Sutton, as quoted in Sonya Colberg, "Thinking Big Began in '70s," *Tulsa World,* February 16, 1999.
[7] Ibid.
[8] Ibid.
[9] John Williams, as quoted in Robert Evatt, "Towering Above Oklahoma: Williams Center Turns 30 Wednesday," *McClatchy - Tribune Business News,* Oct 29, 2006.
[10] Ibid., 34.
[11] Ann Oliver, as quoted in Evatt.
[12] Minoru Yamasaki, *A Life in Architecture* (New York, NY: Weatherhill, 1979), 159.
[13] Ibid., 159.
[14] Ibid., 163.
[15] Ibid.
[16] Colberg.
[17] Lee Davis Kirby, "These Walls: Tulsa Performing Arts Center," *Journal Record,* September 4, 2009.
[18] Ibid.
[19] Ibid.
[20] Lee Anne Zeigler, as quoted in James D. Watts, Jr., "Tulsa's Hidden Treasures," *Tulsa World,* October 8, 2009.
[21] Ada Louis Huxtable, "Big But Not So Bold," *New York Times*, April 5, 1973.
[22] Minoru Yamasaki, "Sticks and Stones," a rough draft of an unpublished writing, The Minoru Yamasaki Papers, Walter P. Reuther Library of Urban and Labor Affairs, Wayne State University, Detroit, MI.
[23] Minoru Yamasaki, as quoted in Charles Jencks, *Modern Movements in Architecture* (Garden City, NY: Anchor Press/Doubleday, 1973), 196.
[24] Jencks, 196.

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Mid-Michigan Modern: Frank Lloyd Wright and Hugh Stubbins, Jr.

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Abstract

The Mid-Michigan area, home to the state capital and Michigan State University, was slow to embrace modernist architecture. Yet two groups of faculty hired well-known architects to design cooperative housing projects. The first, known as Usonia 2, was designed by Frank Lloyd Wright in 1938. He provided a variety of plans and details for the seven individual houses, depending upon the requirements of each family. However, all featured flat roofs, gravity heat, prefabricated sandwich walls, slab foundations, and open plans. Numerous reasons, including construction methods and materials that were atypical for the area, prevented the members from obtaining mortgages and the project failed by 1940. Only one of the houses, a Usonian for Alma Goetsch and Kathrine Winckler, was built, on a different site, in 1940.

After the war, thousands of returning veterans took advantage of the G.I. Bill of Rights to enroll in universities across the country. At MSU, the student population soared as did the critical need for classrooms and housing for students and the expanding faculty. In 1950, a group of young faculty formed Home-Sites, Inc. for the purpose of purchasing land together and building at the same time to save on costs of construction. Of the forty-one Home-Sites families, twenty-four agreed to hire the architect Hugh Stubbins, Jr., of Massachusetts, who provided three options for modest one-story houses. Almost all of the members chose Plan A, which had an open living and kitchen area, slab foundation, prefabricated trusses and walls, low-gabled roof, and extensive glazing facing the back yard.

Both the Usonia 2 and Home-Sites groups were considered progressive and politically liberal, which are characteristics of similar contemporary cooperative housing projects undertaken elsewhere in the country. However, why one project succeeded while the other did not is a question explored in this paper.

Two mid-century modern residential projects in Mid-Michigan, defined as the area around Lansing, the state capital, and East Lansing, the home of Michigan State University, are noteworthy because of the architects involved, their clients, and their designs. The earliest is Frank Lloyd Wright's Usonia 2 project (late 1930s), an unbuilt community of seven moderate-cost homes for faculty at Michigan State University (then Michigan State College of Agriculture and Applied Science or MSC) centered on a communal farm. A second faculty project, from the early 1950s, expanded the residential boundaries of East Lansing to include farmland that was subdivided into forty-one plots. Twenty-four families agreed to build modest homes designed by Hugh Stubbins, Jr. of Lexington, Massachusetts. Their open plans, slab foundations, and flat-roofed garages contrasted strongly to other homes under construction in the post-war period.

Frank Lloyd Wright's legacy in mid-Michigan spans nearly three decades and includes twelve houses, only four of which were built. They range from the early Goetsch-Winckler house, a small Usonian of 1,340 square feet, to a much larger, late prairie version of over 3,700 square feet. The history and significance of the Goetsch-Winckler and the project later known as Usonia 2 were explored in depth in the fiftieth-anniversary exhibition at the Kresge Art Museum, MSU, in 1990 and in the subsequent publication, *Affordable Dreams: The Goetsch-Winckler House and Frank Lloyd Wright*, Kresge Art Museum Bulletin, 1991.[1]

For Usonia 2, a group of eight young MSC faculty known as "the firm" combined to purchase land close to the campus, which they divided into seven plots. To save costs on construction, they planned to contract as a group with an architect, builders, and other trades people. The homes were to be affordable ($5,000-$7,500) and they would share the communal farm at the center of the property.

By the 1930s, the college had evolved from its agricultural and home economics beginnings in 1855 to a more expansive university with a growing arts and humanities program that focused on socially responsible and progressive ideas about the role of these disciplines in contemporary life.[2] Members of the firm were progressive and committed to liberal values in an otherwise conservative arena. Sidney H. Newman, a professor of philosophy and psychology, was in charge. Alma Goetsch and KathrineKathrine Winckler were professors of art education; Jesse J. Garrison taught art history; Erling Brauner taught painting; Clarence D. Hause taught physics; Clarence R. Van Dusen was in the Department of Speech and Dramatics; and Alexis Panshin was a professor of forestry.[3]

Several of those in the initiative were impressed by Broadacre City, Frank Lloyd Wright's latest thinking about decentralized urban development. Wright had begun to work on moderate-cost homes in the second half of the 1930s and the first Usonian, the Jacobs house, was built in 1936 in Madison, Wisconsin. Members of the MSC group visited that house, as well as Wright himself, at Taliesin East. By 1938, they decided to engage him as their architect.

Wright presented an overall plan dated September 1, 1939 (Fig. 1), plus two drawings that show preliminary designs for six of the houses.[4] Each family had written letters to Wright explaining their physical requirements, financial constraints, and likes and dislikes. He responded with a variety of plans; an L-shape for the Garrisons, a hexagonal core for the Panshins, a third design with an entrance at the center, and on the short end for another. The number of bedrooms also differed, depending upon the clients' needs. In addition, Brauner wanted a painting studio, Garrison required numerous book shelves, and Panshin requested a shop and darkroom.

Fig. 1. Frank Lloyd Wright, Ground Plan for "Usonia 2" Lansing, Michigan, *The Frank Lloyd Wright Foundation Archives (The Museum of Modern Art|Avery Architectural & Fine Arts Library, Columbia University, New York), 3912.02*

Documents in the Frank Lloyd Wright Archives reveal each family's relationship with Wright, the evolution of their designs, and, ultimately, the demise of the project by the summer of 1940.[5] It faltered in part because costs increased as the designs grew to meet the needs of each family unit. Moreover, neither local banks nor the Federal Housing Authority in Washington, D.C., would provide mortgages based on Wright's new construction techniques, such as prefabricated walls, gravity heat and flat roofs. The slab foundation, lack of separation between the kitchen and other spaces, and the ceilings that were less than eight feet high were also enumerated.[6] Of the original project members, Alma Goetsch and Kathrine Winckler went ahead with their home but on a different site, and the Brauners built another Wright design after the war at a new location. Other members of the group independently built on their original plots, purchased houses elsewhere or left the college.

The situation with the Panshins is of interest as one example of initial excitement compared with the reality of working with Wright. According to correspondence, Alexis first became interested in Wright's architecture when he was working at Forest Products Laboratory in Madison, Wisconsin, in 1934-35.[7] When the Panshins arrived at MSC, they were pleased to find a group that was equally interested in Wright's architecture and had already hired him to design their homes. On July 7, 1939, the Panshins told Wright that they had $6,000 to spend, somewhat less than others in the group, yet the house Wright designed for them was the most elaborate. [8] Its central feature was a hexagonal room with a workspace/kitchen, ample living room, a study and a shop. The bedroom wing with three bedrooms and two baths was down a long gallery that projected diagonally to one side. On the other side were a carport and a tool shed.[9] After their initial excitement about the design, the Panshins soon expressed concern. Alexis, as a forestry professor, was worried about using untreated wood that checks and disintegrates under pressure. He feared that weathering would lessen the contrasts between the redwood and pine on the exterior, and suggested that "cheaper and better results could be obtained through use of inexpensive wood protected in the conventional way …".[10] He also wondered whether the houses would have enough insulation to keep them warm. They withdrew on August 12,[11] then signed on again,[12] but eventually withdrew altogether. After the war, they purchased land adjacent to the Brauners, and across the street from the Edwardses, both of whom were building Wright-designed houses. The Panshins, however, hired the Keck & Keck architecture firm from Chicago to design their home.

Alma Goetsch and Kathrine Winckler, both of whom were from Wisconsin, were familiar with Wright's architecture and philosophy, had a combined income of $4,500, and persisted in their dream of a Wright home. This house on Hulett Road, which was then a dirt road and sparsely populated, stands today as built in 1939-40 as a pure statement of Usonian architecture (Fig. 2). The carport is at the narrow end turned to the road. The house seems to hug the land and is evidence of Wright's approach to organic architecture. The flat roof, cantilevered carport, in-line plan, horizontal lines, gravity heat, slab construction, board and batten prefabricated walls, are all Usonian characteristics.

Inside, the ceiling at the entrance is low and the space is compressed, only to open up in the living/studio area as the ceiling rises and clerestory glazing lets light in (Fig. 3). Across the room a wall of windows overlooks the landscape that drops precipitously to a ravine. The treehouse effect intentionally melds the exterior and interior. Floor-to-ceiling glazed doors were used throughout the house. In the living space and bedrooms these doors open to the enclosed lanai and make the rooms feel expansive. The lanai was also a nod to Alma Goetsch's desire to feel safe in the countryside.[13] The open brick hearth provides a focal point in the "studio" space, which closes up again at the eastern alcove with a built-in sofa and bookshelves above. A small kitchen "work space" is on the back side of hearth. The bedroom wing, with a bathroom between

Fig. 2. Goetsch Winckler House, exterior, *photograph @Kim Kauffman, 2014*

Fig. 3. Goetsch-Winckler House, interior, *photograph @Kim Kauffman, 2014*

the two small bedrooms, is on the other side of the living area. Wright used a four-by-four foot module to organize all of the components. It is repeated in the cement floor and in the plywood on the ceilings and guides the placement and proportions of windows and doors. Although the house is compact, the public spaces have an expansiveness that belies its 1,340 square feet.

The house quickly proved too small for the women, who asked Wright for an addition in 1942.[14] Although this was designed, it could not be built because it brought the house too close to the property line on the west. They asked Wright again for another bedroom addition in 1947 but then decided to build a completely new house. Wright's plan for a large red brick house with a pitched roof and a two-car carport included a landscape plan, a fountain, and a long driveway.[15] The bedroom/studio wing was set at a 120-degree angle to the rest of the house. There were two fireplaces, ample storage for paintings, and many built-ins. Some of these amenities, however, were eliminated and cement block replaced the brick to save costs. Nevertheless, after finally finding a builder in 1953 who was willing to tackle the building, the women realized that the costs were still beyond their means, and Goetsch-Winckler II remained on the drawing board.[16] In 1965 they retired and moved to Fayetteville, Arkansas, another university town where they hired the local architect E. Fay Jones to design Goetsch-Winckler III, their retirement home. The story of these prescient women as clients of two of the most significant American architects of the 20th century is recounted in *Affordable Dreams*.[17]

The Goetsch-Winckler house was well known both in the local community and nationally. Many children came for art lessons with the two women, and many visiting dignitaries at the university enjoyed their legendary social events. As a result of experiencing the house, several friends and colleagues sought out Wright to design for them, including the Muehlbergers and the O'Donnells, who received designs in the late 1940s but did not construct their houses, and the Schabergs, who built the last Wright home in the area in 1957.

After the war, universities across the country experienced enormous growth as a result of an influx of veterans funded by the G.I. Bill of Rights (1944). At MSC, enrollment in 1940 was 7,836 students; by 1950 it more than doubled to 16,100. This created challenges for all. Classes were held in excess Army Quonset huts that were erected on the campus, but housing was in short supply for students and newly hired faculty. When Myles Boylan, professor of landscape architecture and urban planning, spoke to the Newcomer's Club in February 1950 about "Helpful Housing Hints," his mention of cooperative housing projects elsewhere led to an ad-hoc group that developed Lantern Hill, a cooperative housing community within walking distance of the campus. The fourteen-page "Remembering Lantern Hill, 1950-52," written in 1999 by Alan Grimes, one of the original corporation members, recounts the drama, despair, and hope as the story of this project became a reality.[18]

After Boylan's talk, subgroups studied possibilities of financing, legal aspects of setting up a corporation, cooperative construction programs, and possible sites. By May 1950, "Home-Sites, Inc." was incorporated and the hunt for land started in earnest. Initially, twenty-three acres of farmland north of Burcham Drive (beyond the city limits at that time) was purchased but, as word of the project spread, more people wanted to participate and seven more acres were added. Boylan, a landscape architect, drew a plan that divided the land into forty-one half-acre lots on gently curving roads (Fig. 4). To take advantage of an economy of scale, Home-Sites members agreed to build at the same time. Twenty-four of the forty-one families accepted Boylan's recommendation of architect Hugh Stubbins, Jr., with whom he had studied at Harvard University. According to Warren Brintnall, the architecture reporter for the *Lansing State Journal*, participants saved about fifty to sixty percent of the probable market value of the homes, in part because there were no promotional costs, costly sales programs or business overhead.[19]

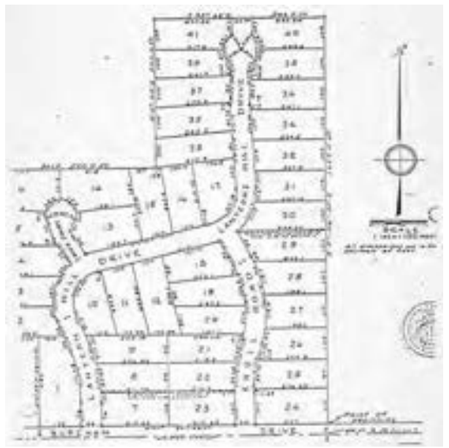

Fig. 4. Lantern Hill plot plan, 1950

Stubbins (1912-2006) was born in Birmingham, Alabama, and educated in architecture at the Georgia Institute of Technology (1932) and Harvard Graduate School of Design (1935), where he studied with Walter Gropius before working for him. In 1949, he formed Hugh Stubbins, Architect, practicing in Lexington, Massachusetts.[20] Lantern Hill was one of his firm's earliest projects. He later gained international acclaim, constructing buildings in Germany, Singapore, and Iran. Among his best-known designs are those for the Berlin Congress Hall in West Germany (1957), Citicorp Center in Manhattan (1976-78), and the Reagan Presidential Library in California (1988-91). Stubbins' pragmatic approach emphasized function, logic and relationship to the surroundings. Years later, he was quoted as saying that architecture is not just individual buildings, but "the whole fabric of our physical environment. Architecture is the man-made world in its totality." As such, he viewed architecture as "an approach to life, … [as] a social art."[21]

In a period when numerous other mid-century modern communities were being constructed and discussed, it was clear that Stubbins was the appropriate architect to become engaged with Home-Sites. He was well aware of cooperative housing developments recently completed or undertaken in Massachusetts by TAC (The Architects Collaborative), the partnership founded in 1945 by Walter Gropius and seven other architects. Among these, their International-style Six Moon Hill development (1947-1951) and the speculative Five Fields (1951-59) in Lexington were based on the idea of utilizing utilitarian modern construction to build low-cost ($15,000+), affordable houses with small bedrooms on lots of equal size. These were probably among the cooperative projects that Boylan lectured about in 1950.[22]

Stubbins also had designed low-cost military housing during the war and participated in the design of two houses for Ingersoll Village in Kalamazoo in 1947.[23] The latter was a project of architect J. Fletcher Lankton and the Ingersoll Steel and Disc Division of the Borg-Warner Corporation. Central to their goal of speeding up construction and saving money was the development of a unit that measured two-and-a-half feet wide, seven-and-a-half feet long and six-and-a-half feet high that contained all of the utilities, plumbing, electrical, and ventilation connections needed in a house, and could be inserted into the structure as it was being built. Stubbins, along with Alden B. Dow, Keck & Keck, and Edward Durell Stone, was among the eight nationally known architects who were asked in 1945 to design a house using the unit. Their designs varied from Cape Cods and two-story Colonials to more stripped-down modernism. Stubbins designed both a one-bedroom, single-story house and a compact, three-bedroom with a low, sloping gable roof.

For Home-Sites, Stubbins was asked to provide three different options.[24] All but three clients selected "Plan A." Although the basic features were set, as Grimes wrote, individualization of the design was possible. Plan A had a slab foundation, rectangular plan with the entry placed just

Image provided by author

Fig. 5. House on Knoll Road, Lantern Hill

off center, and a small study off the entrance (Fig.5). Two or three bedrooms were at one end, with a small bump out from the straight line of the rectangle to enlarge the space of one bedroom and the bathroom. A free-standing fireplace was placed in the large living room that had large expanses of glazing on the backyard side. Rather than a wall, the U-shaped kitchen had a counter to open it up to the dining and living areas. A utility room was provided near the kitchen for the oil furnace and other utilities. Options included an activity room and an open or enclosed carport. Plan B had a small basement and was suited to sites on a hill; two of these were erected. Plan C differed slightly from both A and B in the placement of dining area and kitchen near the entrance; one was constructed.

Many features and construction methods were modern, including the slab foundations, interior partitions rather than load-bearing walls, forced air systems with clay supply tubes under the floors, flat roofs on the separate garages, and large areas of glazing. In addition, the way each low-gabled house was sited on the lot followed ideas of organic architecture. When the FHA office in Grand Rapids refused to approve Stubbins' plans because they were not traditional, the entire project was almost derailed. Stubbins, however, appealed to the Washington office, which overturned the Michigan decision.[25] At this same stage in the Usonia 2 project fifteen years earlier, the FHA, as the lender of last resort, had refused to fund Frank Lloyd Wright's designs and that project had come to a screeching halt.

To cut costs, Home-Sites members did a lot of the labor themselves and acted as subcontractors. They bought appliances in bulk. Large parts of the houses, including trusses and sides, were fabricated in Grand Rapids and trucked to the site. This method sped the construction process and many of the houses that were started in spring 1951 were ready for occupancy by the fall. A *Lansing State Journal* article, Sunday, July 15, 1951, "Homes Built for Faculty, Co-operative Development Near East Lansing

Shows Progress," opined that it is doubtful if the Lansing area has had any other subdivision that has shown such a rapid spontaneous growth as has Lantern Hills … [the] common choice of the same model by most of the families, … along with the fact that all of the Stubbins-designed houses there have natural finished wood siding, account for a notable similarity of the houses at the present stage of construction. However, residents expect to achieve individuality in the finished homes through variations in the landscaping in plans and placement of screen fencing.

The Home-Sites Articles of Incorporation were specific about architectural restrictions for future additions and structures that succeeded in keeping the original aesthetics of the project.[26] As starter homes for young faculty, the Stubbins' designs were modest, but in the decades following their construction most of the houses have been enlarged and the interiors rearranged. Original redwood siding has been painted, cork or linoleum flooring has been replaced, rooms have been combined, and the landscape has matured. Indeed, each has been individualized as anticipated so that now it is fairly hard to find traces of those modest beginnings. What remains unchanged, however, is the sense of community that developed early on as a result of the necessity of working together physically and financially. Most of the original group were the same age and raised their children together. They were of like minds politically as well. Current residents recall that at times Lantern Hill owners were referred to as "commies," confirming the liberal leanings of the close-knit community.[27] As of this writing, two original Home-Sites members still live in their houses as do several children and two grandchildren.[28] Lantern Hill remains prized for the relatively large lots within the city, the park-like atmosphere (with no sidewalks), walkable distance from the MSU campus, and the pride the homeowners have in the neighborhood and its history.

The Usonia 2 group was also thought of as progressive politically and, like the Lantern Hill families, they did a lot of the work themselves to clear the land, sharing in the physical labor to get the sites ready. Why then did one project succeed while the other did not? Alan Grimes offered hints including that the thirty-somethings of Lantern Hill had already worked together to develop several cooperative enterprises – a grocery store, nursery school, and cashless baby-sitting service — through which members of the group became friends, tackling these smaller projects before the larger one. Moreover, Stubbins was a young architect, eager to please. Limiting the choice of designs to three with only slight variations also helped to move the project along quickly. For Usonia 2, each family contracted individually with Frank Lloyd Wright, whose infamous ego affected their relationships. While he stretched their dreams by providing each with a unique design, he paid less attention to their actual financial circumstances. The fact that his proposed construction methods and ideas were new and untried in mid-Michigan in the 1930s was a major obstacle. Flat roofs never did catch on, but while gravity heat and the use of prefabricated components were still not typical fifteen years later, they were more accepted. Both projects took a somewhat Utopian approach, and like similar ones throughout the country, shared similar goals: the development of affordable homes for the middle class through the design of livable spaces in aesthetically aware structures that related to the land in unassuming ways and that provided a sense of community for like-minded people. Lantern Hill members, however, with their bylaws, covenants, and formal incorporation, learned from some of the missteps of Usonia 2 and produced one of the most pleasant and coherent mid-century neighborhoods in mid-Michigan.

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[1] Susan J. Bandes, ed., *Affordable Dreams: The Goetsch-Winckler House and Frank Lloyd Wright* (Michigan State University, Kresge Art Museum, 1991).

[2] Ibid. 7.

[3] Anantole Senkevitch, Jr. "Usonia II and the Goetsch-Winckler House: Manifestations of Wright's Early Vision of Broadacre City," in *Affordable Dreams*, 8-9.

[4] Bandes, 64-65, pl. 2, 3, 4.

[5] Senkevitch, 9-13.

[6] Ibid., 13.

[7] Ibid., 12.

[8] Lucie Panshin to Frank Lloyd Wright (hereafter FLW), July 7, 1939, The Frank Lloyd Wright Foundation Archives, hereafter FLW Archives, The Museum of Modern Art/Avery Architectural & Fine Arts Library.

[9] Senkevitch, 12, pl. 4.

[10] Alexis Panshin to FLW, Aug. 3, 1939, five-page letter canceling order for the house plans, FLW Archives.

[11] Lucie Panshin to FLW, Aug. 12, 1939, FLW Archives.

[12] Alexis Panshin to FLW, Aug. 22, 1939, FLW Archives.

[13] A two-page "idiosyncrasy letter" dated Oct. 25, 1938, was written primarily by Winckler to outline their requirements and hopes. In the short "ps" Goetsch wrote that she is only 5'2", worried about living in the country, and asks Wright to make her feel secure. *Affordable Dreams*, xxiv-xxv.

[14] Ibid., pl. 28.

[15] Ibid., pl. 29 (front elevation) and 30 (site plan); and 71-72.

[16] Diane Tepfer, "From Frank Lloyd Wright to E. Fay Jones: Alma Goetsch and Kathrine Winckler, Ordinary Extraordinary Architectural Patrons," *Affordable Dreams*, 37-38.

[17] Ibid., 39-43.

[18] Alan Grimes, "Remembering Lantern Hill, 1950-52," 1999, typescript. Numerous copies are available at the MSU Archives, MSU Special Collections, Archives of Michigan and from the homeowners.

[19] Warren Brintnall, "Lantern Hill is a Cooperative Neighborhood," *Lansing State Journal* (Jan. 28, 1951).

[20] Dianne M. Ludman, *Hugh Stubbins and His Associates: The First Fifty Years* (Cambridge: Stubbins Associates, 1986). His papers are in Special Collections, Harvard University Graduate School of Design. Lantern Hill is not included here nor in other literature on Stubbins.

[21] Paul Heyer, *Architects on Architecture* (New York: Walker and Company, 1966), 300-301.

[22] "Mid-Century Modern Communities," *Build Blog*, http://blog.buildllc.com/2010/01/mid-century-modern-communities/. This site discusses five such communities and blog posts add many more including Parkwyn Village in Kalamazoo designed by Wright beginning in 1947.

[23] "Ingersoll Village," *Kalamazoo Public Library*, http://www.kpl.gov/local-history/houses-buildings/ingersoll-village.aspx.

[24] Copies of blueprints available at the MSU Archives and Special Collections, among other resources.

[25] Grimes, 10.

[26] Home Sites, Inc. Articles of Incorporation and Protective Covenants (12/27/50). Expired in 1976; copies in the MSU Archives.

[27] Recounted by several current owners.

[28] Pauline Adams (an original owner), phone conversation with author, July 9, 2014; interview July 11, 2014.

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Toward a "Prairie Style": Emergence of a Design Sensibility in the Southern Great Plains

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Abstract

The historic "prairie style" of architecture as initiated by Frank Lloyd Wright was replicated in the estates and parks by Jens Jensen. Yet the distinct prairie style was abandoned as early Modernist architecture became ubiquitously generic in application. A 1992 issue of *Landscape Architecture Magazine* featured the Midwest as a distinct landscape architectural market, but interviews with firms from Chicago and the upper Midwest featured prominently with no mention of any work south of Illinois except to note the pioneering planning work of H.W.S. Cleveland and Hare and Hare in Kansas City. Since 1992, few projects in the Midwest outside of Chicago, Denver and Kansas City have received professional recognition in the national design awards. This drought of two decades changed with the emergence of several firms whose practice focused on restoring prairie ecology as part of the larger land development approach for subdivisions. As these firms won national recognition, a new "prairie style" could be said to have emerged. But this style is not well illustrated at the site scale, rather at a land development scale where the emphasis is on the restoration of natural systems.

Acceptance of "natural landscapes" has been slow to take root in the American imagination. This paper will present a timeline of publication outreach in the southern Great Plains, an ecosystem that is historically understood to be the "Great American Desert." The landscape is subtle with minor variations in color by season, in texture by plant species, and in enclosure by native species.

The most typical design experience of the southern Great Plains has always been at speed; the prairie has historically been "passed through." However, walking or cycling through the prairie provides a completely different set of cognitive clues for how to design in a potential southern Great Plains style.

This paper will articulate the qualities of spatial texture, seasonal change and variation that may help understand the appropriate scale for assigning a prairie style to the remnants of Modern architectural artifacts.

