



VoICES of Place

Empower, Engage, Energize

edra48 **Madison, Wisconsin**
May 31 - June 3, 2017

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May 31 – June 3, 2017

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Introduction



Every year, socially motivated design professionals and researchers come together at EDRA with a shared belief: in creating environments that matter to people and where people matter. It is time for critical reflection, collective thinking and dialog about the future of environmental design. But who do we design for? How do we listen to their needs and desires? How do we navigate the inevitable conflicts among different stakeholders in the placemaking process? What kinds of environments do we want to create together in the end? The conference theme of EDRA48, “Voices of Place: Empower, Engage, Energize,” sets out with these fundamental questions to address issues of equity, justice, and inclusion in the context of environmental design across various topical landscapes including voices across genders, generations, cultures, times; voices from the margins, and from the earth.

Through nearly a half-century of environmental design inquiry, researchers and design professionals have addressed many critical social issues, continually modifying and evolving their approaches as new evidence is uncovered. Despite this effort, inequity persists. Design and planning processes are too often driven by loud voices and fail to reveal those that are quieter, quieted, or hidden. Myths of the “Average Man” expressed through da Vinci’s Renaissance Man and Le Corbusier’s Le Modulor continue to permeate design of our everyday spaces to the exclusion of the young, the old, other gender identities, and those who are marginalized. Policies, planning, and design practices that are insensitive to diverse cultural practices and citizen voices erase the presence of anyone outside of the “average” ideal and turn a deaf ear to the past, present, and future of the whole of our communities. Further, design practices that focus only on the immediate needs of humans, and that fail to consider the natural world and ecology of the surroundings, threaten the health and the very existence of our own and future generations.

This year’s conference program has an intentional focus on inclusivity. Through thoughtful reflection on the core issues of empowerment, engagement, and the energizing of communities, the presentations by the esteemed keynote and plenary speakers anchor each day of the conference. The concurrent sessions lay out the work of a spectrum of scholars who present many silent voices that have been ignored in conventional design and planning processes resulting in exclusion and segregation of different social groups. Poster sessions further deepen these explorations through the opportunity for intense one-on-one engagement, while the mobile sessions capture the essence of Madison and its surrounding designed environments to ground conference attendees in a deeper understanding of the history and culture of the place.

Madison, the cultural, educational, research, and governmental capital of Wisconsin, provides EDRA48 an excellent stage to explore issues of equity and inclusivity in environmental design and research. The city has been consistently ranked as one of the top five livable cities in the United States and acclaimed for innovative city planning that packs a big city into a small footprint. Citizens and communities in Madison consistently fight against racial, ethnic, and economic disparities. These issues of inequity are often linked to place and are being negotiated daily through a high level of civic engagement. Madison also presents a rich planning and architectural heritage of the American Midwest with numerous residential and civic buildings designed by Frank Lloyd Wright and other historic landmarks such as the State Capitol. Here, voices from the past and the present confront each other with recurrent regularity, creating a fertile ground for rich discourse of architectural representation.

The scholarship presented in the EDRA48 proceedings reveals many silent voices that have been ignored in conventional design and planning processes resulting in exclusion and segregation of different social groups. Antidotes to these issues are social inclusion and citizen participation. Against this backdrop, most presentations this year focus on two domains where voices typically go unheard: children and nature ecology, and globalization and aging. These all converge toward a similar goal of creating sustainable places where inter-generational connections can be embraced. The scholarship of EDRA48 also explores various place types including places of living, health care, work, education, processes of participation and post occupancy evaluation, and other pressing issues of cultural sensitivity, architectural phenomenology, and environmental design research education. Studies on cyberspace and digital environment continue to grow.

Geographically, the EDRA48 proceedings present studies by scholars and practitioners from 16 countries around six continents. These studies explore environmental design issues of nearly 20 different countries around the world. EDRA supports the work of scholars from across all regions of the world, even when events outside of their control prevent their attendance at the conference. We are committed to encouraging discussions that are inclusive and value the work of **all** scholars.

Jung-hye Shin, Ph.D.
EDRA48 Madison Co-Chair

Debarati "Mimi" Majumdar Narayan, Ph.D.
EDRA48 Madison Co-Chair

Samuel Dennis, Jr., Ph.D.
EDRA48 Madison Co-Chair

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EDRA48 MADISON

Keynote Address & Plenary Sessions

Keynote Session

Thursday, June 1, 2017, 5:30 – 7:00 pm, Madison Ballroom

Community as Corporation – The Talent Retention Imperative

Successful companies know that investing in individual employees is only as valuable as that organization's ability to keep them from taking their skills elsewhere. Yet we expect the educational and supportive investments for people in low-status communities to result in their exodus. What can be done to retain the talent, spending power, and positive examples that emerge from every community? What effect can a talent retention strategy have on chronic economic stagnation in neighborhoods? What does it look like? Join Majora Carter as she journeys through her own story of escape, return, and revitalization.



Majora Carter
President, MCG Consulting

Majora Carter is a leading urban revitalization strategy consultant, real estate developer, and Peabody Award-winning broadcaster. She is responsible for the creation and implementation of numerous green-infrastructure projects, policies, and job training and placement systems. At Sustainable South Bronx, Carter deployed MIT's first-ever Mobile Fab-Lab (digital fabrication laboratory) to the South Bronx — where it served as an early iteration of the "Maker-Spaces" found elsewhere today. The project drew residents and visitors together for guided and creative collaborations. After establishing Sustainable South Bronx and Green For All (among other organizations) to carry on that work, she opened a private consulting firm to help spread the message and success of the social enterprise and economic development in low-status communities — Best for the World by B-Corp.

Plenary Sessions

Plenary Session 1: Thursday, June 1, 2017, 10:30 am – 11:45 am

Voices from the Past: Linking Historic Preservation to People and Place with the Social Sciences

David Brown, Chief Preservation Officer, National Trust for Historic Preservation; Tom Mayes, General Counsel, National Trust for Historic Preservation; Jeremy C. Wells, Assistant Professor, University of Maryland, College Park

The presenters will discuss how, in the past few years, historic preservation practitioners and advocates have become increasingly interested in a “people-centered” approach to conserving the historic environment. The field, however, needs evidence from the social sciences — especially from environmental psychology — to help substantiate its new goals, which focus on health, quality of life, and human flourishing. To date, researchers in environmental psychology have shown little interest in the historic environment.

The panel will discuss this situation, the state of current knowledge, and offer ways to encourage foundational research in this area with the goal of informing practice. Last, the panel will discuss the National Trust for Historic Preservation’s interest in encouraging environmental psychologists and other social scientists to research aspects of the historic environment and to create pragmatic, applied research methods that practitioners can readily employ.

At the end, there will be a Q&A as well as an opportunity for the audience to provide input about how environmental psychologists and other social

scientists could help answer fundamental questions about people and the historic environment, especially in terms of how research can affect practice.



David J. Brown

David J. Brown leads the National Trust’s comprehensive preservation efforts, with four decades of experience in working to save historic places and build thriving, livable communities. He plays a key oversight role in the implementation of the National Trust’s Preservation10X strategic vision, including the National Treasure campaigns that help protect some of America’s most significant and threatened historic places. He guides the Trust’s advocacy work on behalf of the country’s most important preservation laws and incentives. And he oversees support for local preservation leadership, providing today’s preservation community with effective, high-impact training offerings.

Under David’s direction, the Trust is promoting preservation’s role in environmental sustainability and is committed to improving its diverse collection of historic sites across the country. With his guidance, the organization has focused on a multi-year, \$25 million stewardship program to address critical priorities across its entire portfolio of sites.

David also led the creation of PreservationNation.org — the Trust’s initial introduction to the online world — and conceptualized and fostered the \$15 million Partners in Preservation initiative with American Express. He successfully led the organization’s first capital campaign, the \$135 million Campaign for America’s Historic Places, from 1999 to 2003.

Prior to joining the Trust, David served as the founding executive director of the Preservation Alliance of Virginia, where he produced one of the nation’s first studies on the economic impact of preservation, and as director of the Historic Staunton Foundation in

Virginia. He was among the first graduates of the Historic Preservation Program at Middle Tennessee State University, and has a Master's in Planning from the Georgia Institute of Technology.



Tom Mayes

Tom Mayes, senior counsel for the National Trust for Historic Preservation, has specialized in both corporate and preservation law since he joined the organization

in 1986. He is the principal lawyer for legal matters relating to historic property real estate transactions and for the National Trust's 29 historic sites. Mayes has written and spoken widely on why old places matter to people, as well as preservation easements, shipwreck protection, historic house museums, the Americans with Disabilities Act, and preservation public policy. For many years, he taught historic preservation law at the University of Maryland Graduate Program in Historic Preservation. In 2013, Tom received the National Endowment for the Arts' Rome Prize in Historic Preservation, and wrote a series of essays, *Why Old Places Matter*.

Mayes has developed special expertise in architectural and technical preservation issues, preservation easements, the Americans with Disabilities Act and historic shipwrecks. He is the author of several articles relating to, and has lectured widely on, preservation easements, shipwreck protection, the Americans with Disabilities Act and preservation public policy.

Mayes received his B.A. with honors in History in 1981 and his J.D. in 1985 from the University of North Carolina at Chapel Hill. Mayes received an M.A. in Writing from Johns Hopkins University.



Jeremy C. Wells

Jeremy C. Wells is an assistant professor in the Historic Preservation Program at the University of Maryland (College Park, Maryland, US) and a Fulbright scholar.

His research focuses on improving the practice of conservation/preservation planning and policy through a better understanding of how everyday people value, perceive, and use the historic environment. Wells uses social science research methodologies, such as ethnographies, survey research, phenomenology, and community-based participatory research to influence conservation practice because, fundamentally, he believes that the conservation of the historic environment is an endeavor that should benefit people. Wells is the co-editor (with Barry Stiefel, College of Charleston) of *Preservation Education: Sharing Best Practices and Finding Common Ground* (University Press of New England). His research has been published in the *Journal of Architectural and Planning Research*, *Journal of Environmental Psychology*, *International Journal of Heritage Studies*, *Journal of the American Institute for Conservation*, and the *Association for Preservation Technology Bulletin*, along with numerous book chapters. Wells, who is currently on the board of the Environmental Design Research Association (EDRA) and chair-elect, created EDRA's Historic Environment Knowledge Network in 2008 to work with other academics and practitioners in addressing the person/place and environment/behavior aspects of heritage conservation. Through this network, he helped facilitate creation of the "Principles for Integrating Environmental Design and Behavior Research into Built Heritage Conservation Practice" to help guide researchers and practitioners.

Plenary Session 2: Friday, June 2, 2017, 10:30 am – 11:45 am

Designing Communities for Health: Stories from the Field

Kate Konkle, Action Center Director of Research and Learning, County Health Rankings & Roadmaps; Chris Krehmeyer, President/CEO, Beyond Housing; Board Chair, National Home Matters Movement; Kristie Rauter Egge, Community Health Planner and Health Promotion Supervisor, Wood County Health Department; Sarah Stewart, MPH M.Ed., Active Living Coordinator, Minneapolis Health Department

County Health Rankings & Roadmaps is working to build a culture of health, county by county. We know that where we live matters to our health. And we know that health is more than health care and more than individual behaviors. It's about creating a vibrant community where all people, especially those most affected by poor health outcomes, are heard and have the power to create and implement solutions. It's about working across sectors and with community members to transform policies, systems, and environments that result in everyone having access to quality jobs, education, housing, health care, and other factors that influence health.

In this plenary session, we will:

- Share our model of population health, which includes many of the areas that EDRA members are working in — education, community safety, community development, housing, and transportation as examples.
- Facilitate a panel of community leaders who will share their stories and lessons learned from working to improve health through policy, systems and environmental changes. They will also share how they have worked to engage residents in this work.



Kate Konkle

Kate Konkle is the Director of Research and Learning for the Action Center at County Health Rankings & Roadmaps, a collaboration of the Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute.

Kate leads the development and support of all learning tools and resources used by community coaches to support local action to improve health.

Prior to this role, Kate spent over three years as a Community Coach with County Health Rankings & Roadmaps. As a coach, she provided strategic guidance to communities that used County Health Rankings to drive health improvement.

Kate joined the University of Wisconsin Population Health Institute in 2010 as a Program Manager with the Healthy Wisconsin Leadership Institute. Prior to joining the Institute, Kate was a Wisconsin Population Health Service Fellow. As a fellow, she was placed in the Wisconsin Division of Public Health Western Regional Office in Eau Claire, where she worked on a variety of projects. Kate supported local health departments with their community health improvement planning process and helped lead a statewide project to prepare the state and local health departments for national voluntary accreditation using assessment and quality improvement. Kate holds a Master's in Public Health from the University of Alabama at Birmingham and a B.S. in Human Development and Family Studies from Penn State.



Chris Krehmeyer

Since graduating from Washington University in 1986, Chris has been actively involved in the field of family housing and community development in a variety of capacities. Currently,

he is the President/CEO of Beyond Housing, a NeighborWorks America organization in St. Louis, MO. He has served in that capacity since 1993. Beyond Housing currently has over 130 full-time

employees, a budget of almost \$17 million and controls assets worth more than \$110 million. The organization delivers its mission by producing and managing service-enriched affordable rental housing, operating a Homeownership Center, engaging in a comprehensive Community Building Initiative called 24:1 and leading the region's Foreclosure Intervention Work. The strategic vision of Beyond Housing is to make entire communities better places to live.

Chris has or currently sits on a variety of boards including Midwest Bank Centre and Midwest Bank Centre Holding Company, Community Builders Network of St. Louis, University of Missouri's Not-For-Profit programs, is board chair of the national Home Matters movement and is the former chair of the National NeighborWorks Association Board. Chris has been an adjunct faculty member at Washington University teaching a class in social entrepreneurship; he recently taught at Webster University, teaching a class on not-for-profit mergers, alliances and collaborations.

Chris is married with three children and has an undergraduate degree in Urban Studies from Washington University and an Honorary Doctorate in Humane Letters from the University of Missouri — St. Louis. He was named the Ethical Humanist of the Year for 2003 by the St. Louis Ethical Society, received the Open Door Award from the Equal Housing Opportunity Council in 2005 and was honored as the Practitioner of the Year by the National NeighborWorks Association in 2007. The NAACP of St. Louis named Chris an Inspiring St. Louisan in 2011. In 2011 and 2012 he was named one of St. Louis' Most Influential by the St. Louis Business Journal and one of St. Louis' Most Inspiring by the NAACP. In 2013 Chris received the Lighting the Way Award from United 4 Children and in 2014 was honored with the FOCUS St. Louis Leadership Award.



Kristie Rauter Egge

Kristie Rauter Egge is the Community Health Planner and Health Promotion Supervisor for the Wood County Health Department. She oversees the Healthy People Wood County Community Health Needs

Assessment and Community Health Improvement Plan focusing on Chronic Disease Prevention and Management, Mental Health & Alcohol and Other Drug Abuse, and Healthy Growth and Development. Kristie's work focuses on policy, system, and environmental changes at the local level and she has experience working with diverse populations and numerous community organizations including non-profits, school districts, worksites, city/county planning, and the health care industry, to name a few. She received her undergraduate degree from UW-Eau Claire in Biology and earned her Master's in Public Health through Concordia University. Kristie and her husband are proud to call Wisconsin Rapids home and have an 18-month-old daughter named Avery and a 4-legged, furry 5-year-old named Lucy.



Sarah Stewart

Sarah Stewart, MPH, M.Ed., is the Active Living Coordinator at the Minneapolis Health Department, where her work has focused on changing policies, systems, and

environments to better support physical activity and health in communities using a health equity lens. Prior to her work in Minneapolis, she has organized community health coalitions in Massachusetts and taught health and special education classes in Missouri. She especially loves to bike and walk the myriad trails and greenspaces of the Twin Cities with her family.

**Plenary Session 3, Saturday, June 3,
2017, 10:30 am – 11:45 pm**

Standing with Standing Rock: Voices of Environmental Resistance

Patty Loew, Professor, Department of Life Sciences
Communication, University of Wisconsin-Madison

Why has the Dakota Access Pipeline protest in North Dakota resonated so deeply with indigenous people? Why have so many indigenous people — upwards of 5,000 people representing 400 individual Indian nations here and indigenous communities around the world — rallied around the Standing Rock Sioux community? Dr. Patty Loew (Bad River Ojibwe), the author of *Seventh Generation Earth Ethics*, relates indigenous stories of struggle and resistance — links in an environmental chain that connect Native communities spiritually, culturally, and philosophically to DAPL and have inspired indigenous people to stand up for Standing Rock.



Patty Loew

Patty Loew is a professor at the University of Wisconsin-Madison Departments of Life Sciences Communication and Civil Society and Community Research. She's a

documentary producer and former broadcast journalist in public and commercial television. A member of the Bad River Band of Lake Superior Ojibwe, she is the author of four books: *Native People of Wisconsin*, which is used by 18,000 Wisconsin school children as a social studies textbook; *Teachers Guide to Native People of Wisconsin*; *Indian Nations of Wisconsin: Histories of Endurance and Renewal*; and *Seventh Generation Earth Ethics*, a collection of biographies of Native American environmental leaders. She has produced many documentaries for public and commercial television, including *Way of the Warrior*,

which aired nationally on PBS in 2007 and 2011. Her outreach work focuses on Native American youth and digital storytelling.

EDRA48 MADISON

Mobile Sessions

Mobile Session #1

Saturday, June 3, 1:30 pm – 5:30 pm

The Changing Spaces of Higher Education

Facilities and Planning Management, University of Wisconsin-Madison

This tour explores the changing spaces of higher education by focusing on a cluster of three campus buildings. In addition to their sustainable design features, these three buildings emphasize diverse human experiences in both their indoor and outdoor public spaces.

1. Wisconsin Institutes for Discovery received LEED Gold certification in 2011, and was the third building on the UW-Madison campus to achieve LEED recognition. The building received the Innovation in Green Building Award, and was also named the 2012 Laboratory of the Year.
2. Union South received LEED Gold certification in 2012 and is “considered a living room for students and community members.”
3. Nancy Nicholas Hall received LEED Gold certification in 2013 and is home to the UW School of Human Ecology. Notable spaces include the Ruth Davis Design Gallery, Preschool Laboratory, Rooftop Terrace, and the Laura Linden Discovery Garden.

Participants should be prepared to walk approximately one mile or so to cover all three buildings. Buildings are ADA accessible.

Mobile Session #2

Saturday, June 3, 1:30 pm – 5:30 pm

Innovative Green Infill

Susan Thering, Ph.D., Program Director for the Public Interest Design Institutes (PIDI) and the Social, Economic, & Environmental Design (S.E.E.D.) Project Certification Program at Design Corps.

Tour the projects; meet the planners, designers, developers, citizens, and elected officials who made them happen (housing, mixed-use, and adaptive re-use of historic building).

Participants will tour innovative examples of “green” infill projects with the planners, architects, developers, citizens, and elected officials who made them possible. The first stop will be the Garver Building redevelopment project, which was nominated for a Great Places planning award in 2015.

This project is under construction. Weather and safety permitting, we will walk the grounds and tour the historic 60K square foot brick industrial building. When complete, this property will house a diversity of local food producers, meeting rooms, and a showcase of 50 “green” “micro-lodge/tiny houses,” which will be run like a bed & breakfast. Plans for this site include a “launchpad” for a national initiative to showcase and disseminate model codes for “green” residential infill, including tiny homes, accessory dwelling units, cohousing and micro-cohousing to municipal officials across the country.

The second stop will be the Madison Area Technical College (MATC), where we will tour model green micro-lodges, which were designed for installation at the new micro-lodge facilities at the Garver property and built in collaboration with the MATC construction technology program. Time and construction schedules permitting, we will briefly stop at infill sites that are,

Mobile Sessions

as of this writing, the proposed sites of an innovative mixed-income cohousing project and a pilot micro-cohousing project.

Our guest speakers and tour guides will answer questions about these green infill strategies, the codes, the code development process in Madison, public participation, design, public/private collaboration, and barriers to innovative infill, local and national, overcome and current. Faculty and students will find much fodder for research and willing “place-based” research partners.

Mobile Session #3

Saturday, June 3, 1:30 pm – 5:30 pm

Capital Square and State Street as Contested Public Spaces

Samuel Dennis, Jr., Ph.D., ASLA (University of Wisconsin-Madison) and Ken Saiki, ASLA (Ken Saiki Design)

State Street is a diverse, dynamic and iconic public space in Madison. Designed by M. Paul Friedberg in 1974, the 6-block transit and pedestrian corridor connects the State Capital to the University of Wisconsin. At its eastern end, the Capital Square is home to the largest outdoor farmers’ market in the country and the site of recent massive political protests. To the west, State Street forms the gateway to the UW campus—a confluence of food carts, bicyclists and pedestrians at the intersection of the East Campus Mall and the Library Mall.

The pedestrian-oriented streetscape derives its strong sense of place from a wide variety of land uses, including restaurants, bars, shops, apartments, performance venues, public art installations, and pocket parks. Likewise, its mix of shoppers, tourists, students, buskers, panhandlers, preachers, and demonstrators contribute to State Street’s unique urban vibe in this small Midwestern town.

Public debates over who is welcome on State Street and who is not (and by whom) highlight issues of social justice and equitable access to Madison’s premiere public space. This walking tour will focus on design responses to the competing visions for State Street.

Join landscape architect Ken Saiki, whose office undertook redesign of the Capital Square and State Street amid the many conflicting claims to these public spaces. Stops along the tour include Capital Park, Peace Park, Philosopher’s Grove, and the 600-700 Block on the UW Campus.

Participants should be prepared to cover about 1.5 miles over several hours outdoors. Participants are expected to find their own way back to the conference venue.

Mobile Session #4

Saturday, June 3, 11:30 am to 5:30 pm

Frank Lloyd Wright’s Taliesin

Will be led by Patty Lucas, Taliesin Preservation, Group Tour Coordinator

Includes tour ticket, shuttle, and boxed lunch.

Taliesin (Spring Green, WI) is the home, studio, school, and 800-acre agricultural estate of Frank Lloyd Wright. Wright built Taliesin on his favorite boyhood hill in the Wisconsin River valley homesteaded by his Welsh grandparents and named it Taliesin in honor of the Welsh bard whose name means “Shining Brow.”

The Taliesin estate was his laboratory of organic architecture, with designs from nearly every decade of Wright’s life. The Taliesin residence is the heart of these buildings that Wright designed and modified from 1897 to 1959, including the Romeo & Juliet Windmill, Hillside School, Tan-y-Deri, Midway Barn, and the Frank Lloyd Wright Visitor Center. These are among the reasons Taliesin is often described as Frank

Lloyd Wright's autobiography in wood and stone
(description from the Frank Lloyd Wright Foundation).

Participants will be expected to leave Monona Terrace immediately after the plenary session and gather outside for the shuttle bus. The bus will leave promptly at 11:45 am so participants can arrive in a timely manner for the tour starting at 1:00 pm in Taliesin. Please be advised that you will be expected to eat your boxed lunch on the bus as there will be limited time once we arrive on site. Participation on this tour is capped at 56 and participants will be assigned on a first-come, first-served basis, so do sign up as soon as possible if you want to take advantage of this tour!

EDRA48 MADISON

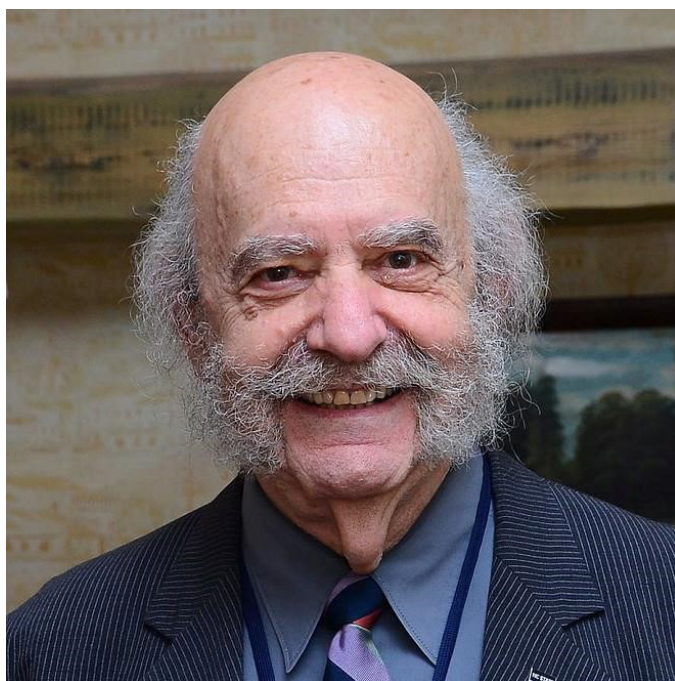
Award Winners

EDRA 2017 Career Award: Henry Sanoff, AIA, Professor Emeritus, College of Design, North Carolina State University

The EDRA Career Award is given in recognition of a career of sustained and significant contributions to environment design research, practice, or teaching. Candidates in the area of design research shall have produced a body of work that provides significant insights into the relationship between environment and behavior. Candidates in the area of practice shall have made significant and lasting contributions to the planning and design of the environment through the application of design research. Candidates in the area of teaching shall have made positive, stimulating, and nurturing influences upon students over an extended period of time and have inspired a generation of students who have contributed to environmental design research.

Would there be an EDRA if it was not for Henry Sanoff?

Distinguished Emeritus Professor Henry Sanoff (1953 New York City College of Technology; 1957 and 1962 Pratt Institute, New York) is the 2017 EDRA Career Award recipient. This is a hallmark award presentation to the founder of EDRA, celebrating and recognizing his half a century of nonstop commitment to EDRA, his vision, determination, exceptional contributions, authorships, ongoing support, and passion that excite and engage all in the field of environmental design research, participatory scholarship, universal design, access, and inclusion, generously sharing his expertise and knowledge and mentoring many generations across the globe on stewardship of spaces and places for people and cultures.



Henry Sanoff is one of the most active researchers in the field of environmental design. He has published 15 monographs and over 85 refereed papers and book chapters. Many of his books have been translated into Korean, Japanese, Polish, Russian, and Spanish languages. Several of his books are recently re-published by major international publishers in international and American journals and publications. He has also been invited as a keynote speaker at conferences in Australia, Chile, China, Cyprus, Brazil, Egypt, Japan, Korea, New Zealand, Portugal, Singapore, South Africa, Spain, Turkey, and the USA.

Professor Sanoff has been a visiting lecturer and speaker at more than 85 institutions and organizations in the USA and across the world including Australia, Brazil, China, Costa Rica, Cyprus, Denmark, Egypt, England, France, Germany, Greece, Hong Kong, Israel, Italy, Japan, Korea, Mexico, New Zealand, Portugal, Singapore, South Africa, Sweden, Switzerland, and Turkey. He has been a visiting scholar at The University of London, Oxford Polytechnic, Royal College of Art, Monterrey Technical Institute, Tokyo University, Western Australia Institute of Technology, University of Sydney, University of Melbourne, University of Wellington, Royal Danish

EDRA Awards

Academy of Art, University of Thessaloniki, University of Hamburg, Seoul National University, Misr University, Yonsei University, and the Polish Institute of Architects.

Professor Sanoff's contributions have been recognized by major universities, architectural associations, and magazines. He has received the Statue of Victory, 1985 World Culture Prize for Letters, Arts, and Science; awards from Progressive Architecture Design Awards Program in 1974, 1978, and 1983; and the Award of Honor, Environmental Design Research Association, 1977. In 1991, he received the Sigma Iota Rho award for Distinguished International Service and in 1994, the NCSU Outstanding Extension Service Award. He has held many international fellowships including University Professor, University of London; the Chettle Fellowship, University of Sydney, 1990; Nell Norris Fellowship, University of Melbourne, 1987; Lecture Fellowship, Institute of South African Architects, 1990; and the Distinguished Fulbright Award to Seoul National University, Korea, 1990; North Carolina Alumni Association honor as Distinguished Graduate Professor, 1995; North Carolina State University, Holladay Medal of Excellence, 1998; Phi Kappa Phi Faculty Achievement Award, 1999; American Collegiate Schools of Architecture (ACSA) Architecture Distinguished Professor, 2000; ACSA Community Design Award, 2001; and Fulbright Senior Specialists Award to Peru, 2001.

Professor Sanoff's research and lecturing activities have contributed tremendously to the profound growth of the field of environmental design research. In many countries of the world, the fields of environmental design research, participatory design, and programming are closely associated with his name and his publications. Bridging the academic world with professional practice is a significant characteristic of Henry Sanoff's work. His participatory methods and design games and their variations are important instruments in the toolbox of today's environmental design and research community.

Professor Sanoff founded the Doctoral Program in Community Design at NCSU-Raleigh and has created a remarkable school of thought, based on his principles of environmental design research, environment and behavior, and participatory design. He is the optimal mentor of graduate students, an intellectual magnet for years for doctoral students across the world, he has taught and mentored hundreds of Doctoral and Master students, saw them thrive and, true to the EDRA tradition of family, saw them develop their own careers and that of their students in universities and institutes in America, Europe, and Asia, inspiring many others in their own. An extraordinary role model for many, the inaugural Emeritus EDRA Board member (2013-2014), Henry Sanoff is constant in his generosity of spirit, collegiality, and dedication to the future of EDRA and Environmental Design Education, Research, Practice, and Advocacy, for people, with people.

A most deserving and inspiring scholar, researcher, activist, and mentor; EDRA stands tall in honor and recognition of Henry Sanoff, the 2017 Career Award recipient.

EDRA 2017 Service Award: Tasoulla Hadjiyanni, Ph.D Professor Interior Design Program, Department of Design, Housing, and Apparel, University of Minnesota

The EDRA Service Award is given in recognition of a specific contribution of service to the field or the organization that advances the field of environmental design research. This award is given to EDRA members who have contributed above and beyond exemplary service to the organization, either in the form of specific significant service contribution to the organization or field or in sustained service to the field and organization as members and volunteers over a period of time.

A long-term EDRA member, Dr. Tasoulla Hadjiyanni embodies the compelling ethical care, service, and engagement characteristic of EDRA values and commitments.

Starting from her own life experiences, and empowered by sustained field research in profoundly important areas of inquiry, instruction, and service, Dr. Tasoulla Hadjiyanni built a well established body of investigation, integration, and outreach that generates knowledge about and advocates for culturally sensitive design that is responsive to human beings' needs, cultures, and spatial and temporal situations. Her EDRA citizenship became a vehicle for the growth, outreach and impact of her scholarship and service.