Full paper withheld at author's request.

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SESSION 8:
Sourcing Creativity

Session Chairs:

Hans E. Butzer, AIA, AK NW, LEED AP, Director, University of Oklahoma College of Architecture Division of Architecture

Sam Day, Assoc. AIA, Common Works Architects

In the last half century, the notion of authorship has come under scrutiny in the fields of film, literature and art. Yet the discipline of architecture has remained committed to espousing singular attribution for any given design. Much unlike cinema, where authorial credit is often shared among many professions; the architectural roles of the client, architect of record and contractor are often downplayed in favor of crediting the vision of a single designer. This session asks to what extent should this auteur model of architectural criticism be sustained, and what are the implications for design collaboration?

Embedded in this question of authorship is the uncertainty about the nature of the relationships among design collaborators. An architect might operate as a director of a design, similarly to art projects such as László Moholy-Nagy telephone paintings and Sol LeWitt's Wall Drawings, where the artist gives instructions for another to interpret and execute the artwork, thus complicating the category of "author." The Surrealist game known as Exquisite Corpse provides an even more democratic model of creativity, wherein multiple artists successively contribute to portions of a drawing without seeing what the artist before had drawn.

The question of design ownership must also be addressed. The rise of open-source design platforms like the Rally Fighter Car and the Open Architecture Network have demonstrated the viability of a copyright-free design model, but what could this democratization of design mean for the design professional? Will design professions lose perceived value if the designer is decoupled from the designed? Or could open-source design inadvertently place the future of our cities in the hands of amateurs? Should design embrace a "Death of the Author"?

The Idea of Anonymity in Postwar Architectural Practice

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Abstract

The vectors of architectural influence are often understood to travel in one direction only: from master to disciple, elder to younger, "genius" to emulator. Such models, based on conventional notions of singular authorship, are at odds with the wave of collective and corporate architectural practices founded in the years immediately after World War II. This paper explores the origins of one such practice, The Architects Collaborative (TAC). The largest dedicated architecture firm in the United States by the 1970s – with some 380 employees at its peak – TAC is often described solely as the office of Walter Gropius, the canonical modernist master and European émigre associated with the Bauhaus and later with Harvard University. Conventional accounts of the firm's origins – that Gropius established the office with "his" students – distort the true story of TAC's founding by seven younger architects who came together through a dense network of personal and professional connections in a shared climate of collective, utopian ideals at the start of the postwar building boom. A reassessment of this context against the accepted historiography of TAC reveals a history of speculation around questions of authorship, influence, and collaborative practice in the years during and after the Second World War.

In the immediate aftermath of World War II, Henry-Russell Hitchcock predicted that the dominant criteria for evaluating postwar modernism would be organized not on the basis of style, but according to economies of production. In "The Architecture of Bureaucracy and the Architecture of Genius," published in the *Architectural Review* in 1947, Hitchcock outlined new categories of practice in the context of an emerging postwar industrial society, at once productive and discursive, that would require terms of description and analysis different from those that had applied to the work of the prewar avant-garde.[1] Previous debates over the language in which to build had been structured around the avant-garde terms of advance or regression. On the other side of World War II, both the exigencies of wartime construction and the immediate needs of the postwar building boom had produced what Hitchcock termed a "clarification of the architectural picture," within which "it came about that there was at last only one contemporary way of building": Like the Allies, modernism had definitively won its own battle at mid-century.

The Architects Collaborative, founding partners c. 1951. From left to right: Benjamin Thompson, Jean Bodman Fletcher, Norman Fletcher, Walter Gropius, Robert McMillan, Louis McMillen, Sarah Harkness, John "Chip" Harkness. *Image courtesy of Perry Neubauer.*

Hitchcock, clearly satisfied with this outcome, ventured that in the wake of this victory the older revolutionary terms of debate would be replaced by newer questions. "It is not too optimistic," he declared, "to say that the particular situation which justified a primary critical approach to new buildings in terms of their degree of modernity came to an end with the present decade."

The new social, political, and economic context of the postwar period, then, would place new demands on the architectural profession, to be resolved within the dominant language of modernism. While industrial development and larger, more complex design problems would require new methods of practice for the postwar architect, they would also require different tools on the part of the architectural critic, faced with entirely new questions in evaluating the built results of these practices. Declaring that with the increasing scale and scope of the new design tasks "the major problem of architecture in the middle of the twentieth century is presumably going to be a problem not of up-to-dateness but of quality," Hitchcock predicted that a new type of professional entity would evolve, equipped with the competence required to provide the required quality of execution: the bureaucratic design office. "Bureaucratic architecture," he wrote, would include "all building that is the product of large-scale architectural organizations, from which personal expression is absent."

In contrast to the emphasis on speed and competence required for the large-scale projects to which this type of bureaucratic architecture would ideally be suited – the article identified town planning, hospitals, and schools as examples – Hitchcock counterposed "an entirely different world" of design practice for those monumental or special cultural commissions requiring artistic or creative synthesis, "the world of the architecture of genius." The genius would be the anti-bureaucrat, "the sort of architect who functions as a creative individual rather than as an anonymous member of a team"; his method would be "a particular psychological approach and way of working at architecture which may or may not produce masterpieces."

These two types of practice and their resulting languages of expression – the competent "prose" of the bureaucrat

and the imaginative "poetry" of the genius – would each have their domain of professional application, not to be confused. So too, their products would require separate modes of evaluation on the part of the critic. "Conceptually the two types of work are distinct and should not be subjected to the same type of analysis and criticism," Hitchcock warned. Henceforth, it would no longer be possible to judge bureaucratic production on the same artistic criteria that had been applied to the prewar authors of avant-garde modernism, whether the interpretive framework of singular authorial intention, or the expressive attributes of imagination, creativity, synthesis, etc.; for "only complex individual structures of generalized symbolic meaning," that is, those produced by the genius, "actually fail architecturally when there has been no individual imaginative formulation." Hitchcock's distinction between the two modes of practices constituted a first call, at the outset of the Cold War, for new methods of history and criticism capable of describing the new systems of production that would mark the decades to come.

A year prior to Hitchcock's text, the sociologist Peter Drucker identified the large corporation as the representative American social institution, a form that would come to constitute the dominant model not just for business but for the majority of postwar organizations.[2] In contrast to both the atelier model and prewar methods of Taylorist production embodied by firms like Ford (and Albert Kahn), Drucker argued that the enlightened managerial principles that would typify the postwar economic boom would emulate the flexible, distributed model of General Motors, based on a management structure of independent automobile divisions combined with centralized, coordinated decision-making and control. The organizational principles of decentralization, collaboration in teams, and a mix of generalists and specialists at different levels within the hierarchy were, for Drucker, the characteristics that would mark the progressive application of corporate models across both business and institutional domains in the postwar context.

True to these predictions, a number of design firms emerged after the end of World War II ready to take up the potentials of just such large-scale, distributed models of practice for the economies of architectural production. Skidmore, Owings & Merrill (SOM), founded in 1936, had emerged from the war with a large staff and a new arsenal of integrated production methods, as the wartime planning of Oak Ridge, Tennessee (the top-secret town for 75,000 people responsible for producing uranium for the atomic bomb), had exposed the firm to rapid production and collaboration in teams with engineers and technical consultants. Caudill, Rowlett, Scott (CRS), founded in 1945 in College Station, Texas, would pioneer (simultaneously with SOM) new disciplinary tools like "programming" and fast-track project management that enabled the flexible production of increasingly large, complex projects in shorter timeframes by what founder William Caudill described as "great interdisciplinary teams."[3] Like SOM, the principals' interest in team production was stimulated by their exposure to the collaborative procedures and flexible design methods required in the reuse of U.S. military bases following the war and developed through the firm's involvement with the rapid design of flexible suburban school programs in the Midwest.[4]

The postwar office that best represented the ethos of distributed team production was The Architects Collaborative (TAC), established in 1945 by seven recent graduates of Yale University, Smith College, and the Harvard University Graduate School of Design together with Walter Gropius, a major voice among the prewar avant-garde for applying collaborative and team production methods to architectural practice. TAC's methodology reflected the collaborative organizational characteristics advocated by Gropius as well as the progressive managerial techniques described by sociologists like Drucker. Its partners' ideological commitment to anonymity was reflected in the firm's name. Like the divisions of General Motors, each principal was responsible for his or her own projects, while a weekly partners meeting allowed project decisions to be vetted by all eight principals as equals, with final decisions made by the principal in charge. Teams were composed of generalists, rather than collections of specialist consultants each capable of addressing only specific portions of a project; like the partners meetings, this structure enabled feedback among different members of each team working on the same problems. Coupled with a steady increase in size (with 142 employees by 1964) this structure enabled TAC to meet the criteria of competence, efficiency, and quality that Hitchcock had posed as the imperatives of this new order of "large-scale architectural organizations."[5]

The foundation of TAC marked a prominent use of the new language of corporate ideology by an office that would rise quickly within the pedagogical and discursive context of American architectural practice in the 1950s. The identification of the office as a collaborative rather than through the names of its partners (as at SOM and CRS) alluded directly to the ideology of anonymous, team-based production that lay at the heart of the corporate model. Gropius, the chosen voice of TAC's organizational model (though significantly, as we will see, not by any means the primary author of the firm's architectural output), had also written about the positive impact that collaborative models of management could have on architectural practices postwar. In 1952, on the verge of his retirement from Harvard to focus on the work of the firm, Gropius reiterated the urgent need for "a closely co-operating team together with the engineer, the scientist and the builder" in which "design construction and economy may again become an entity – a fusion of art, science and business."[6] Only such an integrated, team-based management structure would allow the profession to combat its increasing divorce from building production, a development that threatened to reduce the scope of the architect's services and his role within the new building tasks that demanded comprehensive solutions. This pragmatic argument was coupled with an ideological one: Gropius insisted that this model of collaboration across disciplines would allow the architect to recover the ideal of integration represented by the pre-industrial figure of the master builder in the context of postwar industrial society.

These issues of production would also directly concern questions of authorship and the self-image of the producer, issues with which Gropius was intimately familiar through his long engagement with the teaching of architecture students. He warned that the new team-based production methods required by the needs of industrial society would also entail an inevitable confrontation with inherited expectations about the autonomy and importance of the architect, predicting that:

> *the younger generation of architects... [is] beginning to lose confidence in the trusteeship character of our professional setup and in its logical result: the self-appointed prima donna architect. Architects in the future will refuse to be restrained from a natural urge to take actual part in a team effort with the industry to produce buildings and their parts. The emphasis, I believe, will be more and more on the team.*[7]

Significantly, Gropius understood that the team approach would require new attitudes towards individual self-consciousness on the part of architects accustomed to thinking in terms of singular authorship. Students of architecture would have "to learn to collaborate without losing their identity," an approach he had worked to promote through the institution of collaborative workshops at both the Bauhaus and later at Harvard. The historical task of the next generation of architects, inheritors of the legacy of modernism, would be to overcome "the ideology of the past century" that "has taught us to see in the individual genius the only embodiment of true and pure art."[8]

In the context of all these developments, how was Hitchcock's call for a new mode of criticism commensurate with these changes in production taken up in the decades that followed? In what follows, I will focus on The Architects Collaborative as a firm that was centrally involved in these developments in bureaucratic practice, to examine whether historians and critics were in fact able to develop the sort of tools called for by Hitchcock in describing such practices. Fast-forwarding to the state of architectural discourse at the close of late modernist practice in the 1970s, I will focus on the major critical texts on late modernism written in that decade, a period that marked the peak of TAC's professional successes in the United States and abroad. In looking at how these authors grappled on the level of discourse with the realities of corporate production by offices like TAC, we can gain a first lens into the broader history of how these offices, and the architects who comprised them, negotiated the new terrain of bureaucratized postwar production at the level of practice.

Measured in professional and financial terms, the 1970s was in many ways the peak of TAC's success. In 1973, it was the largest architecture-only firm in the Unites States. From its founding eight principals in 1945, the office had grown to 272 employees, with annual billings in the range of $5 to $7.5 million.[9] In that year the firm completed or had underway a number of major representative projects in the United States and abroad, including the design for the Johns-Manville World Headquarters in Colorado, the result of an architectural competition in which TAC was selected over the offices of I. M. Pei, Josep Lluís Sert, William Pereira, and Caudill, Rowlett, Scott, and a project that Paul Goldberger would later describe (upon the completion of the building in 1978) as "perhaps the ultimate corporate environment in the nation."[10] The headquarters of the American Institute of Architects, designed by TAC, opened in Washington, D.C., that year as the representative space of the architectural profession in the United States. In addition to its prominent national commissions, the firm was building projects all over the world, with large urban projects in countries including Yugoslavia, Greece, the Philippines, Saudi Arabia, Iraq, and Kuwait. By any measure, TAC in the 1970s was an office whose achievements might be expected to figure prominently in any discussion of the profession's most important design practices.

Yet TAC's reflection in the professional literature in the 1970s reveals a profound inability of contemporary architectural writers and critics to acknowledge the firm's achievements – even the basic fact of its existence – in spite of these conspicuous successes. The beginning of the 1970s saw the publication of Charles Jencks' *Modern Movements in Architecture*, a revisionist account of the ideas of the prewar avant-gardes and their legacy for late modernist and, as Jencks would christen it a few years later, postmodern practice. While an entire section of book is devoted to Gropius, his "collapse into formalism" and the legacy of his "mixed intentions" after World War II, TAC is discussed nowhere in the text.[11] The very existence of TAC is indicated only in the captions for three images (out of 236 in the book) of projects listed as "Walter Gropius with TAC." The omission repeats itself in the appendix, where a half-page of references are given for Gropius – subsuming these projects again with the parenthetical "(with TAC)" – while omitting any listing for TAC itself.

Jencks' account is a particularly egregious example of the sort of elision of TAC that exists throughout the literature in the 1970s. In this history, TAC only matters as the office name appended to Gropius' American production, and effectively ceases to exist as a narrative subject after Gropius' death in 1969. The entirety of the firm and its work are casually distorted to fit the master narrative of an architect's fall from the idealisms of the avant-garde under the compromising exigencies of postwar practice; the work of hundreds of architects is reduced to the authorship of one man. The degree to which TAC's presence is suppressed through the entire apparatus of the book (sustained across the main text, captions, footnotes, and appendix of illustrations), combined with the special attention to Gropius and his work after World War II, appears as, if not pathological at least symptomatic, of the deep ambivalence felt by contemporary critics toward the assessment of such bureaucratic firms and their production.

If Jencks provides the most blatant case of obliviousness to (or repression of) the reality of bureaucratic practice in the 1970s, we might look to those critics who were expressly concerned with relating the ideological content of postwar architectural practices back to their means of production. In the second volume of their *Modern Architecture* (1976), Manfredo Tafuri and Francesco Dal Co begin to reiterate the new conditions of practice in the terms laid out by Hitchcock in 1947. In the postwar period, they write:

> A true and proper "architecture of bureaucracy" settled in everywhere, in Europe and America as well as in Asia. But this was no deliberate emphasis on elementals attended by a tragic self-awareness ... The field came to be dominated not by individual architects intent on communicating their opinions of the world but by large studios in which the tasks were parceled out with virtual assembly-line standards ... equipped to work at an intense speed of production and to fulfill demands for high technological levels in buildings as anonymous as the architectural concerns that build them.[12]

While acknowledging these systems of production, Tafuri and Dal Co prove unwilling to take up the new terms of criticism called for by Hitchcock in relation to its products. This recognition is followed not by a deeper investigation of such systems and what they might mean for architectural practice (or for the critical evaluation of such work), but by declaring the work of such offices to be all but worthless for an account of postwar practice. Instead, Tafuri and Dal Co settle for the formal reading of architectural projects in terms of their ideological content or (what is for them much the same thing) as more or less successful reflections of their authors' intentions. Singular authorship remains the necessary requirement for an architectural work to be judged worthy of evaluation – a prejudice that marks Tafuri and Dal Co's approach as conventional in methodological terms, even if critical and Marxist in approach.

In maintaining such a critical refusal, any description of an office like TAC could only be a harsh one. Similar to Jencks and others, Tafuri and Dal Co begin their account of architectural production after the 1950s with the need to take stock of the figures of the prewar avant-garde, those "traditional 'masters' of the modern movement" whose work after World War II had now "arrived at a final accounting." A central figure of this survey is Gropius, "who chose ... to realize in America his constant ideal of teamwork designing as evidence of the continuity between the specialist group and society as a whole." Thus credited alone with these interests, Tafuri and Dal Co claim that "In 1946 [sic] he created The Architects Collaborative (TAC), gathering around himself some of his former students and, as was his wont, reserving to himself the role of methodologist within the group."[13] Symptomatically, the story of agency is told backwards, through the singular intentions of Gropius and his presumed influence on "his" students. In fact, it was the younger practitioners who approached Gropius with the proposal to start an office, possibly after considering other names – George Howe, Louis Kahn, and Edward Durrell Stone among them – in the recognition that a senior practitioner with an established name would be useful to the young firm.

The consequences of such commitment to teamwork – and the grounds for the critical dismissal of TAC's subsequent work as an object of inquiry – would soon become clear. Tafuri and Dal Co render their final judgment of the firm as follows:

> By its nature, and subject as it was to the laws of the American market, TAC very soon became a many-branched, impersonal concern equipped to deal with the major professional ventures and open to any sort of request from public or private clients ... Gropius proved willing to legitimize with his signature ostentatious urban paradoxes like the Pan American Building of 1958 in New York ... More and more the approach of TAC tended towards a formalism whose low point as regards quality was reached in the John F. Kennedy Building of 1961-66 in Boston.[14]

"To legitimize with his signature": The language of authorship is here made explicit, as is the narrative (already prefigured by Jencks) of the avant-garde master subsumed into the corrupting formalisms of bureaucratic practice. Unwittingly capturing their own position in relation to such narratives, Tafuri and Dal Co summarize the historical position of Gropius in the 1970s in the most condemnatory terms: "the refusal of Gropius to remain a 'master' and his disappearance into the reality of American professional life were paid for with a harsh price that necessarily affects any discussion of his career."[15]

The anxieties over how to envision the work of TAC and other "anonymous" bureaucratic practices, evident in these texts, mark a particular form of historical closure. In spite of Henry-Russell Hitchcock's call in 1947 for new modes of criticism adequate to the bureaucratic office, by the close of the 1970s it was still not possible to critically or historically situate the reality of such practices without a reliance on the conventional tropes of authorship, influence, and intentionality. In light of this closure, we might ask: What is it that has prevented architectural historians even today from fully accounting for, or even being able to fully "see" and thus begin to historicize, the work of corporate offices? A look at the elisions of this work from architectural history leads to troubling questions about the adequacy of the traditional methodological apparatus of the architectural historian in situating or properly evaluating this kind of production.

A lasting residue of such historiographical elisions is that it has been largely impossible to incorporate the histories of large-scale, distributed bureaucratic offices like TAC into current histories of postwar architectural practice. The standard methodological apparatus of the architectural historian, with its reliance on the legibility of authorial intentions as discerned through a formal reading of built or published works, has been largely incompatible with practices that are organized around principles of collaboration, anonymity, team decision-making, and large, distributed scales of management and production – precisely the goals upon which TAC was founded in 1945 – despite the fact that such practices were ubiquitous by the 1970s and, indeed, constitute much of the standard business models by which architecture is practiced today.

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[1] Henry-Russell Hitchcock, 'The Architecture of Bureaucracy and the Architecture of Genius," *Architectural Review*, no. 101, January 1947: 3-6.

[2] Peter Drucker, *Concept of the Corporation* (New York: The John Day Company, 1946).

[3] William Caudill, *Architecture by Team* (New York: Van Nostrand Reinhold, 1971). See also William Peña with William Caudill and John Focke, *Problem Seeking: An Architectural Programming Primer* (Boston: Cahners Books International, 1977).

[4] Jonathan King and Langdon, Peter, eds., *The CRS Team and the Business of Architecture* (College Station: Texas A&M University Press, 2002). On the origins of programming in relation to school design, I am indebted to Hashim Sarkis for providing manuscript chapters from his forthcoming book, *A Second Functionalism*.

[5] Walter Gropius and Harkness, Sarah, eds., *The Architects Collaborative 1945-1965* (Teufen: Arthur Niggli Ltd., 1966). In this volume see in particular statements by TAC's founding partners on collaborative production, including Gropius, "TAC's Teamwork," Harkness, "Collaboration," and Louis A. McMillen, "The Idea of Anonymity."

[6] Walter Gropius, "The Architect Within Our Industrial Society," in *Scope of Total Architecture* (New York: Harper & Brothers, 1955), 76-90.

[7] Ibid., 84. Italics original.

[8] Ibid.

[9] Ralph Biggadike, "Architects Collaborative, Inc.," Harvard Business School, Case 575-016 (1974).

[10] Paul Goldberger, "Fleeing Cities, A Company Finds Suburbs Encroaching," *The New York Times*, April 27, 1978. Reprinted as "The Johns Manville Headquarters" in Goldberger, *On the Rise: Architecture and Design in a Postmodern Age* (New York: Times Books, 1983), 97-99.

[11] Charles Jencks, "Gropius, Wright, and the Collapse into Formalism," in *Modern Movements in Architecture* (London: Penguin Books, 1973). See the introduction to the second edition, published in 1983, in which Jencks concludes that "in 1984, fateful year, when our architectural future is being stamped by ever larger bureaucratic firms, when our biggest offices such as those led by Walter Gropius perpetrate a form of historicist kitsch in the Middle East... it is time to reassess our recent past and Western culture together: criticize the unthinking Modernism and historicism which are so commercially successful." Gropius had died in 1969.

[12] Manfredo Tafuri and Francesco Dal Co, *Modern Architecture/2* (Milan: Electa, 1976), 339.

[13] Ibid., 307.

[14] Ibid.

[15] Ibid.

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Fun and Games: The Suppression of Authoriality and the Rise of the Reader

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Abstract

Authorship, in contemporary parlance, is an attribution of creative origin, suggesting that the responsibility for an object lies with a single individual. While the reality of artworks, designed objects, and architecture is indeed much more complex than the lone genius 'authorship' would imply, the use of the term 'author' with respect to non-textual endeavors raises an important question: if architecture can be said to be authored, to what extent are those who come into contact with architecture *readers*?

This paper explores a phenomena wherein the caricature of architect as genius-author was embattled on two fronts—the adoption of gaming and simulation by architects, urban planners and, most importantly, design educators in the late 1960s and 1970s throughout universities in the Midwest. First, collaborative games were used to demonstrate the multiple constituencies involved in design and the complexity of their interactions. Second, design games taught students how to describe and interpret architecture—how to *read* it—emphasizing the role of reception in the creation of architectural meaning, minimizing the agency of the architect's intentions. Drawing on new works in the philosophy of aesthetics and reader-response theory from the period, this paper argues for the necessity of tempering the contemporary celebration of the architect's authority with a reminder about the importance of the reader.

Full paper withheld at author's request.

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Semi-Formal: A Hybrid Housing Model for Brazilian Cities

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Abstract

This year, over 70 million people will be added to the world's urban population. At least 20 million of them will take up residence within informal communities – entirely free from the influence of architects and planners. Of the remaining 50 million, nearly 90 percent will arrive in cities of developing countries like China (United Nations Human Settlements Programme 2013), which supports one architect for every 40,000 citizens (Quirk 2014). At the current rate of urbanization, designers will have alarmingly little impact on the ultimate shape of the global urban fabric. This proliferation of undesigned and under-designed communities will result in cities with built-in socio-economic stratification and preventable ecological externalities. Yet, in light of the failures of twentieth- century subsidized housing blocks, it seems that designed alternatives may be no better at alleviating the crushing centripetal forces of urbanization.

To describe and advance the dialectic between formal architecture and informal building, this essay investigates three South American communities as archetypes for urban development patterns.First, the informal favelas of Rio de Janeiro exemplify the challenges faced by most global squatter cities, including insecurity of tenure, hazardous environmental conditions, and inadequate infrastructure. On the other hand, the planned city of Brasília, originally touted as the antithesis to Rio's slums, now stands as an oft-cited example of the failure of modern architecture and planning. Lastly, an unfinished high-rise in downtown Caracas represents an elusive third type: a semi-formal development, partly authored and partly anonymous. This synthesized model overcomes many of the problems apparent within the dichotomy between the formal and informal city.

Full paper withheld at author's request.

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SESSION 9: Towards a New Studio Environment

Session Chair:

Anthony Cricchio, RA, University of Oklahoma College of Architecture Division of Architecture

As we settle into this century of architectural education, the environment in which students learn to become architects is seemingly rooted in a highly romantic struggle between the past and the now, rather than the past and the future. A dilemma begins to develop when current studio-based teaching environments contradict future curriculums based on building, collaboration and digital technology. Drafting tables and traditional shops are leading to clean rooms, virtual reality environments, prototyping machines and studio lounges. Can the current studio learning environment maintain itself as a sustainable product, or will it become a byproduct of the past?

Being led by a plethora of agencies and organizations, architecture programs are being required to teach more office skills, leaving less time for creative problem development. Can current technologies be used to provide a whole new set of skills that provide students an education worthy of architects' educations of the past? Why have students learn to draw?

A drawing is an abstraction to provide information in a rudimentary way. Students already see in multiple dimensions of the world around us. Why not capture it and educate them for what they are actually seeing? If projects are going to be collaborations, why not spend more time teaching communication and decision making rather than drawing a perspective? This session seeks papers that provide an insight on how studio environments are being redefined within the context of new curriculums and pedagogies.

The Tale of Two Initiatives: Reflective Practice for Collegial Discourse in Design Education and The Global Studio Model

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Abstract

This paper describes two scholarly initiatives related through causality. One initiative involves a reflective exercise addressing the relationships between a design educator's personal practice and his scholarship, teaching, and service. The other initiative is the research project that was instigated as a result of the reflection. The reflective exercise is guided by three questions put forth by faculty colleagues, composed to stimulate debate. The resulting reflection includes an analysis of interactivity in the area of graphic design, and discusses concepts related to a designer's creative process and social context. Ideas are synthesized from this analysis to define the structure and scope of a new project. This second project is aimed at establishing a global community of students, designers, instructors, and institutions, and promoting their communication and collaboration. A key aspect of the project is a proposed new model for the educational design studio involving inter-institutional partnerships between student-faculty teams. Both initiatives address the development of a deeper understanding of one's personal design practice, and the ways this knowledge can be made available to students.