Service on EDRA committees have been prolific, leading over time to her election to the Board of Directors. Tasoulla served as secretary on the EDRA Board of Directors, and continued her EDRA service after end of term on various volunteer committees including participation in the Communication Committee, Development Committee, and Conference Committee.

A significant service to EDRA is envisioning and leading one of EDRA's major publications, transforming its content and its impact. Tasoulla Hadjiyanni served as the Editor of EDRA Connections, providing significant commitment of time and vision to developing the scope and focus of the publication. She broadened the reach and depth of the publication, and created a system that draws on the talents and contributions of EDRA members. During her tenure, Tasoulla oversaw six publications of EDRA Connections and 25 diverse articles. Tasoulla Hadjiyanni also served competently as the Chair of the Residential Environments Network for more than 7 years, maintaining agile connection with network members and developing effective and relevant programs for explorations during and after the annual conference.

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Tasoulla Hadjiyanni's service as a key member of EDRA's Cultural Aspects of Space Network translated into significant relevant contributions to the organization, to the field of environmental design and research, and to communities across the states. She stimulated the cultural network thinking about housing for immigrants in the United States.

Tasoulla Hadjiyanni extended her research interest and engaged approach in service of refugee communities and marginalized populations, including Hmong and Somali refugees, as well as Native American, African American youths and Mexican American communities. She developed products that are significant in housing applications, quality of life and wellbeing, community planning, mental health, and interdisciplinary intersections, for scholars, practitioners, policy makers, and citizens alike.

Tasoulla has continuously served as an EDRA reviewer for conference abstracts and manuscripts; the depth of her engagement speaks to her full commitment and dedication for the growth and excellence of the institution. A scholar and educator, and true to EDRA traditions, Tasoulla provided mentorship for graduate and undergraduate students, paving the way for their own commitment to EDRA and the field.

Dr. Hadjiyanni's service to EDRA and to the field of Environmental Design Research presents a model to fostering communication and engagement between diverse constituents that builds bridges between theory and practice, bringing educators, practitioners, policy makers, and community members together around significant and critical issues. She serves on key community committees including the Urban Land Institute Regional Council of Mayors Housing initiative advisory group; Sustainability Resource Center, University Professional team on Affordable Housing; and others. An engaged citizen, Tasoulla continues to serve as an invited presenter and workshop organizer for several communities.

Dr. Tasoulla Hadjiyanni's service record crosses many boundaries, takes risks, affords many possibilities, and has the potential to greatly transform the academy and the world. She is a most deserving recipient of the 2017 EDRA Service Award.

2017 EDRA Great Places Awards

The Great Places Awards seek to recognize work that combines expertise in design, research, and practice; and contributes to the creation of dynamic, humane places that engage our attention and imagination. Award-winning projects reflect an interdisciplinary approach that is enduring, human-centered, sustainable, and concerned with the experiential relationship between people and their environment (built and natural) over time.

Design Winner: Simona Serafino, Mariahilfer Strasse, Vienna



Overall Context

The Mariahilfer Strasse is a fancy, nineteenth century shopping boulevard in Vienna. In the last decades it became very heavy with traffic. The City of Vienna decided to transform the street into an inviting, pedestrian-friendly avenue.

Like many cities around the world, Vienna is facing a mobility transition: Slowly but surely people are getting out of their cars and are starting to walk, bike, or trolley around. The municipality would like to stimulate this shift from a fossil fueled to a more sustainable social and active transportation. To achieve this, Vienna is drastically changing the road structure. Three out of the seven main roads are downgraded. The Mariahilfer Strasse is one of them.

The heart of the street is now a pedestrian zone. This means cross-town traffic has to take a detour. The two outer zones are designated 'shared spaces'. Cars, bikes and pedestrians all use the same space, causing everybody to be more considerate.

Planning Winner: David Jurca, Making Our Own Space



Overall Context

Making Our Own Space (MOOS) is a planning project that empowers middle and high school students with the skills to transform their local public spaces. Led by a professional design practice, this initiative uses hands-on, on-site workshops to build physical and social infrastructure in collaboration with the surrounding community. The clients for the project are Cleveland Neighborhood Progress (CNP) and the City of Shaker Heights, Ohio. Community park investments were identified through an innovative method that integrates built prototypes into the planning process.

Research Winner: Dean Apostol and James Palmer, *Renewable Energy Landscape*

Overall Context

Land/seascape have become contested ground where two major social forces are facing off. On the one hand, there is a growing realization that land/seascape is a repository for cultural identity (e.g., the European Landscape Convention). On the other hand is the scientific realization that climate change has the potential to drastically impact environmental and social systems. Large-scale renewable energy (RE) development is needed to address climate change. Consequently, there is a major push for renewable energy development in the United States, and onshore and offshore wind as well as large-scale solar is being rapidly developed in Europe. However, there is growing resistance to living with a RE landscape that fails to respect the scenic and cultural qualities we value in our landscape.

We must change how we produce energy, but initial attempts have resulted in landscapes that are unacceptable to a significant proportion of the public that live, work, or recreate in sensitive landscapes with high scenic quality. This book reviews what is known about this problem and proposes a process for evaluating the (primarily visual) experienced effects of this change for integration into a more positive public decision making process.

Book Winner: Kristi Gaines, Angela Bourne, Michelle Pearson, and Mesha Kleibrink, *Designing for Autism Spectrum Disorders*

Overall Context

Designing for Autism Spectrum Disorders aims to increase knowledge about the influence of natural and man-made environments on individuals with autism spectrum disorders (ASD) and other forms of intellectual/developmental disabilities (IDD). Traditionally, the built environment has been designed around the average user with the needs of diverse populations considered the exception in design. However, research is expanding the role of the design professional to consider differences in the way individuals perceive and interact with the environment.

Many individuals with ASD/IDD (also known as neurodiversities) are particularly sensitive to the surrounding environment, primarily because of sensory processing deficits. Considerable evidence shows that the physical environment can positively contribute to accessibility, utility, safety, comfort, and overall well-being. Positive outcomes have been correlated with modifications to color, lighting, space organization, textures, acoustics, ventilation, etc. Additionally, research shows that the general population benefits when interiors and buildings are designed to accommodate more sensitive users.

Michael Brill Award, Co-Sponsored by the Urban Communication Foundation

Michael Brill Award

Named in honor of Michael Brill, architect and long-time EDRA member, for his leadership in workplace environments and communication, this grant is funded by the Urban Communication Foundation and administered in conjunction with EDRA. The goal of this grant program is to encourage innovative research projects that provide a bridge between the fields of communication and environmental design. This grant supports new research or research in progress.

**Award Winner: Georgia Lindsay, Ph.D.,
Visiting Assistant Professor, Environmental
Design Program, University of Colorado
Boulder**

**Communicating Sustainability in the
Green Science Museum**

Project Overview

Buildings can reflect the values of the institutions that create them (for various perspectives on the values contained in the built environment, see Bourdieu 1984; Elias 2000; Franck 2000; Gieryn 2002; Gutman and Glazer 2009; King 1995; Low 1999). Some building types are more explicitly about communicating values than others, though: museums can impart implicit civilizing values (Bennett 1995; Oberhardt 2001), and schools can get LEED points for using their buildings as part of the pedagogy.



This project will bring together a scholar of museum architecture and a scholar of green buildings to explore the use of green museum architecture as a communication tool for sustainability education. Specifically, we are interested in science museum buildings, under the assumption that science museums already have a mission to increase science literacy for the public. We will examine four case study science museums with these overall research questions: What are the ways in which these museums communicate sustainability to the public? And, how (if at all) are these museums using their green facilities to advance green building literacy (positioned at the intersection of science, environmental, and architectural literacies)? This work will bring together theories from the communication literature, the museum literature, and the green building literature in a unique way. It will also have practical results, providing a typology of communication techniques, or a toolbox of strategies, to architects and administrators of museums who wish to employ green buildings for sustainability education.

Four LEED-certified science museums form the core of this exploratory study, selected based on a 2x2 matrix: high to low sustainable design (level of LEED certification and percent of floorplan that is certified) and strong to weak use of the building in museum pedagogy. A variety of methods will help us uncover how the institutions use their buildings to communicate sustainability and increase green building literacy: 1) on-site analysis of the ways in which the green facility communicates sustainability through the built environment, 2) document analysis of virtual and print marketing materials, 3) observations of user engagement with green building displays, and 4) interviews with personnel.

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Refereed Full Papers

An Analysis of Aesthetic Quality of Buildings and Urban Scenes

Antônio Reis, Maria Seadi, Camila Biavatti

Introduction

According to many architects, in many schools of architecture, and to many local governments, the aesthetic quality of buildings and urban scenes is a matter of personal taste, although this may also be driven by social, economic and political forces. Therefore, the fact that many buildings and urban scenes in distinct cities around the world may be perceived as unsatisfactory by many people would be just a consequence of these people having distinct tastes. This is supported by the philosophical approach to aesthetics which is reflected in the saying, 'beauty is in the eyes of the beholder,' and that one's aesthetic reaction cannot be objectively explained (i.e., Lang, 1987). On the other hand, the empirical approach to aesthetics, which covers the formal and the symbolic aesthetics, seeks to understand the reasons people have for their aesthetic evaluations (i.e., Lang, 1987) and allows one to say that 'beauty is much more on the perceived object than in the eyes of the beholder'. The aesthetic quality of architectural composition and the relationship between buildings would be mainly explained by their formal characteristics, which is the concern of formal aesthetics. The idea of architectural composition refers to the relationship among the elements that are part of a building, its formal structure. As mentioned by Hasse and Weber (2010, p. 1), "... architectural composition can be seen as the art of balancing individual architectural parts within an overall whole of a building." The formal characteristics of an architectural composition can be analyzed by means of the visual perception process, which shows that such characteristics may be perceived similarly by different people due to their physiological similar structure, independently of their previous experience and values (i.e., Weber, 1995). The existence of the notion of order (considered as a human psychological and physiological need)

in different architectural compositions tend to be perceived and evaluated positively by different people (Nasar, 1998; von Meiss, 1993; Weber, 1995). Nonetheless, the external relations, the associations made with an architectural composition due to its use and/or its history, such as its historical value, cannot be disregarded. These are the concern of symbolic aesthetics and can be analyzed through the cognitive process which considers one's previous experience, memory, culture, values and knowledge (Weber, 1995; Lang, 1987). In this sense, the historical value of the building would be an association established based on the value that such a building would have due to its history, which assumes some knowledge of this history by those who establish such association. However, older or historic buildings could be positively evaluated not because of their historical value or some other association with the past but due to their formal characteristics, usually with the presence of order and some variety generating visual stimulus (Nasar, 1998). The type and level of education could also affect the aesthetic evaluations, as illustrated by a study of building façades (Jeffrey and Reynolds, 1999). In this study it was observed that the architects had different patterns of preference which were more homogeneous, while a considerable convergence of views was found between the planners and lay people. However, the aesthetic preferences of these three groups tended to have considerable agreement with respect to buildings that were intensely appreciated or depreciated. In addition to the need to deepen the knowledge about these aspects related to formal and symbolic aesthetics, the philosophical approach to aesthetics appears to be dominant in the schools of architecture and in the practice of many architects in different cities in the world. A lack of order in the composition of buildings and in urban scenes, in the formal relationship between buildings, tends to exist in such distinct cities. Hence, there is a need to increase the knowledge about the explanations for aesthetic evaluations and to highlight the importance of the empirical approach to aesthetics. Therefore, this paper analyzes the aesthetic quality of buildings and urban scenes, considering

the approaches of the formal and symbolic aesthetics. Individual buildings and urban scenes characterized by historic and contemporary buildings with different levels of order and visual stimulus are evaluated and compared by people with different levels and types of education, being identified as the reasons for such evaluations.

Methodology

A list of historic buildings was obtained from public institutions in charge of such buildings, and photographs were obtained from an architecture firm and taken by the authors either in Porto Alegre or in other cities. Questionnaires and structured interviews were conducted with 60 architects, 60 non-architect college graduates with a degree in courses that do not deal with aesthetics, and 60 non-college graduates. These 180 respondents were familiar with Porto Alegre, living or working in the city for at least one year, and were contacted through messages by email and phone calls. Single and multiple choice questions were used, such as: "Evaluate the appearance of the building 1 to 6:" [very beautiful; beautiful; neither beautiful nor ugly; ugly; very ugly]; "Please indicate the main reasons justifying the most preferred building: () similarity among the shapes; () lack of similarity among the shapes; () ordered relationship among the shapes; () disordered relationship among the shapes; () geometric regularity of shapes; () lack of geometric regularity of shapes; () existence of visual stimulus; () lack of visual stimulus; () other _____". The structured interview was based on the following instruction related to the historical value of the buildings: "Explain whether the fact a building is old or has historical value affected your evaluation."

Buildings were shown in two A3 boards to respondents of questionnaires, using color photographs of three historic buildings of Porto Alegre (Figure 1) and three contemporary buildings of Porto Alegre, categorized as follows: (a) building 1: historic building with disorder (Figure 3); (b) building 2: historic building with order and little stimulus (Figure 4); (c) building 3: historic building with order and stimulus (Figure 5);

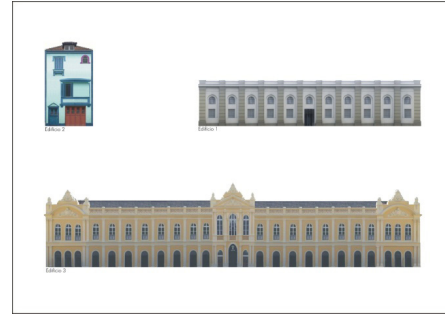


Figure 1: Board with historic buildings of Porto Alegre



Figure 2: Board with historical scenes of Florence and Prague



Figure 3: Building 1: historic building with disorder

(d) building 4: contemporary building with disorder (Figure 6); (e) building 5: contemporary building with order and stimulus (Figure 7); and (f) building 6: contemporary building with order and little stimulus (Figure 8).



Figure 4: Building 2: historic building with order and little stimulus



Figure 5: Building 3: historic building with order and stimulus



Figure 6: Building 4: contemporary building with disorder

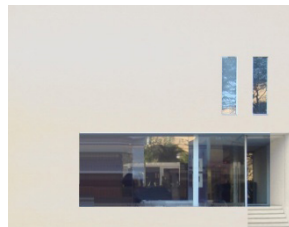


Figure 7: Building 5: contemporary building with order and stimulus

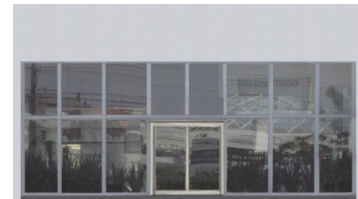


Figure 8: Building 6: contemporary building with order and little stimulus

Three boards with urban scenes were also shown to the respondents, as follows: two historical scenes of Florence and one of Prague (Figure 2); three historical scenes of Porto Alegre; and three contemporary scenes of Porto Alegre. These scenes were categorized as follows: (a) historical scene of Florence with order and little stimulus (Figure 9); (b) historical scene of Florence with disorder (Figure 10); (c) historical scene of Prague with order and stimulus (Figure 11); (d) historical scene of Porto Alegre with order and stimulus (Figure 12); (e) historical scene of Porto Alegre with disorder (Figure 13); (f) historical scene of Porto Alegre with order and little stimulus (Figure 14); (g) contemporary scene of Porto Alegre with disorder (Figure 15); (h) contemporary scene of Porto Alegre with order and stimulus (Figure 16); and (i) contemporary scene of Porto Alegre with order and little stimulus (Figure 17). Buildings and scenes with order and visual stimulus are characterized by an organization of the architectural elements and clear visual stimulus or focus of visual

attention (Figures 5, 7, 11, 12 and 16). Buildings and scenes with order and little visual stimuli are characterized by an organization of the architectural elements but with weak visual stimulus, allowing the perception of monotony (Figures 4, 8, 9, 14 and 17). Buildings and scenes with disorder are characterized by the absence of a visible rule of organization of the architectural elements, getting compromised the perception of order (Figures 3, 6, 10, 13 and 15). The historic buildings of Porto Alegre are those considered of historical and/or artistic value and listed by public institutions in charge of preserving the cultural heritage at the local (EPAHC), state (IPHAE) and federal level (IPHAN). Contemporary buildings of Porto Alegre are commercial buildings built from 1990 that are not architectural works of reference and/or that have not being reported by the media, in order to eliminate or minimize possible impacts advertising of some buildings might have on aesthetic evaluations by respondents.



Figure 9: Historic scene (1) of Florence with order and little stimulus



Figure 10: Historic scene (2) of Florence with disorder



Figure 11: Historic scene (3) of Prague with order and stimulus



Figure 12: Historic scene (4) of Porto Alegre with order and stimulus



Figure 13: Historic scene (5) of Porto Alegre with disorder



Figure 14: Historic scene (6) of Porto Alegre with order and little stimulus



Figure 15: Contemporary scene (7) of Porto Alegre with disorder

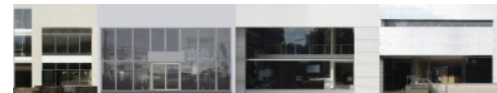


Figure 16: Contemporary scene (8) of Porto Alegre with order and stimulus



Figure 17: Contemporary scene (9) of Porto Alegre with order and little stimulus

Photographs of buildings, both individual and in the scenes, were edited in Corel Photo Paint program aiming at aesthetic adjustments to the categories adopted and elimination of visual distortions, people, vehicles, shadows, distinct skies, vegetation and urban elements (such as poles and light wires, garbage containers, and visual communication elements) that could interfere with the aesthetic evaluation of buildings. Data obtained through the questionnaires were tabulated in the statistical program SPSS Statistics 8 and analyzed using non-parametric statistical tests such as Kruskal-Wallis and Kendall's W (e.g., Lay and Reis, 2005). Data from the interviews were analyzed using frequencies and the meanings of answers.

Results

Aesthetic Quality of Buildings

Statistically significant differences were found among the aesthetic evaluations of the six buildings by the total sample of 180 respondents (Kendall's W, $\chi^2 = 287.101$, sig. = 0.000), by the architects (Kendall's W, $\chi^2 = 119.747$, sig. = 0.000), by non-architect college graduates (Kendall's W, $\chi^2 = 121.54$, sig. = 0.000), and by non-college graduates (Kendall W, $\chi^2 = 90.15$, sig. = 0.000) (Table 1). Thus, buildings characterized by different levels of order and visual stimuli are differently evaluated, indicating heterogeneous aesthetic qualities. Buildings 3 and 2 (Figures 5 and 4, respectively) are those best evaluated by the total sample of 180 respondents with, respectively, 92.7% and 57.3% of positive evaluations. Buildings 4 (41.1%; Figure 6) and 1 (31.7%; Figure 3) are those worst evaluated, showing the highest negative evaluations by the total sample. The top-rated

buildings by architects, showing the highest positive evaluations, are buildings 3 (91.7%), 5 (78.3%; Figure 7) and 2 (55%), while the worst evaluated are buildings 1 (45%) and 4 (38.3%), showing the highest negative evaluations. Buildings 3 (98.4%) and 2 (63.4%) are those best evaluated by non-architect college graduates, while buildings 4 (56.6%), 6 (35%; Figure 8), 5 (33.4%; Figure 7) and 1 (28.3%) are the worst evaluated, with the highest negative evaluations.

The top-rated buildings by non-college graduates, with the highest positive evaluations, are buildings 3 (88.3%) and 2 (53.3%), while the worst evaluated are buildings 5 (31.7%), 4 (28.3%), and 1 (21.6%), with the highest negative evaluations. Although the positive evaluations of these three buildings have been preponderant (5 - 33.3%; 4 - 41.7%; 1 - 45%), the negative evaluations cannot be ignored (Table 1).

Table 1: Degrees of satisfaction with the appearance of buildings

| Degrees of satisfaction | Building 1 Fig. #3 | Building 2 Fig. #4 | Building 3 Fig. #5 | Building 4 Fig. #6 | Building 5 Fig. #7 | Building 6 Fig. #8 |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Total sample — 180 respondents | | | | | | |
| Very Beautiful | 12.2% | 11.7% | 59.4% | 3.9% | 15.0% | 7.2% |
| Beautiful | 26.1% | 45.6% | 33.3% | 26.1% | 34.4% | 23.3% |
| Neither Nor *** | 30.0% | 33.9% | 6.1% | 28.9% | 28.3% | 45.0% |
| Ugly | 21.1% | 8.3% | 0.6% | 32.2% | 19.4% | 18.3% |
| Very Ugly | 10.6% | 0.6% | 0.6% | 8.9% | 2.8% | 6.1% |
| mrν Kendall * | 3.02 | 3.79 | 5.28 | 2.58 | 3.40 | 2.94 |
| Architects — 60 respondents | | | | | | |
| Very Beautiful | 8.3% | 13.3% | 56.7% | 8.3% | 28.3% | 8.3% |
| Beautiful | 20.0% | 41.7% | 35.0% | 20.0% | 50.0% | 20.0% |
| Neither Nor | 26.7% | 35.0% | 6.7% | 33.3% | 20.0% | 51.7% |
| Ugly | 25.0% | 10.0% | 1.7% | 25.0% | 1.7% | 11.7% |
| Very Ugly | 20.0% | 0.0% | 0.0% | 13.3% | 0.0% | 8.3% |
| mrν Kendall | 2.47 | 3.66 | 5.13 | 2.55 | 4.36 | 2.83 |
| mrν K-W ** | 75.28 | 89.39 | 87.76 | 90.76 | 122.15 | 91.48 |
| Non-architect college graduates — 60 respondents | | | | | | |
| Very Beautiful | 18.3% | 11.7% | 66.7% | 1.7% | 8.3% | 5.0% |
| Beautiful | 23.3% | 51.7% | 31.7% | 18.3% | 28.3% | 25.0% |
| Neither Nor | 30.0% | 30.0% | 0.0% | 23.3% | 30.0% | 35.0% |
| Ugly | 20.0% | 6.7% | 0.0% | 48.3% | 26.7% | 30.0% |
| Very Ugly | 8.3% | 0.0% | 1.7% | 8.3% | 6.7% | 5.0% |
| mrν Kendall | 3.35 | 4.03 | 5.43 | 2.32 | 3.03 | 2.84 |
| mrν K-W | 96.46 | 95.76 | 98.46 | 76.60 | 74.76 | 83.78 |
| Non-college graduates — 60 respondents | | | | | | |
| Very Beautiful | 10.0% | 10.0% | 55.0% | 1.7% | 8.3% | 8.3% |
| Beautiful | 35.0% | 43.3% | 33.3% | 40.0% | 25.0% | 25.0% |
| Neither Nor | 33.3% | 36.7% | 11.7% | 30.0% | 35.0% | 48.3% |
| Ugly | 18.3% | 8.3% | 0.0% | 23.3% | 30.0% | 13.3% |
| Very Ugly | 3.3% | 1.7% | 0.0% | 5.0% | 1.7% | 5.0% |
| mrν Kendall | 3.23 | 3.68 | 5.26 | 2.88 | 2.82 | 3.14 |
| mrν K-W | 99.76 | 86.35 | 85.28 | 104.14 | 74.59 | 96.24 |

Note: * Mean rank values obtained through Kendall's W test; ** Mean rank values obtained through the Kruskal-Wallis test; comparisons among Kendall mean rank values should be made horizontally, between the buildings; comparisons among K-W mean rank values should be made vertically, between the three groups; *** Neither Beautiful Nor Ugly.

Thus, building 3 (Figure 5 — historic building with order and stimulus) is the top-rated, both by the total sample and by each of the three groups of respondents (Table 1). Additionally, it is the only building among the six to be positively evaluated (beautiful or very beautiful) by more than 70% of all respondents and by 70% of the 60 respondents in each of the three groups. In addition, building 3, along with building 2 (Figure 4 — historic building with order and little stimulus), and building 5 (Figure 7 — contemporary building with order and stimulus) are the only ones to have a positive evaluation greater than the negative evaluation by each of the three groups of respondents. Building 5 is also the second-best evaluated by the clear majority of architects. On the other hand, building 4 (Figure 6 — contemporary building with disorder) is the worst rated by the total sample (the only one with the negative evaluation higher than the positive) as well as by non-architect college graduates, and the worst rated by architects after building 1 (historic building with disorder) (Table 1). Thus, it is evident the positive aesthetic impact of the presence of order and visual stimulus and the negative aesthetic impact generated by disorder in the building façade. The order of preference for buildings tends to corroborate the results obtained in their individual assessments. The reasons mentioned by respondents to justify their preferences for the buildings show the importance of visual stimulus and orderly relationship among the architectural elements and the negative impact of the lack of visual stimulus and the existence of disorder in the building façade. However, while architects favor the orderly relationship and geometric regularity in buildings, non-architect (either college graduates or non-college graduates), tend to mention the existence of visual stimuli to justify the most preferred building. On the other hand, the existence of disorder in the building façade predominates as the reason to justify the least preferred building by architects, while the main reason for non-architect is the lack of visual stimulus. In turn, most respondents in the total sample and in the groups of non-architect college graduates and non-college graduates said they were influenced by the historic value perceived in the building. Nevertheless, the

justifications mentioned by most of them are related to the architectural composition of the building, to its formal characteristics. One non-architect college graduate said he prefers old buildings because he observes in them greater care in decoration and believes that these buildings have greater architectural value. In addition, the clear majority of the architects did not consider relevant the historic value for the preference or rejection of a building, with an architect saying he considered “the formal characteristics, like harmony, rhythm, colors and heights” in his aesthetic evaluations. Moreover, architects (those most likely to know the history of the buildings and thus, their historic value) perceived building 3 (historic building with order and stimulus) and 5 (contemporary building with order and stimulus) as the most beautiful and building 1 (historic building with disorder) and 4 (contemporary building with disorder) as the most aesthetically unsatisfactory. This confirms the importance and primacy of the formal aspects over the symbolic ones and the fact that the historic value of the buildings does not seem to have affected the aesthetic evaluations by architects. Statistically significant differences in aesthetic evaluations of buildings among architects, non-architect college graduates and non-college graduates were found in three of the six buildings (Table 1): (a) building 1 (Figure 3; Kruskal-Wallis, $x^2 = 8.269$, sig = 0.016); (b) building 4 (Figure 6; Kruskal-Wallis, $x^2 = 9.074$, sig = 0.011); and (c) building 5 (Figure 7; Kruskal-Wallis, $x^2 = 35.873$, sig = 0.000.). The existing differences reveal a greater aesthetic appreciation of the idea of order and further devaluation of the idea of disorder by architects than by the other two groups, which tend to a greater appreciation of the visual stimulus. Nonetheless, when a building has an evident organization and visual stimulus (such as building 3), it tends to be positively evaluated by different groups (Table 1). Statistically significant differences were found among the three groups of respondents in the order of preference of following buildings: (a) building 1 (Kruskal-Wallis, $x^2 = 9.787$, sig = 0.007); (b) building 3 (Kruskal-Wallis, $x^2 = 10.088$, sig. = 0.006); (c) building 4 (Kruskal-Wallis, $x^2 = 9.608$, sig = 0.008); and (d) building 5

(Kruskal-Wallis, $\chi^2 = 36.627$, sig = 0.000.). These results, obtained by the comparisons between the six buildings, tend to reinforce the above individual assessments of these buildings, stressing that, if any, prevail differences between the group of architects and the other two groups (for which order of preference of the six buildings was the same). Additionally, the "existence of visual stimulus" is clearly the main reason given by non-architect college graduates and non-college graduates for the most preferred building while the main justification for architects is "ordered relationship". In this sense, while the architects mentioned "disordered relationship" as the main justification for the least preferred building, the other two groups mentioned the "lack of visual stimulus," particularly those without college education. Therefore, these results corroborate the previous ones in relation to: the overvaluation of order and further devaluation of the idea of disorder by architects; the overvaluation of the existence of visual stimulus by the other two groups; the positive aesthetic impact of a building façade characterized by the existence of order and visual stimulus such as building 3 (Figure 5), the most preferred regardless of a respondent level and type of education.

Aesthetic Quality of Urban Scenes

Statistically significant differences were found among the evaluations of urban scenes by the total sample of

180 respondents (Kendall's W, $\chi^2 = 403.63$, sig. = 0.000), by architects (Kendall's W, $\chi^2 = 174.44$, sig. = 0.000), by non-architect college graduates (Kendall's W, $\chi^2 = 162.48$, sig. = 0.000) and by non-college graduates (Kendall's W, $\chi^2 = 110.89$, sig. = 0.000). These differences show that scenes with distinct levels of order and visual stimuli were differently evaluated. The top-rated scenes by the total sample are (Table 2): (a) scene 3 - Figure 11, historic scene of Prague with order and stimulus; (b) scene 4 - Figure 12, historic scene of Porto Alegre with order and stimulus; (c) scene 6 - Figure 14, historic scene of Porto Alegre with order and little stimulus; and (d) scene 8 - Figure 16, contemporary scene of Porto Alegre with order and stimulus. These results indicate the positive impact of the idea of order and visual stimulus on the aesthetic evaluations of 180 respondents. Scenes 3 and 4 (characterized by the idea of order and visual stimuli) are also the two top-rated scenes by each of the three groups (Table 2). Additionally, scene 8 (order and visual stimulus) is the third most satisfactory for architects and non-college graduates. The scenes worst evaluated by the total sample are (Table 2): (a) scene 5 - Figure 13, historic scene (5) of Porto Alegre with disorder; (b) scene 9 - Figure 17, contemporary scene of Porto Alegre with order and little stimulus; and (c) scene 7 - Figure 15, contemporary scene of Porto Alegre with disorder.