Introduction

Cause. And Effect. This paper describes two scholarly initiatives that are linked by causality. The first initiative is a practitioner reflection exercise I underwent to cultivate a critical discourse between academic graphic design colleagues. The second initiative is the research project that was inspired by my involvement in the reflection exercise. The two projects are also both efforts toward promoting a deeper understanding of one's personal design practice, and exploring unconventional ways this knowledge can be made available to benefit students' learning experiences. The remainder of this paper proceeds by first explaining the details of each initiative, and then connecting ideas between the two projects to emphasize the importance of deliberate reflection and robust collegial discourse.

Reflective Practice for Collegial Discours

As a faculty member of a graphic design program who teaches courses addressing interactivity, I was presented with a challenge. This challenge, issued in good faith by my colleagues, required that I reflect on my personal design practice and its relationship to my scholarship, teaching, and service. The challenge was comprised of three questions, composed to stimulate discussion:

1. Within the context of graphic design, what does it mean to be interactive?
2. What does interactive design mean to you?
3. How are your scholarship, teaching, and service informed by your interpretation of interactive design?

In kind, I intended to compose my responses to these questions to stimulate discussion. Rather than the technologically oriented or media-dependent interpretation of these questions I thought my colleagues expected, I decided to approach the questions conceptually. By exploring the conceptual underpinnings of these questions, I sought to achieve a novel perspective on the emerging discipline of interactive design and perhaps elucidate new ways of interpreting one's place in this increasingly influential context. What follows below is an account of how I derived my responses, beginning with a conceptual analysis of interactivity within the overlapping areas of graphic design practice and education.

Question One: Within the context of graphic design, what does it mean to be interactive?

Initially, my interpretation of this first question was limited to what I consider to be the "creative dimension" of graphic design. My analysis of interactivity in this dimension identified a set of ideas, among which I believe a designer establishes reciprocal connections during the creative process. These ideas include: conceptual understanding, technical skills, aesthetic sensibilities, client content, and user traits (see Fig. 1).

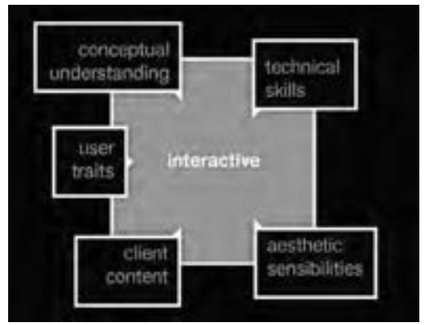

Fig. 1. Ideas of the Creative Dimension

By reciprocal, I mean that a designer does not merely juxtapose these ideas in parallel, with each contributing toward the solution separately. For example, a designer does not simply employ his or her existing technical skill to broadcast a client's content without consideration of the aesthetic result. To the contrary, a designer attempts to form complementary relationships between these ideas, creating a reciprocity that allows the components to develop together, as required by the problem. For example, a designer's aesthetic sensibilities may necessitate the acquisition of new technical skills, which in turn may provide opportunities for new types of client content. From this perspective, interactivity is not a concept to be defined by particular media or technology, but perhaps instead by a designer's ability to draw upon disparate ideas to synthesize a meaningful experience, often in response to a problem.

However, this explanation of what it means to be interactive in the context of graphic design felt too reductive, especially given its emphasis on experience. After further consideration of the first question, an additional dimension of graphic design emerged, one that accommodates the fact the creative process does not happen in isolation. I consider this second dimension to be the "social dimension." My analysis of interactivity in this dimension highlighted the various mutable roles with whom a designer may communicate during the creative process. These roles include: colleagues, clients, users, competition, critics, teachers, and students (see Fig. 2).

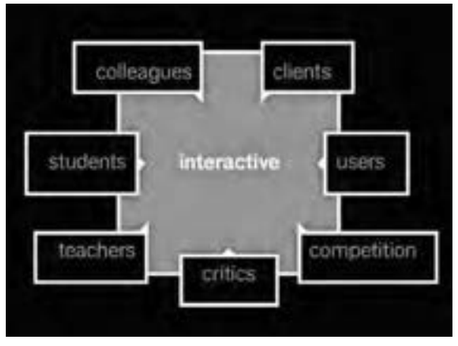

Fig. 2. Roles of the Social Dimension

The variety represented by these roles requires that a designer's communication strategies be diverse, as each involves distinct patterns of communication. For example, a designer's response to a request for revisions can be languaged quite differently for colleagues and clients. However, key to understanding the challenges presented by these roles is their mutability, the phenomenon by which members of a designer's community may shift among roles or come to occupy several at once. For example, a designer's clients are often also target users; a designer's colleagues are some of his or her most important critics; and, in my opinion, the best designers find ways to be both teachers and students every day. Rapidly changing patterns, due to shifting roles, and/or the addition of layered patterns, due to simultaneity of roles, serve to further complicate a designer's communication. For example, the designer's response above may be different still for competitive parties who are also target users. From this perspective, interactivity is not simply the bringing together of ideas for the sake of their sum total, but also an intensely personal and collaborative act, wrought with all the benefits and challenges innate to human communication.

Question Two: What does interactive design mean to you?

Having defined these dimensions, my response to this second question seemed self-evident. To me, interactive design is a process of establishing appropriate connections across the creative and social dimensions (see Fig. 3). It is an eclectic and collaborative approach to creating meaningful solutions. As someone who describes himself as an interactive designer, this designation does not so much indicate the technological context in which I work as it does my approach to a problem and the people involved.

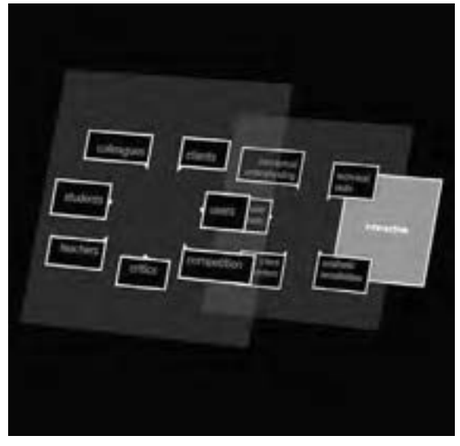

Fig. 3. Creative and Social Dimensions

In anticipation of the third question, I further broke down this definition of interactive design into three constituent parts: a creative activity, a context for instruction, and an avenue for improvement. I identified these partial definitions to help explain how my scholarship, teaching, and service are informed by my interpretation of interactive design.

Question Three: How are your scholarship, teaching, and service informed by your interpretation of interactive design?

My initial response to this third question was comprised of three lists of unrelated activities. I recounted for my colleagues what I considered to be highlights from my commercial design practice, student outcomes, and academic and community involvement. In doing so, I was forced to acknowledge an almost complete absence of connections among the activities on the three lists. Given my emphasis until this point on an approach that prioritized what may generally be described as "coordinated integration," I realized my initial response to this question was insufficient.

Here, I understood the real potential of the reflective exercise. To merely ascertain insight on the current state of a situation and go no further would be to undervalue the effort invested to obtain the insight. It became clear I had a new challenge: to apply the understanding I had developed toward a project that bridged my scholarship, teaching, and service, the scope and structure of which would demonstrate how these activities *could be* informed by my interpretation of interactive design. In the next section, I describe this project and discuss its early progress, current focus, and future goals.

The Global Studio

The global studio project is an effort to connect my scholarship, teaching, and service as a faculty member in higher education. The project was deliberately conceived to integrate my creative activity and instructional capacity to coordinate social improvement. The focal area of the project is interactive design curricula in higher education.

The goal of this project is to establish a global community of students, designers, instructors, and institutions, and promote their communication and collaboration. The project builds on previous research involving inter-institutional curricular collaboration and explores how working across institutional boundaries can expand curricular offerings and enhance students' learning experiences. Below, I discuss the recently completed first phase of the project, the activities involved in the current second phase, and the goals of the upcoming third phase.

Phase One: Student Web Awards

This first phase of the project involved creating and facilitating the 2014 Student Web Awards (www.studentwebawards.net). This event is an online exhibition and competition intended to showcase the best in student Web design. While aspects of this phase of the project touch on all three components of my responsibilities as a faculty member, the focus of this phase is predominantly that of my creative activity. This undertaking began with designing and developing the contest Web site, identifying jurors, and then marketing the event via email and social media. The jurors for this event included myself, Yana Sakellion, assistant professor of graphic design at American University, and David Molanphy, creative director at Perspective Lab. The primary purpose of this phase was to generate student participation in an extracurricular interactive design-oriented activity.

The contest attracted forty-two submissions from six institutions. This participation provided two important benefits to the broader global studio project. First, the interaction among students, as they commented on one another's work via email and social media, constitutes the beginnings of an inter-institutional community (see Fig. 4). Second, the submissions from students helped identify academic programs that are producing high-quality student outcomes, and thus potential partners for the second phase of the project.

Fig. 4. Example of Student Interaction on Social Media

The general response from participants in the event and visitors to the site, as well as the other jurors, was that of approval. In addition to the advantages that the event afforded the broader global studio project, the benefits it offered students in the form of resume material and exposure were widely acknowledged and appreciated. The Student Web Awards is slated to be an annual event. Planning for the 2015 contest is already underway.

Phase Two: Lecture Exchange

This second phase of the project has involved recruiting faculty at select institutions to participate in a lecture exchange series related to interactive design. Youry Khmelevsky et al. advocate for guest lectures as being a way to expand curricular offerings and increase student engagement.[1] The purpose of this phase is to establish an inter-institutional program that provides students access to a wider range of faculty perspectives than those of any individual academic program. As such, this phase of the project most significantly addresses my role as an instructor and potential to realize social improvement.

The scope of the lecture series is intended to include conceptual discussions, procedural demonstrations, and technical workshops. Participating faculty are encouraged to present on any topic they feel is pertinent to contemporary interactive design. The two goals of this phase are to enhance students' educations by increasing the diversity of the instructional material to which they have access, and to inspire student interest in the next phase of the project, which involves collaborative study with students at other institutions.

In addition to the curricular benefit afforded to students, the invitation to be a speaker also provides faculty two opportunities for professional development. First, a faculty member's participation is applicable as both peer-reviewed dissemination and community outreach. Second, one's exposure to other faculty perspectives and academic programs offers a rich context for personal reflection. Joanna Dehoney et al. mention self-study as an important outcome of collaborating across institutional boundaries.[2] Responses to these invitations have been favorable, as five faculty members at four institutions have currently expressed interest in the opportunity.

Our efforts are ongoing in coordinating these lectures. At the time of writing, the details of several engagements are being negotiated among faculty, student organizations, and institutions. In all but one case, the presentations are anticipated to be delivered via videoconference (e.g., Skype). The exceptional case, in which a faculty member will be visiting the campus of a participating institution for a different reason, is expected to involve an in-person presentation.

Due to the grassroots-oriented inception of this project, funds to facilitate faculty travel are scarce. However, the pervading sentiment among faculty during discussions on how to conduct the presentations has been one of finding ecologically sensitive alternatives to requiring travel. Efforts are underway to identify funding sources to support other aspects of the project.

Phase Three: Inter-institutional Independent Study

This third phase of the project will involve the design and development of a community Web site to promote inter-institutional independent study collaborations. Evan Barba et al. describe the benefits of inter-institutional student collaboration to include access to partners with different skillsets and experience working on a multidisciplinary team.[3] The purpose of this phase will be to provide partnership opportunities between student-faculty teams at different institutions. In line with the first phase of the global studio project, this third phase will encompass the breadth of my responsibilities as a faculty member, but with a more equal focus across all three –creative, instructional, and social.

The proposed structure of these partnerships is twofold. First, a student enrolls in an independent study with a faculty member at his or her home institution. Second, this student-faculty team identifies another team with complementary interests at a different institution via the community Web site. Together, these teams define the required objectives and responsibilities to guide their collaboration on a shared project.

Central to the value of this activity is allowing students to participate in the creative process on a potentially global scale. This global studio model was inspired by the structure and operation of multinational design agencies. The organization of these firms is often geographically distributed based on specialized skills, with remote geographies contributing asynchronously to project deliverables. The end result of this third phase of the project is a Web-based learning resource that would share characteristics of both the traditional educational design studio and a virtual learning community. The intended outcome for students experiencing this type of educational context is better preparation for the responsibilities of professional design practice.

Conclusion

The potential influence of the emerging discipline of interactive design is almost incalculable. Over a decade ago, Lyman and Varian described the Internet as "the fastest growing new medium of all time."[4] Since that time, the pervasion of interactivity has included all sectors of the design industry, and its manifestations go well beyond mouse-based point-and-click-style interactions. Voice-user interfaces, augmented reality, and wearable computing all represent exciting frontiers being traversed by contemporary interactive designers.

In response to the rapid evolution of this area of design practice, as well as three questions intended to provoke its consideration, this paper began with a conceptual investigation into the ideas central to interactivity. These ideas included the notions of reciprocity and mutability, and were discussed as means for understanding an interactive designer's creative process and social context. The result of this analysis was an atypical description of interactive design. This description can be summarized as prioritizing coordinated integration of knowledge and people as a strategy for problem solving.

To demonstrate the promise of this strategy, the paper then recounted the details of the global studio project, which has been undertaken with this strategy as a guiding tenet. As described, the scope and structure of the global studio project is defined by my intent to create more meaningful connections among my scholarship, teaching, and service activities. Central to the project is the proposal of a new model for the educational design studio. This model was conceived as a way to connect student-faculty teams globally, and in turn, better prepare students for the responsibilities of professional design practice.

The rate of change in this area of design practice, and the complexity of the information involved, requires that interactive design curricula and pedagogies be reconsidered almost perpetually. To that end, the main points of this paper are not the proposal of a new model, nor the specific results of a singular reflective exercise. Rather, the key ideas to be drawn from this paper are the value of deliberate reflection as a means for coordinating new ideas, and the imperative that faculty colleagues engage in a discourse around these ideas to best understand how to integrate them to enhance students' learning experiences.

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Working Toward a New Studio Pedagogy: The Ferris State University Small Town Studio

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Abstract

Seeking to embody a multi-scalar and holistic approach to sustainability and architectural design education, the Small Town Studio in the Ferris State University Architecture and Sustainability Program has been established to educate architecture and design professionals with a broad understanding of sustainability.

Recognizing the significance of smaller urban areas within the sustainability discourse, the Small Town Studio seeks to serve as a clearinghouse for smaller urban areas found across Michigan (20 percent of Michigan's population) through which a wide range of sustainable design and planning problems can be addressed. This focus on small urban areas (2,500 – 50,000 people) is in part a response to anecdotal evidence that suggests a limited number of architectural schools have looked beyond the context of either highly urban or peri-urban settings for inspiration. Within the Small Town Studio, these smaller urban areas are viewed both as a significant force for sustainable development and a significant source of the world's urban population.

This paper introduces the Small Town Studio and its approach to an architectural studio pedagogy grounded in design research, problem-solving, and communication. It also proposes that if an urban future and the associated built environment is to be built sustainably, it will be necessary to educate a new class of architects well versed in the language of holistic sustainability.

Introduction

With recent increases in global urban growth, discussions related to sustainability and sustainable development are increasingly focused on cities and the built environment. The combination of increased urbanization with high rates of resource use in urban areas raises fundamental questions regarding the ability of current ways of life to be maintained.[1] In discussing global urbanization and its relationship to sustainable development, discourse is often focused on large urban centers or megacities, which may leave out a large percentages of the world's urban population. A deeper understanding of the term "urban" suggests, within the United States, particularly in states such as Michigan,[2] a larger percentage of the population

Ferris State Architecture and Sustainability students work with city officials and local children to reimagine the city of Big Rapids. *Photo provided by author.*

lives in smaller urban settings than are typically considered in discussions of urban sustainability. While these smaller "towns" are considered urban, they are often ignored by built environment professionals, the architectural education system, and the architecture profession. Recognizing their significance within sustainability discourse, the Small Town Studio in the Ferris State University Architecture and Sustainability Program has been established to pursue sustainable urban solutions for smaller, underserved urban areas of Michigan.

Urban Demographic Trends

It is well documented that the planet is becomingly increasingly urbanized. According to the World Health Organization, in 1990 less than 40 percent of the global population was urban, by 2010 it had grown to more than half, and by 2050 it is estimated that 80 to 85 percent will live in urban areas.[3]

This demographic shift has resulted in a significant strain on the planet's resources. It is estimated that the built environment, associated with cities and urban areas, accounts for a majority of global natural resource use. According to the United Nations Environment Program, urban areas currently account for slightly more than half the world's population but emit up to 80 percent of global greenhouse gas emissions and consume 75 percent of global natural resources.[4] Additionally, in many of the world's cities, water use exceeds supply, agricultural systems are unsustainable, congestion is worsening, and economic inequality, family breakdown, and social disruption are increasing.[5]

Paradoxically, as cities and urban areas contribute globally to many social and environmental problems, they are seen as potential solutions to these same problems. While urban areas use a majority of the world's resources, they have the potential to use resources more efficiently than rural or peri-urban areas. As our global society faces the threat of climate change, natural resource depletion, and a potentially unsustainable future, it is in cities and urban areas where solutions to these problems will be found. This view is reiterated by the United Nations, which states, "… the decisions and actions needed to move our society towards more sustainable patterns of consumption and production will have to be decided and implemented, to a large extent, by [urban areas]."[6]

Urbanity Redefine

The potential for a city or urban area to contribute to sustainability is inseparably and specifically tied to its urban form, i.e. the form of the built environment, at both micro and macro scales. However, as keys to a sustainable future appear tied to urban growth, urban form, and the urban built environment, what this urban future looks like, and what the term urban means, is unclear and at times contradictory. Anecdotally, a future where 85 percent of the world's population lives in urban areas may bring to mind images of science fiction movies with a majority of the population living in soaring skyscrapers within a highly dense urban context. Or it may bring to mind images of one of the world's mega cities, such as Tokyo, Mexico City, or New York City. However, these visions may be deceptive, as the planet's 3.6 billion urban dwellers are currently distributed among settlements of various sizes.[7]

A refined understanding of the term "urban" provides a clearer picture of what our current and future urban age may look like. The UN defines urban as "the percentage of the national population living in areas termed 'urban' by that country, typically, the population living in towns of 2,000 or more."[8] In the United States, urban areas are defined as those that "encompass at least 2,500 people."[9] Such broad definitions allow for the possibility that a significant percentage of the world's current and future urban population, particularly in the United States, may be living in settings much less like the mega cities of the world and more like the traditional suburban, small town, and city settings found across the United States and broader world. For example, in the United States, where 80 percent of the population is considered urban, 12.5 percent of the total population lives in smaller urban areas with populations of 2,500 to–50,000.[10]

When considering a future with 80 percent of the population living in urban areas, this deeper understanding of the term "urban" may alter our understanding of how cities and urban areas will contribute to a sustainable future through their urban form and the form of the built environment.

Urban Demographics, Sustainability, and the Local Scale

An analysis of current census data helps clarify how changing urban demographics may be taken advantage of to promote a more sustainable urban form and future. For this paper, 2010 U.S. Census data from the state of Michigan was analyzed to better understand how increased urbanization is currently manifested within the state and how it may change in the future.

The 2010 U.S. Census identifies approximately 80 percent of Michigan's population as living in urban areas, with approximately 10 percent of the population living in micropolitan areas of 10,000 to 50,000. This implies approximately 65 to 70 percent of the population lives in large urban areas over 50,000; however, further analysis of the census data suggests otherwise. Of Michigan's 7,369,957 living in urban areas, approximately 50 percent of those live in towns and cities. This indicates a full 50 percent live in unincorporated townships or villages, while approximately 20 percent live in jurisdictions with a population between 2,500 and 50,000,[11] rather than the large urban centers, such as Detroit, traditionally associated with the discussions of urban populations.

This further analysis of Michigan's urban demographics provides insight into its current urban form and built environment in a way that simply stating 80 percent of Michigan's population is urban does not. A full 10 percent of the population lives in micropolitan areas of 10,000 to 50,000, while an additional 10 percent lives in cities of 10,000 to 50,000, but which are associated with a larger urban area. Thirty-three percent of the population live in urban jurisdictions with less than 100,000 people, while over half do not live in cities or towns at all, but still live in areas considered urban (such as urban, unincorporated townships). This reveals that while 80 percent of the population of Michigan is urban, a majority of the population does not live in traditional "urban" areas.[12]

Within the state of Michigan, this analysis suggests that if steps toward greater urban sustainability are to happen in relation to urban form and widespread urbanization, in addition to the common emphasis placed on megacities and large, classic urban areas, it will be important for the local, neighborhood, and micropolitan scales to be considered.[13]

Role of Architects and Architectural Education in Sustainability Discourse

In recognizing the importance of the built environment within the global discourse of sustainability, the architectural profession, and by proxy architectural education, find themselves uniquely situated to address issues of sustainability related to our urban future. For this paper, it is proposed that if an urban future and the associated built environment is to be sustainable, it will be necessary to educate a new class of architects well-versed in a language of sustainability that holistically includes consideration of social and economic concerns in addition to the typical environmental focus found in many architectural discussions of sustainability.

This view is supported by Jason Walker who finds, "It is evident that effectively teaching sustainability in design education is important in furthering the design disciplines' ability to respond to increasing social, environmental and economic complexities facing our common future." Walker further argues, "If the design professions are to remain relevant, design education must effectively integrate sustainability into curricula's pedagogy to address the

current and emerging issues facing our society to ensure an education that espouses responsible design solutions."[14]

Such an approach to design education, according to Walker, requires a holistic vision of sustainability addressed at multiple scales. Within the built environment, and particularly within urban areas, there are multiple scales of sustainability "that range from the site scale to the neighborhood, community, region, and planet." [15] While it is true no one single designer, or single project, will save the planet on its own, according to Walker, design education must address multiple scales, as each sequential scale influences the other. The slogan "think globally, act locally" is an appropriate analogy for teaching sustainability in design education that includes the macro- and micro-scales.

Small Town Studio Overview

In seeking to embody Walker's multi-scale and holistic approach to sustainability and design education, the Small Town Studio (STS) in the Ferris State University Architecture and Sustainability Program has been established to educate architecture and design professionals on a broader understanding of urban sustainability. Furthermore, with the previously discussed understanding of urban demographics that recognizes the importance of smaller urban areas within sustainability discourse, the Small Town Studio seeks to serve as a clearinghouse for such areas found across Michigan in which a wide range of sustainable design and planning problems can be addressed.

Run yearly as a required senior design studio, the Small Town Studio is embedded in Arch 441: Architectural Design III within the Ferris State University bachelor of science in architecture and sustainability degree program. While projects are derived from community needs, which are submitted via an application process, the studio itself is based on an architectural studio pedagogy grounded in design research, problem-solving, and communication. This pedagogical framework integrates research components into the traditional design-based studio. The goals of this research component are for students to: 1) understand the relationship of architecture and urban design to the social and built environment; 2) appreciate the complexities of place making; 3) address design as a mode of research and practice that shapes the built and social environments; and 4) interact in an interdisciplinary manner with community members, professionals, and students outside the architecture degree program, with a focus on integrating the economic, social, political, and cultural aspects of the built environment. Students then communicate this integration visually, textually, and verbally. Following the research component of the studio, students propose a design intervention for their projects. This combined approach enables students to think both holistically and critically about architectural interventions in relation to a site, the larger environment, sustainability, and society as a whole.

Over its three years of existence, beginning in fall 2012, students have worked on a variety of community-driven design and planning projects. These projects have ranged in scale from a small bridge over a creek in a community park to a 132-page bicycle and pedestrian plan written for and adopted by the City of Big Rapids. Students also communicated options for expanding a private school in Big Rapids and developed a community plan for a local urban village. Within its range of projects, the Small Town Studio seeks to engage students with regional communities in four key capacities: 1) supporting small towns by providing architecture and planning resources not readily available in many smaller, urban communities; 2) promoting citizenship while training future community leaders who are versed in the language of place making and sustainability; 3) facilitating the generation of ideas for clients and communities who may be unfamiliar with the design process and/or architecture and planning solutions available to them; and 4) acting as an intermediary between local community groups and design professionals.

Supporting Small Towns

The Small Town Studio's focus on small urban areas is, in part, a response to anecdotal evidence that suggests a limited number of architectural schools have looked beyond a traditionally urban, or in some cases rural, context for inspiration.[16] This focus is particularly evident in Michigan, where student involvement in design and urban theory has particularly, and primarily, focused on addressing urban issues facing Detroit. In this context, the Small Town Studio seeks to bring attention to the smaller urban areas of Michigan that may have been previously overlooked by architecture and design professions as well as the architectural education establishment, which has often ignored small town settings.

The geographic home of the Small Town Studio is Big Rapids, Michigan, the county seat of Mecosta County and the center of the Big Rapids Micropolitan Statistical Area. The city itself has a population of approximately 10,000, not including Ferris State University's student population of 12,000, and is the center of a micropolitan area with a population of approximately 40,000. This situates Big Rapids within the 20 percent of Michigan's urban population living in smaller urban areas and represents the type of community the Small Town Studio seeks to help.

Big Rapids does not represent the type of urban setting that typically attracts the attention of architecture and urban design or planning studios. While the City of Big Rapids is in a situation to promote and improve on its goals related to sustainability, it has limited resources to do so. Without support from an entity such as the Small Town Studio, Big Rapids would be less able to achieve its goals. It is ultimately the intent that students in the Small Town Studio will aid Michigan's smaller and somewhat forgotten urban areas as they seek to grow and develop sustainably.

Promoting Citizenship

Within its research-based approach to studio education, STS students are asked to actively incorporate into their studio projects material learned in other, non-architectural, community studies courses. These courses, which include public administration, urban-regional planning, community studies, and urban sociology, give students a theoretical background to consider a holistic approach to sustainability that considers the economic, social, and environmental concerns of the communities in which they are working. Primarily taught within the Department of Social Sciences, and the Ferris State community studies minor,[17] these courses cover material and topics that extend well beyond the built environment, but that are essential in facilitating a sustainable society. By asking them to engage with these community studies courses, architecture and sustainability students are in a better position to understand how their design proposals, and the built environment as a whole, fit within the broader societies in which we live. The relationship of these community studies courses with the core architecture curriculum also promotes the program's aim of helping to develop better citizens. The program recognizes that few of its students will go on to become licensed architects; however, all of our students are citizens of the world. Students may become mayors, school board members, and business owners within the small towns of Michigan. With this in mind, the Small Town Studio hopes to train both future architects and future citizens to be more aware and mindful of the interactions between the built environment and larger societies in which we live. Furthermore, it hopes to develop within these student citizens a broad understanding of sustainability that recognizes the importance of social, economic, and environmental matters.