Table 2: Degrees of satisfaction with the appearance of the scenes

| N satisfaction * | Scene 1 Fig. 9 | Scene 2 Fig. 10 | Scene 3 Fig. 11 | Scene 4 Fig. 12 | Scene 5 Fig. 13 | Scene 6 Fig. 14 | Scene 7 Fig. 15 | Scene 8 Fig. 16 | Scene 9 Fig. 17 |
|---------------------------------------|-------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Total sample – 180 respondents | | | | | | | | | |
| Very Beautiful | 7.2% | 3.3% | 47.2% | 30.6% | 5.0% | 7.8% | 5.6% | 10.6% | 4.4% |
| Beautiful | 24.4% | 25.0% | 37.2% | 48.3% | 21.7% | 36.7% | 25.6% | 32.8% | 18.9% |
| Neither Nor ** | 47.8% | 37.2% | 10.6% | 13.9% | 29.4% | 36.7% | 23.9% | 34.4% | 39.4% |
| Ugly | 14.4% | 30.6% | 4.4% | 6.1% | 32.8% | 16.1% | 33.9% | 18.3% | 23.9% |
| Very Ugly | 6.1% | 3.9% | 0.6% | 1.1% | 11.1% | 2.8% | 11.1% | 3.9% | 13.3% |
| mvo Kendall *** | 4.65 | 4.23 | 7.42 | 6.93 | 3.78 | 5.13 | 3.97 | 5.07 | 3.81 |

Table 2 Continued

| Architects – 60 respondents | | | | | | | | | |
|--|--------|-------|-------|-------|--------|-------|-------|-------|--------|
| Very Beautiful | 10.0% | 3.3% | 41.7% | 28.3% | 3.3% | 5.0% | 3.3% | 11.7% | 5.0% |
| Beautiful | 36.7% | 23.3% | 43.3% | 60.0% | 8.3% | 40.0% | 20.0% | 36.7% | 25.0% |
| Neither Nor ** | 41.7% | 33.3% | 8.3% | 6.7% | 25.0% | 36.7% | 18.3% | 38.3% | 41.7% |
| Ugly | 6.7% | 36.7% | 5.0% | 5.0% | 50.0% | 15.0% | 45.0% | 11.7% | 23.3% |
| Very Ugly | 5% | 3.3% | 1.7% | 0.0% | 13.3% | 3.3% | 13.3% | 1.7% | 5.0% |
| mvo Kendall | 5.42 | 4.08 | 7.22 | 7.18 | 2.84 | 5.12 | 3.32 | 5.44 | 4.39 |
| mvo K-W **** | 106.22 | 86.35 | 86.24 | 94.68 | 71.43 | 89.92 | 78.58 | 98.62 | 101.98 |
| Non-architects college graduates – 60 respondents | | | | | | | | | |
| Very Beautiful | 6.7% | 3.3% | 55.0% | 38.3% | 6.7% | 8.3% | 6.7% | 10.0% | 3.3% |
| Beautiful | 23.3% | 30.0% | 35.0% | 43.3% | 28.3% | 45.0% | 26.7% | 25.0% | 8.3% |
| Neither Nor ** | 45.0% | 31.7% | 5.0% | 13.3% | 31.7% | 33.3% | 28.3% | 35.0% | 35.0% |
| Ugly | 18.3% | 28.3% | 5.0% | 3.3% | 25.0% | 11.7% | 25.0% | 25.0% | 36.7% |
| Very Ugly | 6.7% | 6.7% | 0.0% | 1.7% | 8.3% | 1.7% | 13.3% | 5.0% | 16.7% |
| mvo Kendall | 4.37 | 4.28 | 7.63 | 7.09 | 4.33 | 5.47 | 4.22 | 4.66 | 2.96 |
| mvo K-W | 86.67 | 92.10 | 98.82 | 97.94 | 101.74 | 99.42 | 94.37 | 81.32 | 73.84 |
| Non-college graduates – 60 respondents | | | | | | | | | |
| Very Beautiful | 5.0% | 3.3% | 45.0% | 25.0% | 5.0% | 10.0% | 6.7% | 10.0% | 5.0% |
| Beautiful | 13.3% | 21.7% | 33.3% | 41.7% | 28.3% | 25.0% | 30.0% | 36.7% | 23.3% |
| Neither Nor ** | 56.7% | 46.7% | 18.3% | 21.7% | 31.7% | 40.0% | 25.0% | 30.0% | 41.7% |
| Ugly | 18.3% | 26.7% | 3.3% | 10.0% | 23.3% | 21.7% | 31.7% | 18.3% | 11.7% |
| Very Ugly | 6.7% | 1.7% | 0.0% | 1.7% | 11.7% | 3.3% | 6.7% | 5.0% | 18.3% |
| mvo Kendall | 4.16 | 4.35 | 7.43 | 6.53 | 4.16 | 4.82 | 4.36 | 5.11 | 4.09 |
| mvo K-W | 78.61 | 93.05 | 86.43 | 78.88 | 98.32 | 82.16 | 98.55 | 91.55 | 95.68 |

Note: * Satisfaction levels; ** Neither Beautiful Nor Ugly; *** Mean rank values obtained through Kendall’s W test;

**** Mean rank values obtained through the Kruskal-Wallis test; comparison of Kendall mean rank values should be made horizontally, among the scenes; comparison of K-W mean rank values must be made vertically among the groups.

These results show that the lack of organization tends to generate negative aesthetic responses and that the idea of order may not be enough to produce positive aesthetic responses if the stimulus in the scene is too small, in a way that the architectural ensemble can be perceived as monotonous. The negative impact of the disorder idea is corroborated by the assessment carried out by architects, in which the three most aesthetically unsatisfactory scenes are characterized by disorder (Table 2). The ordering of scenes by the respondents, from most to least preferred in appearance, replicates the previous results on the individual assessment of the scenes. The reasons given for the most preferred scenes confirm the importance of the idea of order (similarity between the shapes

and heights) as a necessary condition for a positive aesthetic perception. A negative aesthetic perception is strongly explained by the idea of disorder (differences between forms and heights) for architects and non-college graduates. Regarding the historic value, the results indicate that its existence has not determined a more positive assessment or greater preference for the scene, as shown in relation to the scene 5 (historic scene of Porto Alegre with disorder). Yet, it can be argued that the perception of the scene 3 (historic scene of Prague with order and stimulus) as the most positive is not explained by the historic value of buildings, since the respondents have less knowledge of the history of such buildings than those in Porto Alegre that make up scene 5. In addition,

scene 8 (contemporary scene of Porto Alegre with order and stimulus) was better evaluated than scenes 2 (historic scene of Florence with disorder) and 1 (historic scene of Florence with order and little stimulus) by the total of 180 respondents and by each of the three groups. Scene 8 was also preferred in relation to these two scenes by the total of 180 respondents and by architects. Additionally, most of the total 180 interviewed as well as most of the 60 architects and the 60 non-college graduates interviewed explained that the assessment of the scene was not affected by perception of buildings as old or having historic value. This explanation was mostly mentioned by architects, precisely those who could be most affected by the historic value of the scene due to their academic training, which includes the history of architecture and cities. As explained by one architect interviewed: "the historic value in itself did not affect my evaluation, but the elements of the old buildings, for being more elaborated and detailed, cause the building to become richer in terms of rhythm, shapes and composition". In this sense, one non-college graduate said he was not influenced by the historic value but by the wealth of detail of the scenes. On the other hand, most of the 60 non-architect college graduates reported that the assessment of the scene was affected by the fact that it was perceived as not as old or having historic value. Nonetheless, for those interviewed who said they were affected in their ratings by the historic value of the scenes (77), the most cited reason to explain this effect was the "preference due to compositional aspects." In summary, the results indicate that the historic value of a scene did not affect its evaluation and preference for the clear majority of participants in this research. Statistically significant differences among the three groups of respondents in the aesthetic evaluation of the scenes were found in three of the nine scenes: (a) scene 1 (Figure 9; Kruskal-Wallis, $x^2 = 9.41$, sig. = 0.006); (b) scene 5 (Figure 13; Kruskal-Wallis, $x^2 = 13.13$, sig. = 0.001); and (c) scene 9 (Figure 17; Kruskal-Wallis test, $x^2 = 10.02$, sig. = 0.005). These differences reveal a greater aesthetic appreciation of the idea of order and a further devaluation of the idea of disorder on the part of architects, compared to

the other two groups (Table 2). Statistically significant differences among the three groups of respondents in the preferences for scenes were found in four of the nine scenes: (a) scene 2 (Figure 10; Kruskal-Wallis, $x^2 = 6.611$, sig. = 0.037); (b) scene 5 (Figure 13; Kruskal-Wallis, $x^2 = 25.873$, sig. = 0.000); (c) scene 8 (Figure 16; Kruskal-Wallis, $x^2 = 11.143$, sig. = 0.004); and (d) scene 9 (Figure 17; Kruskal-Wallis, $x^2 = 15.122$, sig. = 0.001). These differences show again a greater aesthetic appreciation of the idea of order and a further devaluation of the idea of disorder by architects compared to the other two groups. In this sense, more architects than people in the other two groups mentioned "similarity between the forms and similarity between the heights" as the main reasons for the most preferred scene, and "the difference between the forms and the difference between the heights" as the main reasons for the least preferred scenes. Nonetheless, when the idea of order and the visual stimulus are clearly perceived in a scene, it tends to be positively evaluated, regardless of the type and level of education. This is evidenced by the fact that scenes 3 (Figure 11 — historic scene of Prague with order and stimulus) and 4 (Figure 12 — historic scene of Porto Alegre with order and stimulus) are the two top-rated scenes (Table 2) and the two most preferred scenes by each of the three groups.

Discussion and Conclusion

Positive aesthetic evaluations and greater preference for buildings are associated with the idea of order and visual stimulus, while negative evaluations and lower preference are associated with the idea of disorder. Compositions characterized by order and little stimulus oscillate between positive and negative evaluations. The reasons given by the respondents show the importance of the idea of order and visual stimulus to an aesthetically qualified architectural composition, as well as sustain the negative impact caused by the lack of organization and stimulus. Therefore, it is also possible to identify a building's formal characteristics that explain its positive or negative evaluations. These results corroborate those obtained in the evaluations of the nine urban scenes, such as the positive aesthetic

impact of the idea of order and visual stimuli, and the tendency of negative aesthetic impact of the disorder idea. These results are also supported by the greater preference for two scenes with order at the expense of a scene with disorder in a research about with three urban scenes (Kowarick et al., 2008), apart from previous results on the need for order in the relationship between the architectural elements (e.g., Weber, 1995). Although the perception of a historic value in a building has been mentioned by most respondents as having affected their aesthetic evaluations, justifications reveal that the formal characteristics of the building, its architectural composition, are what really affected their ratings. Additionally, most of the architects, those with greater knowledge of history of architecture because of their education (and thus of the historic value of a building), understood that the perception of historic value was not relevant to the aesthetic evaluation of buildings. Moreover, the importance of formal attributes of a scene in detriment of its content is further evidenced by the Prague scene being considered very satisfactory by those with no training in architecture (two-thirds of the total sample), who have low potential of knowing the content or meaning of the buildings that made up such a scene. These results are corroborated by those obtained in the evaluation of the nine urban scenes, where the existence of historic value was not decisive for a more positive assessment or a greater preference for the scene and meet the idea that people can evaluate buildings and historic scenes positively due to the existence of order and variety (stimulus) (Nasar, 1998). The evaluation of buildings and urban scenes showed greater aesthetic appreciation of the idea of order and further devaluation of the idea of disorder by architects than the other two groups, which tend to a greater appreciation of the visual stimulus. Thus, these results help to explain the differences between the aesthetic evaluations by architects and laypeople with training of more contemporary buildings (differentiated with more advanced styles) and of more conventional buildings (popular with more traditional styles), in several studies (Devlin and Nasar, 1989; Nasar, 1998; Uzzel and Jones, 2000). The fact that laypeople

prefer buildings with more traditional style seems to be related to its greater visual stimulus, for example, due to the higher level of detail in comparison to more contemporary buildings, such as those of the modern movement. However, when the idea of order and visual stimulus is present in a building (such as in building 3) or in an urban scene (such as in scene 3) they tend to be positively evaluated, regardless of the level and type of education of the observer. Therefore, these results do not support the assertion that architects have different building preferences than the public (Devlin and Nasar, 1989; Fawcett et al., 2008; Nasar, 1998), that the visual preferences of architects differ from the other users, that the different preferences of architects are supported by a specialized education (Fawcett et al., 2008). Therefore, results show that it is possible to explain people's reactions to the aesthetics of architecture mainly on the basis of formal aspects, meeting the argument that the architectural form can be seen free of meaning (Weber, 1995). Results also reinforce the idea that it is possible to design, based on the idea of order and visual stimulus, so that the architectural composition can be positively evaluated by people with different levels and types of training. However, further research is needed to deepen existing knowledge, including greater diversity of architectural examples in different socio-cultural contexts.

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Adaptability and Resilience through Post-Occupancy Evaluation and Co-Production: The Brazilian Case

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Abstract

The current social and climatic changes require urgent revision of urbanization strategies around the world, to reduce environmental and social impacts, as well as to develop the resilience of built environments. Regarding affordable housing in Brazil, the poor condition of its architecture and planning increases the social and environmental vulnerability, especially affecting the dwellers of the social housing complexes. They are forced to make adaptations in their buildings, which are frequently unable to be modified, leading to the inefficient use of resources as well as risks to safety. Additionally, the marginal location of these complexes cause physical and social segregation, expanding the environment's negative effects. Despite all these difficulties, families benefited by social programs keep adapting to their scenarios, surviving the unexpected, and (re)inventing themselves according to their needs. It demonstrates their resilience, which is considered as an adaptive capacity or the faculty for recuperation from impacts (natural, social, physical). Thus, the focus of this paper is to present the research in progress named Adaptability and Resilience in Social Housing Complexes through Post-Occupancy Evaluation and Co-Production¹, developed by the study groups [MORA] housing research of FAUeD/Federal University of Uberlândia and [People, Environment and Performance] from the SSoA, University of Sheffield/TUoS. This project studies a Brazilian social complex named Shopping Park, where advanced Post-Occupancy Evaluation (POE) and Co-Production techniques have been applied. The aim is to explore knowledge about social housing complexes, identifying aspects to improve in future projects. In addition, through the Co-production technique, data have been

collected which can also support the proposition for immediate improvements at the neighborhood in order to develop their resilience. Finally, the established partnership between academics and non-academics can reach significant public benefits, encouraging an environment of empowerment and engagement.

Keywords: Resilience; Adaptability; Social Housing Complexes; Post-Occupancy Evaluation; Co-Production.

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1. Resilience as an Answer

Current social and climatic changes and their unpredictable effects have required an urgent revision of urbanization strategies around the world. Thus, it is known that there is a need to reduce the environmental and social impacts, as well as to develop resilience in buildings and communities.

The term resilience has several meanings according to the area of study. It can refer to the characteristics of an object, system, or a particular location. Considering this case study — research at a social housing community — resilience is defined by the ability of a system to absorb changes, self-organize and increase its capacity for learning and adaptation (Cumming, 2011). In other words, it is the ability of a community to adaptively respond to change rather than simply returning to a pre-existing state (Maguire & Cartwright, 2008).

The term resilience is often used where natural disasters and/or absence of natural resources are common. However, this research focuses on a resilience study in Brazil's social housing complexes, which frequently have to overcome socioeconomic and also environmental difficulties. In order to have a better understanding of historic social housing issues in Brazil, it is necessary to comprehend its accelerated urban growth, which happened between 1940 and 2010. According to UN-HABITAT (2010), during that period the urbanization rate in Brazil increased from 40% to over 85%, which means about 165 million

people were leaving rural areas and moving to cities. That caused a housing shortage, since the demand of housing was higher than the government could offer. Consequently, several Brazilian cities experienced a spreading and peripherization process, which has affected people's quality of life.

One attempt to solve the country's huge housing shortage and at the same time stimulate economic growth was the creation of the program *Minha Casa Minha Vida* (My House, My Life) in 2009 through a partnership between the Brazilian government and the private sector. One of the strongest points of this project was to offer about 3.4 million housing units for low-income families up to 2014. There is no doubt that the program has improved partially the country's housing shortage. However, it has failed to provide to the Brazilian people the quality cities that they desire (Hehl, 2014). This lack of quality can be easily identified by some common characteristics at the *Minha Casa Minha Vida* allotments — such as the low-quality architecture, the inefficient urban integration, the lack of adequate infrastructure and amenities (public transport, sanitation, and public facilities), and the standardization of building types and sizes (inappropriate to the family contingent). In addition, a spatial and social segregation is often apparent because the settlements are usually located on the outskirts of the cities, where land is cheaper. Thus, public-private partnership for the promotion of social housing has certain inconsistencies. In other words, the design and planning processes that try to solve the Brazilian housing deficit have been driven by loud voices, seeking profit and focusing only on the immediate needs of humans.

The focus of this paper is to present the research in progress named *Adaptability and Resilience in Social Housing Complexes through Post-Occupancy Evaluation and Co-Production*, developed by the study groups [MORA] housing research of Faculty of Architecture and Urbanism and Design/Federal University of Uberlândia in Brazil and [People, Environment and Performance] from the School of

Architecture, University of Sheffield in England. The analysis focuses on exploring knowledge about social housing complexes identifying aspects to improve in future projects through advanced Post-Occupancy Evaluation (POE) and Co-production techniques. However, this paper will concentrate on demonstrating the Co-production methodologies and its potential. This is because this technique has been showing that a partnership between academics and non-academics can achieve significant benefits, encouraging an empowerment and engagement environment, mainly for the residents of the social complexes, consequently increasing the local resilience.

2. Learning Objectives

The main objectives related to the research are:

- To explore the Co-production methodologies in order to promote empowerment, engagement and immediate improvements at the social housing complex studied, seeking to increase the local resilience;
- To provide detailed guidelines for more adaptable and resilient upcoming housing projects in a local context, proven through a real case study on POE in association with Co-production techniques;
- To put into practice the developed methodology for the evaluation of resilience in areas of social housing complexes through Post-Occupancy Evaluation (POE) and Co-production methodologies;
- To consolidate an international academic collaboration in order to exchange knowledge related to Post-Occupancy Evaluation (POE) and Co-production methodologies.

3. Post-Occupancy Evaluation and Co-production: Tools for Resilience

Advanced Post-Occupancy Evaluation (POE) and Co-production methodologies were applied at Shopping Park neighborhood between July and August 2016, in order to seek deeper information about this social housing complex. According to Villa & Ornstein

(2013), POE consists of a set of methods and techniques for quantitative and qualitative evaluation of the building performance after its occupation. POE has a role in different case studies, on different areas, notably promoting the improvement of design processes, construction, and use of built environments. The relevance of POE in achieving high quality in architectural projects has already been consolidated by many studies in civil construction in the national field (Elali & Veloso, 2006; Ornstein, Villa & Ono, 2011; Villa & Ornstein, 2013; Voordt & Wegen, 2013), and in the international field (Leaman, Stevenson, Bordass, 2010; Preiser & Vischer, 2005; Mallory-Hill, Preiser & Watson, 2012). It is given that the adoption of several methods in POE is based on the possibility of collecting different types of data, which allows reducing possible erroneous results (Lay & Reis, 2005; Zimring, 2001; Bordass, Leaman & Eley, 2006).

There are significant advantages in trying building evaluation methodologies with unconventional approaches. After all, they allow overcoming the measuring of physical performance, dealing also with different perceptions of characteristics that interfere with the user behavior (Elali & Veloso, 2004; Lay & Reis, 2003 & 2005; Rheingantz, 2009). One of the alternative techniques that became popular in the academic scenario is Co-production. Co-production has its premise that the researcher is impartial. This person works as a facilitator on production and management of space involving all parties, including the community, which is the direct beneficiary. The instrument has emerged in response to a social, political and economic context in companies and governments that cannot respond to contemporary urban challenges in a timely manner.

According to Petcou and Petrescu (2015), Co-production is not only about an unconventional path to face unmet public demands, but also a way to provide effective access to the city. The citizens' right to the city means the right to the urban land, and moreover, the right to participate in its development, use, and management. Thus, the partnership between

academics and non-academics, through co-productive work methodologies, can reach significant public benefits. The generation and dissemination of knowledge matters, while it enables new possibilities of interaction with contemporary social and environmental issues.

The boundaries between knowledge production and effective action must be broken, promoting a reconciliation of academic and non-academic communities. According to Campbell and Vanderhoven (2016), research must be a collaborative and interactive process of shared learning. There is no hierarchy of knowledge forms, while prevail a great interdisciplinary, and, overall, the main goal is effective action. Traditional research approaches are overcome, while non-academic communities no longer take a passive role at the play.

From this, the group experienced two sessions of Co-production at Shopping Park neighborhood, complementing the Questionnaires and Walkthrough sessions, which are conventional POE techniques. An aim is to establish a solid partnership between academics and non-academics. All instruments were first applied simultaneously, willing to reach a specific sample of the neighborhood. Through POE instruments and Co-production, it was possible to get acquainted with the local reality, providing quantitative and qualitative information about their vulnerabilities and, moreover, their potentialities, here understood as resilience demonstrations.

It is possible to extend the adaptive capacity and resilience of the built environment in question. This experiment can promote a real and practical improvement on life quality to residents benefited by social programs in Brazil, starting with Shopping Park neighborhood. In other words, the purpose is to immediately improve the quality of local life in the existing social housing complexes, encouraging minorities to make changes, instead of providing detailed guidelines for upcoming projects more adaptable and resilient.

4. Case Study: The Shopping Park Neighborhood

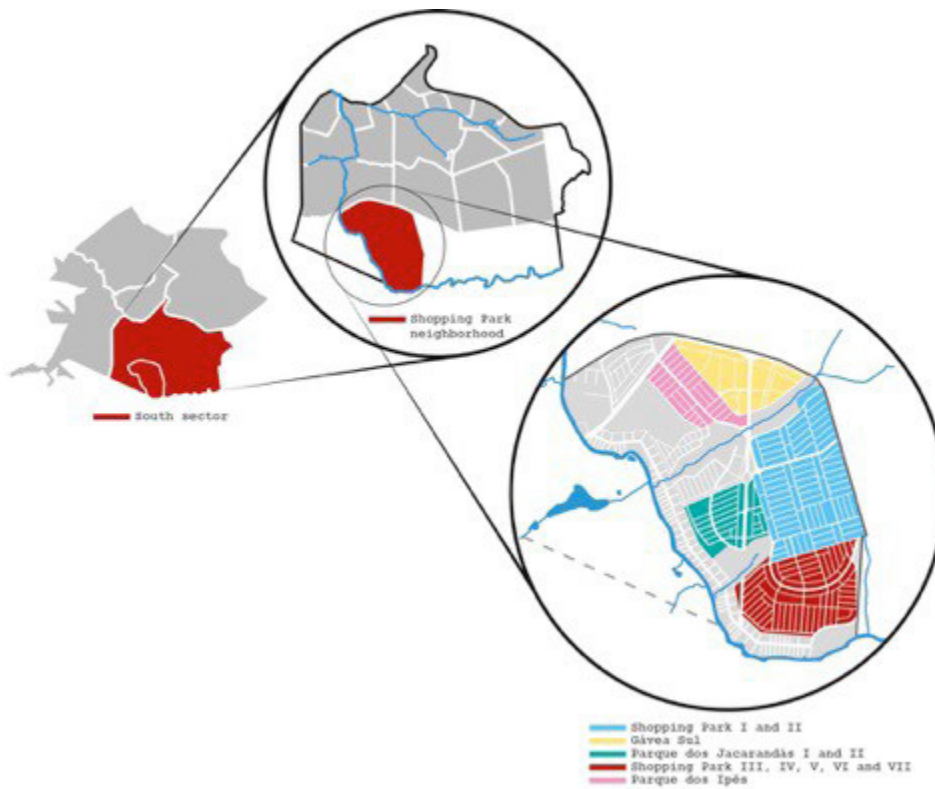
Figure 1. – Uberlândia Location. Source: Authors, 2016



The Shopping Park neighbourhood is located at Uberlândia city at Minas Gerais State in Brazil (figures 1, 2). Shopping Park is located at the south sector of Uberlândia; it is considered an Integrated Neighborhood composed of the following allotments: Parque dos Ipês, Shopping Park I and II, Gávea Sul, Parque dos Jacarandás I and II, Residencial Xingú, Tapajós, Sucesso Brasil, Vitória Brasil, Villa Real and Villa Nueva.

As the social housing units are the focus of this research, the area of study is the one identified in red, involving five of seven allotments. These seven allotments became the first area in Uberlândia destined to produce over 3.000 housing units from the Minha Casa, Minha Vida Program, within the income bracket 1 (0 to 3 minimum wages) during the 2010-2013 period.

Figure 2. Sector, Neighborhood and Allotments division. Source: Authors, 2016.



Unfortunately, three years after the construction, the housing complex shows clear signs of inefficiency and failure in comparison with the original purpose of the program. The initiative of giving people a “dignified living” fell under a mix of various constructive, social and environmental issues. For example, the location is very excluded, because is far from the city center and also because there are few bus lines, which means restricted public transportation (figure 3).

However, the resilience of the environment and the human beings seems to coexist within cracked walls, bumpy roads, and streams clogged with litter (figure 4). Thousands of people inhabit this space and search each day for ways to make it better. Despite the

deprived conditions of its houses and facilities, families are actually happy to live there. In fact, all these perceptions were found by the application of POE and Co-production techniques. Also, during its application, teamwork could identify the community resilience and power, making their voices heard in order to obtain improvements to the neighborhood (figure 5).

Figure 3. Shopping Park Neighborhood and Uberlândia town and Bus Lines Map. Source: Authors, 2016.

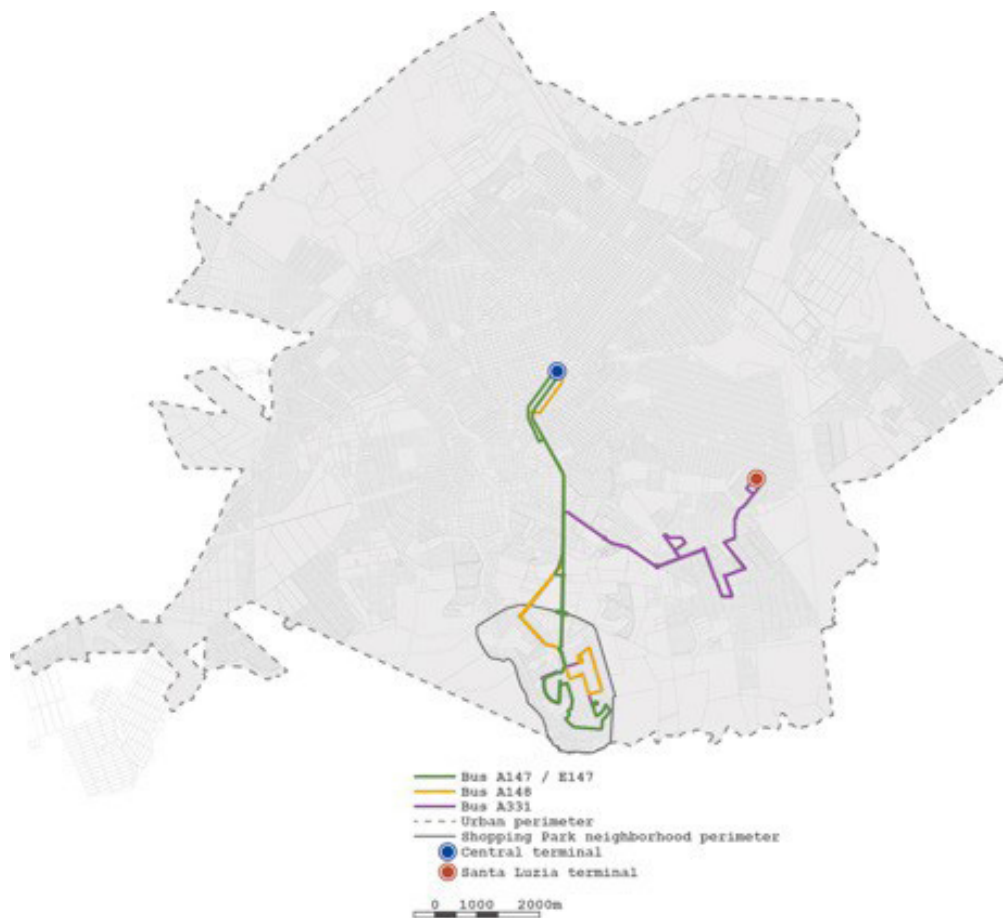


Figure 4. Photos: Shopping Park's failure. Source: Gollino, 2015 (first); Arantes, 2015 (second); Correio Journal, 2013 (two at the right).



Figure 5. Photos: Shopping Park Neighborhood Quarters and Housing Units. Source: Google Maps



Chart 1. Tools and Techniques: Evaluation at Shopping Park Neighbourhood.

Source: Authors, 2016.

| | |
|----------------------|---|
| Questionnaire | DESCRIPTION: Quantitative method that seeks to collect data from a series of questions answered by users. A highly recommended method when there are a varied number of people involved in an evaluation process. Its main advantages are: being a quick method; the possibility to work with larger groups of respondents and/or vast areas; impartial answers, which mean anonymity allows safety and a great freedom of response; and greater uniformity in the evaluation. |
| | MEANS: Digital |
| | SAMPLE: 40 houses located in an allotment of 200 houses (20% of the whole community) |
| | DATE/PLACE: July 5 to 11, 2016 — 40 residences in a block located at Shopping Park’s Neighbourhood |
| Walkthrough | DESCRIPTION: Quanti-qualitative method of analysis based on quality concerns for measuring and descriptive and qualitative identification of positive and negative aspects of environment, also allowing to check its current situation. The analysed themes are: i) Surroundings, ii) Allotment, iii) Housing. |
| | MEANS: Script on paper and textual and photographic recording. |
| | SAMPLE: Representative lots were chosen considering some variants, such as the solar orientation and the different geographical positions of the allotment. |
| | DATE/PLACE: July 8 and 11, 2016 — 4 residences in the same block located at Shopping Park Neighbourhood |
| Co-production | DESCRIPTION: Qualitative and participative evaluation method where the researcher keeps himself impartial, working as a facilitator on production and management of space by involved parties. According to Petcou and Petrescu (2015), it is not only an alternative way to face unmet public demands, but also a way to provide effective access to the city. |
| | MEANS: Script on paper, textual and photographic recording and group dynamics. |
| | SAMPLE: 8 people at the 1 st Co-production and 10 people at the 2 nd — invitations through brochures and WhatsApp messages, for those who have participated on Questionnaires and Walkthroughs. |
| | DATE/PLACE: July 9 and August 7, 2016, at the Center of Unified Arts and Sports (CEU). |

5. Knowledge that Matters: Making Voices Heard

At this stage, the group had already experienced two sessions of Co-production at Shopping Park neighborhood. One was shaped as a Collective Coffee, and the other as the Second Meeting of the “Renew Shopping Park” group. The first experience of Co-production had as its main purpose to present the research in progress to the community of

Shopping Park neighborhood and its main aims and methodology. Through questions as “What do you need?”, “What is missing here?”, “What would you like to have here?”, the residents were encouraged to reflect about their neighborhood, the housing unit and the relationships between dwellers, suggesting locations in the housing complex for the urban elements that are missing there.