Facilitating Ideation

In many cases, it is within economic and social considerations that students' work is the most enlightening. An example of this can be seen in work students undertook in 2012 to write a bicycle and pedestrian plan for the City of Big Rapids.[18] Students approached this project with a holistic vision of sustainability and sought to implement a plan that would serve the City of Big Rapids environmentally and economically, and in a socially just fashion. During their analysis of existing conditions, which combined an income and social demographic study of the community in conjunction with a physical analysis of infrastructure, students quickly found that while pedestrian infrastructure was abundant in more affluent areas of town, there was little or no pedestrian infrastructure in the lower income areas. Furthermore, these areas of the community were geographically isolated by a river that bisects the town (with limited crossings) and major roadways that are unsafe to navigate as a pedestrian or cyclist. This was highlighted in the students' presentation to the Big Rapids City Council with recommendations for how the City's yearly sidewalk maintenance plan could be prioritized to most efficiently provide just, equal, connected, and safe pedestrian infrastructure within the community. This presents one example of how the students' holistic, sustainable approach to an urban design problem suggested a solution that was not evident, and would likely not have been pursued, if left directly to city staff.

In another project, the development of a community plan for Mecosta Village, students helped a local community develop a plan for growth that is socially, environmentally, and economically responsible. This led to a number of grant applications, including an application to extend a rails-to-trails connection to a regional trail and a department of transportation grant for rehabilitating the community's main street. Ideas generated by students also led to a village garden and a summer youth program at a local youth and family center. This program will enable the center to remain open during the summer by allowing local youth to be paid for working at the center and on local community revitalization projects. In a community with limited economic resources, particularly for the youth, this program will have a significant social and economic impact.[19]

Acting as an Intermediary

Within its approach to studio education, the STS recognizes its students are not design professionals, nor does it strive for them to act in that capacity. Small Town Studio students do not seek to replace the necessary work of licensed design professionals within the communities it helps. Rather, when appropriate, students act as intermediaries between a community with needs that it might not yet understand itself, and the realm of the licensed design professional. In this sense, students help communities ideate, define, and understand their place-based problems in ways they are unable to on their own. Students share with communities what is possible and how to proceed towards actionable solutions. When warranted, students may then act as intermediaries between a local community and the design profession. An example of this intermediary approach can be seen in the students' current work on the historic Howmet Playhouse in Whitehall, Michigan.

The Howmet Playhouse is a city-owned, 391 seat theater built in 1916, which represents a significant community asset. During its summer season, the theater runs a successful youth program and produces a number of major productions in conjunction with a local university. These programs provide an impactful social, as well as financial, benefit to the community.

While the theater is owned by the city, it does not receive direct funds from the city. Its limited yearly budget is entirely based on donations and ticket sales. The theater runs a full schedule during its season but struggles to maintain its operations and has a limited ability to perform necessary improvements, such as improved ADA access, restroom facilities, and HVAC improvements. Within this context, the city finds itself in need of renovating and updating the theater. This city has hired a professional architecture and engineering (A/E) team to conduct an initial building assessment and to make recommendations for renovation options; however, there are limited financial resources available to pay for this work.

This represents an opportunity for STS students to act as an intermediary between the city and the professional A/E team. Students do not seek to replace the professional team, nor are they in a position to be able to do so from a legal

and liability standpoint; however, they are able to work with the city and design professional team to facilitate the necessary work. By providing a service to the community, students are able to reduce the A/E fees, making the project achievable for the community. In this way, the STS is both working for and with the Howmet Playhouse and the professional A/E team.

In this role, students will undertake a limited initial building assessment, produce measured drawings, participate in meetings with the community and professional teams to set goals and objectives, and be active members in a community design charette. In this capacity, students provide their technical knowledge and idea generation skills in a formal manner to the city, while not replacing the work of the A/E team. They facilitate, rather than replace, the work of the professional team. Without this key component of the work, it would be difficult for this project to proceed.

Conclusion

The Howmet Playhouse project represents a concise example of student fulfillment of Small Town Studio program goals. Students are helping the community envision and develop actionable solutions for an architecture and planning problem that will lead to increased economic, social, and environmental sustainability within the community, without directly replacing design professionals.

Communities such as Whitehall, Big Rapids, and Mecosta Village exist across Michigan and the greater United States. While these towns are by definition urban, and well situated to address many urban issues in a sustainable fashion, in many cases they lack the will, knowledge, resources, vision, or expertise to do so. In such instances, the Small Town Studio seeks to provide a resource that helps facilitate sustainable development and growth for smaller urban areas of Michigan. In this fashion, the Small Town Studio acts as a resource for small towns that, while urban, are typically ignored or overlooked in discourse on urban sustainability. Furthermore, such communities are often ignored by the architectural education system and broader profession.

The Small Town Studio considers these small towns important within the discourse of urban sustainability, as they represent a significant portion of the world's current and future urban population. It is within these urban settings that sustainable solutions addressing the world's urban growth will be found. Even as cities and urban areas use a majority of the planet's natural resources, these same urban areas provide opportunities for efficient, just, and sustainable resource use and future growth.

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[1] M. Pacione, "Sustainable urban development in the UK: rhetoric or reality?" *Geography*, vol 92, no 3 (2007): 248-265.

[2] Both the U.S. and Michigan have urban population of approximately 80%. See, Michigan Department of Technology, Management and Budget (MDTMB) 2010 Census Data for Michigan, accessed 10 December 2012, http://www.michigan.gov/cgi/0,4548,7-158-54534-252541–,00.html.

[3] World Health Organisation (WHO),*Urban Population Growth,* 2012, accessed 10 December 2012, http://www.who.int/gho/urban_health/situation_trends/urban_population_growth_text/en/index.html.
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[4] Ibid.

[5] A. Nelson, *Steering sustainability in an urbanizing world: policy, practice and performance* (Aldershot, England: Ashgate, 2007).

[6] UNEP.

[7] United Nations (UN), *World urbanization prospects: the 2011 revision*, 2011, accessed 10 December 2012, http://esa.un.org/unup/pdf/WUP2011_Highlights.pdf.

[8] United Nations Department of Economic and Social Affairs Population Division (UNDESA), *World urbanization prospects: the 2009 revision* (New York: United Nations, 2010).

[9] The U.S. Census Bureau further expands on this understanding of urban demographics by identifying various "urban" categories, such as Urbanized Areas (UAs) with 50,000 or more people, Urban Clusters (UCs) with at least 2,500 but less than 50,000 people, Metropolitan Statistical Areas which contain a core urban area of 50,000 or more population, and Micropolitan Statistical Areas, which contains an urban core of at least 10,000 (but less than 50,000) population. See, United States Census Bureau (USCB), *2010 census urban and rural classification and urban area criteria,* 2010, accessed 10 December 2012, http://www.census.gov/geo/www/ua/2010urbanruralclass.html.

[10] USCB.

[11] MDTMT.

[12] Based on analysis of USCB (2010) and MDTMB (2010).

[13] This local focus on sustainability is reinforced by the United Nations' Agenda 21 report which considers local aspects of sustainability in addition to more common global impacts:
"Because so many of the problems and solutions being addressed by Agenda 21 have their roots in local activities, the participation and cooperation of local authorities will be a determining factor in fulfilling its objectives. Local authorities construct, operate, and maintain economic, social and environmental infrastructure, oversee planning processes, establish local environmental policies and regulations, and assist in implementing national and subnational environmental policies. As the level of governance closest to the people, they play a vital role in educating, mobilizing and responding to the public to promote sustainable development. See, United Nations Conference on Environmental Development (UNCED), *Agenda 21: program action for sustainable development* (New York: United Nations Conference on Environmental Development, 1992).

[14] Jason B. Walker and Michael W. Seymour, "Utilizing the design charrette for teaching sustainability," I*nternational Journal of Sustainability in Higher Education*, Vol. 9 (2008): 157 – 169.

[15] Ibid.

[16] One well known exception is the Rural Studio, established in the 1990s by architect Samuel Mockbee in affiliation with Auburn University in Alabama. The Rural Studio has worked extensively with the problems of the rural poor, and provided opportunities for students to engage with real-world issues through real architectural solutions.

[17] Architecture students are able to pursue a Community Studies minor if they are interested.

[18] This plan was subsequently voted on by the City Commission and passed for adoption by the city.

[19] In developing the community plan, students also developed an ongoing service relationship with the Mecosta Youth and Family Center. Each fall semester STS engage in a number of service projects associated with the youth from the Center.

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Toward a New Design Studio Practice: Mapping, Making, and Writing

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Abstract

In the clear and present, working as a graphic designer has evolved away from the design of static, predictable artifacts towards new, dynamic paradigms across rapidly changing technologies. Within the discipline, a designer must possess cognitive, strategic, communication, making and other competencies to keep relevant. Recent discourse on the evolution of the practicing designer includes Steven McCarthy's text, *The Designer as …*, and the professional initiative, "Defining the Designer of 2015," from AIGA, the professional association for design. Each examines the existential nature of today's designer, one by looking at current and historical practitioners, and the other as a forecast of future competencies required for the profession. This presentation shares two aspects of my work: first, an assignment for undergraduate graphic design students and, second, the completion of my master of fine arts degree program. The first project introduced students to new competencies and studio practices in the context of critical transferrable skills, which as future practitioners they take into their professions. Using examples from my classroom pedagogy, the presentation includes student coursework examples demonstrating critical thought, strategy, and making processes. In the second project, I share a graduate school experience that reshaped my own paradigm of "making" in the studio setting. While making can be the professional crafting of a deliverable, in this case making became the exploratory means of problem solving my own master's thesis exhibition.

A suitable metaphor representing how the practice of graphic design is undergoing an evolution of its nomenclature looks something like this: Imagine an electric neon sign composing the word "graphic design." The letters for "g-r-a-p-h-i-c" are flickering in a hot malfunctioning crackle, while the letters for "d-e-s-i-g-n" remain illuminated confidently (see Fig. 1). What this suggests is the prefix "graphic" underserves the broadening scope of a graphic designer's work, as it refers to an age when his or her role was exclusive to the making of artifacts. During that time, the graphic designer worked under a commission structure as an objective provider of communication solutions to business and culture. This singular view of the profession – one of a value-neutral capacity – is conveyed with the term "graphic." It is not inclusive to the interdisciplinary contributions of designers beyond consumer culture, into the humanities and social sciences. Nor is "graphic" associated with the act of making beyond tangible artifacts.

Fig. 1. A metaphor for graphic design nomenclature.

Some of the discourse about the evolving practice of graphic design includes a recent text, *The Designer as Author, Producer, Activist, Entrepreneur, Curator & Collaborator: New Models for Communicating,* by Steven McCarthy, professor of graphic design at the University of Minnesota. Design authorship is an umbrella term that involves an expansive, more participatory, more self-directed, and more meaningful role for a graphic designer, independent of the service-based perception of their work. Through authorship, McCarthy identifies the activities of graphic designers as makers of message, shapers of form, and controllers of medium, and the results of this intersection are vast, often novel, and at times even radical.[1] The 1891 edition of *The Story of the Glittering Plain* stands as a seminal example that McCarthy uses to frame the holistic character of design-authorship projects. *Glittering Plain,* a fantasy novel by William Morris (1834-96) was produced at his Kelmscott Press, an entrepreneurial venture set about publishing well-crafted bound books in the tradition of early printing from fifteenth century Europe. Morris wrote the text, designed the content, printed, bound, and published the book only after he mastered the techniques of printing. Incidentally, his activism for well-crafted objects ran counter to the low quality of mass produced goods and thusly contributed to the Arts and Crafts movement in England.

As was Morris' experience, enabling these pursuits is the available technology, the democratization of tools for making, and new channels for distribution – those and the enterprising character of the individual. From the context of graphic designers in the early twenty-first century, publishing content is immediate, reaching communities happens on a global scale, and conversations transpire simultaneously. Content can be archived, recalled, remixed, or even put through analytics – all of which are enabled by the Internet, the Land of Everything That Ever Was Is Available from Now On.[2] In the 1980s, personal computers enabled the collapse of pre-existing skill sets and in the same breath created new ones. Together, the computer and the Internet enabled all that was digital to become transferrable across the planet. In the periphery were communication and cultural ramifications of the collapsed Berlin Wall, which, according to author and columnist for *The New York Times* Thomas L. Friedman, enabled the flattening of the world (thus realizing Marshall McLuhan's "global village"). "In this digital age," writes John Maeda, president of Rhode Island School of Design (RISD), "there is a renewed curiosity about humanity, materiality, and all things physical, simply because much of the world has lost sight of them."[3]

Another point of discourse on graphic design's evolution began in 2006 when AIGA, the professional association for design, partnered with software maker Adobe and began an initiative to define the designer of 2015–the so-called "2015 initiative." The Visionary Design Council, advisory board to the initiative, was assembled from notable leaders in the design, business, and design education communities. Between January and May 2007 interviews with influential leaders took place, and the 2015 initiative's statement of purpose took shape. Later that year, the initiative was shared among a larger, diverse group as a session at AIGA's national design conference. Then in April 2008, the AIGA-Adobe team took an online survey of the design community at large that generated more than 1,500 responses. Disseminated from these findings were thirteen competencies projected for the designers of 2015, who would be facing the demands of the profession's future. Supplementing them were six major trends identified for the challenges they posed to the entire design profession.

Between the two lists, a reader will encounter the denotation of *making* exactly once, and it occurs in the introduction to the six major trends: *These trends define design's role in a much broader, strategic context than its roots: the making of things and beautiful things. Although that remains an important contribution, they will be a manifestation of a solution that may involve many different forms, including intangibles such as strategy and experiences.4* For the designer of 2015, making is inherent to the process of what they do, but is no longer exclusive to the end-deliverable – it will be the means to an end and contribute to the end result, but may not necessarily be the end in itself. By contrast, within the thirteen competencies is the connotation of *making*, such as in the second competency: *Ability to solve communication problems including identifying the problem, researching, analysis, solution generating, prototyping, user testing and outcome evaluation.5* This competency addresses the design process as a general ability, and although not mentioned outright, graphic designers are *making* under the broader headings "solution generating" and "prototyping" that are mentioned. Within this process, these outcomes – be they tangible or not – go on to be user-tested and evaluated, whereby further iterations of a solution or prototype can be made or even redeveloped based upon the evaluation feedback.

To express the relationship of thinking and making, John Dunnigan, professor and department head of furniture design at RISD, authored the term "thingking." It describes a process-driven act of creating things by altering materials and giving form to ideas, while simultaneously evaluating information and challenging assumptions. Thingking is a process that leads to discovery and new possibilities. It is critical making, distinguished from making in the general sense, and different from production, which occurs after thinking ends and before fabrication begins.[6] The topic of making is tertiary in other AIGA 2015 competencies that speak to enabling technologies and interdisciplinary team structures. From the fifth competency one can postulate that when a graphic designer builds his or her acumen for new methods of making, it increases the capacity for what can be made. In turn, these abilities provide added value to clients and companies. Later on in competency eleven, productivity through collaboration within interdisciplinary structures is addressed. Here, the complex interconnections among people, places, and things lend themselves to problem solving at the systems level.[7] Greater complexity demands greater responsibility for a graphic designer to be an articulate communicator who interfaces across disciplines to get his or her work done. Moreover, the graphic designer will contribute to the making of systems that are intangible solutions, suggesting a shift in the profession toward a new paradigm.

As suggested by the 2015 initiative and the expanded roles that practicing graphic designers assume through authorship, the evolution of the graphic design profession challenges how future practitioners are educated. The technology that enables new capabilities in the profession holds promise for contributions toward design pedagogy and, equally so, ramifications for it. Rosanne Somerson, provost and chief academic officer at RISD, takes note of this in her introduction to the book, *The Art of Critical Making*:

> As educational systems propel us further and further away from physical, tangible experience, how better might learning support nimble, innovative, and imaginative thinking than through models that emphasize the iterative formation of ideas through making? Contemporary times call for contemporary thinkers and makers.[8]

Several of these issues were encapsulated within an advanced level assignment that I led for undergraduate graphic design students. The learning objectives for the assignment drew from my own six-point teaching philosophy of transferrable skills for students to carry into their careers as graphic designers. Titled the "Community Three-Dimensional Object," it set up an experience for my graphic design students to engage with a complex design challenge involving research of a topic, analysis of their findings, and identification of a problem statement for a hyper-local community of active users. Solutions were generated through an iterative making process I call *thinking with their hands*, which is similar to John Dunnigan's "thingking" in that they share a component for critical discovery through activity. Completed solutions were hand-held objects that connected to a greater social context with careful consideration for materiality, form, and user need. For example, Meghan's community wanted to shift negative public perceptions of the millennial generation through an

interactive survey administered by active users for a local event. Her work effectively heightened awareness to passive viewers about the greater instances of similarity between millennial and preceding generations. Jessica's community wanted to shape public opinion about expansion of the wind turbine industry in central Michigan, which ranks fourteenth in the United States for wind harvesting potential. Her work succeeds in delivering a memorable knowledge experience to passive-viewers through a crafting activity and exhibits notable attention to materials that are entirely reusable or recyclable (see Fig. 2).

Fig. 2. Jessica's wind turbine and Meghan's millennial objects.

Critical making procedures were implemented over the course of developing my master of fine arts thesis exhibition. To frame this reference, exhibiting graphic design in museums or galleries is vexing, as it removes the objects from their native context and limits consideration of the work exclusively as "art." But public exhibitions themselves create a situation for visual communication to educate. Aside from the social functions of museums, visitors seek inspiration and learning by them (hence the root word *muse* in museum). Creating spaces, arrangements, and exhibits within these institutions is another contribution from the graphic designer's acumen. Guiding designers is activity theory, a broad learning methodology focused on interactions of people with objects to foster understanding of their environment. This means an exhibit may undergo the work of a designer in the development of engaging environments, which creates conditions for an experience where cognitive intent emerges.

Informing and educating an audience is not exclusive to the practice of a graphic designer. The value of visual communication design, after all, is how it addresses nearly all aspects of society and culture. It is called upon to explain, inform, persuade, and entertain the behavior of viewers in their surroundings. When employed to inform, visual communication situates moments of contemplation – allowing for the consideration of meaning. When employed to educate, it disseminates appropriate knowledge messages to an audience of learners.[9] The agency of making abstract topics concrete within a knowledge environment was developed into the education theory *constructionism* by educator, mathematician, and computer scientist Seymour Papert (b. 1928). Constructivist teaching runs counter to didactic teaching strategies (i.e. lectures), and studies have demonstrated how long-format lectures are archaic and ineffective.[10] My work in the master of fine arts exhibition was the concrete manifestation of educational methods that inform a user experience about the topic of letterforms. Traditional museum culture, like that of the didactic classroom, has held the common notion that "seeing equals understanding." Comparatively, these museum and classroom environments share the challenge of catering their respective content for increasingly fragmented audiences with divergent learning abilities; i.e., "The visitor's desire to learn – but in easy accessible stages – suggests different priorities in exhibition display techniques."[11]

My polygon-shaped forms for the exhibition are designed as a new visitor experience with visual language. This serves as an appropriate topic based on the notion that museum visitors are inherently knowledgeable about their alphabet, yet specialized content from an undergraduate typography course offers a new set of categories for learning (see Fig. 3). Selected for this exhibition were general typographic anatomy terms, the histories of upper case letter and symbol development, anecdotes about particular letters and symbols, and select quotations from literary or graphic art sources. Each letter and symbol is nearly twenty-four inches tall, colorful, and clearly legible from across the gallery space. The multi-faceted surfaces on the forms engage visitors to read, explore, contemplate, and physically move around the information. Planning the physical scale of these forms took into account the social aspects of museum spaces, in that floor-standing works such as these should not create barriers for visitors. This is why the peak height is less than five feet tall, so that visitors on opposite sides of the forms may catch a glimpse of each other, encouraging social encounters. A hierarchy of textual matter was established so that levels of information could be experienced from various vantage points. Viewers may find content to enjoy on any of the form's five general surfaces, at close or distant proximity, and including the top (as visible from the above balcony at the Eli and Edythe Broad Art Museum, East Lansing, Michigan). Visual strength, clarity, and an expansive font family for great flexibility in the visual hierarchy determined the selection of the typeface Gotham by Hoefler & Co.,

Fig. 3. A knowledge experience within an exhibition space.

described by Typography.com as "… that rarest of designs, the new typeface that somehow feels familiar. From the lettering that inspired it, Gotham inherited an honest tone that's assertive but never imposing, friendly but never folksy, confidant but never aloof."[12]

Color was carefully selected on the basis of aesthetic and organizational properties. The Broad Museum gallery has a tremendous amount of natural lighting pouring in from its iconic northwest corner window and uses overhead lights to enhance the space. This meant colors would appear vibrant during day and evening times, and a specific palette was assembled to engage this characteristic. Each color has a corresponding dark and light value that was assigned to represent a particular style of letterform. Blues represent circle forms. Greens represent square-sided. Oranges represent square-circles. Reds represent angular forms. The difference in the color's value provides the means to highlight anatomy on the letters while creating spatial playfulness where letters overlap. I find the tension between two and three dimensions creating a visual implication of depth is a common attribute in my work.

The forms were assembled by hand with Photo-Tex brand repositionable printer fabric, half-inch honeycomb boards, two-by-four-inch lumber, and plastic-hinged edging at the seams. These materials contributed advantages during assembly. Honeycomb board may be prepared with a simple box cutter and is receptive to folds. It is also incredibly strong despite being lightweight (two pounds per 48-inch x 41-inch sheet). Photo-Tex is a printable, adhesive-backed fabric for large plotters that will not stretch or tear in production. In thinking about the lifecycle of my work beyond this particular MFA exhibition, I wanted the design to reflect a consideration of one-time use. Post-exhibition, the specific materials would be: 1) recycled – honeycomb board corrugated panels on the exterior and plastic-hinged edging, and 2) re-used – wall stud grade lumber for the substructure. It is the responsibility of a designer to develop clear visual communications for the end user, while simultaneously practicing as a good steward to the environment. My description for this is "design citizenry," working with a consciousness about the potential impact materials and artifacts have on society and the planet.

To provide a context for the reader that recounts my thought process and making procedure, I will share journal-style entries (had I made them at the time) accounting for my activity:

October 2013. Objective #1: Make dimensional letterforms. Objective #2: Put them in the most interesting space in the museum. At this phase, the process of making involves arrangements of letters, studies of their formal possibilities, and prototyping their placement in a museum. It didn't take me too long to realize that content (a message) had to be incorporated along with form. That notion eventually turned toward creating a knowledge experience for public visitors of the museum. No matter. That's a problem for another day. "Making is not about the end – it is about the process," says RISD associate professor of, foundation studies, Leslie Hirst.13 So I press on. Scouting locations in the Broad Museum revealed opportunities. Because I knew the physical space, I could ideate with human scale in mind. Working with museum preparators was invaluable, as these are the people who know the dimensions, materials, weight load restrictions, and logistics of these spaces. Most helpful was they offered me insights about the museum's virginal terrain. These particular spaces throughout the museum are where no artist had ever placed work, but some exhibiting artist could. It helps that the museum opened in 2012, leaving immense potential to help "break in" the space, and that the staff was cognizant of the museum's identity as a contemporary showplace. Furthermore, they opened their "wouldn't it be cool if …" possibilities to me. I would make. I would position. I would study. I would repeat.

January 2014. Objective #1.1: Create a dimensional, unique knowledge experience about letterform styles. Objective #2.1: Place them in the museum with all the other MFA work that includes visibility from above. Space is a premium commodity anyway, and the Broad was filling up with work in every gallery making for a hectic spring calendar. My formal studies considered situating a floor-seated piece that was visible to users from five sides. They can walk around, see through, and experience the piece from above. At this point the spectacle of a wall of lettering approximately eight feet tall has been explored deeply. Note to self: I need to flesh out practical concerns SOON. At this phase, co-dependency of content and form relationships was included with each study. Museum visitors would learn about the styles of letterforms (round, straight-sided, etc.) in a visual array of letters and punctuation marks. Form and counter form studies opened the possibility of "windows" for users to see through to the other side. Cropping letterforms brought abstraction to the letters and treated them as framed modular units (see Fig. 4). *This suggested that construction of the forms could be of flat panels, or even six-sided boxes. As boxes, more surfaces could welcome more content. Explorations of a gridded box arrangement included staggering units, stacking … Modularity also*

became a strategy for placement in the gallery space, knowing that flexibility around other graduate works would ease installation. Intuitive engineering will be required.

Fig. 4. Form and counter form study with "windows."

Nothing that I wrote about could have happened had I not received undergraduate and graduate degrees in graphic design from the fine art departments of public universities rather than design schools. Within their academic framework, the fine art discipline's choice for disseminated forms remain publication and exhibition, which are the venues best suited for peer review and public witness to the work at hand. Facing this at the beginning of my studies, I formed an unspoken thesis statement for myself: "What does a designer do with a gallery space?" During the journey I was able to develop a thesis that explored disciplines beyond my own, and these included education theory, pedagogy studies, architecture, environmental design, and museology (the science or practice of organizing, arranging, and managing museums). Encounters with sources such as those from Steven McCarthy, AIGA, and RISD occurred, in part, after my thesis was completed. I had been actively informed by AIGA's proceedings for much of my career as a practicing graphic designer prior to attending graduate school, but from the perspective of a master of fine arts program they took on greater meaning in my work as a design educator. By happenstance, my faculty mentor at Michigan State University, Kelly Salchow MacArthur, associate professor of graphic design, is an RISD graduate, and I can only assume that her experiences there permeated the guidance she provided during my making process. This is in reference to the material I found in the *Art of Critical Making* text produced by that design school in 2013 and how relatively familiar it seemed to me post-MFA.

If anything, the experience of producing an MFA thesis presented the opportunity to practice and develop awareness of graphic design under the new paradigm that incorporates authorship, and making; contributing to society beyond the sphere of consumer culture. If my professional title as a graphic design educator were a neon sign, it would now have a malfunctioning word – "graphic."

Images provided by author.