Figure 6 shows the urban elements at the Shopping Park neighborhood. Suggestions refer mainly to the installation of new commerce, health and education facilities, and leisure and rest facilities in the neighborhood. At this meeting a name was chosen to identify the project among the community,

“Renew Shopping Park — Integrated Solutions for the Neighborhood.” In the second Co-production, the aim was to continue the process of understanding the needs and potentials of the Shopping Park community, evolving to the new question, “What is your favorite place in the neighborhood?”

Figure 6. Location of urban elements proposed by residents. Source: Authors, 2016.



LEGEND:

- | | | | |
|--|---|--|--|
|  Basic Health Unit |  Recreation Center |  Lottery |  Participants' Residences |
|  Public Hospital |  Linear Park |  Gas Station |  "Walkthroughs" Applied |
|  Traffic Signaling |  Echologic Park |  Police Station |  Questionnaires Applied |
|  Public Daycare |  Ecopoint |  Bus Shelter | |
|  Public High School |  Supermarket | | |

Most participants first placed their opinion in relation to their needs and lacks. Thus, the needs identified in the first Co-production were strengthened. After that, the next question was “What is your favorite place at the neighborhood?”, and cited sites were: My Street, The Centre of Unified Arts and Sports (CEU), the River and the High School. Overall, negative aspects prevailed over the positive, and some suggestions were made for facilities at each one of these cited places. Despite the cited problems, it was agreed that the CEU is currently the most important reference point of meeting to the residents in that region, pointing to the need for its renewal.

Figure 7 shows the favorite places of the residents at the Shopping Park neighborhood, as well as its positive and negative aspects, and suggestions for facilities at these locations. Comments predominated on the “My Street” element, such as the perception of its negative aspects, highlighting the dissatisfaction of residents regarding their current housing situation. Their difficulty to glimpse positive aspects when many other problems call more attention was noted.

Figure 7. Positive and Negative Aspects and Suggestions for the Favorite Places at Neighbourhood, Source: Authors, 2016.



Realizing the predominating negative feeling of the residents in relation to their neighborhood, it was agreed that the third Co-production ought to focus on the choice of effective qualification actions. Based on the results of the two first Co-productions, Questionnaires and Walkthroughs, five possible

interventions were identified on a small scale to improve their life quality. They are: building an Ecologic Park, creating a recycling point, constructing ecological bus shelters and/or the improveing of CEU's square.

Figure 8. Collective Discussion at the First Co-production. Source: BORTOLI, 2016.



Figure 9. Collective Discussion at the Second Co-production. Source: BORTOLI, 2016.



Thus, the plan is to submit for discussion these possibilities among dwellers at the next Co-production experience, making their voices effectively heard. After all, some recommendations for the tool are the importance of strengthening the brand of the group “Renew Shopping Park”, in disclosures and during the next Co-productions, and the importance on maintaining an always-on and positive communication with the locals, through WhatsApp and in person.

6. Considerations

Both Co-production and Post-Occupancy Evaluation benefited from the cross-check. After the application of the diverse tools, one can point out some highlights: Despite the mistakes on the original project, the community has become spontaneously more resilient. For example, more than 90% of the houses have been improved by expansion or refurbishment, without any help of the government. However, Co-production sections point out there is still much to do to achieve a fully-realized notion of the power residents have. Putting people together to discuss their common interests showed researchers how unknown they were to each other — and at the same time, how equal their problems were. For example, we noticed that acoustic problems have affected every house. Other highlights from the Co-production session included registering residents in a WhatsApp group in which they can talk to each other, offering their services and products (important income generation), complaining about neighborhood problems, invitations for parties and events, etc. We noticed after the group discussions and during the co-production sessions that the community is now stronger and more clear about the common problems they fight against.

To summarize, considering all these aspects, future actions have been defined and led by the community. It shows the importance of the Co-production methodologies in improving the engagement and empowerment of the Shopping Park dwellers. Thus, it can help develop a resilient future.

7. Acknowledgements

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Voices from the Garden: How Does the Millennial Student Culture Fit into Vegetable Gardening?

Elizabeth Payne Tofte; Juriel A. Rogers

Introduction

Around the world, school gardens play an important role in contributing to students' inclusive education. School gardens provide hands-on learning experiences by showing students how to grow, increase preference for, and consume fresh fruits and vegetables. Course curriculum often involves horticulture, environmental science, nutrition, and home economics. According to the United Nations' Director of Nutrition and Consumer Protection, "The belief that school gardens can become a seed ground for a nation's health and security (is) increasingly backed up by experience and research" (Muehlhoff and Boutrif, 2010). We tend to associate school gardens with elementary and secondary education, but vegetable gardens also exist on university campuses. These gardens may actually play a greater role in changing students' perception of food-related issues as they prepare to become scientists, policy makers, educators, and the like.

This paper discusses preliminary results from participant observation of millennial students attending a weekly vegetable gardening course. When designing the vegetable gardening class, landscape architecture instructors assumed participating students would be majoring in landscape architecture, horticulture, nutrition, or would have been raised in a family that gardened. However, student enrollment proved different from expectations. Students came from a wide variety of majors including pre-veterinary medicine, mechanical engineering, communications, elementary education, art, and other disciplines. While these students were curious to learn about vegetable gardening, they showed little to no tacit gardening knowledge, lacked understanding of basic gardening terms, and had never mastered the use of

gardening tools or performed repetitive gardening tasks. It appeared these millennial students had little to no vegetable gardening culture on which to rely. Instructors were interested in revising traditional gardening curriculum to reflect the needs of their students.

Questions

Four preliminary questions were asked in order to address these issues: What do millennials think about growing their own food; Are they concerned about local fresh food, food security, or food-related health issues; Do millennial students understand traditional gardening culture; Do they participate in a set of behaviors with specific artifacts at a designated site using conventional knowledge to grow fresh produce? The final line of questioning focused on how the millennial student culture fits into vegetable gardening; this resulted in hearing millennial students' voices from the garden. Using Spradley's matrix, open-ended survey questions were designed to allow for short answer responses. Data were extracted using common words from students' responses, which produced multiple responses for most questions.

Descriptive Question Matrix

This study used participant observation to describe millennial students' relationship to the vegetable garden, based on activities that took place during class periods. "Classical ethnographic research methods" (Whitehead, 2005, 2) were used to locate social situations, conduct participant observations, and make an ethnographic record of millennial students' behavior in the garden. James P. Spradley's Descriptive Question Matrix (J. P. Spradley, 1980, 82-83) was used as a foundation for this research. Data were gathered, from within the garden, for each of the nine dimensions of social situations: "Space, Actor, Activity, Object, Act, Event, Time, Goal, and Feeling" (J. P. Spradley, 1980, 78). This is a significant study, because it is the first known documentation of the application of this ethnographic research method being used by a landscape architecture instructor to observe millennial students' gardening activities. Due to the

limited availability of peer-reviewed documentation on millennial students in the garden, this paper provides an initial assessment of the millennial gardening culture. Data will support this initial investigation through domain analysis and focused observation.

Literature Review

To help support the limited availability of literature on the use of participant observation of millennial students in the garden, from the point of view of landscape architecture instructors, literature was reviewed from several disciplines: ethnography, landscape architecture, planning, horticulture, and health education. Local food is a current topic addressed in various interdisciplinary arenas. Special focus was placed on recent ethnographic studies of small food production gardens plus the habits of millennials, as consumers of locally grown food. Although the study of millennials in the garden setting lacks scholarly support in peer-review journals, many non-academic articles and blogs were available focusing on elementary schools or community gardens. The university vegetable garden in this study functions as a cross between a school teaching garden (Heim, Stang and Ireland, 2009) (Murphy, 2003) and a community garden (Somerset, et al., 2005) (Kingsley, Townsend and Henderson-Wilson, 2009), with students and faculty participating in many different roles.

Ethnography

According to James P. Spradley, ethnographers “search for the cultures people use to order their lives” (J. P. Spradley, 1980, 39). The search for understanding begins by making the descriptive observations of features common to all social situations: place, actor, and activities. Observing people as actors in a place reveals recognizable patterns of activities. Linked together, these patterns provide an ethnographic record of a social situation. The term “social situation” refers to the stream of behaviors (activities) carried out by people (actors) in a particular location (place) (J. P. Spradley, 1980, 86). The act of studying a single social situation may lead to the discovery of related situations. “The theory of search for the larger units

of cultural knowledge” (J. P. Spradley, 1979, 94), provides ethnographers with a better understanding of the cultural patterns in behavior. Ethnographic research may be used successfully when identifying cultures within gardening communities.

Gardens

Gardening programs have been used to advocate and promote the “growing community” topic (Eggert et al., 2015) (Block et al., 2012). In an article by Block et al., data were obtained for the Stephanie Alexander Kitchen Garden Program in Victoria, Australia, using interviews, focus groups, and participant observation methods (Stephanie Alexander Kitchen Garden Foundation, 2012). The Block study parallels this millennial garden study in terms of students’ number of contact hours in the garden, additionally, efforts to achieve specific “program objectives for providing pleasurable experience that has a positive impact on student engagement, social connections, and confidence within and beyond the school” (Block et al., 2012, 419). The differences between the kitchen garden and the university vegetable garden in this study are that the kitchen gardens were located in elementary school environments and the student population was much younger than university students. The Block study enforces the importance of tracking school learning performance and social engagement as indicators of positive change. These performance indicators were not quantified for the university students. In the future, however, these indicators may prove helpful, as the primary objective of the university vegetable gardening course is to have fun and make friends.

Methods

Location

The garden in this study was designed to replicate a residential-scale vegetable garden of sufficient size to feed a family of four. It is located on the university campus and maintained under the purview of the landscape architecture department.

Participants

Each year, 20 freshmen participate in a “1 for Fun” course titled, *Grow Your Own Salads and Soups: Vegetable Gardening*. The online brochure promotes the course as follows:

“Everybody wants to eat healthy, but not everyone knows how to grow his or her own food. Learn the basics for growing a fall/winter garden. Students will plant, tend, and harvest a home vegetable garden. They will eat what they grow!” (Center for Teaching and Learning, 2014, 12).

Forty-four participants in the study were divided into eighteen groups of two or three students (n=18). The researcher participated as one of the course instructors. In this way, the researcher observed and participated in what the students were doing each fall semester.

Time frame

This study was conducted over the course of two 15-week-long semesters, during the falls of 2014 and 2015. The 50-minute class period allowed students and the instructor adequate time to spend in the garden. Each class period, the instructor(s) explained and demonstrated individual acts, activities, and the use of objects (tools). Students also counted and tasted fresh picked produce.

Pedagogical goals

The instructor sought to gain knowledge that may result in identifying new ways to encourage positive social connections among millennial students and to provide opportunities for them to plant, tend, and harvest vegetables in a residential-scale garden setting.

Measurements and instruments

The researcher modified James P. Spradley’s original Descriptive Question Matrix (J. P. Spradley, 1980, 82-83) to structure reflective responses to social situations taking place during gardening classes (events). Millennial students (actors) were observed in the garden (a space) participating in gardening (activities).

These occurrences reflect the nine dimensions of social situations (J. P. Spradley, *Participant Observation*, 1980, 78) which were modified to understand millennial students in the garden setting.

See Figure 1, Spradley’s Original Descriptive Question Matrix

1. Spaces: Can you describe in detail all the spaces in the garden?
2. Tools: Can you describe in detail all the tools you use when gardening?
3. Act: Can you describe in detail all the acts you do when gardening?
4. Activities: Can you describe in detail all the garden activities?
5. Events: Can you describe in detail all the events that took place during the semester?
6. Time: Can you describe in detail all the time periods?
7. The Student: Can you describe in detail all the students you met?
8. Goal: Can you describe in detail all the goals?
9. Feeling: Can you describe in detail all the feelings experienced when in the garden?
10. Place: A tenth category was added to describe ‘place’ in relationship to the nine dimensions of social situations. Place refers to the overall identity of the space (assuming millennials have found their ‘place’ in the gardening culture).

| James P. Spradley's Descriptive Question Matrix | | | | | | | | | |
|---|--|---|--|---|--|---|---|--|--|
| | Space | Object | Act | Activity | Event | Time | Actor | Goal | Feeling |
| Space | Can you describe in detail all the places? | What are all the ways space is organized by objects? | What are all the ways space is organized by acts? | What are all the ways space is organized by activities? | What are all the ways space is organized by events? | What spatial changes occur over time? | What are all the ways space is used by actors? | What are all the ways space is related to goals? | What places are associated with feelings? |
| Object | Where are objects located? | Can you describe in detail all the objects? | What are all the ways objects are used in acts? | What are all the ways objects are used in activities? | What are all the ways that objects are used in events? | How are objects used at different times? | What are all the ways objects are used by actors? | How are objects used in seeking goals? | What are all the ways objects evoke feelings? |
| Act | Where do acts occur? | How do acts incorporate the use of objects? | Can you describe in detail all the acts? | How are acts a part of activities? | How are acts a part of events? | How do acts vary over time? | What are the ways acts are performed by students? | What are all the ways acts are related to goals? | What are all the ways acts are linked to feelings? |
| Activity | What are all the places activities occur? | What are all the ways activities incorporate objects? | What are all the ways activities incorporate acts? | Can you describe in detail all the activities? | What are all the ways activities are part of events? | How do activities vary at different times? | What are all the ways activities involve actors? | What are all the ways activities involve goals? | How do activities involve feelings? |
| Event | What are all the places events occur? | What are all the ways events incorporate objects? | What are all the ways events incorporate acts? | What are all the ways events incorporate activities? | Can you describe in detail all the events? | How do events occur over time? Is there any sequencing? | How do events involve the various actors? | How are events related to goals? | How do events involve feelings? |
| Time | Where do time periods occur? | What are all the ways time affects objects? | How do acts fall into time periods? | How do activities fall into time periods? | How do events fall into time periods? | Can you describe in detail all the time periods? | When are all the times actors are "on stage"? | How are goals related to time periods? | When are feelings evoked? |
| Student | Where do actors place themselves? | What are all the ways actors use objects? | What are all the ways actors use acts? | How are actors involved in activities? | How are actors involved in events? | How do actors change over time or at different times? | Can you describe in detail all the actors? | Which actors are linked to which goals? | What are the feelings experienced by actors? |
| Goal | Where are goals sought and achieved? | What are all the ways goals involve use of objects? | What are all the ways goals involve acts? | What activities are goal seeking or linked to goals? | What are all the ways events are linked to goals? | Which goals are scheduled for which times? | How do the various goals affect the various actors? | Can you describe in detail all the goals? | What are all the ways goals evoke feelings? |
| Feeling | Where do the various feeling states occur? | What feelings lead to the use of what objects? | What are all the ways feelings affect acts? | What are all the ways feelings affect activities? | What are all the ways feelings affect events? | How are feelings related to various time periods? | What are all the ways feelings involve actors? | What are the ways feelings influence goals? | Can you describe in detail all the feelings? |

Figure 1. Spradley's Original Descriptive Question Matrix

| James P. Spradley's Descriptive Question Matrix for Landscape Architecture Students | | | | | | | | | | |
|---|--|--|---|--|---|---|---|--|--|--|
| | Space | Tools | Act | Activity | Event | Time | Student | Goal | Feeling | Place |
| Space | Can you describe in detail all the spaces? | What are all the ways space is organized by tools? | What are all the ways space is organized by acts? | What are all the ways space is organized by garden activities? | What are all the ways space is organized by events? | What spatial changes occur over time? | What are all the ways space is used by students? | What are all the ways space is related to goals? | What places are associated with feelings? | Does this space have the potential to become a place for Millennials? |
| Tools | Where are tools located? | Can you describe in detail all the tools? | What are all the ways tools are used in acts? | What are all the ways tools are used in garden activities? | What are all the ways that tools are used in events? | How are tools used at different times? | What are all the ways tools are used by students? | How are tools used in seeking goals? | What are all the ways tools evoke feelings? | How do tools contribute to the evolution of a new place? |
| Act | Where do acts occur? | How do acts incorporate the use of tools? | Can you describe in detail all the acts? | How are acts a part of garden activities? | How are acts a part of events? | How do acts vary over time? | What are the ways acts are performed by students? | What are all the ways acts are related to goals? | What are all the ways acts are linked to feelings? | Will acts in the new space support Mill. connections to gardening? |
| Activity | What are all the places garden activities occur? | What are all the ways garden activities incorporate tools? | What are all the ways garden activities incorporate acts? | Can you describe in detail all the garden activities? | What are all the ways garden activities are part of events? | How do garden activities vary at different times? | What are all the ways garden activities involve students? | What are all the ways garden activities involve goals? | How do garden activities involve feelings? | Will activities in the new space support Mill. connections to gardening? |
| Event | What are all the ways events occur? | What are all the ways events incorporate tools? | What are all the ways events incorporate acts? | What are all the ways events incorporate garden activities? | Can you describe in detail all the events? | How do events occur over time? Is there any sequencing? | How do events involve the various students? | How are events related to goals? | How do events involve feelings? | Is this space efficient for Millennial events? |
| Time | Where do time periods occur? | What are all the ways time affects tools? | How do acts fall into time periods? | How do garden activities fall into time periods? | How do events fall into time periods? | Can you describe in detail all the time periods? | When are all the times students are "on stage"? | How are goals related to time periods? | When are feelings evoked? | Will time be beneficial for the translation of this space to a place? |
| Student | Where do students place themselves? | What are all the ways students use tools? | What are all the ways students use acts? | How are students involved in garden activities? | How are students involved in events? | How do students change over time or at different times? | Can you describe in detail all the students? | Which students are linked to which goals? | What are the feelings experienced by students? | Discuss student actions that support the translation of space to place. |
| Goal | Where are goals sought and achieved? | What are all the ways goals involve use of tools? | What are all the ways goals involve acts? | What garden activities are goal seeking or linked to goals? | What are all the ways events are linked to goals? | Which goals are scheduled for which times? | How do the various goals affect the various students? | Can you describe in detail all the goals? | What are all the ways goals evoke feelings? | What objectives are used to manifest the goal of space to place? |

Figure 2. Modified Descriptive Question Matrix with new category for Place

Data results

1. Space results



Figure 3. SPACE: A garden of sufficient size to feed a family of four was much smaller than students expected.

Sixty-seven percent of student groups described an ideal garden as having plenty of sunlight with fertile soil (61%), and the availability of water (51%) all within a large open space (28%). Functionality and accessibility of a space were secondary considerations, followed by aesthetics (22%), color (11%), and mood (5%).

When asked what makes an appealing space to garden, students provided responses reflecting the following statement:

Quote 1: "A lot of color and vegetables with plenty of sun, rock and water features, many fruit trees and vegetation and maybe an arbor nearby."

2. Tool results



Figure 4. TOOLS: Using a simple hand trowel was a new experience for many students.

When asked, students described in detail all the tools they used. Over 30% of the student groups reported using hula hoes, wheelbarrows, and shovels with 20% using the watering hose. Another 29% used knives to prepare fresh picked vegetables for tasting. Although all students helped with harvesting produce at some point during the semester, only 13% actually reported using buckets, gloves, or their hands to pick vegetables. One student even reported using a stick to plant seeds. Students were observed by the instructor every class period while using their cell phones to look up information on gardening related activities such as plant identification. Seventy-eight percent of the student groups reported using their cell phones as a tool to take photos and/or use the Internet, with 12% stating they never used their phone.

3. Acts results



Figure 5. ACTS: This was one student's first time picking peppers. She loved the bright "salsa" colors.

Individual acts included hoeing raised beds and paths, pushing the wheelbarrow to haul mulch, and shoveling the mulch. Students planted seeds and bedding plants, raked, and watered. They took photos with their cell phones and used their five senses to touch, smell, pick, cut, taste, and eat vegetables. Acts noticed but not documented were standing, squatting, walking, talking, asking questions, and various other social interactions.

4. Activities results



Figure 6. ACTIVITIES: Gardening involves weeding, wearing gloves, and getting down on your knees.

Over 75% of student groups participated in harvesting vegetables by the fourth week of class. By the end of the semester, everyone had participated in harvesting produce. All students enjoyed activities such as carving pumpkins and making fresh salsa. Ninety percent of student groups liked making salsa and pico de gallo. Planting the winter garden was reported by 52% as being a memorable event. Only 11% of student groups indicated preserving herbs as an enjoyable activity.

5. Event results

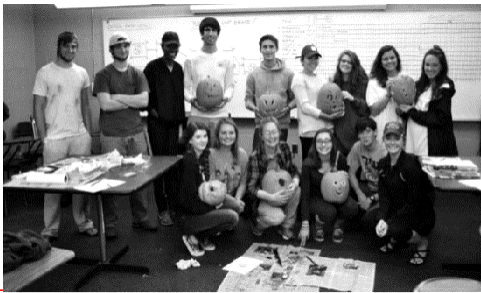


Figure 7. EVENT: Every class event presented engaging activities for student participation.

Each class period was an event. Individual events consisted of smaller acts and activities. These smaller acts were supported by lectures and hands-on learning activities provided by the instructor.

6. Time results

During the 50-minute class periods (events) students participated in individual and group activities,

harvesting the summer garden and planting the fall/winter garden.

7. Students' results



Figure 8. THE STUDENTS: Students enjoying and discussing a variety of produce after harvesting and counting the yields.

In open-ended responses, beans and corn were the most favored vegetables. Seventy-eight percent of students preferred beans, and another 56% also preferred corn. Listed in order by group preference, were cucumbers (70%), tomatoes (53%), peppers (35%), spinach (18%), squash (18%), cabbage (12%), and broccoli (12%). Categories mentioned only once were pumpkins, cauliflower, onions, spinach, watermelon, okra, lettuce, eggplants, asparagus, zucchini, Brussels sprouts, carrots, and potatoes. Sixty-one percent of students indicated they prefer their vegetables either raw or boiled, followed by 56% who like their vegetables canned, grilled, or fried. Forty-four percent enjoyed baked vegetables and 28% liked their vegetables microwaved. Responses were split for the question, "Do you see growing/promoting garden fresh vegetables fitting into your chosen profession?" The following quotes reflect the variation in responses provided by the student groups:

Quote 1: "Yes, fresh vegetables and gardening could benefit medicine/diet in animals." – Pre-veterinary student

Quote 2: "Yes, I could use my communications major to be a spokesperson for encouraging people to have their own vegetable garden." – Communications freshman

Quote 3: "No, not directly, but the vegetables people consume affect the health of patients' teeth." – Pre-dentistry student

When asked whether they believe food is related to mental, physical, or spiritual health, 100% of students agreed that food quality is related to health.

Quote 1: "Yes, eating unhealthy-like fast food can cause a lot of health problems."

Quote 2: "Yes, GMO-free food is better for your body. It is of better quality and nutrients and it strengthens the immune system while supporting mental health and being cost effective."

Quote 3: "Yes, healthy food makes you feel better!"

When answering, "Do you think vegetable gardens matter to millennials?" the majority of the student groups said no. The following quotes reflect their opinions:

Quote 1: "Not as much during this day and age. Gardening has become less of a priority due to the convenience of supermarkets."

Quote 2: "Not as much, because many millennials prefer to be around technology."

Quote 3: "Millennials have mostly grown up buying vegetables at the store. Many don't know how big of an impact vegetable gardens make."

When responding to, "Do you see tending a garden that you own once you graduate and have a house/job?" the majority of the student groups indicated yes, in some form.

Quote 1: "Not until I am older and have more time."

Quote 2: "Yes, when we have more time, such as retired."

Quote 3: "Yes! It would save money and I would be healthier."

8. Goals results

In a multi-response assessment, 39% of the students reported registering for this course to learn about growing vegetables; 28% were interested in learning about Landscape Architecture and 22% were interested in becoming a gardener. Less frequently did students mention taking the course to enhance creativity (6%), have fun (11%), or for enjoying garden design (17%).



Figure 9. GOALS: Engaging students in gardening activities to learn about the garden is a primary goal.

9. Feelings results

Out of the 18 groups, 77% indicated they had experienced gardening with their grandparents. Included in those 77%, 92% also gardened with their parents. Fewer responses fell within other categories. These included neighbors (6%), youth groups (6%), with self (6%), and in a community garden setting (6%). It was surprising to find no responses in the school category. When asked with whom do they prefer to garden, 83% of students indicated a preference to garden with family, while 44% of the original 83% reported that they would prefer to garden with friends. 28% said they would be comfortable gardening by themselves. 39% of the student groups stated their first impression of the garden as "small." 22% stated that the garden was either "unkempt" or "pretty cool." The following response reflects the voice of the student groups' responses when asked, "What did you like about the garden?"

Quote 1: Everything is natural and you know where your food is coming from."

Discussion and significance

While less attention has been placed on reestablishing the home garden for families, where gardening is essentially a “lost art”, social inclusion has been a subject of discussion surrounding the promotion of school and community gardens, local fresh food, food security, and the elimination of food deserts in under-served communities. Student group responses provided initial data for further investigation.

The sample of students was self-selected; students autonomously signed up to take the course because they were interested in learning about gardening and/or Landscape Architecture. Yet, only one-third of these students were raised in a family where food was grown by the parents or grandparents. Fewer students reported having ever gardened at school or in a community garden. When asked whether they thought that vegetable gardens matter to other millennials, half the respondents thought not.

On the other hand, results indicate that all of the students participating in the study thought quality of food was related to mental, physical, or spiritual health. This is important because students taking the class represent a wide variety of academic majors. It is positive to note, half of the students expressed interest in promoting garden fresh vegetables in their future professions, or as future homeowners.

Students were confident to speak for themselves and share their personal preferences for vegetables. Individual preferences varied greatly. Still, a favorable cultural fit with the garden was identified for several of the nine dimensions of social situations. Millennial students’ voices must continue to be heard on issues involving gardens, local fresh food, food security, and the elimination of food deserts in under-served communities. They will soon be practicing professionals in their chosen fields of study. Because they anticipate being homeowners, parents and engaged citizens in their local communities, their preference for gardening will influence future issues involving food security and availability.

Conclusion

This paper reported research on the original nine dimensions of social situations applied in a garden setting, using millennial students as the actors. This study is significant because it is the first known documented application of this ethnographic research method, used by a landscape architecture instructor, to observe millennial students in a garden setting. James P. Spradley’s Descriptive Question Matrix provided a solid foundation for researching millennials in the garden. The researcher and instructors successfully documented first impressions, maintained field notes, produced photographs, conducted interviews, coded open-ended survey responses, and collected personal reflection narratives. The researcher used concrete descriptions and language to describe what was seen, heard, tasted, sniffed, touched, and emotionally felt by millennials, while in the garden. They were observed developing positive social connections with other students as they planted, tended, and harvested vegetables during class time. As a result of this study, millennial students’ voices are beginning to be heard from the garden.

Future research and limitations

Block’s performance indicators were not quantified for the university students. However, in the future these indicators may prove helpful. Further data analysis is needed to answer the four preliminary questions in more detail. Searching beyond the university garden may identify other places millennial students prefer to grow vegetables and clarify cultural perceptions regarding gardening. More work needs to be done to document acts.

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Comparison of Aging in Place in Japan, South Korea, and China

Yeji Yi; David Boek

Abstract

Aging in place has been a guiding principle which supports older people continuing their independent lives in their own home. As Asian countries have rapidly experienced population aging, they are trying to adapt this concept. This paper focuses on the accommodation of aging in place in three Asian countries: Japan, South Korea, and China. Current conditions, aging issues, aging policies, and trends in three countries were compared. This analysis aims to (1) figure out distinctive features of aging in place in three countries, (2) understand common characteristics which are different from Western ones, (3) discuss trends in aging industry, and ultimately, (4) achieve the well-being of older people. This research indicates that an aging timeframe shows Japan is followed by South Korea and China respectively, so each society is facing distinctive aging issues. Policies in three countries were changed from supporting seniors' facilities to housing responding to aging in place, and from national government to local government. This trend seems positive, reflecting advanced countries' precedent. Also, the fact that group-oriented cultural characteristics were reflected in some policies supporting aging in place implies the possibility of a transformed concept of aging in place. Lastly, the aging industry in three countries is seen as promising. Policy makers and marketers are focusing on providing in-home care, support for the baby boomer group, and aging-friendly digital homes. In sum, a comparison of aging in place in three countries reveals the possibility to establish an altered concept of aging in place suited for their own circumstances.

Keywords: Aging in Place, Aging Issues, Policy, Trends, Japan, South Korea, China

Comparison of Aging in Place in Japan, South Korea, and China

Aging in place has been a crucial element which enables older people to continue to live independently in many developed countries which have experienced population aging. As Asian countries are going through the same demographic transition as Western countries, they are trying to adapt this concept for supporting older people.

Though aging in place has become a principle philosophy in caring for older people since the 1960s in developed countries, studies on aging in place in three countries started relatively late: studies on aging in place in Japan and South Korea appeared after 2000s; studies on aged people in China significantly increased in 2010 but studies on aging in place were still scarce (Jin & Lee, 2014). Research has been primarily conducted, but not limited to, four criteria: (1) policies and programs supporting aging in place, (2) housing types and case studies, (3) aged people's recognition and preferences for aging in place, and (4) technology for aging in place. Also, research on aging of Asia countries has been conducted; however, the concept of aging in place was not discussed.

This paper focuses on the accommodation of aging in place in three Asian countries: Japan, South Korea, and China. It also compares current condition, aging issues, aging policies, and trends in those countries. This analysis aims to (1) figure out current distinctive features of aging in place in three countries, (2) understand shared characteristics which are different from Western ones, (3) discuss how policy makers and aging markets approach to aging in place, and ultimately, (4) achieve the well-being of older people.