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[1] Steven J. McCarthy, "Chapter 1: Concept, History," *The Designer as Author, Producer, Activist, Entrepreneur, Curator & Collaborator: New Models for Communicating* (Amsterdam: BIS, 2013),7-27. This thought also framed by McCarthy's introduction to the book.

[2] Patton Oswalt, "Preface Forward Intro," *Zombie Spaceship Wasteland: A Book* (New York: Scribner, 2011), 4.

[3] John Maeda, "Foreword," *The Art of Critical Making: Rhode Island School of Design on Creative Practice*, Eds. Mara Hermano and Rosanne Somerson (Hoboken: John Wiley & Sons, 2013), 7.

[4] AIGA and Brian Rea (illustrator), "Designer of 2105 Trends," http://www.aiga.org/designer-of-2015-trends/.

[5] Ibid.

[6] John Dunnigan, "Thingking," in Hermano and Somerson, 94-115.

[7] Meredith Davis, "AIGA Boston Presentation," http://www.aiga.org/uploadedFiles/AIGA/Content/Tools_and_Resources/Designer_of_2015/davis_keynote_paper_and_images.pdf.

[8] Rosanne Somerson, "The Art of Critical Making: Introduction," in Hermano and Somerson, 19-31.

[9] Andrew Blauvelt and Ellen Lupton, "Introduction," *Graphic Design: Now in Production*, Eds. Rob Giampietro (Minneapolis, MN: Walker Art Center, 2011), 9.

[10] An abridged section from my MFA thesis that includes ideas from two sources: Joan Middendorf and Alan Kalish, *The "Change-Up" in Lectures* (Rep. N.P.: Middendorf & Kalisch, 1996), and John H. Falk, *Identity and the Museum Visitor Experience* (Walnut Creek, CA: Left Coast, 2009), Chapters 7-10, especially Ch. 7, "The Museum Visitor Experience Model."

[11] Philip Wright, "The Quality of Visitor's Experiences in Art Museums," *The New Museology*, Ed. Peter Vergo (London: Reaktion, 1989), 119-48.

[12] "Gotham," http://www.typography.com/fonts/gotham/overview/.

[13] Leslie Hurst, "Groundwork," in Hermano and Somerson, 37.

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The Architecture Studio … Because Nobody Warned Me

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Abstract

The romanticism of the studio environment is one that entices us to the profession of architecture. We see it in the movies and read about it in *The Fountainhead*, but is it still alive and well? And will it continue that way? Our study of the studio begins in the Renaissance and continues through time to include the Ecole des Beaux Arts, Wright's Ocatillo, the Charles and Ray Eames Studios, and the present-day school environment.

The studio is a much-necessitated space of learning. Teaching styles may vary and technologies have also definitely changed, but the energy created in the studio of a working environment will continue to be a source of creative stimulation in the present, as it has in the past and will be in the future. One can only imagine Brunelleschi directing the men building the Santa Maria del Fiore dome, or any wise man directing construction taking suggestions from the mason who knew how to work the material. One can imagine François Blondel directing his students in Rome, surveying the great columns, and then rebuilding them to life-size scale at the École des Beaux Arts in Paris, or Frank Lloyd Wright directing his students as they designed the resort in Arizona on the campground studios they built and called Ocotilla. Charles and Ray Eames created furniture, architecture and film, and Frank Gehry designs his irregularly-shaped structures in his studio and then transfers the information to modern digital technologies for which he was a pioneer.

In all cases, there has been the spirit of learning, collaboration and use of modern technology in a space, whether open to the skies or defined by walls and roof. In each case, the technology reflected its time. Brunelleschi used a chain to tie the base of the dome, Frank Lloyd Wright used translucent canvas roofs and Frank Gehry used the computer to be able to construct the museum at Bilbao.

Finally, I will demonstrate how the romanticism of the studio is still very much alive today and will continue to be despite the change or inclusion of digital technologies by showing modern-day examples of the studios; one in an existing warehouse and another a new structure. I will conclude with a description of how I apply my experience to influence, inspire, and encourage students to include all they learn in studio in their projects as they advance in their careers.

The Architecture Studio

To describe what the studio is, we can begin by searching on Merriam-Webster's online dictionary, which states that a studio is a place where people go to learn, practice or study an art. The definition of the studio is best described by events and places that have led to the creation of tremendous architecture. Such was the case with Brunelleschi when, described by Antonio Di Tuccio Manetti, after losing the competition for the Baptistery doors, Brunelleschi and Donatello go to Rome where:

> … he observed many marvels and beautiful things since for the most part were built in diverse epochs by very fine mas ters … He saw ruins – both standing or fallen down for some reason or other – which had been vaulted in various ways. He considered the methods of centering the vaults and other systems of support, how they could be dispensed with and what method hat to be used, and when – because of the size of the vault or for other reasons – armatures could not be used.[1]

After his studies in Rome he returns to Florence and builds the great dome of Sta. Maria Del Fiore. Here we see two types of studios, both very relevant, inspiring, and crucial to the development of Brunelleschi's architectural career: one studio being Rome and its great buildings, and the other the construction site at Sta. Maria Del Fiore. One must also consider his upbringing, including the studio in which he and his family would create fine jewelry and how it helped develop his eye for detail and function. With his combination of knowledge, Brunelleschi was also able to come up with modern technology that helped him in the construction of the dome.

We can continue our studies by reading about the École de Beaux Arts in Paris, where Jean-Baptiste Colbert, who sent his students to Rome to study, surveyed and then built to scale these great wonders in the courtyards of the school so that the incoming students may gaze upon these works, learn from them, and then apply this knowledge in their quest to be architects. In this sense, their studio beginning was similar to that of Brunelleschi, where Rome's great structures inspired and educated, but, at the École de Beaux-Arts, the studio was found in their courtyard and corridors. Jean-Baptiste Colbert and, as years passed, Felix Duban, the director following Colbert, continued to add learning features to the school as he remodeled.[2] Thus, by having the students recreate the surveyed columns to scale and by the decoration on the walls of the corridors, an experience was created that, in turn, influenced the mental development of all students .

We move on to Frank Lloyd Wright, who took advantage of all his surroundings and called nature his church and his studio. One of those studios was located in Arizona, while designing San Marcos in the Desert, which was to have been a resort. Wright describes,

> [The] Arizona desert itself was an architectural inspiration to me and because it was actually the architect's workshop in this endeavor, the feeling of the whole building in all its parts now designedly belongs to the terrain. This is what I mean by indigenous architecture. San Marcos in the Desert proves it is not only possible but that it is here.[3]

Wright and his apprentices worked in a camp they created that they took to calling "Ocatillo," an ephemeral camp whose terrain inspired them. Wright describes,

> The little camp is finished. We love it. The canvas windows and the doors of Ocatillo are like ships-sails … a discovery I made in seeking coolness, to be used during the heat of the day; closed at night … the lines of the landscape stretching themselves wide open toward the sun in order to aid a little in warming the interiors in winter.[4]

He continues to describe the camp and how they worked to design San Marcos in the Desert Resort, "We worked on it until the middle of the following June. Often we worked at night by gasoline light until we put in a Kohler plant and had all the electric light we wanted. We worked out of the 'resort'"….[5] This is just one account of many ephemeral studio spaces he worked in. In his autobiography, he describes the seven years he spent in Japan, where he learned Japanese customs and how they worked and studied and about the soil where he was to build the Imperial Hotel. There, he came up with a floating foundation construction that later proved to be successful. Prior to attending college, Wright describes his upbringing at the Lloyd Jones' farm at age eleven and playing with Froebel blocks among many other studio experiences he had.

In the film documentary on Charles and Ray Eames, narrator James Franco describes their office in Los Angles, California, as an ad hoc studio, where one day the desks would be in place for the employees to work on and the next the space would be cleared out and turned into a filming studio. When the circus would come to town, Charles Eames would supply the employees with cameras and film and instruct them to take lots of pictures.[6] The Eameses also created their own laboratory while working on the Case Study House in Palisades, California, which has served as a great learning laboratory for architects and architectural students alike.[7] That was Charles Eames' established studio but does not include the studio where he and Eero Saarinen worked on the development of what is now known as the Eames chair, which later Mr. and Mrs. Eames and his office perfected and completed. The Eames office researched, developed, and introduced a lot of new technologies and used them in its offices, and these technologies are still used in today's settings.

Frank Gehry describes to director Sydney Pollack how he comes up with his designs. In one scene we see him with his designers forming cardboard into the shape he feels best fits the structure they are working on. The model is then finalized and transferred to a digital image that plots coordinates and helps create the drawings for the project. This is his current-day studio, but he explains that, before he studied architecture, he was an art student at the University of California Los Angeles, where one of his professors invited him to go with him to a job site. At the job site, construction was going on which intrigued him and his professor, after observing Gehry, suggested that he study architecture instead of sculpture.[8]

Because Nobody Warned Me

This brings me to my experiences with "the studio," and I begin with a Louis I. Kahn quote that has intrigued me since I watched the documentary that his son, Nathanial Kahn, produced, *My Architect:* "How accidental our existences are really, and how full of influence by circumstance."[9]

I had always credited my high school drafting teacher for introducing the wonderful world of architecture to me. Jay Stevens did a good job of directing me this way, but ever since I heard that quote, I have looked back and felt that, had it not been for my lack of craftsmanship in industrial arts in junior high, my shop teacher, Mr. Beasley, would not have told me that, instead of signing up for shop at the vocational school, I should try drafting first. If that had not have happened, I would not have done so. These are two forms of studios I was exposed to at that age: the wood shop and the drafting studios.

In the process of recalling the events that have led me into my educational path, I began to read *Frank Lloyd Wright: An Autobiography.* I began to recall events and the environments, or studios if you will, that led to my architectural education and to now being an educator. Thinking of the events has brought back memories of a short informational film presented on *Sesame Street,* which is now available on YouTube. In the den of our house where I played with Legos and other toys, I watched this short film of a man working on a structure. I discovered it was the Watts Towers in Los Angeles, California, and that it was dreamt up and constructed by a man named Simone Rodia.[10] The den is not very different than the school that Wright attended, where he learned to play with blocks, except for the Legos and the television, which was a new technology of the time and a visual stimulator for me. I also had to look to the time when my father added on to the house. Those were my teenage years when I used to spend hours staring at the floor plans and elevations that the draftsman my dad hired had drawn up to help build my dad's dream. Perhaps it was not the famous cathedrals that Wright and others were exposed to, but it was my cathedral.

When attending college, another accidental influence in circumstance was my education at the University of Texas at Arlington, where we were supplied with studios, and my friends and I experimented with photography, model building, spray painting, and other means of technology. I later applied that experience when I created a studio in my house while working on my master's degree via long distance at La Universidad Nacional Autónoma de México, best known as UNAM, or The National Autonomous University of Mexico, in collaboration with the University in Juárez, known as the Autonomous University of the City of Juárez, from 1998 to 2001. Here, our studios changed considerably. Not only was the learning a new way of getting instruction – long-distance learning and now online education – now we were using computers to write our reports, scan our sketches, create CAD drawings, download pictures from our new digital cameras, and ultimately produce our theses. And since studios were not supplied, our teams would take turns going to each other's houses, sharing our ad hoc studios to produce the work asked of us. This was for the time somewhat different, though I am reminded of visiting a friend who was attending Columbia University in 1995 who was already creating drawings on the computer.

In reflecting further, I am also reminded that my current house has been my laboratory or studio, much like Wright's but without the apprentices to help me tear down, cut down, and build to alter an existing 1960s home. Help of course I've had, but paid help or help from my father. In my studio I have cut the grade of the slope, added concrete block walls, stucco walls, put in pavers and painted the house exterior, among other experiments. In the interior, I have demolished walls, put up new beams and piers, new wood flooring, new sheetrock, and textured and painted, among other experiments. It is a marvelous studio where I have been free to build, learn, and improve that craftsmanship I once lacked.

The Studio Space of the Future

The studio space, what it is and what it will be, can be paired off with what Louis I. Kahn told students out on the lawn at Rice University in Houston when he was asked where architecture would be in fifty years. His first response to that question was "You cannot anticipate…" and was followed with a story of how, while working with General Electric, he was shown a drawing of what a space port would look like and in response, he said to the engineers,

> It will not look like that… and they moved their chairs closer to the table and they said, 'how do you know?' I said it was simple … if you know what a thing will look like fifty years from now, you can do it now. But you don't know, because the way that a thing will be fifty years from now is what it will be.[11]

The Others and Ours

Within the past five years, in the search for ideas about what the most current idea on how a studio should be, I visited two schools of architecture that have organized their studios in the most current of layouts. And although one is a reclaimed structure and the other is a new structure, both setups are relatively similar.

The first was the Southern California Institute of Architecture in Los Angeles, California (Fig. 1). The studios are set up in a series of reclaimed railroad warehouses. Each warehouse is set up for a different purpose, including the studios. There are no partitions separating the classrooms and the only thing that separates the different class levels are the warehouses in which they are set up. The critique area is set up in the corridor that connects the warehouses and one or two conference rooms are included in a separate warehouse for instruction, away from the open and possibly noisy studio spaces. Even their furniture seems to be built by the students and is complimentary to the open warehouse space. The second school I visited was the School of Architecture and Planning at the University of New Mexico in Albuquerque (Fig. 2). Antoine Predock designed an open studio space that has no visual separations among the classes or class levels, all of which are located on the second floor of the School of Architecture and Planning. Only the graduate students, who are located in a mezzanine level, have special treatment. In the same area where the studios are located there are a series of conference rooms for instructional space, and these are the only areas that have partitions. The critique area is on the lower level.

In both cases we see an open studio with the bohemian treatment of sketches and cardboard and other model-making materials all over, and buried underneath all these traditional experimental devices is the laptop. The spirit of the studio lives well in both spaces.

Fig. 1. SCI Arch Studios, Los Angeles, California *(photograph by Emmanuel R. Moreno)*

Fig. 2. UNM School of Architecture Studios, Albuquerque, New Mexico *(photograph by Emmanuel R. Moreno)*

In the studio today, and in the manner that my design studio at the El Paso Community College is conducted, this spirit of learning, experimenting, and using modern technologies is very much in the spirit of the past, present, and dare I say, future. One must keep up with the technologies of the day, but as I tell my students, one must learn to crawl before we can learn to fly. So we begin the studio by describing what it is that, at least for the moment, the student realizes has been an influence in his or her decision to pursuing a career in architecture. At that time we also investigate proportions found in nature and also used in the design of structures. One then describes how our perceptions of space and the creation of it and of forms affect how we see space. This explanation is accompanied by a project that incorporates the creation of such and the use of proportions to do so. We then explore the outdoors and go on a hike and investigate our environment – the rocks, plants, and wildlife.

For the starting student, particularly in the foundations of design, I hope to help them channel that inner childhood creativity by breaking away from the everyday use of computer games, social media, and sometimes misleading Internet searches by introducing visual and hands-on projects at the beginning of the semester. Then they learn to transfer that information to a digital end product, and are taught how the past has influenced the present and thus the future. We begin the semester by having the students learn craftsmanship with a simple project where they learn how to build basswood models. So again, we begin with our hands, similar the beginning stages as children who are learning through visual and physical contact. The course continues by having the students select from a list of significant modernist structures and explore and investigate the proportional system used to create the structure along with the forms and volumes this system creates through a series of drawings and a skeletal model depicting what was researched.

In keeping with the spirit of the studio environment, the first two projects help to preserve the past and instill it in the students, and then we continue with the present through the following project. In the beginning of the project, the information researched is also understood through hand drawings and then built with cheap cardboard that can easily be cut and altered as needed and then transferred to the computer, thus introducing modern-day technology. Finally, students complete a basswood model to demonstrate craftsmanship. The students are encouraged to discuss what they learned from previous and current projects, to include personal experiences, and to articulate what it is about those personal experiences that influenced them to become interested in architecture. They then tie together the two experiences to emphasize what they learned. Through this investigation, students should be able to discuss proportions found in the modernist structures and how they can use them in the design of structures. We then describe our perceptions of space and the creation of it and of forms, and we introduce a project that incorporates the creation of space and the use of proportions to do so. No real-life practical purpose is set on the creation of this project; the

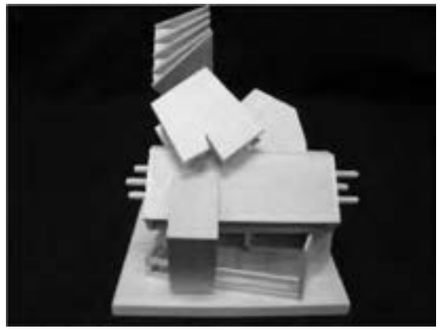

Fig. 3. Forms and Space Project student Peter Armendariz Spring 2012 *(photograph by Emmanuel R. Moreno)*

Fig. 4. Bridge to Sanctuary Project, Student Edgar Sanches Spring 2014 *(photograph by Emmanuel R. Moreno)*

assignment consists of the students creating volumes with the assistance of a cubist painting, and students implement the proportional system they previously learned by using it to create volumes and forms that are visually pleasing (Fig. 3). In this stage of the studio, the students are using the studio not only to create their projects, but as the students have become familiar with each other, it is a space for collaboration, exchange of ideas, self-teaching, and helping one another improve their craftsmanship, and they give each other ideas on how to go about building the physical models and how to make the computer drawings to create their presentations.

The final project combines all that they have learned, and they are encouraged to explore the possible future. Students are then presented with the task of designing a bridge to a meditation sanctuary in a canyon located in the Franklin Mountains of El Paso, Texas (Fig. 4). The process begins with a personal exploration of the site and then continues when they are asked to find a native plant and study the building blocks of this plant, very much in the same spirit as studying the Froebel blocks that Wright used as a child. From there, the student then creates the structure and meditation sanctuary. In all cases, we see the exploration of the site as our outdoor studio, a place to absorb we see and learn from it. Then the students apply what we learn in the studio environment to produce their projects.

What I Have Come to Understand

> *… Cameron said suddenly: "Howard, when you open your office, take snapshots of it and show them to me." … Three days later he came back … Roark handed him an envelope, without a word. Cameron looked at the snapshots, at the one of the broad, bare office, of the wide window, of the entrance door. He dropped the others, and held the one of the entrance door for a long time …"Howard," he said. "Look at it." He held it between them. "It doesn't say much. Only 'Howard Roark, Architect.' But it's like those mottoes men carved over the entrance of a castle and died for …"*[12]

In conclusion, I have explored those influences and events of the past, of the present, and of a suggested future. In this exploration, I described how the architects of the past have studied and learned how to create spaces and forms and how modern-day architects, such as Wright, Eames, and others, explored and used modern day technology.

Observing successful current schools of architecture and how they use their studio spaces solidifies that the students at the El Paso Community College are using their studios in much the same way and confirms that the spirit of the studio is still very much needed for the experimentation and collaboration, and this use space can guide the students in the right direction for a positive learning experience. The spirit and romanticism of the studio is well and present today and will apply to the future. These are the circumstances and the goals we aim for that help lead us to our eventual life-long education and influence how we conduct our offices to create better architecture.

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[1] Harry Francis Margrave, *Architectural Theory* (Malden, MA: Blackwell Pub, 2006).
[2] Richard Ingersoll and Spiro Kostof, *World Architecture: A Cross-Cultural History* (New York: Oxford University Press, 2013), 719.
[3] Frank Lloyd Wright, *Frank Lloyd Wright: An Autobiography* (Petaluma, CA: Pomegranate), 312-315.
[4] Ibid.
[5] Ibid.
[6] Sydney Pollack, director, *Sketches of Frank Gehry* (Sony Pictures Home Entertainment, 2006).
[7] Jason Cohn and Bill Jersey, directors, *Eames: The Architect and the Painter* (New York: First Run Features, 2011).
[8] Pollack.
[9] Nathaniel Kahn, director, *My Architect* (New York: New Yorker Video, 2004).
[10] Watts Towers Foundation, "Stock Footage - Watts Towers, Los Angeles," uploaded on 7/10/2010, http://www.youtube.com/watch?v=8egAOJdsrXI.
[11] Louis I. Kahn and Dung Ngo, *Louis I. Kahn: Conversations with Students* (New York: Princeton Architectural Press, 1998), 36-39.
[12] Ayn Rand, *The Fountainhead* (New York: Plume Publishing, 1968).

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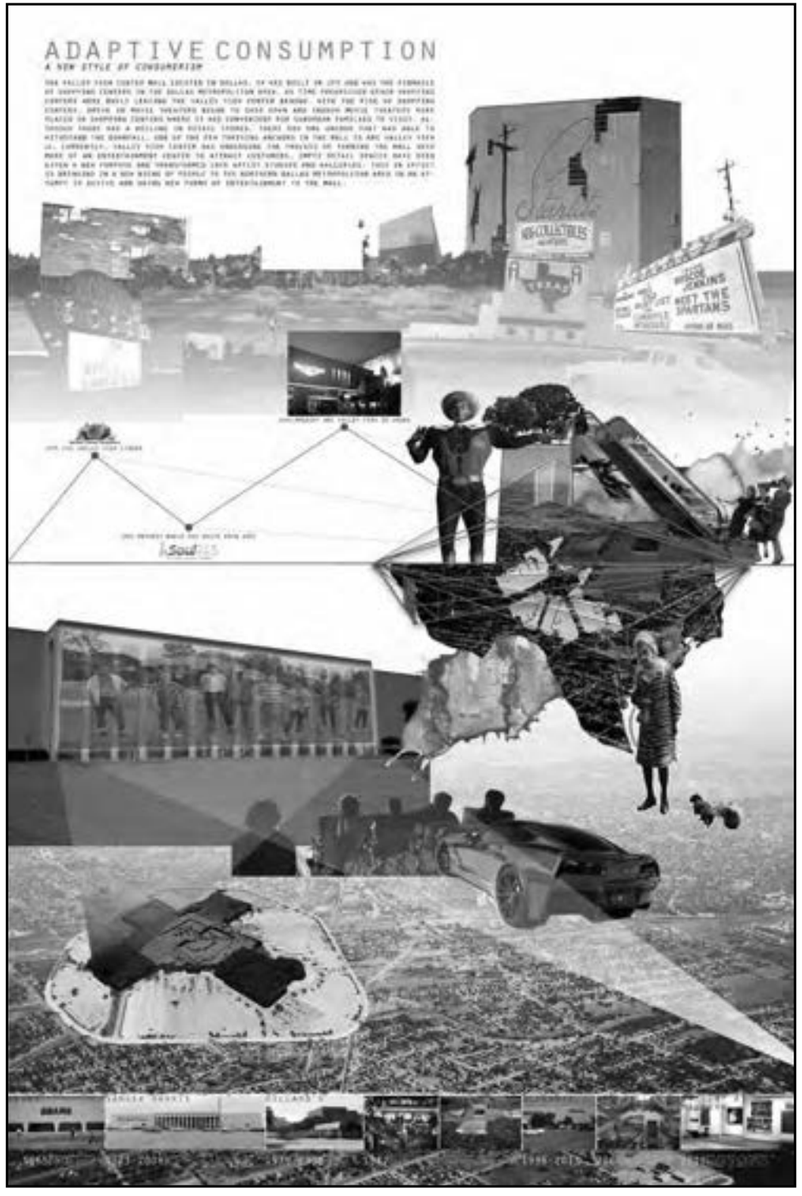
POSTER PRESENTATIONS

Adaptive Consumption: A New Style of Consumerism

Joseph Echavarria, Student
Gregory Marinic, AIA, ACSA, NCARB, IIDA, IFI, IDEC, Faculty Advisor
Ziad Qureshi, Faculty Advisor
University of Houston



Abstract

The Valley View Center Mall located in Dallas, Texas was built in 1973 and was the pinnacle of shopping centers in the Dallas metropolitan area. As time progressed other shopping centers were built, leaving the Valley View Center behind. With the rise of shopping centers, drive-in movie theaters began to shut down and indoor movie theaters were placed in shopping centers, where it was convenient for suburban families to visit. Although there was a decline in retail stores, there was one anchor that was able to withstand the downfall AMC Valley View 16. Valley View Center has undergone the process of turning the mall into more of an entertainment center to attract customers. Empty retail spaces have been given a new purpose and transformed into artist studios and galleries. This in effect is bringing in a new niche of people to the northern Dallas metropolitan area in an attempt to revive and bring new forms of entertainment to the mall.

Architecture in the Dark

J.P. Maruszczak
Associate Professor
University of Texas at Arlington

Roger Connah
Associate Professor
Carleton University

Abstract

Believing the world needs constant scripts to renew its own meaning, architecture in the dark draws out at 24fps cinematic reverse architecture within the listing body of the Costa Concordia. The script of seven cuts navigates several questions: Do architects always meddle in areas they cannot control? Or can we turn this on itself? Are architects always usefully behind the philosophical, social and cultural curve? Is speculation – fiction and non-fiction – less and less trusted while new science and bigger and bigger data makes information networks from laundry lists and corporate failure? Films can be re-shot to become virtual architecture. Our incredible advances in technology, management and risk might be neutralizing our cities as we speak.