1. Current Conditions

1.1 Rapid Process of Demographic Transition

An "aging society" is defined as one in which the population aged 65+ make up at least 7 percent, an "aged society" at least 14 percent, and a "super-aged society" at least 20 percent, according to the United Nations (Neil, Richard, & Keisuke, 2007). Aging in

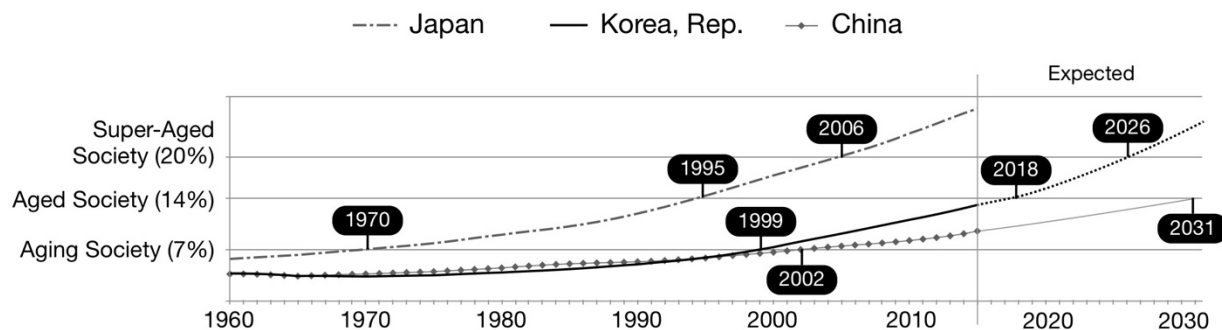


Figure 1. Aging Timeframe in Japan, South Korea, and China. Adapted from age distributions of United Nations Population Division's World Population Prospects. Expected year for South Korea from Neil et al., 2007; and for China from Kwong & Cai, 1992.

Japan precedes other Asia countries. Japan became an aging society in 1970, aged society in 1995, and has become a super-aged society since 2006.¹ Furthermore, the proportion of the population aged 65+ has been the highest in the world since 2004.¹ South Korea has become an aging society since 1999,¹ is expected to become an aged society in 2018, and a super-aged society in 2026 (Neil et al., 2007). China started becoming an aging society in 2002,¹ and is predicted to reach an aged society in 2031 (Kwong & Cai, 1992). In 2015, the portion of population aged 65+ is 26.34% in Japan, 13.13% in South Korea, and 9.55% in China.¹

The aging timeframe in Japan, South Korea, and China is a bit different (Figure 1). However, these countries have in common that aging occurred rapidly compared to Western countries. In fact, it took more than 40 years in Sweden, Germany, and England to complete the transition from aging to aged society (Shin & Lee, 2008).

1.2. Distinguishing Features of Aging in Japan, South Korea, and China

Japan, South Korea, and China share common characteristics of rapid demographic change, while aging in the countries has its own distinguishing features (Table 1).

First, Japanese super-aged society precedes other East-Asia countries. As a result, for a long time, Japan has faced challenges of their high percentage of elderly people and negative population growth (Phillips, 2002). Actually, Japan's population has shrunk from 2010 census population of 127 million to 2015 figure of 126 million.²

Second, Korean society is likely to be characterized by Korean baby boomers those who were born between 1955 and 1963, because they comprise about 15% of the total population. They are expected to enter old age soon and to start entering "empty nest"³ phase rapidly within five to ten years (Han et al., 2011). Last, aging in China showed distinctive features due to its huge absolute number of aged people. To be specific, among more than 1.36 billion people, the population aged 65 and above was about 125 million in 2014.⁴ The portion of aged population is also expected to increase rapidly as a result of previous population control policies, such as Wan-Xi-Shao in 1971 and one-child policy in 1978 (Chow, 1999), though the government announced a two-child policy in 2015.

² Based on age distributions of United Nations Population Division's World Population Prospects.

³ "Empty nest" means a lonely feeling parents may feel when their children leave home.

⁴ Based on age distributions of United Nations Population Division's World Population Prospects.

¹ Based on age distributions of United Nations Population Division's World Population Prospects.

Table 1. Key Features of Aging in Japan, South Korea, and China

| | Japan | South Korea | China |
|--------------|---|--|--|
| Key Features | <ul style="list-style-type: none"> • High percentage of elderly people • Negative population growth | <ul style="list-style-type: none"> • Baby boomers are expected to enter old age | <ul style="list-style-type: none"> • Huge absolute number of elderly people • Population control |

Note. Data from chow, 1999; Phillips, 2002; Han et al., 2011

Table 2. Aging Issues and Their Causes in Japan, South Korea, and China

| Primary Causes | Aging Issues |
|--|--|
| <ul style="list-style-type: none"> • Falling fertility/ rising longevity • Rapid urbanization • Participation of woman in the workforce • Late and fewer marriages • Cultural and generational shifts | <ul style="list-style-type: none"> • Negative implications on labour force • Increased number of retirees • Elderly’s quality of life • Insufficient central/local governmental provision • Limited time to prepare for rapid aging • Uncertain family and community support |

Note. Data from Tsai, 1987; Phillips, 2002; and Neil et al., 2007.

2. Current Problems

An aging population is the outcome of two fundamental factors; falling fertility and rising longevity (Neil et al., 2007). This change forced a relatively small number of workers to take responsibility for not only maintaining social and economic livability, but also caring for elders. To be specific, in 2015, the age dependency ratio (the ratio of people over 65 to those age 15-65), indicated 61% in Japan, 37% in South Korea and China, meaning two or three aged dependents for every five workers.⁵ Also, the sustainability of pensions, welfare system and quality of aged people’s lives have become concerning as the number of aged retirees has increased (Phillips, 2002).

Rapid urbanization process has also accelerated aging issues (Phillips, 2002). Dramatic migration from rural areas to cities are accompanied with some changes. These changes are not limited to, but include increased portion of nuclear/single family, participation of woman in the workforce, and late/fewer marriages. Furthermore, cultural and generational shift in public thinking, which assumed adult children had responsibility for caring for their parents, has brought ambiguities for aged people about support by family or community. This phenomenon in three countries made society keep aging at an accelerated pace, however, governments have less time to prepare for this rapid population aging (Table 2).

⁵ Based on age distributions of United Nations Population Division’s World Population Prospects.

3. Policies Supporting Aging in Place

Japan's Ministry of Health, Labour and Welfare, Korea's Ministry of Health and Welfare, and China's Ministry of Civil Affairs have responsibilities for planning and practicing policies for aged people. In addition to governmental policies, the involvement of

local government and civil society has significantly encouraged aging in place by providing a variety of programs. Aging in place can be supported by policies, such as welfare policies for elderly, housing policies, and other supportive policies (Table 3).

Table 3. Overview of Policies Supporting Aging in Place in Japan, South Korea, and China

| | Japan | South Korea | China |
|-------------------------------------|---|---|--|
| Welfare Policies for Elderly | <ul style="list-style-type: none"> • Social Welfare Law for Elderly (1963) • Gold Plan (1989) • The Long-Term Care Insurance System (2000) | <ul style="list-style-type: none"> • Social Welfare Law for Elderly (1981) • Long-Term Care Insurance (2008) | <ul style="list-style-type: none"> • Social Welfare for Elderly (1949) • Five Guarantee Program (1950s) • The Elderly Right Law (1996) |
| Housing Policies | <ul style="list-style-type: none"> • Silver Housing Project (1987) • Gold Plan (1989) • The Law Concerning Stable and Securing Housing for Elderly (2001) • Policies for remodeling elderly housing | <ul style="list-style-type: none"> • Guideline for elderly housing (2003) • Supply of national rental housing for elderly (2005) • Elderly housing remodeling & improvement project (2006) | <ul style="list-style-type: none"> • Supply of Welfare facilities for elderly (1959) |
| Supportive Policies | <ul style="list-style-type: none"> • Policy of deduction for medical expenses for elderly (1973) • The Protection Law of the Family Care (1997) | <ul style="list-style-type: none"> • Deducted Income Tax Law for elderly (1981) • Policies supporting three-generation family (1981) • Policies supporting dependents (2002) | <ul style="list-style-type: none"> • Endowment Insurance System (1955) • New Basic Pension Insurance System (1998) • Eleventh 5-Year Plan (2006) • Reformed one-child policy, called two-child policy (2016) |
| Main Features | <ul style="list-style-type: none"> • Well-developed welfare systems • Community-based Integrated Care system • Local governments' effort to meet their residents' unique needs. | <ul style="list-style-type: none"> • Thrive in group oriented housing • Lack of provision | <ul style="list-style-type: none"> • Family-based care • Gap between urban and rural • Insufficient supply |

Note. Data for Japan from Cho, 2013; South Korea from Phillips, 2002; Shin & Lee, 2008, Chun, Kim, Lee, & Lee, 2009; and China from Tsai, 1987; Rim, 2009.

3.1. Policies Supporting Aging in Place in Japan

The concept of aging in place was first considered in the late 1980s, and there were two turning points in Japan's policies: Gold Plan in 1989 and the Long-Term Care Insurance Act in 2000. Each handed the responsibilities of welfare service for aged people from family to society and from society to local community (Cho, 2013).

First, the Gold Plan was enacted in 1989 and aimed to reduce the number of aged people staying in hospitals (Cho, 2013). The Gold Plan was the first senior welfare system responding to aging in place in some parts. Second, Japan has developed its own LTC since 2000. Especially, the revision in 2005 enabled Japan to apply the concept of Community-based Integrated Care, ultimately, the concept of aging in place (Cho, 2013). Lately, Seon evaluated LTC in Japan as becoming stabilized through the last revision in 2015 (Seon, 2015).

3.2. Policies Supporting Aging in Place in South Korea

According to Shin & Lee (2008), public policies for aged people in South Korea can be divided into five areas: (1) supporting senior housing, (2) community based welfare service, (3) supporting senior housing remodeling, (4) supporting for dependents, and (5) subsidy of housing expenses.

First, policies for senior housing were changed toward housing based on aging in place and local government authority. Also, community-based welfare service has been successful in providing volunteer programs, education, and counseling services. However, policies supporting senior housing remodeling, policies for supporting dependents and subsidies of housing expenses exist but are insufficient; these systems need to be compensated. (Shin & Lee, 2008).

3.3. Policies Supporting Aging in Place in China

The public welfare policies in China still cover just people's basic needs but do not provide advanced

services, such as health care and improvement of life (Rim, 2009). In fact, older people's independent life has been supported by two principal policies: filial care and pension.

First, the traditional custom of filial care has been made into law.⁶ Thus, the majority of elderly parents are living with their children or living in their own housing. Also, this law is positively supported by government, because it doesn't create a burden on budget and provides a solution of the child-care problem in a double-income family (Tsai, 1987). Second, pension policy has played a key role to maintain older people's independent life ("China's Social Protection System of the Elderly," 2010). Pension was reinforced in 2006 as the eleventh five-year plan included the goal of coverage of urban basic old-age pension up from 174 million people in 2005 to 223 million people in 2010.⁷

4. Trends

Aging group of consumers is seen as attractive and promising, considering its proportion of aging population and its anticipated growth ("Overview and Trends in the Senior Industry in Japan and Investment Opportunities," 2012). Then, how do policy makers and aging markets approach aging in place? They are focusing on in-home care, support for baby boomers, and aging-friendly digital home.

4.1. In-home Care Programs

Nursing care businesses can be categorized into four types: (1) live-in care, (2) day facility, (3) in-home care, visited by caregiver, and (4) equipment, tools, etc., to be rented out/purchased for homecare (Figure 2). Currently, live-in care is the most dominant; however, services related to in-home care are expected to flourish according to a report by Mizuho Corporate Bank. Thus, in-home care is becoming the mainstream in Japan, South Korea and China.

⁶ According to the General Principles of the Marriage Law, Article 15, 18, 22 of the Marriage Law, Chapter 7 of the Criminal Law.

⁷ Based on China's 11th Five Year Plan < https://en.wikipedia.org/wiki/Five-year_plans_of_China

| Types of Nursing Care Businesses | | |
|--|--|--|
| Lending/Purchase of Related Equipment, Tools, and Others | | |
| Live-in Care | Commuting | In-home Care |
| <ul style="list-style-type: none"> • Intensive Care Home for Elderly (Tokuyo) • Long-term Care Health Facility (Rouken) • Designated Medical Long-term Care (Yorobyosho) • Care House • Silver Housing • Group Home • Fee Based Nursing Home • Serviced Housing for Elderly • Rental Housing for Elderly and Others | <ul style="list-style-type: none"> • Day Service • Day Care • Alzheimer's Day Service | <ul style="list-style-type: none"> • Caregiver Visit • Nurse Visit • Home Bathing Service • Home Care Service • Nighttime Caregiver Visit Service |

Figure 2. Types of Nursing Care Businesses. Adapted from "Overview and Trends in the Seniors Industry in Japan and Investment Opportunities," 2012

4.2. Support for Baby Boomer Group

Japanese baby boomers born 1947 to 1949 have begun to face retirement since 2007; Korean and Chinese baby boomers born mid-1950s to 1960s are expected to face retirement. The needs of this population will become a greater part of industry market. The policymakers' and marketers' primary approaches to support this group can be divided into three: education program, providing jobs, and reducing their burdens.

First, policymakers and marketers have tried to provide realistic information and advice on how to prepare for life in retirement (Han et al., 2011). Second, "working" has been a keyword that describes baby boomers' life. It is expected that change in labour markets will occur as witnessed in the West for the past 20 years. Policymakers and marketers are focusing on these older labor forces. Last, baby boomers are illustrated as the "Sandwich Generation," which implies they have duty to care for their elderly parents as well as support dependent children. In this regard, policymakers and marketer expect that market demand for paid caregiving services will expand sharply and are preparing programs which help them adapt successfully to life after retirement.

4.3 Aging-Friendly Digital home

Technological support helps older people to continue living independently within their own home rather than moving to sheltered or residential care.

Major Japanese companies have recently launched robots for the home care services market ("Digital Health in Japan," n.d.). Furthermore, South Korea has explored aged people's needs on digital housing design and services. According to this research, aged people preferred technology supporting their independent life, while not preferring one which overly substitutes humans' role. Also, health care, leisure, and social network supporting digital features are proven the key for their aging-friendly digital homes (Kwon, Lee, & Lee, 2008). In addition to these trends, China is also likely to focus on aging-friendly digital homes reflecting their thirteenth five-year plan in 2016 which addressed population aging and innovative technology ("China Turns to Face its Aging Population," n.d.).

5. Conclusions

The purpose of this study is to figure out distinctive and shared features of aging in place in Japan, South Korea, and China, and to investigate how the aging market in these countries is seen. Three countries have

developed their own ways to support people's aging in place as following:

1. Aging timeframe of Japan, South Korea, and China is a bit different; Japan has become a super-aged society in 2005, South Korea has turned into an aging society in 1998, and China in 2000. However, three countries shared a common feature of an accelerated pace of aging compared to Western countries. This distinguishing phenomenon implies a possibility to transform the concept of aging in place into an Asian way.
2. Each society is facing distinctive aging issues: high portion of aged people and negative population growth in Japan, predicted retirement of baby boomers in South Korea, and a gigantic absolute number of aged people in China. However, it is anticipated South Korea and China will accordingly go through the same challenges as Japan in the near future because the aging timeframe reveals Japan is followed by South Korea and China respectively.
3. Japan's policies are characterized by its well-developed programs which systematically connected with local communities, while South Korea and China are providing insufficient services to limited recipients. However, in common, policies in three countries were changed from supporting senior facilities to housing responding to aging in place, and from national government to local government. This trend seems positive, reflecting advanced countries' precedent. Especially, the involvement of local government and civil society has made significant improvement in the application of aging in place by providing programs suited for their residents.
4. Common cultural characteristics, such as harmony among group members being regarded as a high value, were reflected in some policies supporting aging in place; for instance, advanced community-based integrated care system in Japan, success in group-oriented senior housing in South Korea, and dominant family-based care in China.

5. Aging industry in three countries is promising. Policymakers' and marketers' major emphases have been upon providing in-home care, support for baby boomer group, and aging-friendly digital homes.

This paper focused only on the case of Japan, South Korea, and China. In sum, comparison of aging in place in those three countries reveals the possibility to establish altered concept of aging in place suit for their own circumstances.

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Rethinking Diversity in the Construction Industry: Situating Today's Discussion of Workforce Recruitment, Affirmative Action, and Hiring into an Historical Context

Heidi Wagner

Introduction

This paper explores workforce demographics of those who not only design our built environment, but the people who actually build it. Placed into an historical framework, the paper looks at an industry workforce in the United States, namely construction, which is still 90% European American and 90% male. With the media and industry publications presenting numerous articles about current worker shortages, and research findings stating men and women of color and white women still struggle to acquire jobs, training, and promotions in the construction industry, the paper contextualizes the current workforce make-up within an historical context, suggesting new insights can be found when considering the history of exclusion in construction hiring and building trade unions. Even today, common stated conventional industry wisdom is that, for example, "Women just don't want to work construction," (Paap, 2006). Hence, the paper is an encouragement to reconsider today's conventional wisdom concerning construction industry workforce diversity for all of those involved in designing and building our lived environments. Specifically, the paper presents a discussion of the current construction industry workforce, a policy analysis of the history of affirmative action and its intersections with the construction industry in the United States, and suggests best practices in implementing hiring goals and alternate ways to support more human resource diversity within the industry.

According to the media, there's a labor shortage in the construction industry. An article from Construction Business Owner in 2015 titled, "Global Construction Labor Skill Shortages," (Pillai) states architecture and engineering firms, general contractors, and specialty trades are all suffering skilled worker shortages in an industry that is adding jobs monthly. The Chicago Tribune, on May 31, 2016, carried a story, "Construction contractors warn of a labor shortage as building booms," (Elejalde-Ruiz), and Construction Dive, in 2016, gives a dire prediction in the title of one of its articles: "AGC: 'Only a matter of time' before construction labor shortage cripples broader U.S. economy'" (Slowey). Many more popular press pieces contain similar statements.

Yet, with all these lamentations over labor shortages, there's still a large group of workers in the United States (U.S.) — men and women of color and white women — who struggle acquiring jobs, training, and promotions in the construction industry, and, further, finding work environments free of harassment or finding work environments not comprised of traditions which are socially and culturally isolating to those who are not white, heterosexual, U.S. born men. Why this disconnect between a significant portion of the workforce and recruitment and training in the construction industry? In particular, considering women currently make up just under 50% of U.S. workers and people of color are an annually growing portion of the U.S. population, why are these demographics not already working in the industry in numbers more proportional to their overall representation in the workforce? Industry insiders would say the issue is that it's difficult to find women or men of color who want to work in the construction industry. However, men and women of color and white women consistently describe their extensive efforts to acquire work and training in construction (Wagner, 2015). Thus, the following pages suggest by adding an historical framework to analysis of the current makeup of the construction workforce, new insights can be found when considering human resources practices. In particular suggesting other reasons for lack of more diversity in

the demographic make-up of the construction industry besides a lack of interest by all women and men of color.

Background

Because hiring goals (an affirmative action policy) have been a part of the construction industry for decades now, it is difficult to talk about a history of construction workforce demographics without an extensive discussion of the goals, and they will be the focal point of this discussion. Affirmative action is infamous in United States cultural lexicon. Yet, few people know the history behind its creation or the historical intersections affirmative action has had with the construction industry.

Affirmative action is any measure beyond termination of a discriminatory practice adopted to prevent past or present discrimination as well as future injustice (The Leadership Conference on Civil and Human Rights, 2014). Affirmative-action measures attempt social restructuring (King, 2007). As such, the policies, or even attempting to put such a policy in place, can elevate social tensions and a clutching onto existing group identities and processes (King, 2007). In the construction industry, hiring goals have been in place for decades on certain federal projects. States and some municipal and private entities have also enacted hiring goals. Hiring goals refer to a percentage of hours worked by a defined, underrepresented group of building trades people. These hours generally include all trades from electrical to masonry to tapers and painters and many others, as well as direct supervisors i.e., a tradesperson who may be supervising other trades people. The goals do not include project managers, engineers, planners, architects, or estimators. Historically, goals have been set for men of color and, subsequently, for women of any race or ethnicity. More recently, local hires (within the neighborhood or city of the project), military veterans, and people with disabilities have been included in the policy. Though hiring goals are meant for those working in the building trades, people across a number of occupations are affected by the policy. This

includes construction company owners, those working in human resources, site supervisors and project managers, and even estimators as they are working through best guesses at workforce hours needed for any project.

As policy within the built environment industry, affirmative action has outcomes complicated to measure, is applied without consistency, and has enforcement that, since the 1980s tends to be limited (see the 1989 U.S. Supreme Court decision *City of Richmond v. J.A. Croson* and the 1995 decision *Adarand Constructors, Inc. v. Peña*), but still requires (paper)work to meet "good faith efforts". Distained and inconsistent as the policy may be, there is evidence it has some effect on increasing diversity of hiring in the construction industry. For example, when employers simply sign a contract related to hiring of women and minorities followed by weak enforcement and little oversight, workplace diversity does not increase (Moir, Thomson, & Kelleher, 2011). Inversely, when people associated with a construction project do implement extra initiatives to increase diversity of the workforce (including recruitment programs and on-site monitoring), women and men of color participation increases (Brown & Jacobsohn, 2008; Moir, Thomson, & Kelleher, 2011). Yet, the policy is derided in the industry. Attorney Margery Newman, who specializes in construction law and litigation, states there are four main reasons people in the construction industry oppose affirmative-action policies (1996). Objections fall into some or all of the following opinions:

- philosophical opposition to preferential treatment programs;
- belief M/WBE firms are inexperienced, incompetent, and/or financially weak;
- assertion that affirmative-action programs increase costs;
- a notion programs discriminate against majority-owned businesses (Newman, 1996).

In the construction industry, affirmative-action programs attempting to diversify the white male workforce have often led to workers' believing any person of color or

white woman who shows up at a worksite has been hired only because of affirmative action (Paap, 2006). Myths about the easy lawsuit filed if any person of color or white woman is fired as well as the myth about increasing numbers of people of color and white women working in construction serve to “reproduce the meritocratic self-image of the industry while ensuring that white male workers retain the identity as the authentic construction worker” (Paap, 2006, p. 80). Arguments have been made against affirmative action because of the side effect discussed above i.e., any person from a marginalized group who is hired is considered by people in the dominant group(s) to have been hired only because of affirmative-action requirements and not merit (Paap, 2006; Thomas, 2004). That is to say: some affirmative-action detractors argue simply having the policy stigmatizes people who fall into “disadvantaged” categories, thus preventing them from having the opportunity to take full responsibility for their accomplishments (Thomas, 2004). However, many advocates for a more diverse workforce counter that without the policy in place the industry would be even less diverse than it is now (BPA Report, 2011, video file). Further, many tradeswomen, for example, are aware they were first allowed the opportunity to work in the construction industry because of affirmative action policies but have since created successful careers for themselves in their respective trades (Eisenberg, 1998; Wagner, 2015).

Inquiry

First, in reviewing the topic of construction workforce demographics within an historical context, a look at the current workforce is useful. Two recent points (2014 and 2004) were chosen. The Current Population Survey (CPS) is the U.S. government monthly household survey of employment. The U.S. Census Bureau and Bureau of Labor Statistics conduct the survey of about 60,000 households per month. Part of the CPS, and used for this research, is the Merged Outgoing Rotation Group (MORG) portion of the survey. The MORG survey asks weekly earnings and hours worked among other employment data inquiries (National Bureau of Economic Research (NBER),

2015). In 2014 data, participants who worked in the construction industry (code 770) were culled from the data (N=12,671). Duplicate cases were removed. In 2014, women constituted less than 10% of industry workers; white people were approximately 90% of the workforce; 82% of workers were U.S. born followed by those born in Mexico who make up 9% of the workforce. The average age for construction industry workers in 2014 was 43—lower than the average age of workers in all occupations in the data set at 47 years. Union membership was also culled. About 16% of industry workers were union members in 2014.

A MORG data set from 2004 was also analyzed in order to compare two points in time—specifically to compare the workforce pre and post the most recent economic downturn (approximately 2008) in order to see if that downturn caused any changes of note in the workforce. Construction industry workers were culled (N = 14,540). Duplicate cases were removed. In 2014, women were 9.1% of the industry and in 2004 women were 8.9%. In 2014, white people were 90% of the workforce, and, in 2004, white people were 90% of the workforce. These numbers do not show men and women of color or white women have made any gains in the construction industry workforce over that decade. Union membership, at 16% in the 2014 data set, held fairly steady from 17% in 2004. In 2004, 86% of workers were born in the U.S. compared to a slightly lower 82% in 2014. The average age of an industry worker in 2014 was 43 compared to a slightly lower 40 in 2004.

A brief history of affirmative action

The United States, historically and currently, includes people from around the globe having different reasons for traveling to and living in the country; or, in the case of Native Americans, having been here long before any immigrants from other continents. Groups of people in the U.S. experienced differing treatment under the law and in society, as well as differing levels of cultural acceptance. This has meant people have experienced differences in access to education and the job market. Marginalized people attempted to acquire

equality in different ways. Yet, African Americans, taking their chances with the federal government as a better option than its localized counterparts, have always been at the forefront agitating for national policy instituting equality of opportunity in the workplace (MacLean, 2006).

African Americans and the building construction trades Government expenditure during World War II (larger than that of the Great Depression) allowed labor activists to push the issue of discrimination in hiring (Golland, 2008). Responding to a threat by African American labor activists to march on Washington, on June 25, 1941, citing a need for all available workers, President Franklin D. Roosevelt issued Executive Order (E.O.) No. 8802 (Golland, 2008). The order prohibited race discrimination in the defense industries and other federal contract work, and established the Fair Employment Practice Commission (FEPC; Golland, 2008). When Dwight D. Eisenhower was elected president in 1952, the government of the Soviet Union and other communist nations continually pointed out racial discrimination in the United States when attempting to convert nations to empower communist governments, especially when working in Africa (Golland, 2008). Overt racial discrimination was certainly easy to identify in the United States. In response to communist claims of U.S. racism, President Eisenhower issued Executive Order 10479 prohibiting discrimination with federal contracts and establishing the President's Committee on Government Contracts (PCGC) to enforce the executive order (Golland, 2008). President Eisenhower was seen as a pro-free market, anti-communist president, hence the action was viewed less as sympathetic to labor and more as an anti-communist maneuver (MacLean, 2006).

A major federal policy affecting workplace equity was the Civil Rights Act of 1964 (Public Law 88-352 [78 Stat. 241], including Title VII, the most contentious part of the act (National Archives, 2009). Section 703(a) made it unlawful for an employer to discriminate because of an individual's race, color, religion, sex, or national origin (National Archives,

2009). Conservatives, who were vociferously opposed to the act, argued individuals had a right to associate with and hire whomever they wanted as part of one's constitutional liberty (MacLean, 2006). On the other side, activists opposing discrimination of all forms were energetically engaged across the country during the 1960s. People were arguing that overt forms of discrimination were simply wrong and should not constitute part of one's individual freedom.

Another notable aspect of the Civil Rights Act of 1964 is the word "sex" being added to title VII by Virginia Representative Howard Smith (Menand, 2014). Smith added the word as an attempt to stall or kill the bill by making it seem a joke (Menand, 2014). However, the bill passed with the category of "sex" included, thus allowing women to gain access to numerous occupations and educational institutions which had formerly excluded them. Title VII created the Equal Employment Opportunity Commission (EEOC) to implement the law (National Archives, 2009). With the EEOC in place, people experiencing discrimination in the labor market had their first law stating labor discrimination was illegal and had an enforcement body toward which to direct complaints (MacLean, 2006). The EEOC originally planned for grievances concerning discrimination to number in the hundreds; yet, 9,000 were filed in its first year of operation (MacLean, 2006). By 1975, the commission addressed about 77,000 complaints annually, leaving many unanswered (MacLean, 2006). As Nancy MacLean stated in *Freedom is Not Enough*, "The insistence of so many ordinary workers on fair treatment helped create an innovative and effective national policy: affirmative action" (2006, 76). That is to say, while affirmative action was not actually spelled out in Title VII, the actions of thousands of U.S. workers describing the discrimination they experienced in the workforce helped to define what, in practical terms, non-discrimination actually was (MacLean, 2006).

Before "affirmative action" was part of policy, it was a concept. Affirmative action was not automatically implied in the 1964 Civil Rights Act, yet affirmative

action advocates could not escape the fact that measuring was crucial in evaluating success (King, 2007). The actual term “affirmative action” originated in 1961 (King, 2007). Vice President Johnson requested an African American attorney, Hobart Taylor, Jr., develop vocabulary for the work employers would need to do in realizing anti-discrimination regulations (King, 2007). Attempting to put an upbeat spin on the situation, Taylor described his decision to use “affirmative action”: “I was searching for something that would give a sense of positiveness of performance [and] torn between the words ‘positive action’ and the words ‘affirmative action.’ And I took ‘affirmative’ because it was alliterative” (King, 2007, p. 119).

The Philadelphia Plan

Title VII had taken fair employment practices beyond those holding government contracts and placed these edicts on all employers. In order to get the new law passed, much compromise was made, causing weak enforcement, and containing within its contents a specific barring of any preferential treatment to correct an imbalance. In an effort to advance the Civil Rights Act of 1964, President Johnson issued EO 11246 on September 24, 1965. The order, monitored by the Office of Federal Contract Compliance Programs (OFCCP), now within the Department of Labor, required active responses by private firms receiving federal grants to address patterns of hiring discrimination (King, 2007). Simply stated by the political scientist Desmond King, “It is difficult to imagine how this compliance could be assessed without some resort to the compilation of statistical data about the racial (and ethnic and gender) profile of a given firm’s workforce, especially relative to the composition of the local workforce” (2007, p. 119).

In 1967, observing that non-white workers were almost wholly excluded from membership in industrial and craft unions for the building industry, specific action was taken to target four urban areas (Marcus, 1970). These were called “special area programs” and included Cleveland, Philadelphia, San Francisco, and St. Louis (Fulton, 1970). The programs in San

Francisco and St. Louis were unsuccessful, but the work in both Philadelphia and Cleveland showed promise for positive impact (Fulton, 1970). The original Philadelphia Plan was put into effect on November 20, 1967 (Fulton, 1970). Although similar to the plan composed in Cleveland, the Philadelphia Plan required a “representative number” (without defining “representative”) of minorities in each trade rather than the unspecified increase written into the Cleveland plan (Fulton, 1970).

In September 1969, groups advocating for racial diversity in the construction industry workforce discovered a surprising ally in President Richard Nixon (MacLean, 2006). The Nixon Administration issued the Revised Philadelphia Plan (MacLean, 2006). The plan, meant to be implemented nationwide, included a provision to bypass union hiring halls if unions would not provide people of color to work and to decertify apprenticeship programs that did not admit people of color (MacLean, 2006). In fact, the policies of the Philadelphia Plan had been written by the Johnson administration but were not implemented because of fears about political fallout toward Democrats (MacLean, 2006). President Nixon, on the other hand, saw implementing the Philadelphia Plan as a shrewd political move (MacLean, 2006). By supporting organizations such as the NAACP, Nixon could appear progressive on issues of race—veteran Civil Rights leaders commended Nixon’s action—while simultaneously dealing a blow to the left-leaning labor unions which held significant economic and political power at the time (MacLean, 2006). Furthermore, this move aggravated a divide among those generally in support of Democrats: union members and people of color (Golland, 2008).

From its inception, the Philadelphia Plan faced strong opposition. Comptroller General Elmer Staats became the leading opponent of the plan, declaring that it violated competitive bidding principles because, with the affirmative-action provisions, the lowest bidder may not be given the contract (Fulton, 1970). Further, Staats stated any prescribed requirements must be set in the

invitation for bids (Fulton, 1970). In dealing with the comptroller's objections, the revised plan, issued on June 27, 1969, described target ranges for employing people of color within government contracts exceeding \$500,000 (Fulton, 1970). Specifically, the Department of Labor set employment goals for minority workers in seven trades: iron work, plumbing and pipefitting, steamfitting, sheet-metal work, electrical work, roofing and waterproofing, and elevator construction (Fulton, 1970). These goals began at 4-6% for the employer's 1970 workforce and increased to a high of 20% in each trade after 4 years (Marcus, 1970). The numbers needed to be met; otherwise, an employer needed to demonstrate a "good-faith" effort had been made, and, finally, the plan specified workers had to be new hires with no white worker being replaced (MacLean, 2006). Requirements actually followed the course courts had been taking in response to discrimination lawsuits (MacLean, 2006).

The comptroller general, again, found the plan to be invalid, interestingly, because of the specific hiring goals (Marcus, 1970). Staats argued the specified goals for hiring people of color violated two sections of the 1964 Civil Rights Act: Section 703(a) dealing with discrimination because of race—any race—and Section 703(j) outlawing preferential treatment for groups or individuals (Marcus, 1970). In contrast, the attorney general declared the plan to be lawful, stating it was basically concerned with broadening the recruitment base (Marcus, 1970). Before the legality of affirmative action was, in essence, turned over to the courts, there was one final attempt in Congress to not allow implementation of the Philadelphia Plan. An amendment supporting the comptroller general's interpretation of the Philadelphia Plan was introduced (Marcus, 1970). Although the debate was fierce, in the end, the amendment was defeated, and the comptroller did not carry through with his stated threat to refuse payment to any company complying with the plan (Marcus, 1970). This is the policy which set the hiring goals for men of color in the construction industry.

Women and affirmative action

The Philadelphia Plan was an effort to integrate men of color into the construction industry. "Sex" had likely been added to Title VII as a joke or, at minimum, a last-minute thought. Nonetheless, women began invoking Title VII to acquire entry and promotion into a number of occupations historically unwelcoming. Women used Title VII to enter manufacturing jobs and to acquire positions as professors at universities (MacLean, 2006). Still, few argued women should work as building tradespeople. Building-construction union jobs were considered to be the most desirable of all blue-collar work (MacLean, 2006). Good pay, benefits, respect, and room for advancement were achieved by individuals who acquired such occupations, and these jobs had been carefully guarded for decades (MacLean, 2006).

Another barrier for women wanting to enter the building trades was that the jobs were actually associated with masculinity itself (Paap, 2006). Women's desires to acquire construction jobs forced both men and women to re-examine "gender" (Paap, 2006). As stated by Nancy MacLean in *Freedom is Not Enough*, construction trades work produced a male, working-class bond: "These performances insinuated whiteness and maleness into definitions of skill" (2006, p. 93). The ties of technical competence in this industry to being white and male have historically been so strong that they led to a wider cultural conclusion that someone who is not white and male simply could not be a competent building tradesperson (MacLean, 2006; Paap, 2006). While Title VII made it illegal to discriminate against women when hiring, there was more than a 10-year lag from the signing of the Civil Rights Act of 1964 until women—even in small numbers—were admitted to building-construction unions.

In 1976, a consortium of women's groups sued the U.S. Department of Labor for failing to provide enforcement of Title VII (Eisenberg, 1998). The lawsuit was dropped because President Carter subsequently issued affirmative-action regulations (41 CFR 60-20)

expanding Executive Order 11246 and establishing a separate goal for hiring women (Eisenberg, 1998). This policy action was the first allowing women to gain entry into building-trade unions (Eisenberg, 1998). The Carter administration set a goal of increasing the number of women working in the construction industry to 6.9% of the workforce with the goal for women to be 24% of the building-trades workforce by 2000 (women are currently less than 3% of trades workers) (Eisenberg, 1998).

First elected in 1980, President Ronald Reagan was not a supporter of affirmative-action policy. The Reagan administration cut full-time employees at the Office of Federal Contract Compliance Programs by one-third, and Reagan signed Executive Order 12608 of September 9, 1987: Elimination of Unnecessary Executive Orders and Technical Amendments to Others (United States Department of Labor [USDOL], 2011). Within this order, President Carter's Executive Order 12086 was revised (USDOL, 2011). The Reagan administration made affirmative-action numbers for government construction projects unenforceable guidelines rather than mandatory goals (USDOL, 2011). Today, states and municipalities may set more rigorous goals for hiring a diverse construction workforce, but as far as the federal government is concerned, a "good faith effort" remains policy.

The U.S. Supreme Court often has the final say about whether a policy will be implemented. In the past decade or more, rulings have gone against affirmative action (See, for example, 2009 *Ricci v. DeStefano*); yet, previously, a number of rulings decided in favor of affirmative action. For example, in *Griggs v. Duke Power Co* (401 US 424 1971), the court ruled against the use of intelligence tests, stating that, even if they were neutral, such tests often operated to uphold an exclusionary status quo (King, 2007). Subsequent to the judgment, employers had to demonstrate statistical parity between the racial makeup of their employees and the local population from which the workforce was drawn (King, 2007). In *Fullilove v. Klutznick* (448 US 1980), the court held setting a percentage of jobs for

eligible minority candidates to be constitutional (King, 2007). The above examples, as well as a number of other cases, kept affirmative action policy on the books. Yet, affirmative action always had detractors. As a new concept in the 1960s, it possessed just enough support to get written into federal policy. Since the 1980s, the tide turned strongly against any affirmative action. The policy, over the past 30 years, was whittled away with many cases in court challenging the approach and some statewide efforts at ending it. For example, in 1996, California enacted Proposition 209 prohibiting any affirmative action programs in employment education and contracting and, subsequently, the state of Washington enacted the same prohibition (The Leadership Conference on Civil and Human Rights, 2014). Michigan (in 2006), Nebraska (in 2008), and Arizona (in 2010) all passed statewide bans on affirmative-action/equal-opportunity programs (The Leadership Conference on Civil and Human Rights, 2014). In 2012, New Hampshire and Oklahoma banned using any affirmative-action policy for college admittance (The Leadership Conference on Civil and Human Rights, 2014).

Reflections

What can be learned from a policy analysis placed in an historical context? A review of the history of affirmative action at the federal level is that of policy having made workplaces more equitable. However, the construction industry continued resisting attempts to support a diverse workforce. Hiring goals as a policy tool, have, at minimum, kept alive conversations about men and women of color and white women working in the construction industry. Rather than being a burden, the construction industry could view its historical monoculture and the scrutiny it has put them under through an opportunities framework. Leaders in the design and construction field could aim to surpass other industries in order to become the industry where a truly diverse workforce feels supported and able to excel. In order to achieve this status, the following are likely good places to begin:

- Education and acknowledgement of the history of exclusion and discriminatory practices enacted by

unions and construction companies in the United States;

- Less defensiveness around business as usual; being open to innovative efforts for inclusion
- More transparency in hiring practices and union membership;
- Innovative, directed recruitment;
- Rethinking the concept of “most qualified” — such as making needed training more transparent and onsite training consistent, fair, and professional.

Additionally, hiring goals could be more effective and less punitive. For construction companies, creating methods for reducing paperwork and hoop-jumping relating to diversity in hiring would be a worthwhile endeavor. Recognizing good faith efforts required by the federal government and government at other levels cost construction companies money — even for minimal compliance and minimal gains at diversity in the workforce — one reasonable alternative might be to create a buy-out option for companies interested in bidding on projects with hiring goals. A buyout could be along the lines of putting a certain amount of money into recruiting and training men and women of color and white women, military veterans, and people with disabilities. Funds could be paid to non-profits or to scholarships at trade and technical colleges and universities to support men and women of color, white women, veterans and those with disabilities in acquiring construction industry job skills training. In order to make substantial steps toward increasing diversity, the buy-out amount would have to be equal to or exceeding the costs of complying with current hiring goal requirements, but, in return, instead of having money go toward staff filling out paperwork, the money would go directly to creating a larger hiring pool of workers with a baseline of training. One more option could be an incentive (monetary) placed into contracts for those companies exceeding the goals. These could be structured similar to clauses included in contracts for early completion on a project. The tactic may remove some of the feelings of negativity surrounding the goals, and seems likely to be defensible in court.

A common refrain posits hiring goals subvert the requirement that the most qualified person for the job is hired. Because companies need to be hiring the “most qualified” person for the job, ideas around the cultural concept of “qualified” need further scrutiny if not re-evaluation, especially considering that the majority of the historical knowledge about building-trade skills and revenue within the construction industry remains with white men. The concept of “most qualified”, as defined by industry personnel, can appear to have less to do with skills, work ethic or capacity and desire to learn, and more to do with having an identity as a young, white man. Therefore, more transparency in hiring practices is necessary. Even giving feedback to rejected applicants about what skills are needed in order to be hired and where to acquire those would help to take some of the mystery out of acquiring building trades jobs for those lacking previous connections to the industry.

Finally, the construction industry has a reputation for enacting a culture of mistreatment of difference. The cultural traditions of the industry need re-evaluation, in part, due to the public-relation issues the field has and, more importantly, for the lived realities of those out on worksites. One impression left by discussions of those in the industry about needing to diversify is that diversity in hiring is only needed because there is a shortage of white men to fill jobs (Paap, 2006). The idea a man or a woman of color, or a white woman, might be the best person for the job of brick mason, steel worker, or plumber appears to be rarely considered (Paap, 2006), but now is the time to acknowledge the potential, capabilities and skills of all U.S. workers. Further, it’s time to acknowledge the desire of a broad range of people to be given true equality of career opportunity in the construction sector. Everyone in the built environment sector can work toward supporting this equality of opportunity by not accepting the empirically unsupported mantra that only white men want to work in the construction industry.

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Mitigating Stress-Inducing Effects of Viewing Urban Hardscapes with Water Sounds

Hope Hui Rising

INTRODUCTION

Water and Attention Restoration Theory

Proponents of Attention Restoration Theory found that scenes with vegetation helped promote relaxation and enhance human cognitive performance (Chang, Hammitt, Chen, Machnik, & Su, 2008; Hartig, Mang, & Evans, 1991; Kaplan, 1995; Ulrich et al., 1991). Ulrich (1981) revealed that settings with water sustained attention and interest more effectively than those with vegetation. When coexisting with hardscapes, waterscapes may be more footprint-efficient than vegetation and thus more feasible for increasing the attention-restoration capacity of urban environment with a typical high demand for developable land.

Restorative effects of urban waterfalls

Water's attention-holding properties (Ulrich, 1981) may help explain the high levels of preference for water scenes (Herzog, 1985; Zube, Pitt, & Anderson, 1975). Waterfalls may be the most footprint-efficient waterscapes because they are likely to be more vertical than horizontal. However, most waterscape preference studies assume that waterfalls do not typically occur in urban settings. For example, Ulrich (1981) considered water scenes separate settings from urban scenes when he concluded that water scenes were more restorative than urban scenes without water or vegetation. Zöhre Bulut, Karahan, and Sezen (2010) discovered that waterfall was the most preferred waterscape among all natural waterscapes. Yet, when both urban and natural waterscape scenes were included, urban waterscapes were the most preferred, followed by rural waterfalls, and standing water bodies (Zohre Bulut & Yilmaz, 2009). There is a need to study the restorative effects of urban waterfalls and other urban waterscapes.

Ecological validity of waterscape studies

Most of these aforementioned waterscape studies relied solely on the use of visual stimuli for indoor controlled experiments despite the memorable sounds generated by many waterscapes. Water sound was not mentioned in the most recent study on water as a restorative component in urban spaces (Pradhan, 2012). Little research has been conducted to understand the restorative effects of actual waterscapes where both visual and auditory properties of water are often experienced simultaneously.

Stress-mitigating effect of water sounds

Researchers found that soothing environmental sound had positive effects on health, including stress-reduction and immuno-competence (Caine, 1991; Charnetski, Brennan, & Harrison, 1998; Holm & Fitzmaurice, 2008). Knight and Rickard (2001) revealed that exposure to relaxing sounds prevented increases in anxiety, heart rate, and systolic blood pressure due to the presence of stressors. Using the Electroencephalograph (EEG) data of 12 participants in a repeated measures research design, (Aly, 2012) discovered that one of the four water sound recordings could help reduce anxiety. Although this study appeared to be the only one focusing on human physiological responses to water sounds, it did not provide strong evidence for the potential stress-mitigating effects of watersounds.

Optimization of waterscapes' stress-mitigating effects with water sounds

Urban landscapes have been found to negatively impact short-term recovery from stress (Velarde, Fry, & Tveit, 2007). This is likely due to the prevalence of hardscape in urban environment because viewing paved surfaces has been observed to increase stress and frustration for patients prone to overstimulation (Ulrich, 2002).

Many researchers substantiated the restorative and affective effects of viewing water surfaces (Dupont, Pihel, Ode, & Van Eetvelde, 2013; Nasar & Li, 2004). However, incorporating large surfaces of water bodies

into densely developed urban environments tends to be less feasible in urban areas considered prime real estate. Investigating the extent to which water sounds mitigate the stress-inducing effects of viewing hardscapes may help optimize waterscapes' restorative potential with a more compact water surface footprint.

SITE SELECTION

Lawrence Halprin's office designed several urban waterscapes in the form of waterfalls, such as those in Lovejoy Fountain Park, Keller Fountain Park, and Freeway Park (Hirsch, 2014). The canyon waterfall in Seattle's Freeway Park was designed to circulate 28,000 gallons of water per minute over 30-foot

tall vertical walls (Figure 1). The original design was reduced to 9,500 gallons per minute due to increased safety standards and reduced maintenance budgets. The water is currently turned off all year round.

Portland was sued for misallocating its stormwater budget for maintaining and operating its aesthetic fountains in city parks. To keep the cascade waterfall running in the Keller Fountain Park, the city has to pump 13,000 gallons of water per minute (Figure 2). Turning off the fountain was not an option due to a strong demand from residents to keep the fountain operational.



Figure 1. Canyon Fountain in Seattle's Freeway Park.



Figure 2. Ira Keller Fountain in Portland's Keller Fountain Park.

Lovejoy Fountain Park (Figure 3) was chosen as the study site because its much smaller waterfall appears to generate equally impressive water sounds with a smaller water and energy demand compared with the

waterfall fountains in Freeway Park and Keller Fountain Park. In addition, the park contains eight other waterscapes interspersed among concrete surfaces with little ground vegetation.



Figure 3. Lovejoy Fountain Park

STUDY HYPOTHESES

This study postulated that water sounds could potentially help ease the stress-inducing effects of viewing paved surfaces commonly found in urban environment. Previous studies suggest that such stress-mitigating effects can be indicated by a lowered skin conductance level (GSL) (Hietanen & Korpela, 2004), galvanic skin response (GSR) (Bakker, Pechenizkiy, & Sidorova, 2011), and body temperature (Briese & Cabanac, 1991). No significant changes in GSL, GSR, and body temperature were expected when participants were simultaneously exposed to water sounds and the view of concrete surfaces. It was also hypothesized that a higher volume of water sound would induce a greater level of reduction in GSL, GSR, and body temperature regardless of the visual stimulus viewed by participants.

RESEARCH DESIGN

Sample size for repeated measures research design

The investigator conveniently sampled 18 participants in the vicinity of Lovejoy Park for a repeated measures design. Each participant was exposed to a total of

18 visual-auditory conditions based on a combination of two visual stimuli (views of water or concrete) with varying sound effects at nine waterscape locations. Two trials were taken for each condition with unfocused and focused gazes respectively. The repeated measures designs tend to have more statistical power than cross-sectional designs because they allow the detection of within-subject change over time. (Aly, 2012) used a similar repeated measures design with only 12 participants and four water sound recordings. Using the process outlined by Guo, Logan, Glueck, and Muller (2013), a power analysis was conducted in GLIMMPSE to verify that a sample size of 18 provided a statistical power greater than .8.

Experimental protocols

At each of the nine waterscape locations in the park, participants flipped a coin to determine whether they should view water or concrete first. Participants had to look at the first visual stimulus without controlling their gaze for 15 seconds and then switch to the second visual stimulus for another 15 seconds without focusing their gaze. Then, they repeated the same viewing protocol while fixating their gaze at one point.

Participants wore a mobile eye-tracker embedded in a glass frame so that the investigator could verify the assigned stimulus was viewed with the correct gaze. A mobile sensor was incorporated into a watch that participants wore to record their body temperature, galvanic skin response (GSR), and skin conductance level (SCL).

DATA ANALYSIS

Epoch analysis

AcqKnowledge 4.4 was used to import physiological data and perform epoch analyses. For each 15 second epoch, three response variables were calculated as indicators of stress level in the participants. These dependent variables were change in body temperature (Δtemp), change in GSR (ΔGSR), and change in SCL (ΔSCL).

Linear mixed effects model

The investigator used PROC MIXED to run a separate mixed effects model for each of the response or dependent variables in SAS. In other words, only the response variable differed between the three models. A linear mixed effects model is a special type of hierarchical linear regression model to account for both fixed and random effects. The fixed effects variables would always have the same levels if one were to repeat this study. In contrast, the random effects variables have not been measured at every level found in the population. In other words, the actual values of the random effects variables are essentially a random sample of the possible values they could take. If one were to repeat this study for validation, the random effects variables would still be included but the levels could be completely different.

Fixed and random effects variables

The model included CW and Sound as fixed effects variables. CW was coded 1 for concrete and 0 for water. Sound was rated 2 for locations at the lower level in front of a large waterfall and 1 for locations at the upper level above and behind the large waterfall. The model included Subject as a random effects variable due to differences in participants'

physiological reactivity to environmental stimuli (Manuck, Kasprovicz, Monroe, Larkin, & Kaplan, 1989). Focus was also a random effects variable because the eye-tracking recordings showed individual variations in participants' unfocused gaze patterns. Some participants skipped certain locations because other visitors were standing in front of those water features. Station was thus incorporated as a random effects variable. The model also accounted for an interaction term between CW and Sound since the presence of water sound might mitigate the stress-inducing effect of viewing concrete or amplify the restorative effect of viewing water. A CW-Focus interaction term was also added to the random effects because many researchers (Meaney, 2001; Nordh, Hagerhall, & Holmqvist, 2013) discovered a correlation between the distribution of eye movement pattern and the restorative effects of visual stimuli.

RESULTS

Δtemp as response variable

Figure 4 shows that the linear mixed effects model assumptions remained unviolated for Δtemp . The residuals were roughly normal without obvious pattern. Table 1 illustrates that sound was the only significant fixed effect ($p < .05$) in the Δtemp mixed effects model.

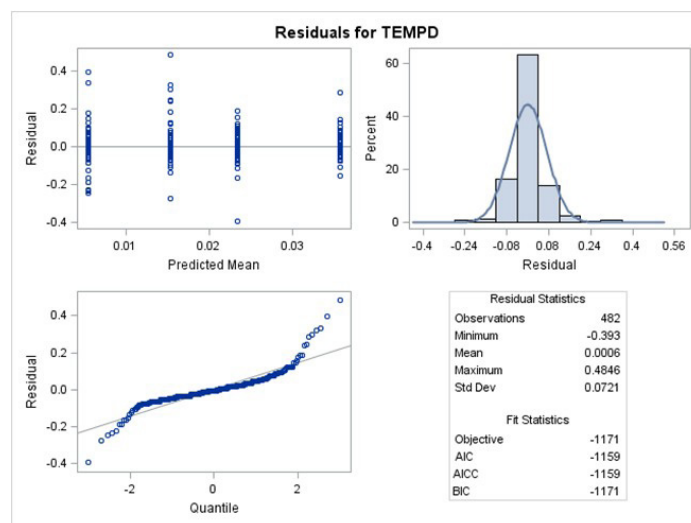


Figure 4. Residual Plots for the temp mixed effects model.

| Type 3 Tests of Fixed Effects | | | | |
|-------------------------------|--------|--------|---------|--------|
| Effect | Num DF | Den DF | F Value | Pr > F |
| CW | 1 | 3 | 0.03 | 0.8661 |
| Sound | 1 | 7 | 8.11 | 0.0248 |
| CW * Sound | 1 | 437 | 2.78 | 0.0960 |

Table 1. Significance Tests for fixed effects of the Δ temp mixed effects model.

| Solution for Fixed Effects | | | | | | | | | | |
|----------------------------|----------|----------|----------|----------------|-----|---------|---------|-------|----------|----------|
| Effect | CW | Sound | Estimate | Standard Error | DF | t Value | Pr > t | Alpha | Lower | Upper |
| Intercept | | | 0.03569 | 0.007849 | 3 | 4.55 | 0.0199 | 0.05 | 0.01071 | 0.06067 |
| CW | 0 | | -0.01233 | 0.01043 | 3 | -1.18 | 0.3226 | 0.05 | -0.04553 | 0.02088 |
| CW | 1 | | 0 | . | . | . | . | . | . | . |
| Sound | | 1 | -0.03021 | 0.009450 | 7 | -3.20 | 0.0151 | 0.05 | -0.05255 | -0.00786 |
| Sound | | 2 | 0 | . | . | . | . | . | . | . |
| CW * Sound | 0 | 1 | 0.02221 | 0.01331 | 437 | 1.67 | 0.0960 | 0.05 | -0.00396 | 0.04837 |
| CW * Sound | 0 | 2 | 0 | . | . | . | . | . | . | . |
| CW * Sound | 1 | 1 | 0 | . | . | . | . | . | . | . |
| CW * Sound | 1 | 2 | 0 | . | . | . | . | . | . | . |

Table 2. Maximum likelihood coefficients for fixed effects of the Δ temp mixed effects model.

The estimated coefficient for Sound in Table 2 indicates that Δ temp was significantly lower for locations above and behind the waterfall (Sound=1) compared to locations at the lower level in front of the waterfall (Sound=2). Behind the waterfall, the waterfall sound was barely discernable in the presence of low bubblers and cascades while the waterfall sound dominated the auditory experience for other waterscape locations in front of the waterfall.

Δ GSR as response variable

Figure 5 indicates that the linear mixed effects model assumptions appeared to hold true for Δ GSR. The

residuals were nearly normal with no apparent trend. Table 3 shows that none of the fixed effects had a significant p-value in the Δ GSR mixed effects model. This is not surprising given the very low coefficient estimates in Table 4. Every single fixed effect in the Δ GSR model has a larger estimated coefficient standard error than estimated coefficient.

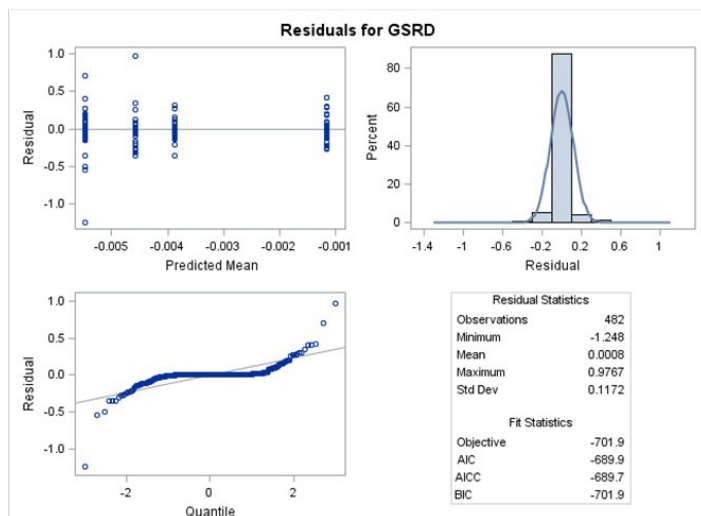


Figure 5. Residual Plots for the Δ GSR mixed effects model.

| Type 3 Tests of Fixed Effects | | | | |
|-------------------------------|--------|--------|---------|--------|
| Effect | Num DF | Den DF | F Value | Pr > F |
| CW | 1 | 3 | 0.03 | 0.8771 |
| Sound | 1 | 7 | 0.01 | 0.9358 |
| CW*Sound | 1 | 437 | 0.05 | 0.8163 |

Table 3. Significance Tests for fixed effects of the Δ GSR mixed effects model.

| Solution for Fixed Effects | | | | | | | | | | |
|----------------------------|----|-------|----------|----------------|-----|---------|---------|-------|----------|---------|
| Effect | CW | Sound | Estimate | Standard Error | DF | t Value | Pr > t | Alpha | Lower | Upper |
| Intercept | | | -0.00388 | 0.01296 | 3 | -0.30 | 0.7842 | 0.05 | -0.04513 | 0.03737 |
| CW | 0 | | -0.00069 | 0.01695 | 3 | -0.04 | 0.9699 | 0.05 | -0.05462 | 0.05324 |
| CW | 1 | | 0 | . | . | . | . | . | . | . |
| Sound | | 1 | -0.00160 | 0.01536 | 7 | -0.10 | 0.9199 | 0.05 | -0.03792 | 0.03472 |
| Sound | | 2 | 0 | . | . | . | . | . | . | . |
| CW*Sound | 0 | 1 | 0.005025 | 0.02162 | 437 | 0.23 | 0.8163 | 0.05 | -0.03748 | 0.04753 |
| CW*Sound | 0 | 2 | 0 | . | . | . | . | . | . | . |
| CW*Sound | 1 | 1 | 0 | . | . | . | . | . | . | . |
| CW*Sound | 1 | 2 | 0 | . | . | . | . | . | . | . |

Table 4. Estimated Coefficients for fixed effects of the Δ GSR mixed effects model.

Δ SCL as response variable

Similarly, Figure 6 suggests that the linear mixed effects model assumptions applied to Δ SCL although the residual pattern was not as normal as the other two models. Table 5 shows that none of the fixed effects

had a significant p-value in the Δ SCL mixed effects model. This was to be expected because, as shown in Table 6, every single fixed effect in the Δ SCL model had a larger estimated coefficient standard error than estimated coefficient.

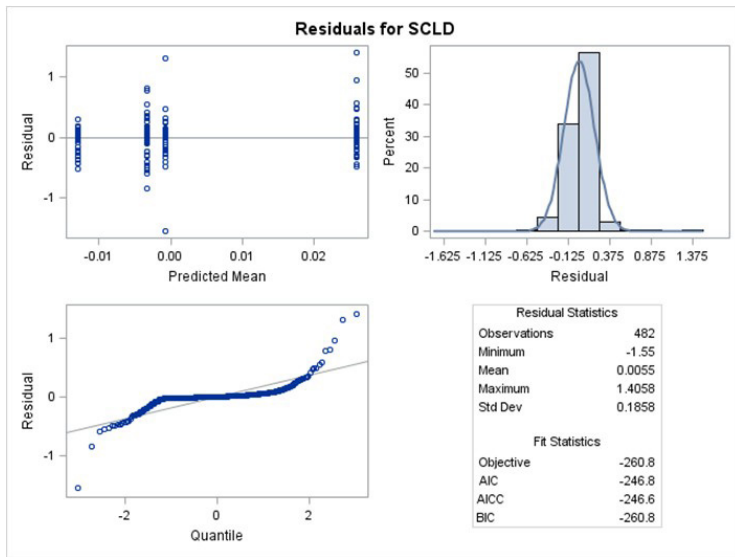


Figure 6. Residual Plots for the Δ SCL mixed effects model.

| Type 3 Tests of Fixed Effects | | | | |
|-------------------------------|--------|--------|---------|--------|
| Effect | Num DF | Den DF | F Value | Pr > F |
| CW | 1 | 3 | 1.04 | 0.3833 |
| Sound | 1 | 7 | 1.13 | 0.3231 |
| CW*Sound | 1 | 437 | 0.25 | 0.6160 |

Table 5. Significance Tests for fixed effects of the Δ SCL mixed effects model.

| Solution for Fixed Effects | | | | | | | | | | |
|----------------------------|----|-------|----------|----------------|-----|---------|---------|-------|----------|---------|
| Effect | CW | Sound | Estimate | Standard Error | DF | t Value | Pr > t | Alpha | Lower | Upper |
| Intercept | | | -0.01296 | 0.02229 | 3 | -0.58 | 0.6018 | 0.05 | -0.08391 | 0.05799 |
| CW | 0 | | 0.01214 | 0.02854 | 3 | 0.43 | 0.6994 | 0.05 | -0.07870 | 0.1030 |
| CW | 1 | | 0 | . | . | . | . | . | . | . |
| Sound | | 1 | 0.009671 | 0.02408 | 7 | 0.40 | 0.7000 | 0.05 | -0.04727 | 0.06662 |
| Sound | | 2 | 0 | . | . | . | . | . | . | . |
| CW*Sound | 0 | 1 | 0.01702 | 0.03391 | 437 | 0.50 | 0.6160 | 0.05 | -0.04962 | 0.08366 |
| CW*Sound | 0 | 2 | 0 | . | . | . | . | . | . | . |
| CW*Sound | 1 | 1 | 0 | . | . | . | . | . | . | . |
| CW*Sound | 1 | 2 | 0 | . | . | . | . | . | . | . |

Table 6. Estimated Coefficients for fixed effects of the Δ SCL mixed effects model.