Are we facing the drastic condition of The Indifferent? architecture: the dark side!

bleunoir

Stephanie Garcia
Estefania Mendivil
Gregory Marinic
Arquipelago

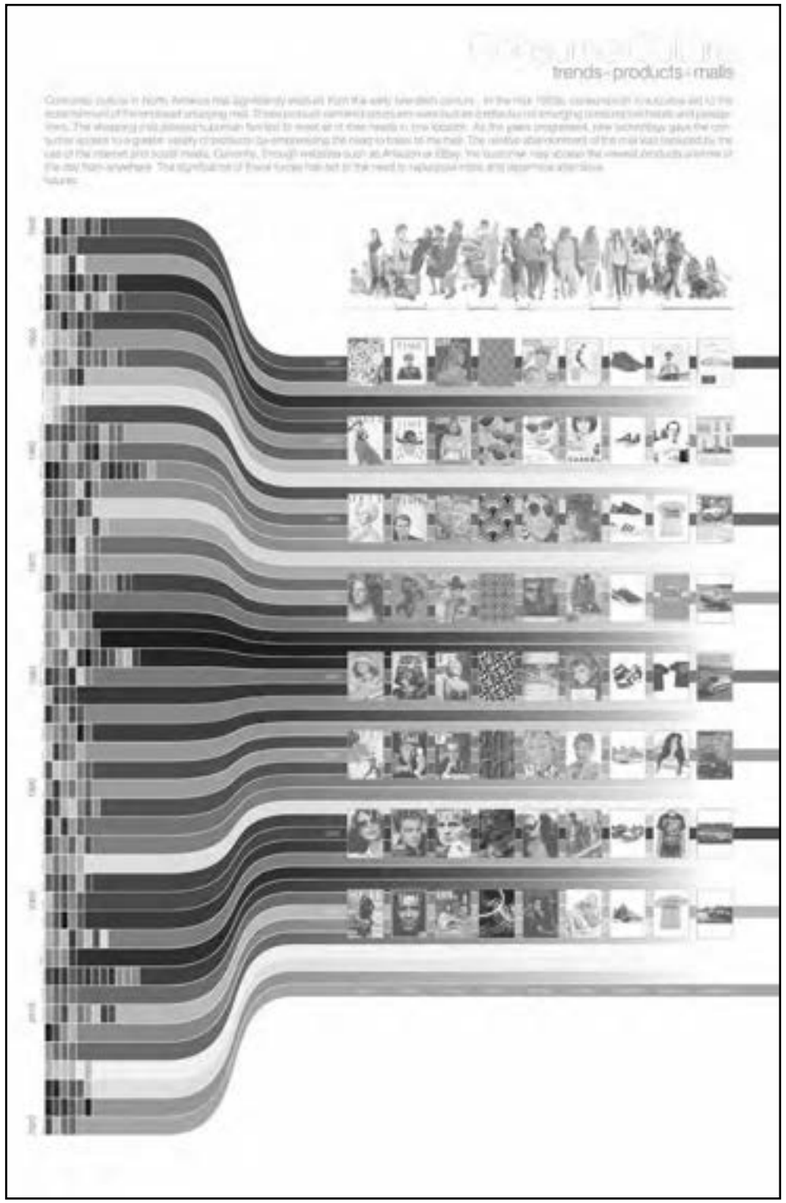
Abstract

This project focuses on an immersive interior architectural environment housed within a landmarked building in Soho. Time, memory, and materiality form a provocative narrative merging past and present. Here, a new French restaurant is intermingled with both a wine institute and retail space. Film and filmmaking were explored as conceptual generators with particular reference to issues of time, space, atmosphere, and remembrance. Focusing on methods of joining form, materials, and space, research explored the overlapping realms of film noir and architecture in interior environments, at the building scale, and within the larger urban context of lower Manhattan.

Like the cuisine it backdrops, the design of Bleunoir and Vinothèque speaks simultaneously to traditional and contemporary conditions. Nineteenth-century interior architectural details are preserved, restored, and revealed as subtle counterpoints to an inserted contemporary spatial and material language. The challenge of this space was to create a light-filled underground space that would gently invite patrons to venture further below street level. A three-story wine tower marries four levels of space with two discrete programmatic environments.

Consumer Culture

Joseph Echavarria, Student
Arianne Gonzato, Student
Gregory Marinic, Faculty Advisor
Ziad Qureshi, Faculty Advisor
University of Houston

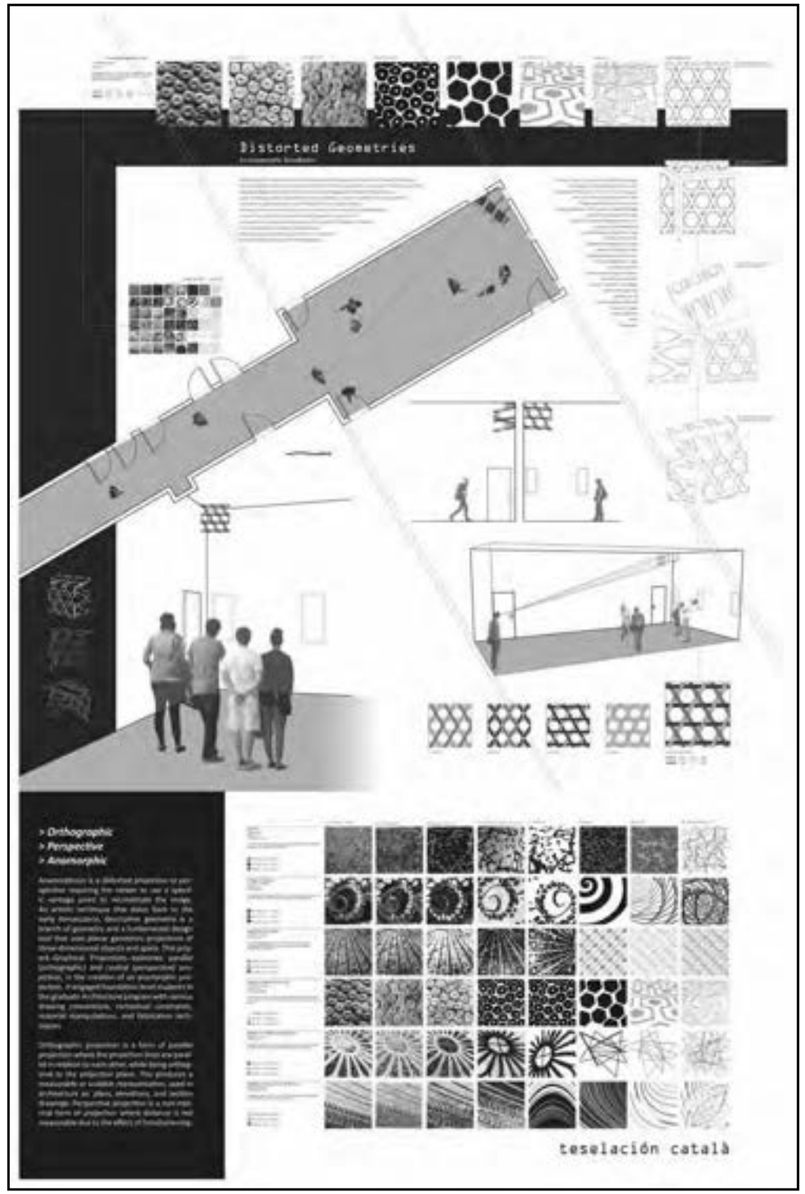


Abstract

Consumer culture in North America has significantly evolved from the early twentieth century. In the mid-1950s, consumption in suburbia led to the establishment of the enclosed shopping mall. These product-centered structures were built as a reflection of emerging consumptive habits and perceptions. The shopping mall allowed suburban families to meet all of their needs in one location. As the years progressed, new technology gave the consumer access to a greater variety of products, de-emphasizing the need to travel to the mall. The relative abandonment of the mall was replaced by the use of the Internet and social media. Currently, through websites such as Amazon or eBay, the customer may access the newest products anytime from anywhere. The significance of these forces has led to the need to repurpose malls and determine alternative futures.

Distorted Geometries

Courtney Doss-Lomas,
Graduate Student
Jessica Fleming,
Graduate Student
Alex Pickard, Graduate Student
Gregory Marinic, Faculty Advisor
Jason Logan, Faculty Advisor
Graduate Architecture Program
University of Houston

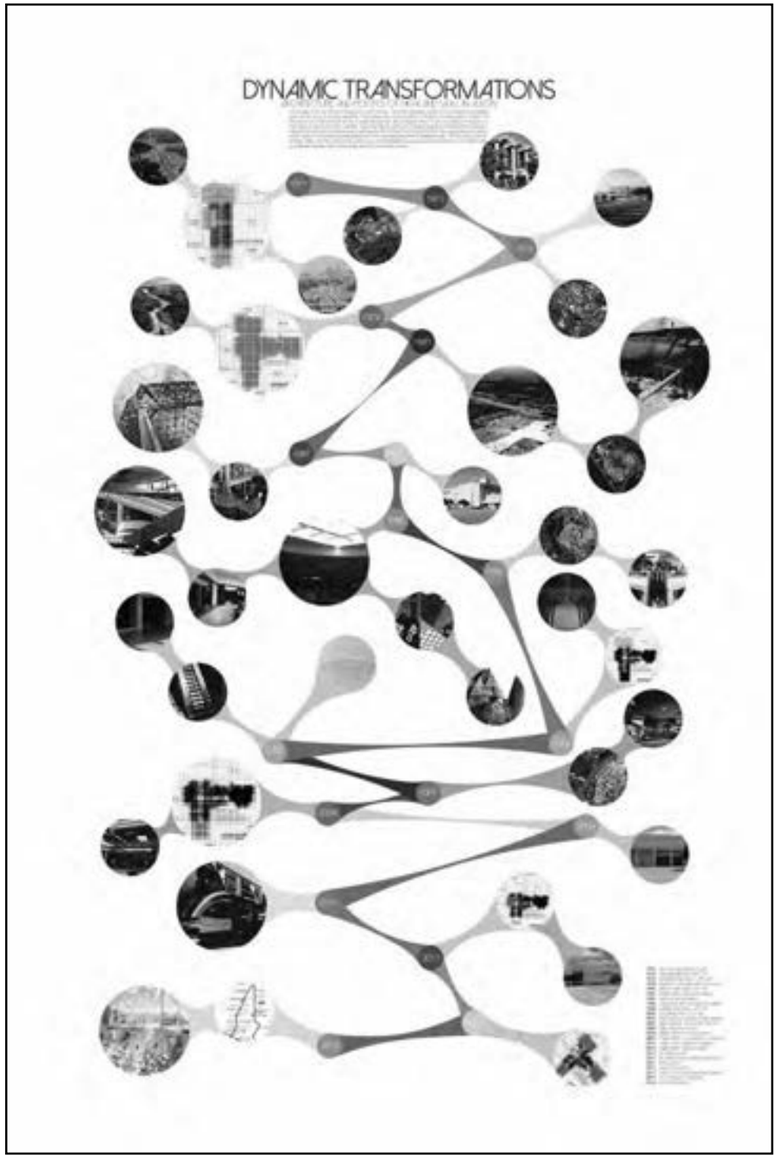


Abstract

Anamorphosis is a distorted projection or perspective requiring the viewer to use a specific vantage point to reconstitute the image. An artistic technique that dates back to the early Renaissance, descriptive geometry is a branch of geometry and a fundamental design tool that uses planar geometric projections of three-dimensional objects and space. This project – Graphical Projections – examines parallel (orthographic) and central (perspective) projection in the creation of an anamorphic projection. It engaged foundation-level students in the graduate architecture program with various drawing conventions, contextual constraints, material manipulations, and fabrication techniques. Orthographic projection is a form of parallel projection where the projection lines are parallel in relation to each other, while being orthogonal to the projection plane. This produces a measurable or scalable representation, used in architecture as plans, elevations, and section drawings. Perspective projection is a non-metrical form of projection where distance is not measurable due to the effect of foreshortening.

Dynamic Transformations: Architecture and Politics of Highland Mall in Austin

Ana Sotelo, Student
Gregory Marinic, Faculty Advisor
University of Houston

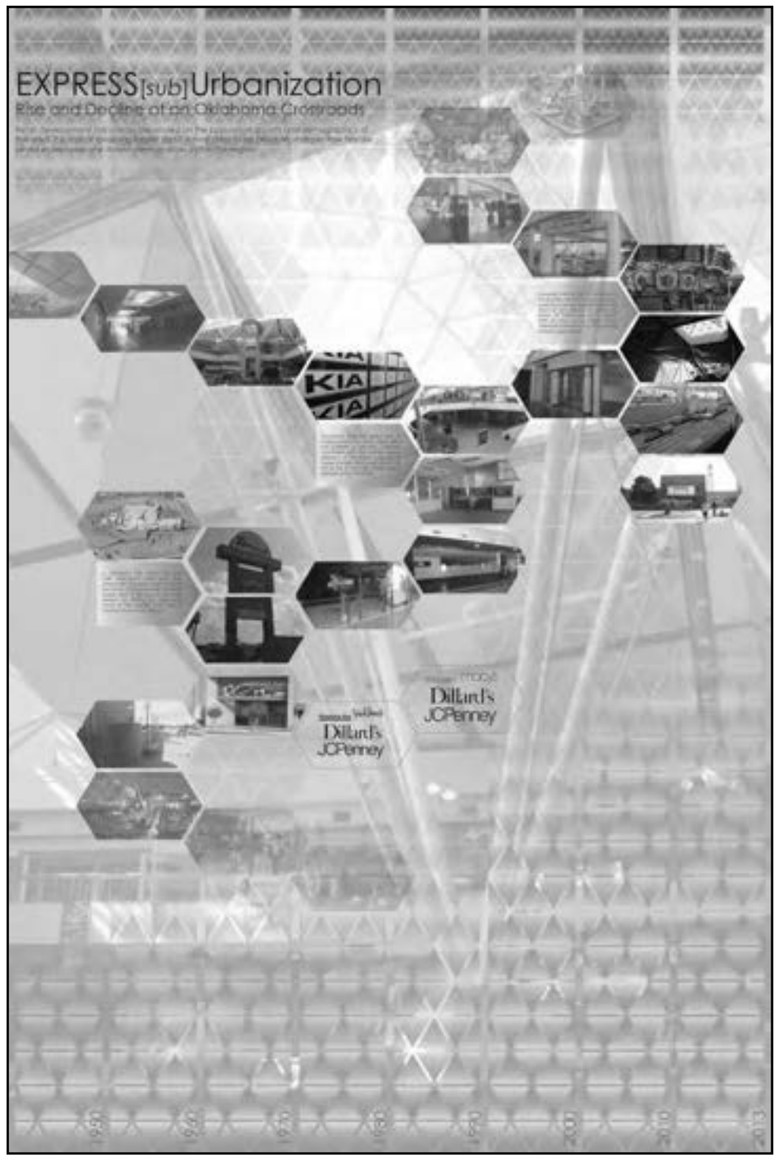


Abstract

The decade of the 1970s is often depicted as one of pivotal change. Socially progressive values were becoming increasingly more prominent while political and economic liberties of women were also rising. These values were noticed in urban environments, including Austin. Austin, in the 1970s, was seen as a cultural Mecca, a creative atmosphere, and a dynamic setting. It was home base for those who were intellectual, freethinkers, and musicians. In the time that followed, the city was known for being a place of cultural clash. The Highland Mall came to be in the 1970s, emerging with Austin's new vibe. Through the 1980s and '90s, this mall was the primary shopping venue. As the notions of the time changed and the demographics of different parts of the city shifted, the mall lost much of its clientele. Today, the mall consists of few open stores, many vacant leasable spaces, and deserted parking lots. The mall is now used by those few Austinites who use its empty space for their own leisure activities.

Express [sub] Urbanization: Rise and Decline at an Oklahoma Crossroads

Francesca Sosa, Student
Gregory Marinic, Faculty Advisor
Ziad Qureshi, Faculty Advisor
University of Houston

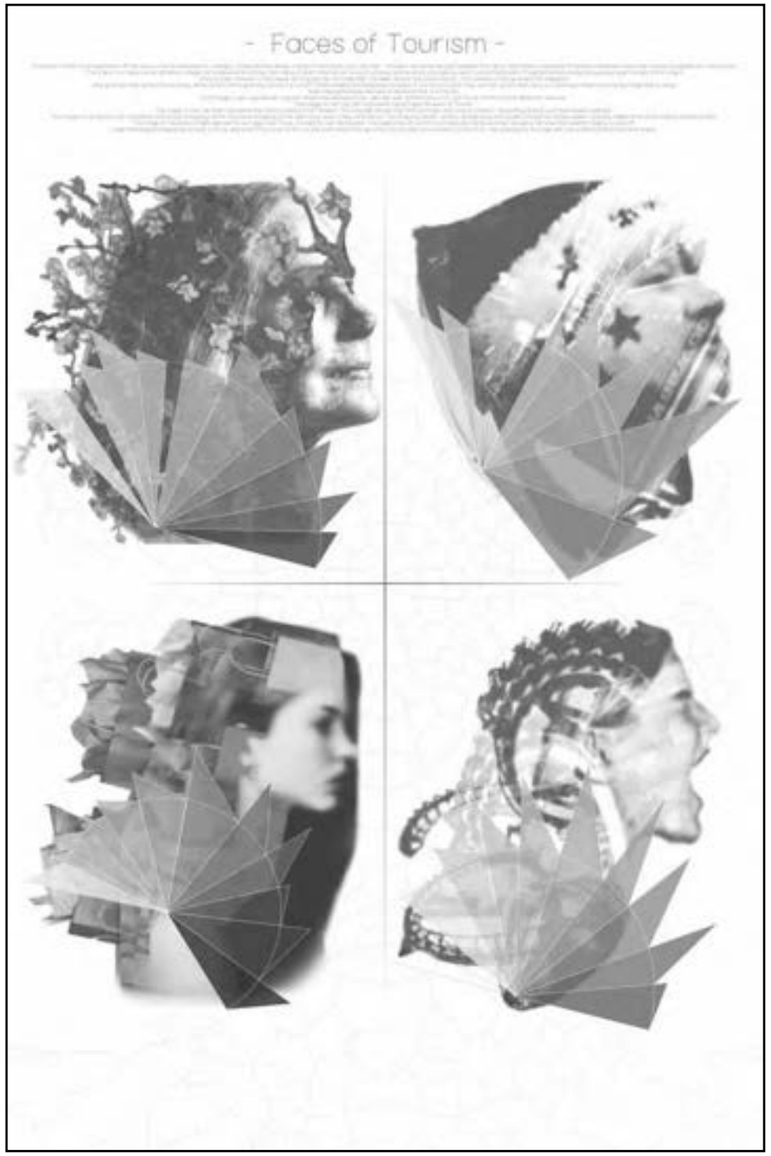


Abstract

What once was one of the main reasons for moving to the suburbs in the 1970s sits at the crossing point of I-35 and I-240 in Oklahoma City, Crossroads Mall. Its location was chosen precisely for the major intersection of the interstates and by the time of the grand opening in 1976 it was among the 10 largest shopping malls in the United States. However, what used to be the reason for moving to the suburbs is now just a memory. Its four anchor stores – John A. Brown, Dillard's, Montgomery Ward, and JC Penney – had all left by 2008 due to bankruptcy or the decline in the number of shoppers. Other factors that have contributed to the decline of the mall include the increasing crime and safety issues in the area, the increase in retail south of Oklahoma City, the lack of substantial expansion and/or renovations to the building. As foreseen, after the anchor stores fell vacant several tenants followed, leaving the building almost completely unoccupied. Efforts are being made to revive this piece of retail history with the idea that it will now cater to the growing Hispanic population of Oklahoma City.

Faces of Tourism

Emily Keller, Student
Gregory Marinic, Faculty Advisor
Ziad Qureshi, Faculty Advisor
University of Houston



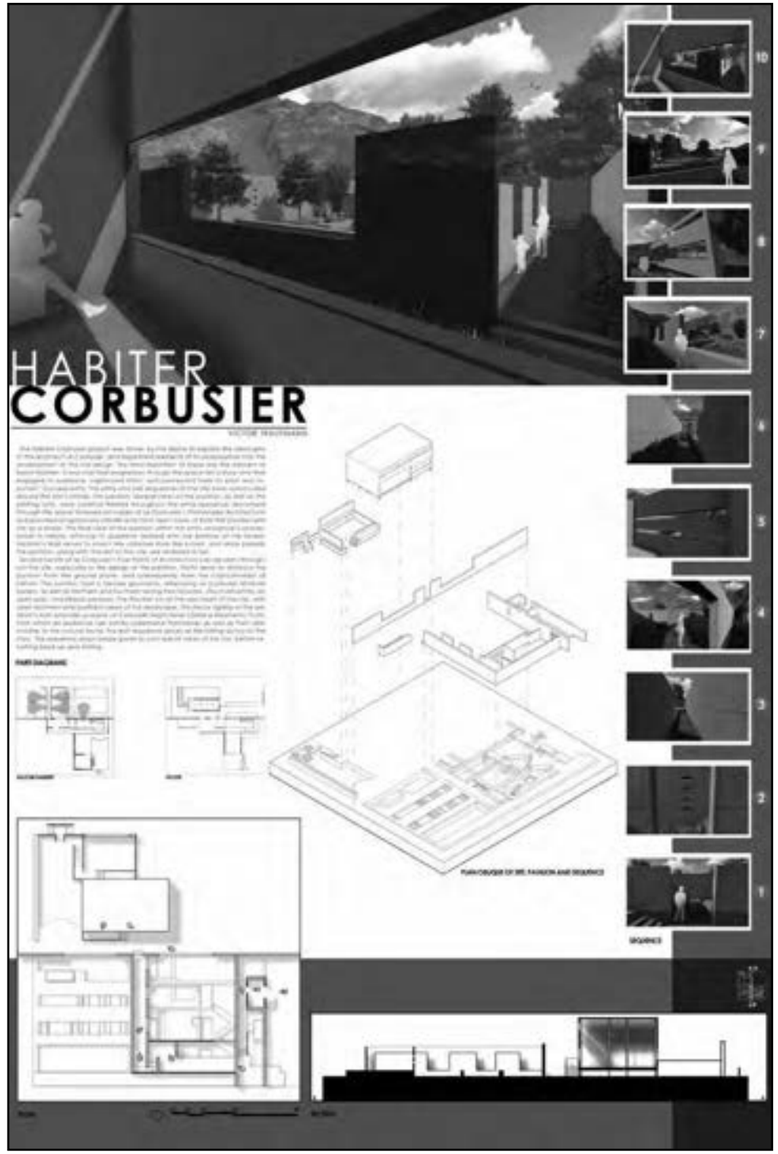
Abstract

Faces of Tourism is an exploration of the types of tourist attractions in Arlington, Texas and the density trends of the tourists who visit them. Arlington lies along the path between Fort Worth and Dallas, creating an in-between destination spot that is easily accessible from both cities. There are four major tourist attraction categories located within a three-mile radius of each other: an art museum, a major sports arena, a shopping center, and a theme park. These attractions bring many people to the Arlington area year round, but not even two miles away is a dying mall, Six Flags Mall, that sees none of this tourist activity. Why does this mall remain almost empty while there is thriving activity across the street? Understanding and analyzing the types of tourists and when they visit the city will help reach a conclusion about why the Six Flags Mall is failing.

Each face symbolizes the type of attraction in the city. Each image is layered with a green wheel that represents the calendar year and the number of monthly visitors to each attraction. The image on the top left represents the Arlington Museum of Fine Art. The image on the top right represents the Dallas Cowboys AT&T Stadium. The image on the bottom left represents the Lincoln Shopping Center. The image on the bottom right represents Six Flags Over Texas, Arlington's own theme park.

Habiter Corbusier

Victor Trautman, Student
University of Oklahoma



Abstract

This project took place during the first semester of second-year architecture studio. The project as a whole comprised several phases. The first phase involved the diagrammatic study of Le Corbusier's Villa Cook, as well as studies of its plans, sections, and elevations. The second phase involved using one plan, one section and one elevation to create a collage reflective of the architectural philosophies of the architect. The collage was used as the site for the final phase of the project. The collage created by the plan, section, and elevation of the building were to be considered sacred ruins on the site, which were to be respected and left as untouched as possible. The final phase of the project was to design a procession through the ruins, as well as a pavilion for the site. Project parameters required that Hadrian's Wall run completely through the site from east to west and that the site be designed utilizing the architectural philosophies of Le Corbusier.

Lotus Wrap

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Zachary Haines, Grad Student
Clark Harrington, Grad Student
Gregory Marinic, Faculty Advisor
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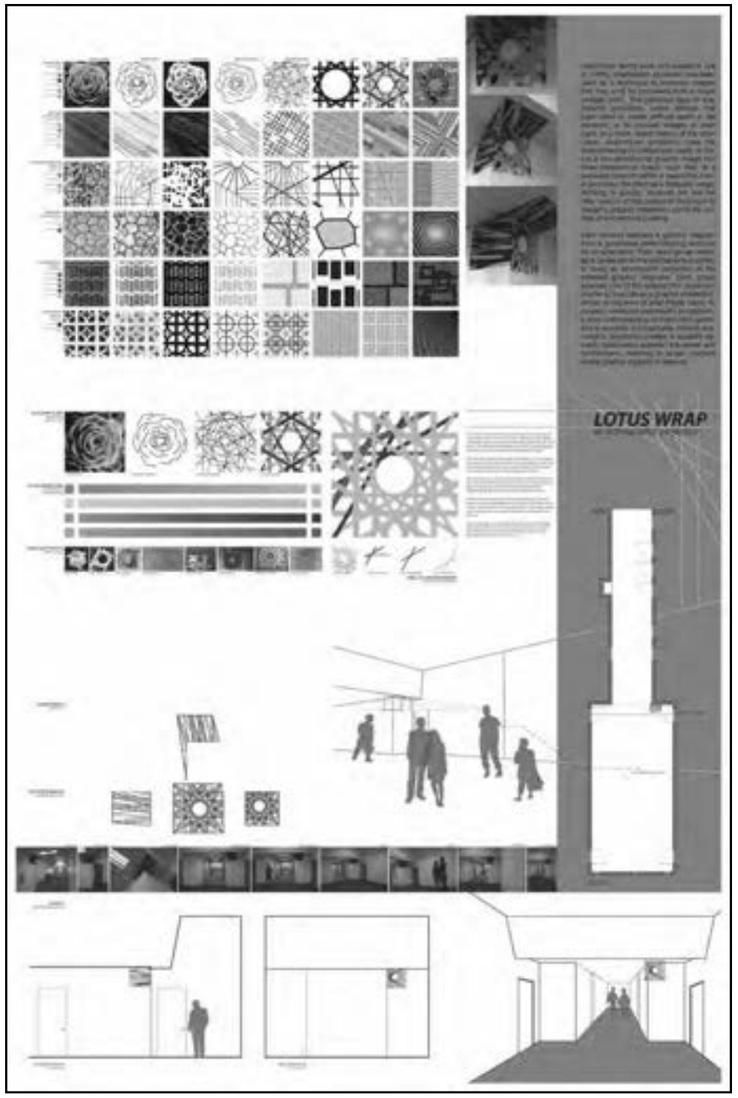

Abstract

Historically dating back to *Leonardo's Eye* (c. 1485), anamorphic projection has been used as a technique to construct images that may only be perceived from a single vantage point. This particular type of anamorphic projection, called oblique, has been used to create artificial depth in flat surfaces, or to conceal images in plain sight. In a more recent history of the technique, anamorphic projection uses the foreshortening of perspective depth to distort a two-dimensional graphic image into three-dimensional space, such that at a particular location within a space the viewer perceives the effect as a flattened image.