DISCUSSIONS

Stress-mitigating effect of water sounds

The lack of significant results for the change scores of SCL and GSR may be due to the stress-mitigating effects of prevalent water sounds in the park. This result lends some support to the first hypothesis. Since changes in body temperature, SCL, and GSR were not consistent, possible experimental design issues may need to be addressed to fully substantiate the first

hypothesis: 1) 15 seconds may not be long enough for inducing sufficient stress levels in participants with concrete as a visual stimulus; 2) the restorative effect of viewing water may linger beyond 15 seconds to contaminate the stress-inducing effect of viewing concrete. Future research should lengthen participants' exposure to a higher baseline stress level, possibly by using traffic noise as the baseline stressor. In addition, the baseline stressors may be used to fill

transition periods to be inserted between the two visual conditions to isolate their potential lingering effects.

Effects of waterfall sound quality and volume

Several participants mentioned they meditated next to the waterfall in the past. Since loud sounds are typically not conducive to meditation, a greater drop in body temperature for locations in front of the waterfall may have been associated with the exposure to the more restorative waterfall sound in relation to the quieter sounds of low bubblers and cascades behind the waterfall. If water sound quality does not significantly influence its stress-mitigating effect, a higher volume of water sound from the waterfall may have induced a greater drop in body temperature as stated by the second hypothesis. Future research should examine the effects of water sound types and volumes in controlled lab settings. The mean levels of body temperature, SCL, and GSR should also be included as dependent variables for testing whether the louder waterfall sound at the lower level is associated with significantly lower SCL and GSR baselines in relation to the quieter waterscape sound at the upper level.

CONCLUSION

This research provides preliminary support to suggest that waterfalls have the potential to be effective stress-mitigating urban waterscapes. This is likely because waterfalls generate high volumes of restorative water sounds without necessitating large water surfaces. However, waterfalls tend to be more water and energy consumptive than other waterscapes. By implementing the latest technologies to reuse water and harvest energy from water's kinetic movements, small waterfalls can be a potentially effective public health intervention that helps alleviate the stress-inducing effects of viewing predominately hardscaped urban environment.

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Homeless Trajectories in the Indeterminate Landscape

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People experiencing homelessness are unwelcome in urban public space. Anti-homeless regulations prevent homeless people from resting in a park (Mitchell, 1997). Police sweeps remove street youth congregating in urban plazas (Gibson, 2011). And hostility from businesses drives city-wide efforts to rid their public spaces of “bums” and “vagrants” (Amster, 2004). Designers of public spaces participate in this removal of homeless people from public view by facilitating commerce, automobile travel and gentrification, all activities usually exclusive of people in the deepest poverty. Outside of the few urban parks available to them, homeless people congregate in depressed neighborhoods or skid row (Dear & Wolch, 1992), in large open spaces associated with rivers and near rail yards and transportation hubs (MacCannell, 2005). These are “leftover,” un-designed places. In contrast, the design of public open space often includes goals of improving the quality of life and the neighborhood aesthetic, a life and aesthetic that does not include homeless people. Design represents an imposed order; homelessness represents an unwanted disorder (Duncan, 1978).

How then can we design public spaces to be more inclusive of homeless people? First, we recognize design will not solve the challenges of homelessness. To alleviate its debilitating conditions, we need to work to change policy, urban discourse and structural injustice. Design may not solve the problem of people without shelter, but it can improve their everyday experiences. Second, we learn more about how homeless people experience public space, particularly the social and physical barriers they encounter. Third, we apply what we learn to redesign our public spaces to be more inclusive, creating multi-functioning, active spaces at

times and letting disorder prevail over the controlled and constrained.

Homelessness and public space

To tackle the challenge of designing for homeless people, it is first important to understand how homeless people experience public space. I undertook a pilot project funded by the Social Sciences Research Council to determine the feasibility of analyzing homeless/public space interaction, as it relates to the design and planning of city spaces. To understand how homeless people experience public space I evaluated their behavior through observation as a mobile participant in the everyday. Homeless people frequently walk and bike, as police and business owners often ask them to “move along” (Gibson, 2011), and this suggests using mobile methods (Büscher & Urry, 2009). To establish context and potential barriers to public space, I interviewed policy makers and social service providers who served homeless people in three California cities: Sacramento, Oakland and Santa Cruz. These cities have mild climates, significant homeless populations, and an established homeless service infrastructure. The purpose of the research was to determine first if the question of homelessness and design of public spaces could be answered, and second if the methods of observation and interviews would be the best way to do that.

For this article, I focus on the homeless populations in Sacramento and Santa Cruz because of their similar median age (45 and 46), similar ethnicities (both are 57% white) and similar percentages of families (Applied Survey Research, 2015; Schatz & Halcon, 2013). The cities diverge in the number of unsheltered homeless: 31% of homeless people in Sacramento are unsheltered, while 69% of homeless people in Santa Cruz are unsheltered. This may be due to the greater percentage of homeless people per capita living in Santa Cruz (0.7% vs. 0.17%). Both Sacramento and Santa Cruz have large open space in the center of town attractive to homeless residents.

Sacramento has a long history of squatters and vagrants inhabiting the riverine landscape. From the founding of the city in the gold rush era to the shanty towns of the Great Depression, the American River floodplain has hosted fluctuating numbers of transients (Eifler, 2002; Reis, Henley, & Sacramento County Historical Society, 1993). Contemporary unsheltered homeless people camp in the public open space along the American and Sacramento Rivers because the dense riparian vegetation screens tents from public view and it is proximate to social services and downtown (Vollmann, 2011). Immediately to the south of the American River Parkway and homeless camps, homeless pedestrians and bicyclists navigate the Richard Boulevard neighborhood along sidewalks and dirt shoulders adjacent to chain link fences and barbed wire that surround light industry and warehouses. Two of the largest homeless service centers reside in this neighborhood providing food, job assistance, community and in one case, shelter for 70 men. South of the Richards Boulevard neighborhood, the railroad tracks run east-west forcing auto and pedestrian traffic to cross at two points, 7th Street and 12th Street. The 12th Street undercrossing in particular constricts the busy pedestrian traffic to four feet of sidewalk next to fast-moving cars. People exchange pleasantries, deal drugs, hop the fence to the rail yards, spray paint graffiti, walk briskly, shuffle, trudge and rest along this mobile community meeting place. Under the tracks and south along 12th, a homeless pedestrian soon reaches the well-maintained office buildings of downtown. Here, many homeless people rest on the benches of Cesar Chavez park watching purposeful office workers walk by. Elsewhere downtown and in particular around the Capitol, homeless people must keep moving to avoid notice by business owners and the police.

The smaller city of Santa Cruz does not have a large downtown or a state capitol. What the town does have is an ocean-side location, a beach boardwalk and amusement park, and a small downtown retail core centered around Pacific Avenue that attracts tourists. Pacific Avenue has wide sidewalks used by homeless

people, often youth, to sell crafts, panhandle and busk. A recent ordinance limits the time they can occupy a spot of sidewalk in this informal economy. Two blocks east of Pacific Avenue, a homeless pedestrian can climb the steep slope of a levee to an asphalt bike path overlooking the San Lorenzo River. Similar to the American River Parkway, San Lorenzo Park flows through the middle of town, providing open space for movement and rest. Unlike the American River though, the San Lorenzo's much narrower band of riparian vegetation consists of rushes, cattails and the occasional willow, making it a more visibly accessible place for everyone on the levee. Small groups of homeless people congregate on the path and low retaining wall telling stories about their experiences traveling, going to the doctor, conflicts with police or surviving a rough patch. On the south side of the river, San Lorenzo Park contains a disc golf course occupied by small groups of lounging homeless men and patrolled by city park rangers to remove people drinking alcohol or camping. Heading east, upstream along the river, the bike path eventually ends at a city-subsidized apartment/loft complex for artists. At night, the greater number of unsheltered homeless people make use of the surrounding forest and hillsides to set up hidden camps on public and private property. It is the periphery that becomes home.

The observation of homeless people in both Sacramento and Santa Cruz suggests several key binaries of public space related to their behavior and the discourse on homelessness. Each binary leads to a design implication, a challenge for current urban design to become more inclusive.

Movement/rest

A tremendous amount of land within city boundaries is devoted to transportation, mostly in the form of streets, sidewalks, parking lots, gas stations and interchanges. The majority of public space, up to 80% in a city like London, is designated for cars. Parks and plazas occupy a much smaller percentage. The Richards Boulevard neighborhood in Sacramento, inhabited by many homeless people, contains only public space

in the form of a road or sidewalk (until one enters the American River Parkway). Chain link fences bound the private spaces making them inaccessible to pedestrians. This large expanse of urban lands devoted to automobile transportation has two effects: it creates the sense that the pedestrian or bicyclist does not belong, and it feels uneasy or unacceptable to be resting in these spaces. Homeless people in particular must keep moving.

But mobility does not just inform designed streets and sidewalks; mobility informs all types of public space. A plaza does not arise from the application of horizontal static forms. Rather, layers of overlapping trajectories create the plaza through interactions, presence and absence, movement and rest (Massey, 2005). The “mobility turn” has refocused socio-spatial thinking on the dynamic qualities of movement — meaningful motion as practiced, embodied and represented (Sheller & Urry, 2006). People do not experience urban public space as a static landscape viewed from afar, but as a constantly shifting sequence of encounters. Homeless people in particular are in constant negotiation with societal norms to carve out space for rest.

A shift from static form to trajectories has a number of design implications. The first is disciplinary; if all public space is defined by mobility, then landscape architects in particular need to shift their thinking of what it means to design public space. Designers creating jewel-box plazas also have something to say about public transportation infrastructure. The second, if space is about movement, then which movements? Why do we make choices to prioritize one movement or flow over another? From a design perspective, there seems to be some creative interventions to be made in public space to make it easier and safer for homeless people to walk and bike in the city, quite possibly at the expense of the dominance of the car. The closure of car lanes, or whole streets to then allow for more space for bikes and walks would enhance efficiency, sociability, and access.

Order/disorder

Designed space, if it is ordered space formed by the shapes and circulations of architectural styles, often leads to exclusion. Those people bringing in a shopping cart of stuff with a disheveled appearance do not fit with the orderly design aesthetic. They are out of place (Cresswell, 1996). But this is a closed, static view of space. Designers attempt to transcend the closed nature of space by juxtaposing different spatial forms — a grid, arc or angle (Tschumi, 2014). Doreen Massey (2005) argues for truly open public space; the juxtaposition should not be just one of overlapping forms, but overlapping trajectories. This brings a space’s indeterminate qualities to the foreground, creating opportunities for surprise and difference. Consider the 12th Street underpass; it is a forced constriction and unsafe environment, but also a dynamic meeting space precisely because of the density of trajectories. Or Pacific Avenue in Santa Cruz, a busy shopping street that downtown business owners have attempted to control, but nevertheless, remains indeterminate due to the shifting presence of street youth singing and selling their wares.

In the indeterminate landscape, riparian vegetation grows into dense thickets, asphalt pavement slowly erodes and homeless people forge paths through the brush. If there is design, it is the design of a tableau or stage upon which diverse performers move. It is flexible. A bike path hosts recreational bicyclists, meandering homeless men with bags of recycled cans, office workers walking at lunch and a real estate agent driving his SUV to show a client the view of the river. Along the American River Parkway, the local preservation society would like to remove the homeless from the area. It needs to be “cleaned up” to return it to its “pristine” state (Jahn, 2005). While removal of trash and debris is an admirable goal, the removal of homeless people from public space who do not have access to private space is problematic. Sarah Dooling (2009) calls the pitting of pro-environmental river and open space advocates against a vulnerable and impoverished population “ecological gentrification” — the exclusion of a group of people from a

natural area by means of environmental discourse. The preservationists are only comfortable with indeterminate open space if it is seen as natural; no people allowed. A study of American River Parkway users called nearby residents at their homes to assess their use and opinions of the park (Berg & Martinez, 2006). In my estimates, recreational bicyclists (who supposedly have homes) and homeless people frequent the parkway in equal numbers, yet only one of these groups received the opportunity to contribute to the future vision of the park. By narrowing a public space to one single purpose (in this case, recreational bicycling), planners removed the opportunity for indeterminate space to surprise and challenge.

The response from many Sacramento and Santa Cruz residents to homelessness is to lament the crime and trash in the parks, returning the discourse to cleaning up the place. We need safer cities and cleaner waterways. But is it the crime and trash residents object to or is it the unclean homeless people in their backyards? Dirt and destitute inextricably link in the eyes of the public (Sibley, 1995). Homeless people create indeterminacy by their presence. We cannot anticipate the movement and actions of a homeless person, and this unknown (and thus uncontrolled) may drive concerns over safety.

Public/private

In many ways, homeless people are not unique in their use of public space. They try to create small personal territories, they adapt and read symbolic cues according to their context, and they socialize with other people of similar circumstances (Low, 2000; Marcus & Francis, 1997; Whyte, 2001). What is unique about their experiences stems from the role of public space as their home. They must live out their private lives in public space (Baxter & Hopper, 1981). Maintaining a temporary invisibility for private functions becomes important for everyday life. Wasserman and Clair (2009) describe the establishment of an urban camp beneath a freeway overpass and the attempts of the homeless men to control, clean, and maintain this space as a home.

In a similar way, I encountered a homeless man and woman picking up the trash around a shady bower of sticks immediately adjacent to the American River Parkway bike path and carrying it over to an office dumpster nearby. One man entering the warren of thin dirt trails between the blackberry in the American River riparian zone challenged me with, "What are you looking for?!" I was unaware I was too close to his camp for him to maintain privacy.

The public/private binary may not be appropriate to describe the homeless urban experience (Miles, 2000). The distinction benefits property owners and public officials, but does little to address the domesticity of homeless people in public life. In Sacramento, regulations prohibit camping on public and private land within the city limits. This creates a dual bind for homeless people; their private lives are banned from the public, and their public lives cannot enter the private. In a sense, by using the language of "public/private" we are removing homelessness from urban discourse.

Homeless people do not have to accede to this discourse. The public realm has always been contested. Homeless people resist notions of public/private through resisting norms and practicing 'out-of-place' behavior (Crawford, 1995). Resistance includes daily transgressions of space in the form of trespass, jaywalking, and panhandling, allowing the homeless person to reassert control in the face of constraint. Tent cities pop up in indeterminate spaces and vacant lots, often with their own political structure to recreate a sense of order and home (Herring, 2015). Sacramento's unsheltered homeless people banded together to form Safer Ground, a loose organization advocating for camping rights (while camping) in the city. In Santa Cruz, San Lorenzo Park hosts many homeless people who refuse to go elsewhere and appear to belong through sheer numbers, but the size, openness and visibility of the river corridor prevents the space from becoming solely a "homeless" park, allowing small groups of people to rest in pockets of shade.

Conclusion

Over 35 years ago, William Whyte (2001) addressed the problem of “undesirables” by advocating for more active spaces to attract people in sufficient numbers to dilute the effects of the “undesirables.” This design advice continues to apply today. Yet, Whyte’s point of view arose from the general city dweller, not the “undesirables” themselves. The point of view of homeless people may reveal more about what makes a welcoming public space. Since mobility and indeterminacy are central concepts to their experience of place, I intend to incorporate a more mobile methodology into the project and do walking interviews with homeless people. By walking their everyday pathways and listening to their thoughts on public space, I will gather insight on constraints and challenges of public space, ultimately contributing to the reconfiguration of public space to make it more inclusive and friendly to homeless people.

Designers can specify benches comfortable for sleeping and accessible garbage cans to make public space more inclusive of homeless people. But, a more substantial approach to the design and maintenance of public space shifts the discourse from stasis to mobility. It shifts the discourse on power and control from order to the indeterminate, confident in the myriad daily interactions to sort themselves out rather than needing to be controlled. And it shifts the discourse on property from public versus private to a more transitional space, both public and private. The design of public space could then be reconciled to the needs of those facing extreme poverty, like homeless people.

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Schoolyard Solar Gardens: Solar PV Systems in Public Elementary School Landscapes in Tucson, Arizona

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Introduction

Solar Photovoltaic (PV) system installations in the United States have been on the rise during the past decade. In early 2016, the millionth PV system was installed, and projections of the future remain positive. The state of California leads the charge by a wide margin due to high populations, energy costs, legislation, and available irradiance. With plentiful sunshine, the state of Arizona is among the next states to follow, and has grown to a solar PV capacity of 2020 MW-dc (Association, 2016). It is no longer uncommon to see dark panels affixed to rooftops or spanning parking lots. This renewable energy infrastructure is easing its way into society, similar to energy transmission infrastructure, but brings with it different meanings, opportunities, and risks.

Conventional power plants have been at conflict with residential and commercial zones for decades, yet energy producing infrastructure deemed as renewable and clean can go where no power plant has gone before. The social embrace of decentralized solar panels in particular in recent years has even overcome concerns of aesthetics, becoming a symbol of responsibility toward the environment and indicative of financial savvy (Kennedy, 2016). Opportunities for Power Purchase Agreements (PPA) have further made them available to individuals and organizations that lack the ability to afford the heavy initial investment. This has led to commitment from schools and school districts seizing the opportunity to offset uncertain long-term energy costs. As a result, 4,000 schools as of 2014 had implemented solar energy on their campus, and 70,000 more schools have been deemed to benefit greatly from solar as well (Foundation, 2014).

In Arizona, it was determined that 99.1% of schools would benefit from going solar (Foundation, 2014). The National Solar Schools Census, which tracks K-12 installations, lists Arizona to have 226 systems already installed, yet only one of the systems found in this study are represented in that figure. Also, the census lacks designation between rooftop systems and arrays that are installed in the landscape, which is an important distinction considering the young children participating in that environment.

Given the schools' architectural limitations, high amounts of openspace and opportunities to produce shade in a hot and arid environment, it is hypothesized that solar energy arrays are becoming a common and significant element in schoolyards in Arizona and merit special attention for further study and exploration to ensure a continuation of improvement in these important learning environments. This study paints a more complete solar picture for public elementary schools in Tucson, Arizona, and brings a greater awareness of the opportunities and constraints of this infrastructure within children's environments. Considering Arizona's early adoption of solar energy, this trend may be a canary for other schools across the nation as renewable energy infrastructure becomes more readily available with the need for openspace near to the source of use. Further research questions are suggested to further the conversation to better integrate solar infrastructure into the landscape, especially with relation to the advancement and enhancement of children's play and learning environments.

Background

Spatial distribution of renewable energy
Renewable energy follows a distribution regime that is much different from conventional energy sources, being distributed, decentralized and diversified. While fossil fuel energy transcends geography due to the high power densities that overcome the friction of distance, renewables are limited by distance and display characteristics similar to pre-fossil fuel energy types (Calvert & Simandan, 2010). Renewables also face spatio-temporal variability making suitability site

specific (Calvert & Simandan, 2010). These qualities in combination with minimal emissions necessitate and allow for the careful integration of renewable energy infrastructure into shared environments with people.

Limitations to rooftops

Understandably, solar panel infrastructure is often placed on rooftops where solar irradiation is typically unimpeded. With this trend, visibility is the primary connection people would have with this form of renewable energy. However, opportunities to place panels on a roof are limited by available area (including limitation from local code regulations), shading, orientation, and structural integrity (Team, 2011). Pitched roofs can be restrictive in providing appropriate orientation and azimuth, while flat roofs can more easily accommodate the project needs with a panel mounting structure. Solar modules and racking typically result in 3–4 pounds of weight per square foot. New construction (especially in locations with snow loads) should not have structural concerns, but older building stock, especially in warmer climates, needs to be assessed to ensure adequate load bearing capacity (Diehl, 2015).

Solar Schools

Many creative initiatives and incentives have been created to foster implementation of solar systems. The Solar Foundation specifically has a program titled “Solar Schools” which supports K-12 schools with solar installations. Its 2014 report, *Brighter Future: A Study on Solar in U.S. Schools*, found nearly 4,000 schools in the U.S. already have solar, and estimates the potential for more than 70,000 more schools to benefit from the transition as well (Foundation, 2014). Motivation for schools to implement solar energy includes: Financial stability, Educational opportunities, Environmental protection, Resiliency and emergency response. The report lists Arizona behind only California and New Jersey with 226 K-12 solar PV installations with a capacity of 66,288 kW (roughly 13.5% of total Solar PV capacity in U.S. Schools).

They also list Arizona as having 99.1% of schools that could save money by going solar.

Schoolyards and Nature

Considering the possible limitations to rooftop solar systems, it is important to also consider this push for Solar Schools in context of the potential impact on learning environments. Schoolyard environments have progressed through many years starting as a few pieces of play equipment mounted on hard surfaces to the typical designer play areas from the ‘50s and ‘60s that were criticized for the lack in opportunity for creative play. The resulting push for more creative play led to awareness that nature is an excellent resource for creativity and learning. According to Tai et al., the playground trend in the 21st century is now, “moving beyond the long established parameter of a single large piece of equipment in a park or schoolyard to a mix of commercially manufactured equipment and natural elements of sand, water and plantings” (Tai, 2006). Considering the typical school year in the United States, nature also responds to the environmental needs of the site. Trees shade and evapotranspiration to help cool the schoolyard for the children. Carefully placed deciduous trees and vines may provide shade during the warmer times of the school year, while giving way to the sun during the cooler times of the year (Tai, 2006).

These natural elements also provide opportunities for learning. Environment-based Education uses the outdoor environment for education-based goals that may or may not be related to environmental education, but which have been shown to enhance children’s abilities to learn (Carrier, 2009; Tai, 2006). Furthermore with urbanization and depletion of nature related experiences, schoolyards are significant open spaces that may connect children with living things (Danks, 2010; Louv, 2009). Thus schoolyards are among the most important of social spaces with a great impact and influence on the future.

Methods

This study explores and describes the connection between the spatial distribution of this form of renewable energy with the integration into schoolyards in Tucson, Arizona to initiate further conversations and research concerning these trends. While this form of energy is typically seen in a good light, it is imperative to take a critical look at what these mean in relation to the progress made toward better learning environments, particularly in elementary schools. Using Pima County, Arizona GIS data, Public elementary school parcels were identified in the eight school districts that cover the greater Tucson, Arizona metropolitan region. 105 elementary schools were identified. KMZ files were created to map solar panels based on recent aerial imagery for each school. The KMZ files were imported into ArcGIS and related to the school parcel data. Further observation from current and historic aerial imagery was completed for schools with solar panels with field checks for 5 of the 52 schools to verify accuracy. District and school websites were also reviewed along with local news stories for further verification and insight.

Findings

School to School

105 public elementary schools exist in the eight districts that encompass the Tucson, Arizona metropolitan region. Of those, 52 have installed solar photovoltaic systems on their campus with a total of 186 arrays. Twenty more public elementary schools from two districts are slated to have systems installed to raise the percentage from 49.5% to 68.5% (S. U. S. District, 2016; Schools, 2016). All of the schoolyard installations were completed since 2010, with the majority completed in 2015 (Figure 1). Interestingly, of the 52 schools with solar, only 3 have the systems installed on the roof, accounting for only 10 of the 185 total arrays. The remaining 175 arrays are mounted on canopy structures in the landscape and span softscape, parking lots, hardscape, and playgrounds (Figure 2). The arrays over both surfaces greatly vary in size and number. The average number of array structures within the schoolyards with ground-mounted solar PV is 3.5, with a range from as few as a single array, to 9 distinct structures scattered on the campus. Area covered by each structure averages roughly 5400 square feet or nearly 260 modules (4600 square feet median), with a range from approximately 1200 square feet consisting of 60 modules, to over 7600 square feet with 960 modules.

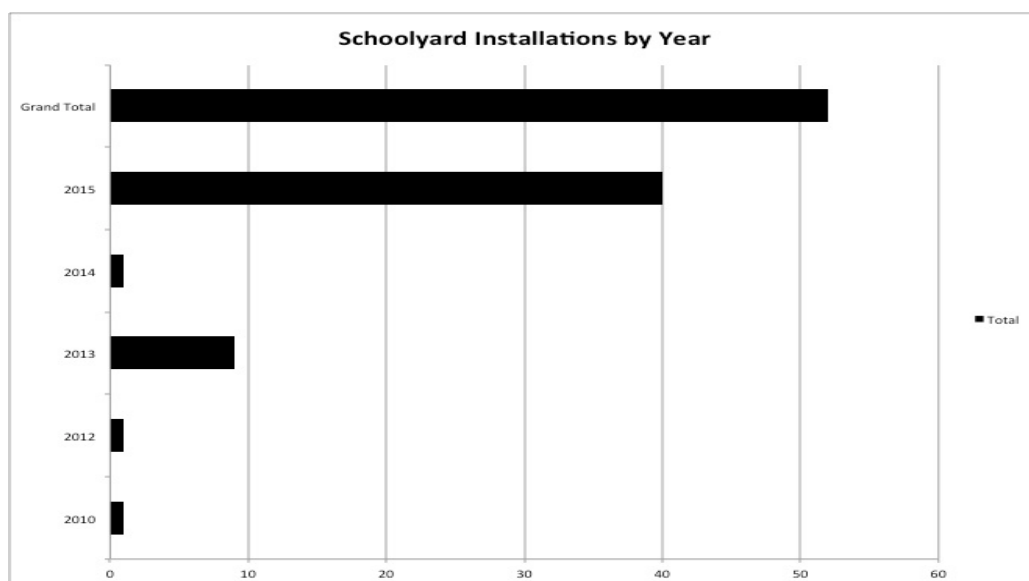


Figure 1. Schoolyard Installations by Year in Tucson Public Elementary Schools

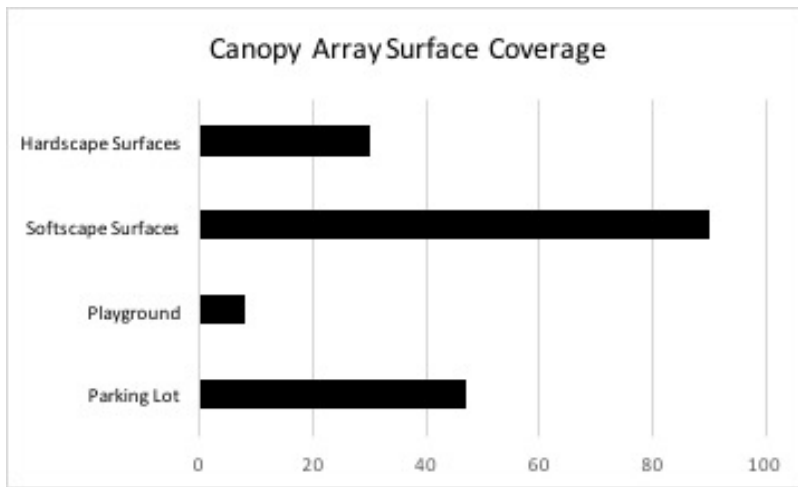


Figure 2. Surfaces under Solar PV canopies in Tucson elementary schoolyards

District to District

Five of eight school districts have some solar with a sixth to implement it as well (Figure 3). Tanque Verde Unified School District has 100% of its elementary schools with solar, however, there are only two elementary schools within that district. Tucson Unified School District has the highest number of elementary schools with 37 out of 49 with solar installations (75%). Marana Unified School District has 10 out of 12 (83%), Vail Unified School District has 2 out of 8 (25%), and Sunnyside has only 1 out of 12 (8.3%) of thitseir elementary schools with solar installations

(Figure 4). Sunnyside’s single installation was the first of any solar installations among the public elementary schools in the area in 2010, and is a single roof array comparatively smaller than the PV systems at the other schools. The district has announced plans to install additional solar on 10 of the 12 elementary schools in their district on roofs and over parking lots. Tucson Unified had only 1 school with the installations on the roof, and Tanque Verde Unified had 1 of its 2 schools with solar arrays both on the roof and in the landscape.