Working in groups, students used the latter version of this projective technique to design a graphic installation within the college of architecture building. Each student selected a graphic diagram from a generative pattern-finding exercise for consideration. Then, each group selected a space within the architecture building to study an anamorphic projection of the selected graphic diagrams. Each group selected one of the anamorphic projection studies to execute as a graphic installation, similar to the work of artist Felice Varini. To properly construct anamorphic projections, a solid understanding of descriptive geometry is required. Conceptually, oblique anamorphic projection creates a spatially dynamic relationship between the viewer and environment, isolating a single moment where graphic legibility is attained.

Mall Mania: An Exploration of American Shopping Malls

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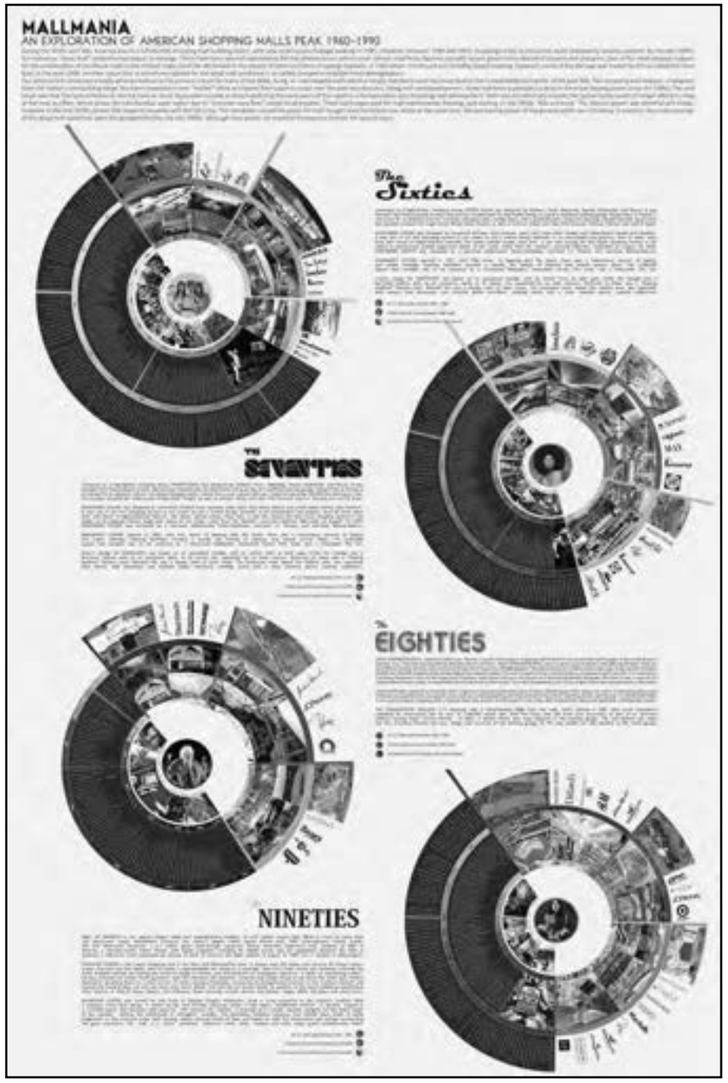
Emily Keller, Student
Gregory Marinic, Faculty Advisor
Ziad Qureshi, Faculty Advisor
University of Houston



Abstract

During the 1970s and 1980s, America was in a full-throttle shopping mall building boom, with new retail square footage peaking in 1985. However, between 1989 and 1993, shopping center construction starts dropped by seventy percent. By the late 1990s, the notorious "dead mall" syndrome had begun to emerge.

Our premise is to showcase visually what we believe is the primary reason for many of the dead, dying, or redeveloped malls, which is simply that there were too many built in the United States during the 1970s and 1980s. This shopping mall malaise, a hangover from the nation's overbuilding binge, has been repeated in over-"malled" cities and towns from coast to coast over the past two decades. Along with overdevelopment, there had been a precipitous drop in American buying power since the 1990s. The end result was that the typical American did not have as much disposable income as they had during the early years of the nation's suburbanization and shopping mall development. With less discretionary income, the typical family could no longer afford to shop at the mall as often, where prices for merchandise were higher due to "common area fees" levied on all tenants. These surcharges paid for mall maintenance, heating, and cooling. In the 1950s, 1960s and early 1970s, electric power was plentiful and cheap, but in the mid-1970s, power bills began to escalate with the oil crisis. This inevitably caused the prices for mall-bought merchandise to rise, while at the same time the purchasing power of the general public was shrinking. In essence, the underpinnings of the dead mall syndrome were being established by the late 1980s, although they would not manifest themselves entirely for several years.

Material Behaviors: An Architecture at the Scale of the Interior

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Joseph Echavarria, Student
Jessica Garrett, Student
Joshua Hollie, Student
Emily Keller, Student
Roni Kop, Student
Jonathan Lampson, Student
Cecilia Mejia, Student
Madelaine Parker, Student
Francesca Sosa, Student
Ana Sotelo, Student
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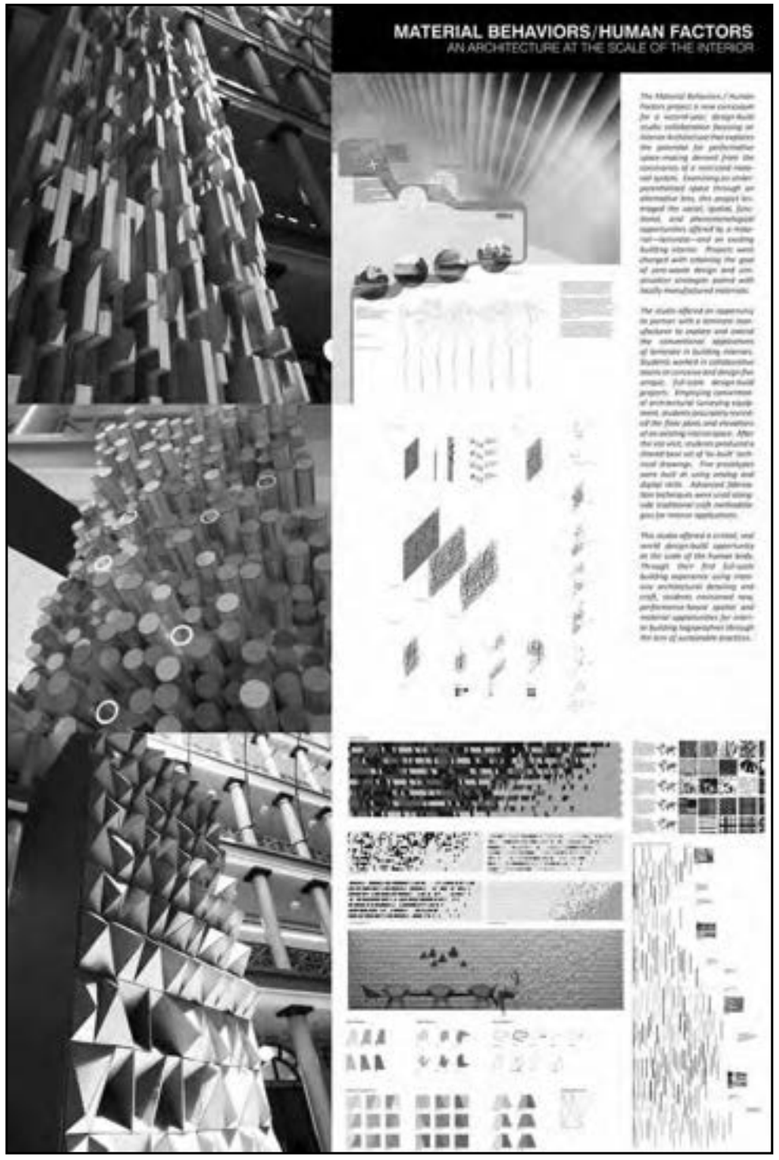


Abstract

The Material Behaviors/Human Factors project is a new curriculum for a second-year, design-build studio collaboration focusing on interior architecture that explores the potential for performative space-making derived from the constraints of a restricted material system. Examining an under-potentialized space through an alternative lens, this project leveraged the social, spatial, functional, and phenomenological opportunities offered by a material – laminate – and an existing building interior. Projects were charged with attaining the goal of zero-waste design and construction strategies paired with locally manufactured materials.

The studio offered an opportunity to partner with a laminate manufacturer to explore and extend the conventional applications of laminate in building interiors. Students worked in collaborative teams to conceive and design five unique, full-scale design-build projects.

This studio offered a critical, real-world design-build opportunity at the scale of the human body. Through their first full-scale building experience using intensive architectural detailing and craft, students envisioned new, performance-based spatial and material opportunities for interior building topographies through the lens of sustainable practices.

Material Technocracy: Eladio Dieste & Reinforced Brickwork

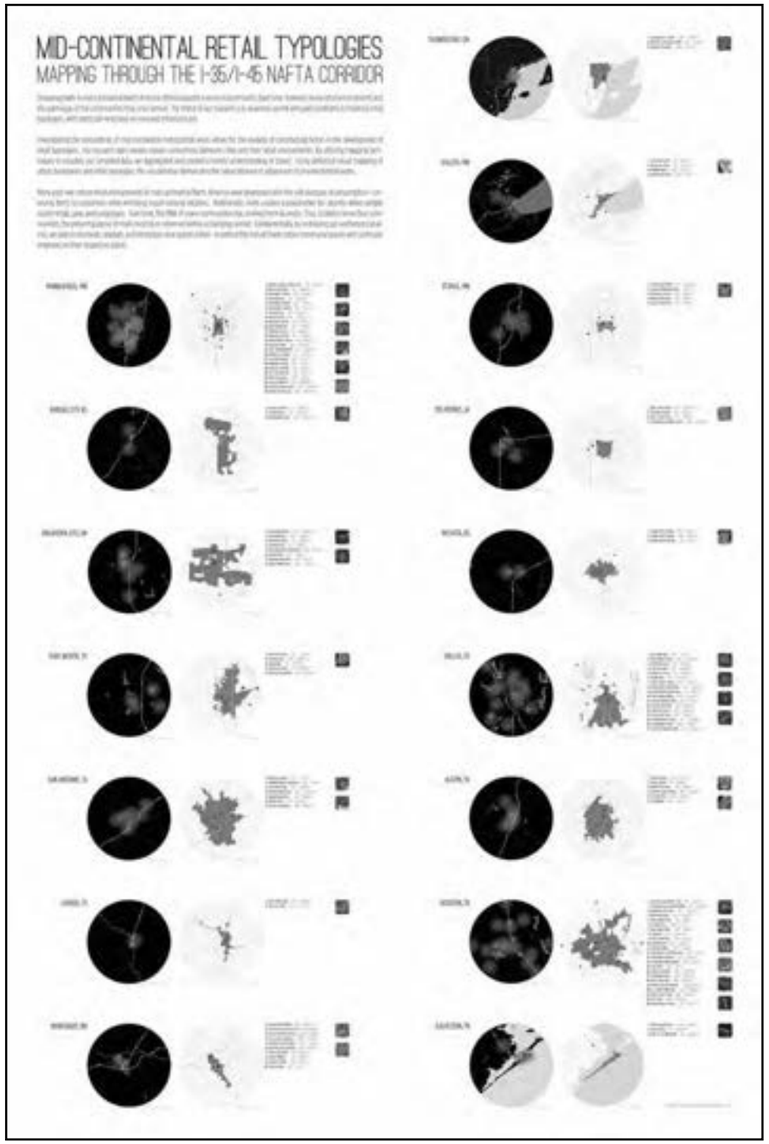
Federico Garcia Lammers,
Assistant Professor
Brian Skrovig, Graduate Student
South Dakota State University

Abstract

The work of Uruguayan engineer Eladio Dieste has been studied and admired for its material audacity, structural innovation, and role in broadening the definition of material practices in Uruguay and South America. The research shown as a part of *Material Technocracy* is focused on the intersection between Dieste's reinforced brickwork and the socio-political conditions under which this work was constructed. Is Dieste's architecture modern? Is it political? It is experimental? Is it finished? Exploring the relationship between building technology and politics is a fundamental way of articulating the impact of history on contemporary architecture. To study the importance of this impact, Federico Garcia Lammers and the Department of Architecture at South Dakota State University have organized a study abroad program based in Montevideo, Uruguay. A portion of this program focuses on the politicization of material practices through the examination of Dieste's work. *Material Technocracy* seeks to examine the ways in which Dieste's work can contribute to methods of making that are compatible with contemporary building processes and current socio-political conditions in small communities.

Mid-Continental Retail Typologies: Mapping the I-35 / I-45 NAFTA Corridor

Ana Sotelo, Student
Francisco Salas, Student
Gregory Marinic, Faculty Advisor
Ziad Qureshi, Faculty Advisor
University of Houston



Abstract

Shopping malls in mid-continental North America gave suburbs a sense of community. Over time, however, many retail environments lost the patronage of the communities they once served. The intent of our research is to examine current and past conditions in historical retail typologies, with particular emphasis on enclosed infrastructures.

By utilizing mapping techniques to visualize our compiled data, we aggregated and created a holistic understanding of "place." Using analytical visual mapping of urban boundaries and retail typologies, this visualization demarcates the radial distance of adjacencies to enclosed retail nodes. Many postwar indoor retail environments in mid-continental North America were developed with the sole purpose of consumption – conveying items to consumers while enriching major national retailers. Additionally, malls created a placeholder for urbanity where people could mingle, play, and congregate. Overtime, the DNA of many communities has evolved from its origin. Thus, to better serve their communities, the present purpose of malls must be re-informed within a changing context. Fundamentally, by mobilizing our synthesized analysis, we plan to reactivate, readapt, and reintroduce new opportunities to extend the lives of these indoor communal spaces with particular emphasis on their respective places.

placepavilion 01_the view finder Experiencing an Inhabitable Map

Joshua Nason, Assistant Professor
University of Texas at Arlington

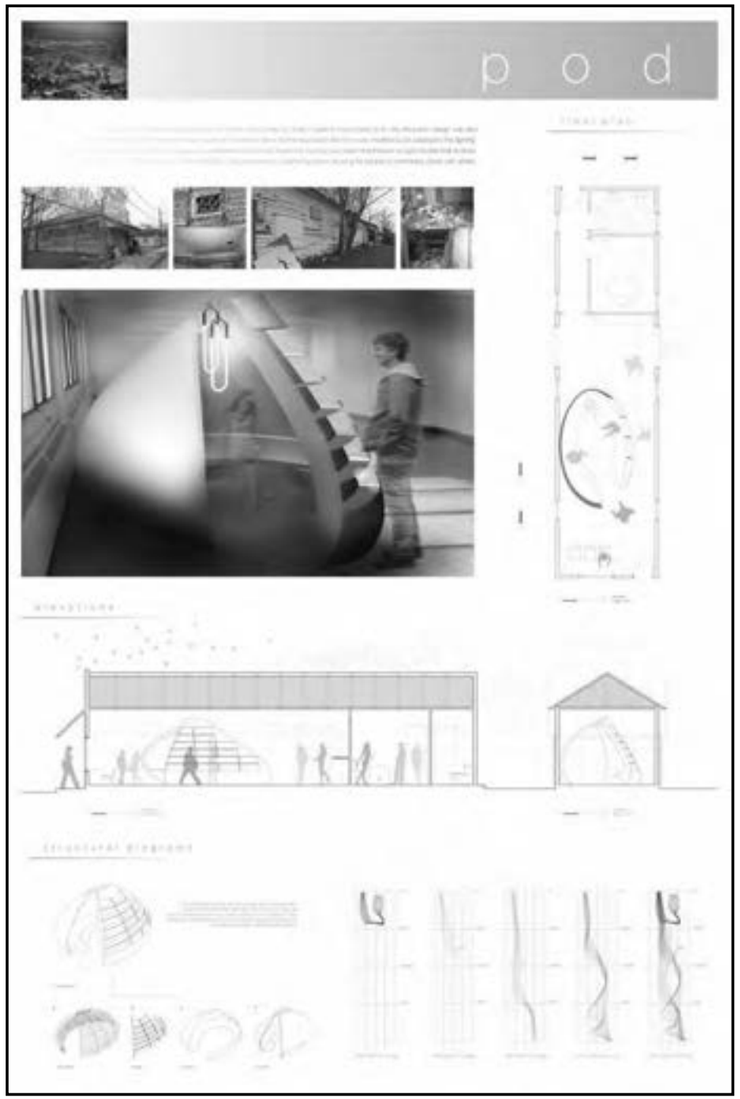
Abstract

The Place Pavilions are individually scaled constructions built as maps and mapping devices, simultaneously. Affording inhabitants the opportunity to experience their environment freshly by framing the sensory perception of surroundings, the pavilions reveal through regulation, stimulate through stipulation. By restricting the customarily pervasive experience of a place, the pavilions allow one to focus on specific elements around him or her to notice that which is usually ignored. Thus, allowing the map to be experiential and the reader to be informed.

Such pavilions translate map readers into viewers into inhabitants interacting with that which they see. These designed and built experiential devices tectonically mediate between the reader and the read in a haptic and individualized, participatory manner. The goal is to introduce viewers to atypical readings of their surroundings by presenting to them detailed, specific, loaded and yet personalized views of what they otherwise take for granted.

POD: Fifth Ward Renaissance: From History, a Future

Arianne Gonzato, Student
Joshua Hollie, Student
Emily Keller, Student
Francesca Sosa, Student
Jason Logan, Faculty Advisor
University of Houston



Abstract

"One of the differences between this neighborhood and one like River Oaks is that they have lots of support and all kinds of resources available. Here, in the Fifth Ward, it's the exact opposite – these people have no resources at all. There's one clinic, one library, no YMCA, very few activities, and the community is very fragmented. It's not the kind of environment that helps a child excel."

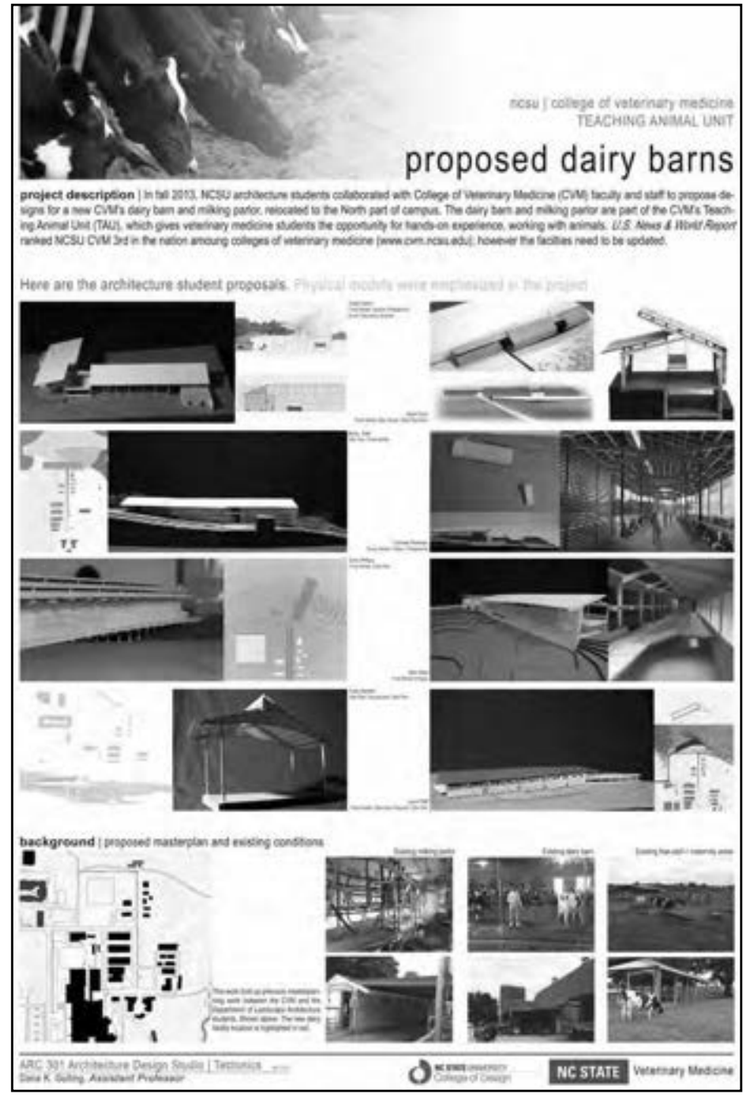
Ernest McMillan - Community activist and contributor to the Fifth Ward Enrichment Program

This project engages design research toward rebuilding an historic African-American community in Houston's Fifth Ward. It partners with the Fifth Ward CDC and the Olivet Missionary Baptist Church to build an e-Reading Room that enhances literacy and learning in the neighborhood. Furthermore, this project seeks to mobilize history in the rebuilding of a modest and threatened structure in the neighborhood.

Using the archives of various African-American churches in the Fifth Ward, this proposal will result in the development of an exhibition that chronicles in its most extensive form to date the historical rise, fall, and projected rebirth of the Fifth Ward. The proposed e-Reading Room will be housed in a building of historical significance to the African-American community in the neighborhood. A diminutive and poetically crumbling shotgun storehouse will offer an opportunity for students of the newly formed Interior Architecture program at the University of Houston to serve as community advocates, designers, and re-builders of the Fifth Ward.

Proposed Dairy Facilities for the NCSU College of Veterinary Medicine

Dana Gulling, Assistant Professor
North Carolina State University



Abstract

At North Carolina State University, our third-undergraduate architecture studio (ARC 301) was redesigned to introduce students to building tectonics with an emphasis on physical model making. Fall 2013 was the first time the redesigned ARC 301 was taught. Design projects were to address building materials, structural systems, and passive strategies (e.g. passive heating, cooling, and lighting).

In fall 2013, we worked with the NCSU College of Veterinary Medicine (CVM) to propose a new dairy barn and milking parlor for the college. For background: In spring 2012, a master plan was developed through a collaboration between the NCSU Department of Landscape Architecture and the CVM students. The master plan proposed to move the CVM dairy herd from the current historic and outdated barns in the south pasture to a new dairy facility in the north pasture. The new facility would terminate a new campus axis.

This project used physical study models as the primary design tools. Students made multiple iterations to investigate building placement, massing, and topography. Study models were particularly helpful in giving students feedback on how materials helped to define space, how the model could resist structural loads, and quality of light and air movement though the building.

Pulp Verite

J.P. Maruszczak
Associate Professor
University of Texas at Arlington

Roger Connah
Associate Professor
Carleton University

Abstract

Pulp Verite is an audio-visual remix of three architectural projects: (1) Interface, Animall, & Brautigan (Big Town Mall, Mesquite, Texas), (2) The Bystander in Calgary (twelve reverse architecture scripts) (3) Pulping Detroit: On the road 2013 (iRreversible aRchitecture).The poster maps three distinct video cartographies as cinematic counter-proposals to rescript the dynamics of the dispersed city. Rethinking the fluidity and contingency of these stretched entropic landscapes, the project explores three navigations, moving from (1) project scripting to (2) video cartography and finally to (3) a mini architecture screener. Using ideograms, scores, scripts, indexes, photo-cartographies, and clips/mini-films, a new architecture verite (direct cinema) will be proposed. P.U.L.P. is an altered architecture working model contained within the acronym: Pedagogics – Urgency – Liminal – Portal.

Representations of Domestic Life in 1950s America

Dr. Filiz Sonmez, Assistant Professor
Erciyes University

Abstract

The intention of this study is to "social approach" a modern house of the 1950s to reveal the domestic experiences of the families by utilizing texts and visual images in media. This will be possible by using postwar residential architectural examples, intended to contribute to a larger corpus of data documenting the lived, subjective, social, cultural, and dialectical experiences of domestic life. Rather than the way it is usually discussed – as a question of design form or style that is usually highlighted in the architectural magazines of the 1950s – this study will focus on the domestic space that is posited here as a social and cultural landscape.

The overall aim of this study is to examine how families inhabited rooms and used their furnishings and appliances in the 1950s and to determine the relationship between the space and their domestic desires. This will enable us to comprehend the actual family life lived within that space. Therefore, by considering some images in the media, we will attempt to analyze the domestic space.

For the purpose of this poster, we concentrate on domestic advertising from newspapers, and design magazines such as *House Beautiful*, *Better Homes and Gardens* and *House and Home*.

Revitalization

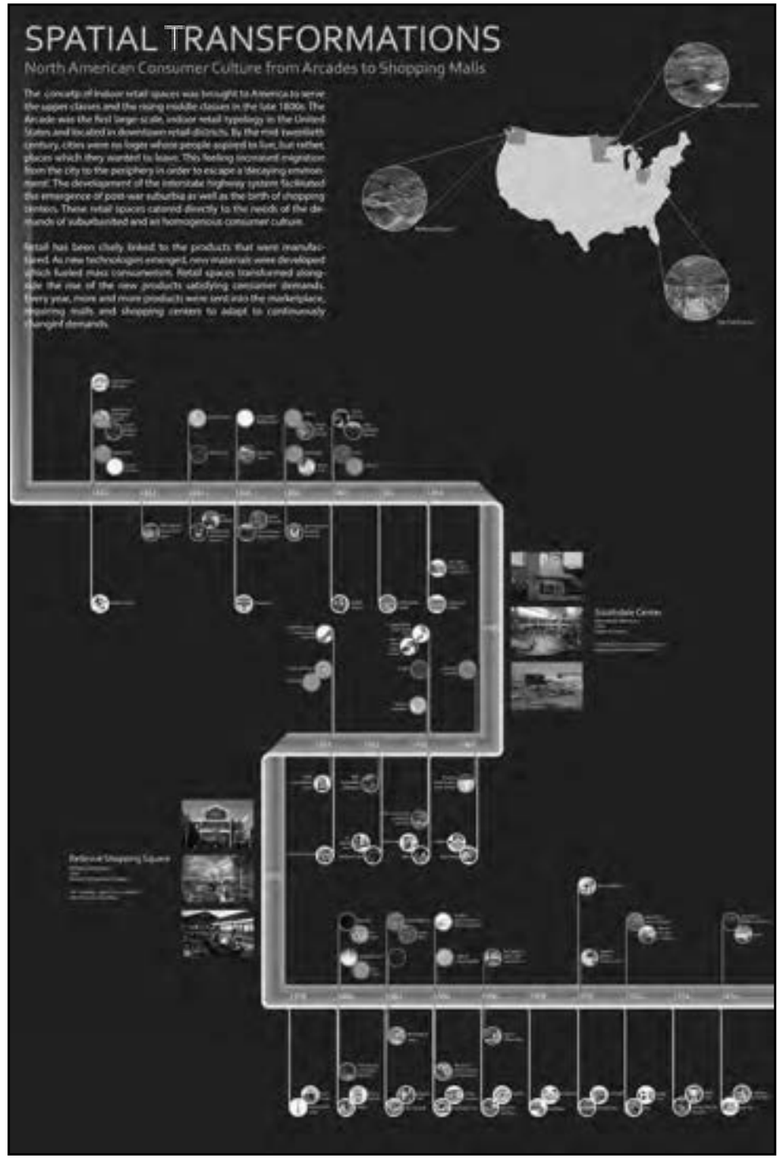
Arianne Gonzato, Student
Gregory Marinic, Faculty Advisor
Ziad Qureshi, Faculty Advisor
University of Houston

Abstract

The River Center Mall was constructed in 1988 after the extensive redevelopment and expansion of the iconic River Walk in San Antonio, Texas. Prior to its definite construction, the mall housed a variety of stores that went from its beginnings as a Lord & Taylor owned by May Department Stores and Joske's to its current structure housing a Macy's and Marriott hotel. Currently, the mall has become more underutilized by residents and visitors due to the lack of historic linkage to the city, absence of guarantee in quality and status, little upgrading and activation of the spaces, and lack of community involvement. These four elements can be identified as the River Walk's reason for success. By repurposing the current structure, I will utilize the elements that created the successful River Walk and apply them to the hypothetical renovation of the River Center Mall into a fully developed community center.

Spatial Transformations: Arcades to Shopping Malls

Minelya De Leon, Student
Francesca Sosa, Student
Gregory Marinic, Faculty Advisor
Ziad Qureshi, Faculty Advisor
University of Houston

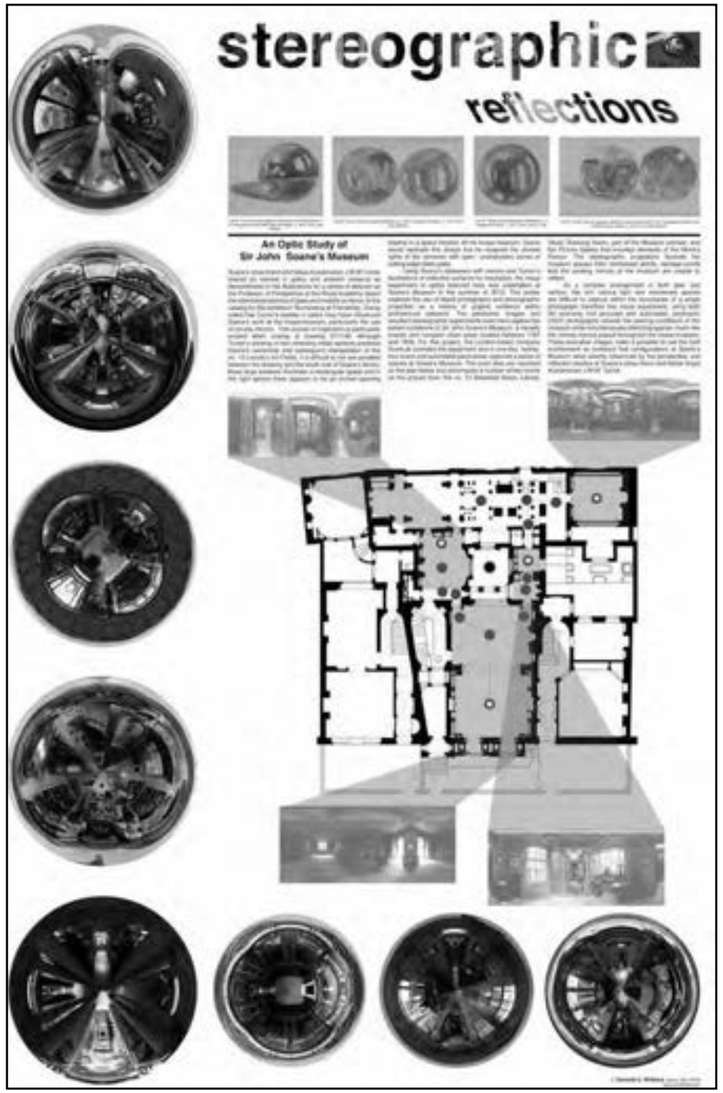


Abstract

The concept of indoor retail spaces was brought to America to serve the upper classes and the rising middle classes in the late 1800s. The arcade was the first large-scale, indoor retail typology in the United States and located in downtown retail districts. By the mid-twentieth century, cities were no longer where people aspired to live but, rather, places they wanted to leave. This feeling increased migration from the city to the periphery to escape a "decaying environment". The development of the interstate highway system facilitated the emergence of post-war suburbia, as well as the birth of shopping centers. These retail spaces catered directly to the needs of suburbanites and a homogenous consumer culture. Retail has been closely linked to the products that were manufactured. As new technologies emerged, new materials were developed, which fueled mass consumerism. Retail spaces transformed alongside the rise of the new products, satisfying consumer demands. Every year, more and more products were sent into the marketplace, requiring malls and shopping centers to adapt to continuously changing demands.

Stereographic Reflections: Conditions of Sir John Soane's Museum

Danielle Willkens, Ph.D. Candidate, AIA, FRSA
Visiting Assistant Professor
Auburn University



Abstract

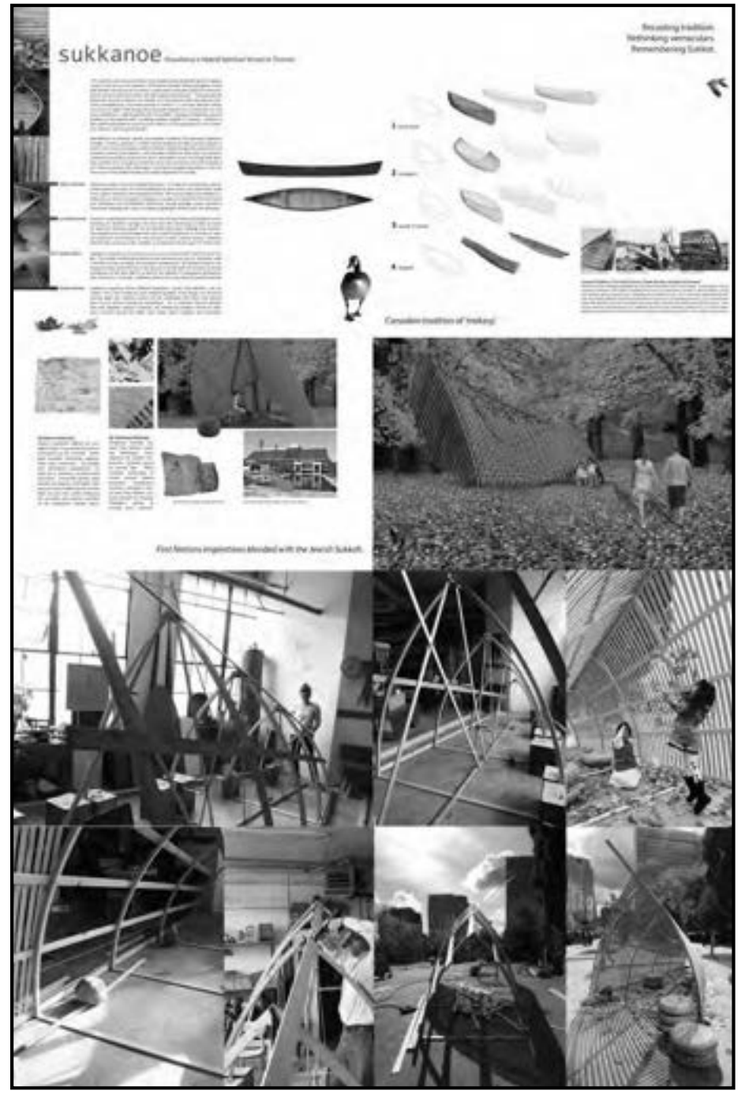
This work was undertaken as part of research toward a Ph.D. in architectural history and theory at the Bartlett School of Architecture, University College London. This poster explores the use of digital photography and stereographic projection as a means of graphic evidence within architectural research. The panoramic images and resultant stereographic experiments seen here capture the extant conditions of Sir John Soane's Museum, a visually chaotic and compact urban jewel created between 1797 and 1836. As a complex arrangement in both plan and section, the rich natural light and intertwined spaces are difficult to capture within the boundaries of a single photograph, therefore this visual experiment, using both 3D scanning (not pictured) and automated, panoramic DSLR photography records the existing conditions of the museum while simultaneously distorting spaces, much like the convex mirrors placed throughout the house-museum. These evocative images make it possible to use the built environment as evidence that configurations at Soane's Museum were directly influenced by the perspective and reflection studies of his close friend and fellow Royal Academician J.M.W. Turner.

This proposal is related to a broader research investigation titled "Thomas Jefferson, Sir John Soane and Maria Cosway: the Transatlantic Design Network, 1768-1838" that examines the enduring connections of figures, architectural sites, and theories for interpreting the built environment while integrating practice-based investigations.

Sukkanoe

Nicholas Herrera, Student
Gregory Marinic,
Assistant Professor
University of Houston

Michelangelo Sabatino
Illinois Institute of Technology



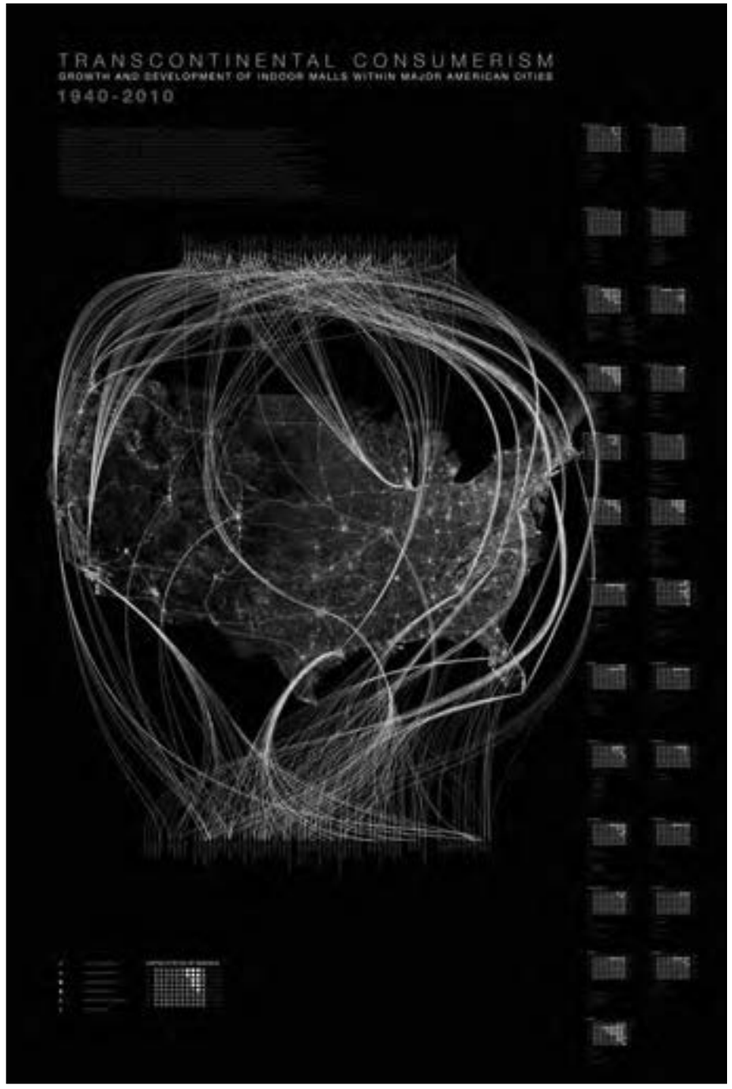
Abstract

The sukkah is a temporary structure and symbolic place of gathering that is deeply rooted in the history and tradition of the Jewish people. Bringing together family and friends, this temporal structure is assembled to provide space for communities to connect with each other and the natural environment. This proposal for Sukkaville envisions the sukkah as a site-specific and site-relevant construct responding to a Canadian context in Toronto. It assumes that the sukkah can act as an "agent" that brings diverse people together for a communal act, and thus, establishes a hybrid identity for itself. Sukkanoe blends the ancient tradition of the sukkah with a building tradition specific to Canada. Builders of the sukkah participate in a journey that reflects upon the experiences of the Jewish, First Nations, and Canadian people.

Hybridizing First Nations, Jewish, and Canadian traditions, this proposal, Sukkanoe (sukkah + canoe), provides a shelter-vessel designed for Mel Lastman Square in North York, Ontario, Canada. It offers a "hybrid" sukkah design that draws from and combines Jewish, First Nations, and Canadian traditions, both past and present. *Sukkanoe* transforms the iconic birch-bark canoe. The shape and materials used for this concept are meant to recall the innovation and self-reliance of First Nations peoples, the challenges of European voyageur explorations, and the transience of the Sukkot holiday and Jewish migration to Canada.

Transcontinental Consumerism

Mathew Caballero, Student
Joshua Hollie, Student
Gregory Marinic, Faculty Advisor
Ziad Qureshi, Faculty Advisor
University of Houston



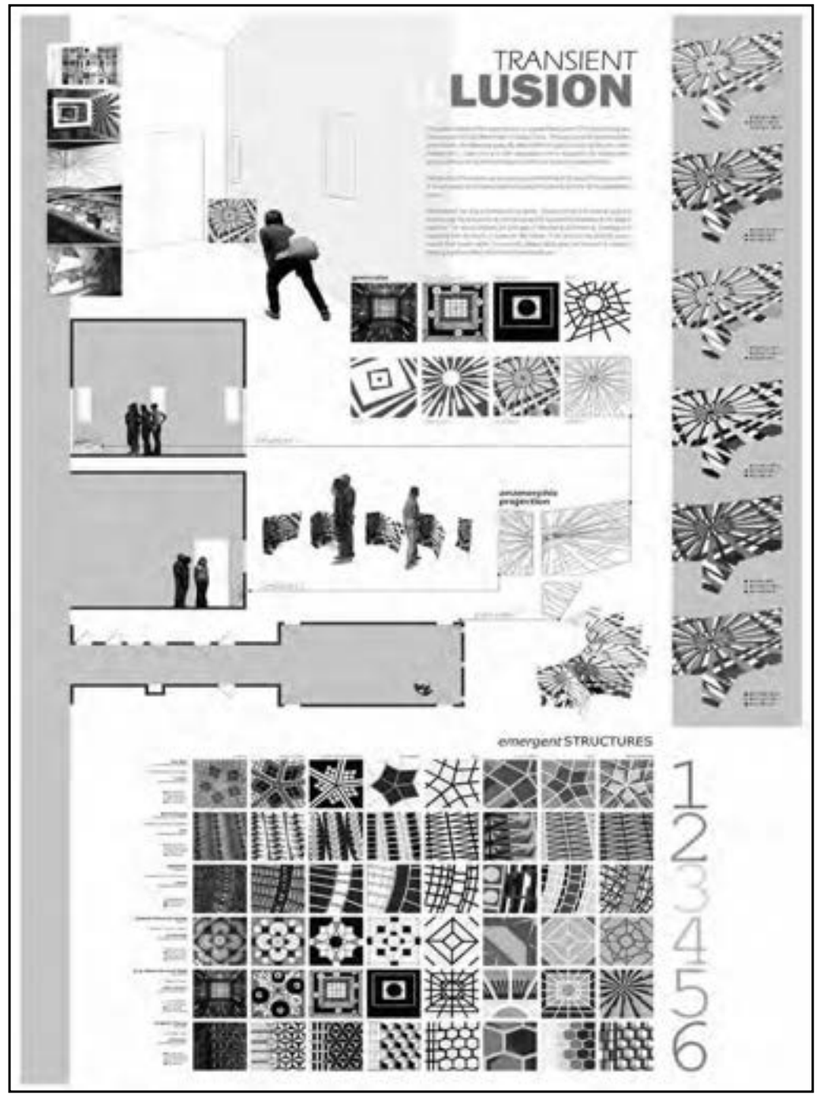
Abstract

The changing landscape of a fashion runway creates a constant renewal of architectural retail spaces. To experience this movement one has to speed up time, as decay is not always as fast as birth. Bridging the connection of these retail spaces to the runway, the indoor shopping mall is an optimal catalyst for such depiction. At the scale of a shopping mall, one can visualize the process of development, growth and decay of consumer culture across the United States. This visualization is expressed through various peripherals to gain a wide image of the current status of this culture. Viewing this culture through time, one is able to discern specific areas that have prospered and developed between 1940 and 2010 by means of population growth.

The population growth of the examined cities is a product of various streams used at different scales. This attraction begins to cause growth and movement of people to be closer to that center. The growth of the suburban culture is also introduced and reflects this consumerism. At a larger scale, the sizes of these central consumer hubs are dependent on the interstate system as means of internal commerce and population growth. At a global scale, the periphery of these malls and their culture is impacted by international migration. The temporal aspects of this culture over time have created a catalog of spaces that reflect a history of that place.

Transient Illusion

Zoe Gao, Grad Student
Keung Young Park,
Grad Student
Javier Vesga, Grad Student
Gregory Marinic,
Faculty Advisor
Jason Logan, Faculty Advisor
Graduate Architecture Program
University of Houston



Abstract

This project started with the exploration of an organizational system. The object of study was the atrium at the Xi'an Westin Hotel in Shaanxi, China. Through a series of transformational permutations, the object was gradually detached from its grid and axial rigidity into a more dynamic form. Scale, mass and color manipulation were engaged in the transformative process, without losing either the object's identity or its sense of appropriateness. The result from this evolution is an expanded understanding of the original form, represented in two elements, that blended together to visualize the inherent potential of its organizational system. One element, the grid, is intended to be dense, emerging from its functional basis and transforming into a sequence of rotating squares that represent the deepness of the skylight aperture. The second element, the light path, is intended to be unlimited. Emerging and exploding from its origins, it represents the relation of the artificial and sunlight sources around their master vector. Geometrically related radial arrays are arranged in sequence creating a gradient effect and a three-dimensional illusion.

SESSION CHAIRS

Dr. Suchismita Bhattacharjee is an assistant professor of interior design at the University of Oklahoma, with research interests that specialize in understanding how sustainability practices, policies, and human behaviors relate to energy efficiency. She has accumulated industry experience as an assistant project manager working for J T Builders in Los Angeles, California, and as a trainee architect working for Agrawal and Agrawal in Kolkata, India.

Bhattacharjee attended Virginia Tech, where she earned her Ph.D. in environmental design and planning and a master of science in building construction. She also earned a master of science in construction management from Michigan State University and bachelor of architecture degree from Jadavpur University in India.

Dave Boeck, AIA, NCARB, LEEP AP is an associate professor of Architecture in the Division of Architecture at the University of Oklahoma. He received a bachelor's of environmental design degree and bachelor's and master's of architecture degrees from OU. Boeck's studio teaching has focused on sustainable design and interdisciplinary project development. His research in the area of aging in place has used participatory action research methodologies that included photo voice, focus groups and user-focused design charrettes. Boeck has been in private practice since1981. His current practice focuses on addressing the issues of aging in place both at the residential level and in the design of the community around these age-friendly homes.

Daniel Butko, AIA, NCARB, LEEP AP, ASA is an assistant professor of architecture at the University of Oklahoma. His research focuses on materials, sustainability, and acoustics, and he has been awarded numerous private and government grants. Butko's publications and paper presentations include collaborative efforts within national and international conferences and journals. He is also currently composing a 300-page book with a nationally known publisher focused on architectural materials.

Butko's professional background spans over 23 years in all phases of design, client management, consultant collaboration, and construction administration in both small design-build and nationally known architecture and construction firms. Notable awards include the 2012 EPA P3 Award (sustainability in design and construction), 2005 Robert Bradford Newman Medal (architectural acoustics), and 1993 Walt Disney Dreamers and Doers Award recognizing creativity and constancy.

Hans Butzer, AIA, AK NW, LEEP AP is passionate about legacy building, through both his practice-based creative research and university work with students and faculty. As director of the Division of Architecture in the College of Architecture at the University of Oklahoma, Butzer seeks to empower faculty and students to continually redefine the potentials of the program's Creating_Making curriculum. His teaching focuses on ethics and sustainability, and community-engaging advanced architecture and urban design studios.

An award-winning practice allows Butzer to offer ideas on architecture, landscape, sculpture and urban design that help shape the lives of Oklahoma families and communities. Building on his educational experiences at the University of Texas at Austin School of Architecture and Harvard University's Graduate School of Design, Butzer is intent on creating exceptional educational environments and living for all of our students.

Anthony Cricchio, RA is associate professor at the College of Architecture, University of Oklahoma. Cricchio holds a B.S. in architecture (1993) and a MArch (1995) from the University of Texas at Arlington. He has practiced in the Dallas-Fort Worth area with Corgan Associates and taught at the University of Texas at Arlington. He also held an assistant professorship position at Oklahoma State University.

Cricchio has been recognized with several significant prizes, including the Beck Professional Award for the 2005 Ken Roberts Memorial Delineation Competition and 2012 ASAI Award of Excellence, as well as recognition as a finalist in the 2003 Braun Prize Competition and honorable mention in the 2001 UIA Water and Architecture Competition. During his teaching career, he has also mentored many students who have placed in student design competitions.

Sam Day, Assoc. AIA graduated from the University of Oklahoma in 2013 with a bachelor's degree in architecture. As an undergraduate, he worked as an urban designer at OU's Institute for Quality Communities. He presented a paper at the 2012 Oklahoma Film and Video Society Conference in Stillwater, Oklahoma, and a poster at the 2013 OU Undergraduate Research Day. Since graduating, he has worked as an architectural intern at Butzer Gardner Architects in Oklahoma City and is now at Common Works Architects. He currently serves on the AIA Oklahoma Graphics Committee and the OU Goff Lecture Series Committee, and is helping to develop Ohm Space, a digital fabrication workshop and education center in Oklahoma City.

Ron Frantz, AIA is a licensed architect who specializes in historic preservation, Main Street revitalization, neighborhood revitalization, and all types of community-based, grassroots type of design programs. With two degrees from The Tulane University of Louisiana, he has work experience that includes being founding partner of two architecture firms, serving on the staff of a non-profit organization, working in private sector firms and a state agency, and being staff and faculty at a private college. Currently, he is an associate professor in the Division of Architecture at the University of Oklahoma College of Architecture and director of Great Plains Studios, a part of OU's Institute for Quality Communities.

Dr. Dawn Jourdan, Esq. is an associate professor and director of the Division of Regional and City Planning in the College of Architecture at the University of Oklahoma. Previously, she held a joint appointment in the Colleges of Design, Construction, and Planning and the Levin College of Law at the University of Florida. While at UF, Jourdan also served as director of the Center for Building Better Communities. She began her academic career as an assistant professor of planning at Texas A&M University in College Station, Texas. Before returning to academia, Jourdan worked for the State and Local Government Division of Holland & Knight LLP's Chicago offices.

She earned a Ph.D. in urban and regional planning from Florida State University in 2004, a joint degree in law and urban planning from the University of Kansas in 2000, and a B.S. in Urban Affairs and Theatre Arts from Bradley University in 1996. She is a member of the American Institute of Certified Planners. Her teaching and research interests converge on the ways federal, state, and local regulatory schemes influence the development of cities and those living in them, with a special interest in housing, historic preservation, and disenfranchised populations.

Tammy McCuen, LEED AP is the Harold W. Conner Professor in the Haskell & Irene Lemon Construction Science Division at the University of Oklahoma College of Architecture. Her research interests specialize in understanding BIM as a tool for collaboration and lifecycle costing. McCuen also looks at spatial thinking, mental models, and spatial reasoning, as well as augmented reality for design and construction. She has accumulated industry experience as vice president of Bridgeport Development, chief estimator for Heartland Homes, and project manager and chief estimator for Bell Industries in the Oklahoma City metropolitan area.

McCuen's recent research has been presented at the National Institute of Building Sciences Building Innovation Conference, the American Institute of Architects FOREFRONT Conference, and the Association for the Advancement of Cost Engineering International Conference, among others. She earned an MBA, a master of science in construction science degree and a bachelor of interior design from OU.

Dr. Stephanie Zeier Pilat, FAAR is a designer and scholar whose work examines points of intersection among aesthetics, politics, and architecture. Pilat holds a Ph.D. and master of sciences from the University of Michigan, as well as a professional degree in architecture from the University of Cincinnati. As an assistant professor of architecture at the University of Oklahoma, she teaches both history and design courses. Pilat is the author of *Reconstructing Italy: The Ina-Casa Neighborhoods of the Postwar Era* (Farnham: Ashgate 2014). Her research has been supported by the American Academy in Rome, the Fulbright Program in Italy, the American Association of University Women, and the Wolfsonian-FIU. Pilat is currently developing a new line of research exploring the relationship among national identity, health, and architecture under fascism titled *Shaping the Body Politic*.

Elizabeth Pober, IDEC, IIDA, NCIDQ is an associate professor of interior design in the College of Architecture at the University of Oklahoma. She holds a master's degree in construction administration and bachelor's degree in interior design. She is a member of both the Interior Design Educators Council and International Interior Design Association and is NCIDQ certified.

Her research areas include technological design visualization methodologies, abstract concept development and creative thinking in the design development process, spatial perception, experiential learning, K-12 built environment education, BIM and information exchange, and BIM for cognitive spatial problem solving. Her teaching areas include architectural design and human factors, capstone, environmental psychology, computer drafting, modeling, rendering and animation, BIM, and travel abroad programs.

Scott Williams, IDEC, Assoc. AIA, LEEP AP is an assistant professor in the Division of Landscape Architecture in the College of Architecture at the University of Oklahoma. His research and teaching interests are in exterior lighting design, beginning design, hand and digital graphics, and historic preservation. He has both master and bachelor of architecture degrees from the Technical University of Munich in Munich, Germany, and studied at the State Art Academy in Düsseldorf, Germany. As a licensed architect in Germany, he was registered with the Architektenkammer Nordrhein-Westfalen. He has studied with Sir James Stirling and Daniel Liebeskind, worked with Frank Gehry and is a LEED AP. Actively involved in community and professional service, he currently serves as a commissioner on the Historic District Commission for the City of Norman, Oklahoma, and on committees with the International Association of Lighting Designers, Association of Outdoor Lighting Professionals, and International Landscape Lighting Institute.

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