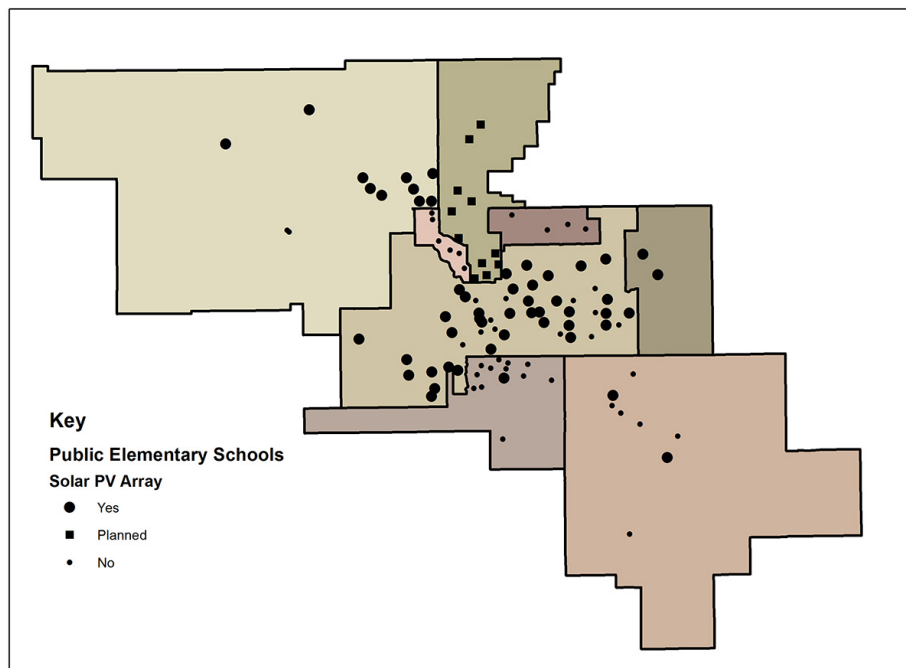


Figure 3. Public Elementary school solar PV installations by district

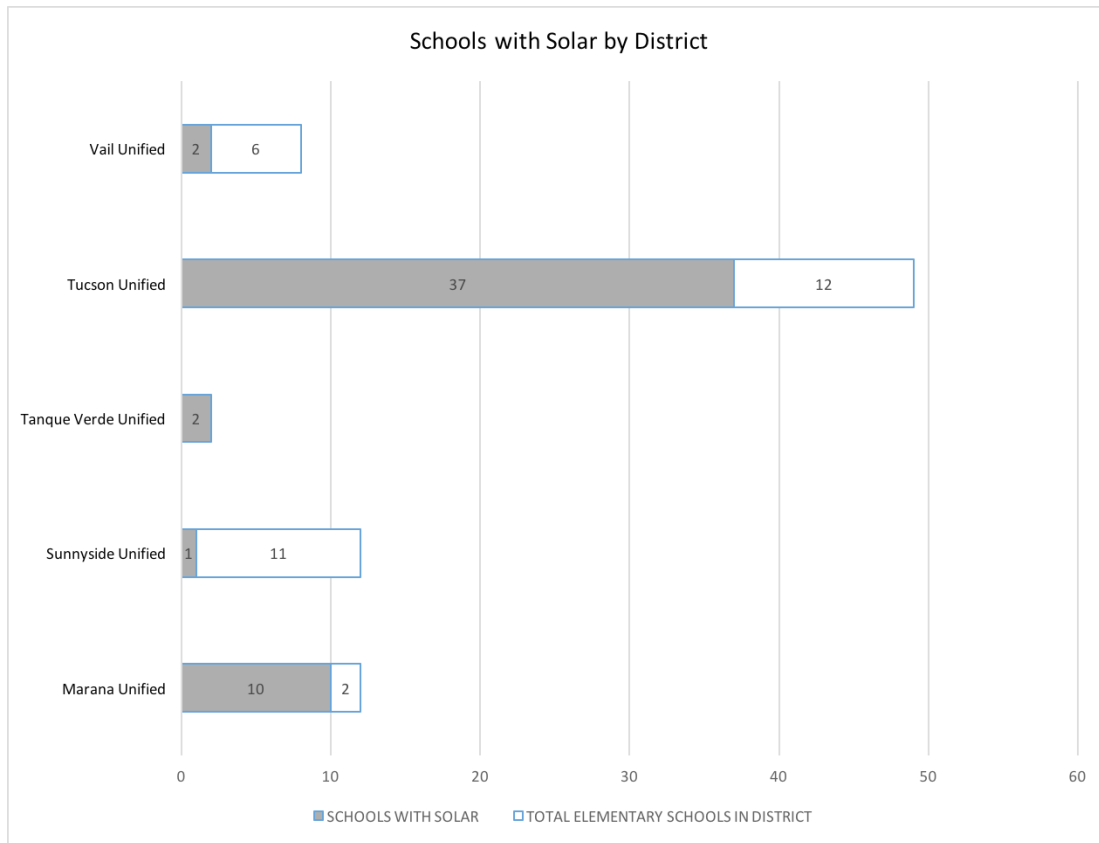


Figure 4. Elementary schools with solar PV by district

Discussion

As can be seen from the data, solar PV systems are being incorporated into many elementary schools in Tucson, far beyond what is recorded on the National Solar Schools Census. In Tucson, districts now play an important role in implementing solar more broadly, which accounts for the large percentage of individual schools with solar throughout the region. Los Ranchitos Elementary School within Sunnyside Unified School District emerges as the only school that installed solar without a broader push from the district; however, that district now plans to install solar at 9 of 11 elementary school locations, which includes an expansion at Los Ranchitos Elementary School (S. U. S. District, 2016). Furthermore, the districts also mention incorporation of solar infrastructure at their middle schools and high schools, which greatly adds to the number of systems in K-12 environments (M. U. S. District, 2016; S. U. S. District, 2016; District, 2015; T. V. U. S. District, 2016; Schools, 2016). This

also suggests that the primary goal in installing solar in these environments is financial, which is supported by web announcements concerning the projects. While some STEM learning opportunities are mentioned, the fact that the greater number of arrays are showing up in the landscape rather than on roofs does not seem driven by environmental and pedagogical goals. Many systems are where children may utilize the shade and interact more closely with the PV structures. The visual access to the modules overhead for learning is slightly more advantageous than if placed on the school roof, but certainly the pedagogical need for solar panels would not require as many arrays in the landscape (Figure 5). This merits a closer look at best practices of incorporating solar PV in the landscape from a social and environmental perspective to coincide with the economic incentives, especially considering the potential conflict with nature-based environmental learning goals.



Figure 5. Solar array spanning a public elementary schoolyard

While the PV structures provide ample shade for the children, given the timing of the schoolyear over the winter months, the benefit is limited to a few hot months at the beginning and end of the schoolyear. It can then be argued that a deciduous canopy tree or vines would be more efficient in providing shade during times of high temperatures, allowing sun to penetrate during times of lower temperatures. Considering the number of PV structures that span hard surfaces, perhaps they can be placed over surfaces where trees are unable to be planted or thrive, but even fabric canopy structures can be removed during the winter months to promote the passive solar gain to warm the landscape, which is not possible for PV arrays. Naturally the majority of PV canopy structures have a south facing orientation with a rise to the north, to maximize solar gain throughout the year. This is counterintuitive compared to passive structures that would have the rise toward the south to allow for the low winter angle of the sun to access the space. Care

should be taken in this case to place structures away from areas that would most benefit from the winter solar access.

Spatially, the widths of the panels are fairly uniform, typically stretching 5–6 lengths of a module across, roughly 30–40 feet. Array lengths can vary from short arrays that closely resemble a square of 30–40 feet in length, to a single long array that spans nearly 300 feet (Figure 6). This provides a much greater area of shade than schoolyards have ever seen. It is important to explore site scale issues to determine the appropriateness of this amount of shade, and what environmental and maintenance issues it may bring over the landscape. Other landscape issues that need further exploration include the buzzing noise created, erosion potential from storm runoff, adjacent plant material health, and debris/vandalism typical in schoolyards (Figure 7).



Figure 6. Solar PV array that stretches the length of a schoolyard



Figure 7. Objects thrown onto solar PV canopy structure in an elementary schoolyard

Conclusions

This study illustrates the changing face of spatial distribution of energy generating infrastructure by exploring the implementation of solar PV arrays in elementary schoolyards in Tucson, Arizona. Findings conclude that (1) Solar installations in schoolyards are greatly out pacing reporting, (2) Solar systems at Tucson public elementary schools are most commonly found in the landscape and not on roofs, and (3) Schoolyard solar systems should be integrated into the landscape to enhance natural play opportunities and not conflict with environment-based learning objectives. The context of this study shows this early

adoption of solar energy infrastructure within a valued learning environment as a possible future scenario for schoolyards across the nation and world. While positive trends in renewable energy can generally be gleaned as progress, it is imperative to understand the other layers of intricacy related to social sustainability when allowing these technologies to take form in the built environment. Further research about this spatial shift is merited in relation to schoolyard learning environments and beyond.

Possible further research questions include: How do children respond to the PV shade infrastructure,

how are they used? How are the canopy structures utilized for STEM or other learning activities? What safety concerns exist (electricity, noise pollution)? How do PV shade structures differ from trees and other shade devices and what considerations were taken in placing them? How can the solar structures be better incorporated into the landscape? What maintenance challenges are created (stormwater runoff, plant material health, mowing, debris/vandalism)?

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Planning and Design Process of Nursing Home, Singapore

Case Study of the New 300-Bed, 7-Story Psychiatric Nursing Home, Singapore

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Introduction

Singapore's three immediate priorities, at the start of independence in 1965, were to gain international recognition for its independence; to plan a strong defense that would "defend this piece of real estate; and thirdly to energize the economy on how to make a living for our people". The Minister for Health at that time, Yong Nyuk Lin, stated the situation clearly and bluntly: "Health would rank, at the most, fifth in order of priority" for public funds. The queues ahead of health were national security, job creation, housing and education. While all these took precedence over health care planning and development, the basics of public health were maintained. The government in 1983 issued a White Paper declaring its health care goals, acutely aware of the importance of the societal needs of caring for its populace including the elderly and elderly with infirmities soon after the nation had achieved a level of military and economic stability and had achieved a GDP of over S\$50 billion in 1983 from 1964's S\$8.5 billion approximately. Singapore celebrated its 50th birthday in 2015 with a larger than planned graying population and with its society having greater affluence and demand on needs, wants and expectations.

1. Background

Today's nursing homes can trace their origins back to the 1930s, when community-based charitable organizations (like Little Sisters of the Poor, which founded St Theresa's Home in 1935) were the first to provide sheltered accommodations. They catered to homeless and destitute elderly immigrants. Following WWII and the Japanese Occupation, social welfare

programs began to cater to the displaced population. In 1982, the Committee on the Problems of the Aged was formed to study the problems that would be faced by society and the aged due to the aging population. In 1984, the committee presented its report, in which homes for the elderly were classified into two broad categories:

a. Homes for the destitute elderly, under the responsibility of the then-Ministry of Community Youth and Sports.

b. Homes for the sickly elderly, managed by voluntary welfare organizations. They would also be overseen and assisted by the Ministry of Health (MOH) to ensure they were "adequately and efficiently managed".

Specialized care for conditions such as dementia created the need to have staff skilled to care for those with higher needs such as difficult-to-manage behavior. It also created the issue of providing specialized dementia homes versus up-skilling all nursing homes to care for residents with dementia.

The government has also aggressively expanded nursing home numbers and beds, and is building 10 new nursing homes and complementary day care, dementia day care, day rehabilitation services. All of these are expected to be fully completed by end 2016/early 2017. These are located in areas to involve the community in eldercare as well as to create elderly-friendly neighborhoods.

2. Case Study of New 7-Story, 300-Bed Psychiatric Nursing Home, Singapore

The government funding of a new 7-story high-rise building was a first in its effort to provide better built environment to meet the specific needs of Singapore's psychiatric and dementia population. It mandated that the psychiatric nursing home was to provide and support the long-term care of the residents who are with stable psychiatric illness, to meet their safety, changing needs and graceful aging. It had to provide

a suitable environment for the caregivers and care providers to achieve satisfaction and safety at work. It had to be constructed under a strict budget and to adhere to specific guidelines and all other generic rules and regulations.

The overarching emphasis of the concept and philosophy is as shown in Table 1. The principal attributes framed the desired outcome of the 300-bed,

7-story psychiatric nursing home. The specifics for the exterior and interior of the home are mandatory and had to achieve specific guidelines with strong emphasis on health and safety for both patients and staff. These are over and above all other generic rules and regulation applicable to similar projects.

a) **Information + Timeline**

- Site Area: 047 ha approximately
- Gross Plot ratio: 1.9
- Gross floor area: 9725sqm
- Car park: 1520sqm for 38 lots
- Total built area: 11245sqm
- Bed component: 300

b) **Resident Mix**

- The 300 residents comprised the following mix:
- i. Ambulant — need nursing supervision: 50%
 - ii. Ambulant (demented — wandering behaviour) and need close supervision: 20%
 - iii. Mentally/intellectually dull (with psychiatric illnesses): 10%
 - iv. Non-ambulant — need nursing supervision: 20%

Principal Attributes

- Patient-centric perspective (Flow & Safety)
- Staff-centric perspective (Efficiency)
- Engage 5 senses (Feeling, Sight, Hearing, Smell, and Taste)
- Safe and disabled friendly
- Low maintenance
- Green mark certification

Exterior

- Welcoming
- Embrace nature
- Tranquil, serene and warm
- Promote outdoor activities
- Observe safety features

Interior

- Homely
- Facilities efficient workflow
- Allow easy supervision of patients
- Promote good airflow (natural ventilation)
- Ample activities areas
- Staff resting areas
- Observe safety features

Table 1. Vision

| Typical Time/Session of the Day | Activities |
|---------------------------------|--|
| Early Morning (7:00 to 9:00) | Vital Checks, Medication and Morning Care Breakfast |
| 9:00 to 11:00 | Optional Activities (exercise, classes, music, etc.) Health Services |
| 11:00 to 13:00 | Lunch |
| 14:00 to 17:00 | Optional Activities (classes, outing, etc)/Health Services |
| 17:00 to 19:00 | Dinner |
| 19:00 to 21:00 | Shower, Medication, Evening Personal Care |
| 21:00 to next morning | Bed Time/Throughout the night — vital checks, medical staff on call |

Table 2. Nursing Daily Activities & Work Flow

Reviews of related papers and articles including Table 2 and Table 3 were carried out to better understand the psychological distress of dementia and other psychiatric patients and the psychological effects of living in a high-rise built environment. Search on the common characteristics of dementia and psychiatric patients was conducted to clarify the limitations of their living in a high-rise built environment and to identify the physical and psychological needs of their daily activities. Two standards were used:

- a. A Guidebook on Nursing Homes (2002), which provides standard reference source, guide and checklist to organizations for the establishment and management of nursing homes, on facilities and space, furniture and equipment and samples of organization mission, philosophy and objectives to better understand the vision and objectives of the Ministry of Health/Institute of Health (MOH/IMH).
- b. Enhanced Nursing Home Standards by Nursing Home Standards Workgroup (January 2014), which provides the enhanced standards underlining the importance of preserving the dignity of care for residents, requiring nursing homes to ensure that the dignity of the individual is respected, requiring that physical restraints are used on patients as the last resort and attending to the psychosocial well-being of patients.

Data were also gathered from the 9 existing nursing homes on the needs of respective residents, the working environment of care-givers, care providers and their expectations. Surveys made of 9 existing nursing homes and common space including ward, dining hall, healing garden, lift, staircase and ramp, and post-occupancy evaluation (POE) on the common spaces of ramp, dining area, ward and healing garden in two existing homes. Workshops were conducted for the participating groups and the team of consultants to deliberate and to determine the required facilities to be provided in the new psychiatric nursing home.

The participants were focus groups made up of staff from Ministry of Health and Institute of Mental Health, user participants from the health care social service sectors and caregivers and care providers. They were grouped and tapped for their experience, knowledge in delivering nursing facilities, and in the development of health care built environment. They were briefed that live-in residents were the main occupants for the built environment. They were to elicit feedback from care providers on challenges in operating their residential facilities to achieve an integrated, seamless and patient-centric care delivery outcome during discussions in workshops. They were to record the ideal facilities, workflow and the pitfalls for evaluation and adoption. They were most importantly told to recognize that caregivers were the eyes and the voice of the live-in residents and they knew the needs, wants and expectations of each resident under their charge. Scenario-Based Team Design (SBTD) was structured, consisting of the team of consultants and key members from the Ministry of Health and the Institute of Mental Health. SBTD was tasked to seek fresh insights and perspectives on the needs, wants and expectations of psychiatric residents, and to provide a conducive environment to caregivers and care providers for them to achieve efficient and quality service without unnecessary waste of effort and time. It was the adopted tool used as the planning process to organize the flow and to achieve buy-in from the many stakeholders and participants. It was used to follow through from finalization of the 2-day (2p) workshop to its final outcome. Models adopted were: Kano Modeling, Care Plan Mapping, Detailing Core Features of Individual Facilities and Layout Design.

Analysis: Issues and Impacts

Workshops were held to evaluate the findings (Table 3 — Extract from Paper by Chan, S.K. for EDRA47 (May 2016, Creative Enhancement in High-Rise Nursing Home to Support Well-Being) of the operational aspect and the spatial layout of these nursing homes. Similarly, site visits to the Nursing

Homes held on 7, 9, and 12 July, 2010, were conducted:

1. to study the operations, workflows and facilities;
2. to adopt positive points;
3. to recognize the pitfalls to avoid;
4. to understand the homes' management/planning of day centre, staff quarters kitchen and laundry (outsourced or provided in homes);
5. to view the best attributes of the Built-Environment to meet the 5 senses.

The Homes made general remarks on the following issues:-

1. Shortage of staff affects the control/monitoring of residents affects ideal layout;
2. Staff ratio to Bed/residents type affects layout as a constraint/challenge in managing a home especially for wearily and advanced dementia residents;
3. Focused on space configuration/simplicity of shape/color differentiation/visual control/proximity of facilities/danger of unprotected space/beauty and selection of plant and location.

| Outline of Facilities | | | | | | | | | |
|---------------------------------------|--|-------------------------------------|---|--|--|---|--|--|--|
| Name of Facilities | N1 | N2 | N3 | P1 | P2 | W1 | W2 | R1 | R2 |
| Establishment year | 2003 | 1999 | 2000 | 2006 | 2005 | 2002 | 2002 | 2001 | 1998 |
| Capacity | 200 | 210 | 401 | 192 | 208 | 213 | 235 | 116 | 132 |
| Tenants' symptom, age, etc. | Elderly, dementia, Average age above 80 years | Elderly, dementia | Elderly, dementia, psychiatric 5% | Psychiatric (dementia), Average age 69 years | Psychiatric 90%, Dementia 10% | Psychiatric 50%, Homeless 50%, Only men | Psychiatric average age above 50 years old, Only women. | Intellectual disability From 19 years to 65 years old. | Intellectual disability Average age 44 years old. |
| Composition of Facilities | | | | | | | | | |
| Number of people per unit | 21 – 40 | 30 | 30 | 48 | 32 – 35 | - | - | - | - |
| Spaces of unit | Dining, cum daily space, NS | Dining, living, NS | Dining, day space NS | Dining, day space NS | Sofa space, NS | - | - | - | - |
| Common facility for tenants' activity | Recreation, rehabilitation rooms, library, café and roof top | MPH, rehabilitation room and garden | Activity centre: cafeteria, consultation, multi-purpose rooms and lounge, church and pool | | Dining Hall, MPH, working, rehabilitation rooms, place of prayer and outside rest area | Dining hall, MPH, and lounge/activity on each floor | Dining hall, MPH, consultation rehabilitation rooms and rooftop/ (activity centre) | Dining hall, MPH, and activity hall | Dining hall, MPH, rehabilitation, and recreation areas |
| Composition of Cubicles | | | | | | | | | |
| The number of beds in a cubicle | 3 – 8 | 2 – 6 | 1 – 6 | 12 | 4 – 20 | 6 | 3-10 | 18, 12 | 6-8 |
| Area per person (m ²) | 5 | 5.5 | 5.8 | 5.8 | 6.75 | 3.3 | 3.7 | 4.6 | 3.1 |
| Wall | Half | With windows | Standard | Half | By building shape | Half | Standard and Half | Half | Standard |
| Furniture around bed | Small storage furniture | Wooden storage furniture | Small storage furniture | - | Small storage furniture | Small storage furniture | Small storage furniture | Small storage furniture | Small storage furniture |
| Curtain | - | - | - | - | Δ (only dementia unit and serious unit) | - | - | - | - |

Table 3. Facilities of 9 Existing Nursing Homes



Figure 1. Typical Floor Plans

Observations, especially on Tembusu Home/Sunlove Home and Peace Heaven Nursing Home, exemplified a strong interest and emphasis on the need to better what has been achieved on the following:

1. Improved relationship of spaces and visual/psychical control of staff and residents within the wards;
2. Shade, natural light, active natural fenestration, skylight, meaningful courtyard (not air well);
3. Appropriate garden at different levels for different types of residents;
4. Safety and Security (not repressive and repulsive but 'sweet' and 'gentle');
5. Ramp for movement between floors and holding areas are necessary for the less ambulatory residents;
6. Area for meditation and 'departure' ceremony from Home adjacent to area for holding the deceased;

7. Areas for flexible division for ad hoc/planned use;
8. Movement of food from Kitchen to different end destination;
9. Location of laundry and open air drying,
10. Community participation/communal activities and spaces;
11. 'Real World' needs and expectation of Residents/Care Providers and Administrators,
12. Environment and space for caregivers and volunteers;
13. Conductive, Caring and Complete Built Environment.

SBTD formed 4 teams for a task and recommendation exercise. SBTD and user participants began the preparation of 3 approaches with 3 schematic layout floor plans. The 3 approaches consisted of courtyard, compact and cluster layout plans. The courtyard

plan was used as the basis for the development of 4 Options.

The ramp-courtyard Option 1 was selected to be developed with consideration to the Design Brief, its constraints and opportunities of the site, allowable gross floor area, the cost, time and budget; and the mix and the level of the residents on the respective floors to a set of 4 schematic layout floor plans for 4 formed teams' exercise.

Ministry of Health/Institute of Mental Health (MOH/IMH) and the group commenced by re-thinking on the hierarchy of the Residents — first as a person, second as a patient and lastly as a “prisoner” (protected resident). They challenged issues of fixed medication timing, fixed bathing hours, on shift schedule; fixed waking at 5am, choice and when meals are to be taken, mandatory bathing before breakfast — which are mostly existing paradigms based on past practices and standards.

Summary of Facilities Needed

| | PATIENT | | | | | | | | | | | | | | | | | | STAFF / UTILITY / VISITOR | | | | | |
|--------------|---------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|---------------------------|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| MD | / | / | x | / | / | / | / | / | / | / | / | / | / | / | / | x | x | x | / | / | / | / | / | / |
| AMBULANT | / | / | / | x | / | / | / | / | x | / | / | / | x | x | x | x | x | x | / | / | / | / | / | x |
| DEMENTIA | / | / | x | x | x | / | / | / | x | / | / | / | x | / | / | / | / | x | / | / | / | / | / | x |
| NON-AMBULANT | / | / | x | x | x | / | / | / | x | / | / | / | x | / | x | x | x | / | / | / | / | / | / | / |

- | | | |
|---|---------------------------|-------------------------------|
| 1 Day Space | 10 Linen Room | 19 Nurse Station |
| 2 Dormitory | 11 Isolation Rm | 20 Staff Rm w/ toilet |
| 3 Dining Hall | 12 Timeout Rm | 21 Staff Pantry |
| 4 Nocturnal Space | 13 OT/PT Rm (in the ward) | 22 Cleaner's Utility Rm |
| 5 Protected Indoor Garden | 14 Multisensory Rm | 23 Store Rm |
| 6 Shower Rooms (w/ dressing area for MD patients) | 15 Patient Pantry | 24 Visitors' Rm (in the ward) |
| 7 Toilet | 16 Reminiscence Rm | |
| 8 Sluice Room | 17 Prayer Rm | |
| 9 Treatment Rm | 18 End-of-Life Rm | |

Notes :
 • Treatment Rm for Ambulant patients is integrated in the Nurse Station
 • OT/PT Rooms for Ambulant & Dementia will be at Multipurpose Hall.

Table 4. Summary Of Facilities Needed

The 4 scenario-based team design units concluded the study and prepared the Summary of Facilities for programming, planning and designing for the team of consultants to develop the various plans for the penultimate plan/design of the new facility. It led to the finalized parameters for the design. Concurrently the 4 teams completed the study on patient/resident profiling, needs definition, mapping ideal plan, mapping proposed care plan indicating facilities and

efficient layout of facility and planned the study layout for each cohort of residents. The participating group and the team of consultants then made a final review of the Teams' Study.

3. Discussion

The issues impacting planning and design:

1. Site: Provision of open space for communal usage, orientation of the buildings, creating cool,

naturally ventilated interior space are provided and all the wards are not A/C.

2. Patient Profile: Non-ambulatory patients are located at lower floors for the ease of trolley bed maneuvering. Common space activity rooms & MPH are located in the middle floors making them more accessible to the patients. Intellectually disabled patients are housed at the highest floor for better segregation.
3. Safety on the use of the ramp, in the garden and others areas. All the floors in the outdoor space are barrier-free and slip resistant for all the patients. The ramp serves as a link between all the floors, for maneuvering of large numbers of patients during peak hours. It augments the fire escape staircase. It helps in the daily movement (when required) of trolley beds and in times of emergencies. The ramp is essential to achieve universal and sustainable ways of living, working and producing.
4. Nursing observation versus patient privacy. A fan-shaped plan is better compared to the traditional straight line plan for the ease of supervision by the nurse. The ideal maximum number of wards under one supervision counter should not be more than 6. The 6 clusters of wards are bowed to improve the supervision spectrum.
5. Healing Garden is an important pathway through which the built environment might influence mental health with its restorative power (Evans, G. W., 2003) as it helps patients with mild and moderate forms of dementia to function at a higher level of their own endeavor. (Cooper-Marcos, C., et al., 2014)

4. Findings

The final design demonstrated 3 major design emphases: 1) Good zoning, vertically & horizontally; 2) Efficient planning of different functional spaces; 3) Good maintenance. A clear zoning of the different functional spaces is critical as the nursing home is serving a special group of users. These user spaces had to be segregated from the public realm and yet, fully interlinked within itself and made possible

with the incorporation of an access ramp located at the east side of the building. The service core is independently located and is also very accessible to all levels with the use of the service lift that provides the vertical transportation. The parameters, guidelines and standards from A Guidebook on Nursing Homes, 2002 and Enhanced Nursing Standards Home Standard, Jan. 2014 respectively are maintained as follows:

- 6 sqm per bed is adopted in the ward;
- Day-room of each ward of 60 sqm;
- Residents' privacy and dignity;
- Facilities to keep residents meaningfully engaged;
- Environment: safety and comfort; adequate lighting, ventilation, no noise pollution and safety for residents to move around;
- Safety arrangements are in place to protect staff and visitors;
- Healing environments, such as healing gardens and recreational facilities are included;
- Essential ancillary services whereby residents can be moved and/or transported.

The design has achieved the following good attributes:

Operational:

- 1) Patient-centric perspective (Flow & Safety)
- 2) Staff-centric perspective (Efficiency)
- 3) Safe and disabled friendly
- 4) Low maintenance

Spatial design:

- 1) Facilitates efficient workflow
- 2) Allows easy supervision of patients
- 3) Promotes good airflow (natural ventilation)
- 4) Ample activities areas
- 5) Safety features
- 6) Homely

The 7-story structure with a 6-story has a simple floor layout with proper placement of living, dining, physiotherapy and occupational therapy rooms which do not exceed residents' ability to adapt, supports patients' daily living and wayfinding. (Bush, J. A., et

al., 2008). It has purposefully designed space where patients can occasionally get away and be alone, thus provided some respite from harmful effects of crowding. (Evans, G. W., 2003) The main features of the planning are (1) the provision of six-story high ramp, (2) the positioning of the dining room in the mid-floor, (3) the provision of healing garden, and (4) the use of six-bed rooms. The continuous six-story ramp is the defining design element that helps dementia and psychiatric patients to attain the sense of personal control and balance from an otherwise helpless and frustrating situation with regards to mobility between different floors. Caregivers' daily work achieves greater efficiency and greater work satisfaction as the use of the ramp imposes less concentrated and concerted physical effort as compared to the use of stairs. The ramp is the visual connector to Ulrich's seminal thesis (1984) "view through a window influence recovery," an emergency exit to the external compound and allows the residents to do their nocturnal walk in a safe and protected space.

The dining hall located on level 4 is in the main circulation route and accessible from all the wards at each level and with the "friendly way-finding" ramp regulates and controls travel of residents, care givers and visitors. Its location achieves equitable travelling distance for the 120 residents on the two top and the two bottom floors.

The Healing Garden located in the center courtyard provides residents with exposure to natural elements. It is a secure and safe environment that offers everyday activities in a soothing yet challenging experience. It helps residents to cope better with stress, heightens their body awareness, strengthens their feelings of self-worth, and improves their social competence. The dementia ward on level 1 enables residents' direct access to the discreetly enclosed garden for their physical activities.

The fan-shaped cluster of 6 bed ward (10 wards housing total 300 beds) support and ease nurses' supervision and observation of residents. The cluster

allows change and flexibility in configuration to cope with different residents' disabilities and illness, and to deal with severe outbreaks. Dementia wards are located on level 1 in an environment which encourages physical movement and vision of the surroundings. Notwithstanding the dispute that dementia is not a psychiatric illness (Power, A., 2012, <https://changingaging.org/blogstream/dementia-and-psychiatrists/>), designers are required to provide suitable design elements in the building to support the well-being of residents and the work of the caregivers.

Finally, it was fortuitous that the site was enlarged to accommodate the ramp through the intense effort of the lead consultant with the support of the user-participants. Thus it illustrates that good architecture, engineering design and collaborative efforts of all participants can make great differences to people's lives.

Conclusion

The study demonstrates that Singapore's model is able to meet the increasing and evolving needs, wants and expectations and benefit the principal beneficiaries — residents, caregivers and care providers. The collaborative efforts of all key participants on the study of existing welfare facilities, on the paradigms of nursing daily activities, movement and work flow; the residents' daily activities and movement; and the social components of key stakeholders regarding areas and process do provide good results. They enrich the development of critical knowledge for use in the planning, design, and management of welfare nursing homes and the operation of the facilities.

The integrated design approach with focus on the essential common spaces of ramps, dining facilities, and healing gardens reveal they do help and benefit residents, staff and visitors. Further, ramp (when linked with meaning and motivation progres) improves the final outcome and enlarges the experience and the understanding of the world. The ramp generates the awareness and confirms the context of the space and location. It helps also to define the purpose for living

by the joy of movement and of the vistas gained. Singapore's Model is sound when it is planned and built with focus on collaborative efforts of all key players and participants to resolve real issues. The study concludes that the key attributes including common spaces, dining facilities, healing gardens, circulation space and ramp enhances the well-being of the residents, staff and visitors.

Recommendation is made to do additional study on areas of possible failures as well as areas of creative opportunities. Both areas are to be studied to eliminate negative result and to gain good result for a better built- environment. The authors intend that further study be made on key areas of possible failures as well as on key areas of creative opportunities .These studies will help to eliminate negative results and will gain good results for a better built- environment.

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Environmental Characteristics that Enable Dying Patients to Exercise Choice and Personal Preference.

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Background

Where and how people will die is a significant concern of human life and of society (Worpole, 2009). The physical environment has significant impacts on patient quality of life (Cohen et al., 2001) and possibility of a “good death” (Tong et al., 2003). People fear in death losing themselves, their identity (Walter, 1996). This fear of losing our “I” or “me-ness” in the Western individualistic society was one of the influential factors for the hospice movement in attempt to personalize death and dying (Worpole, 2009; and Walter, 1996). Worpole (2009) wrote in his book, “The fear of dying on a large public ward was one of the driving forces in the creation of the hospice movement”.

Since the beginning of the hospice movement in the United States of America in the mid-1970s, the architectural design of hospice in general has been considered similar to nursing home design (Verderber & Refuerzo, 2006). But in recent years, several studies have found different dimensions of the hospice environment to address the physical, emotional, psychosocial, and spiritual concerns of dying patients and their families (Nakashima, 2002; Silver, 2004; Evans, et al., 2006; Anderson, 2007; Rowlands & Noble, 2008; Rijbi et al., 2010; and Brereton et al., 2011).

A sense of control is a basic need to humans and losing this can lead to depression, elevated blood pressure, and other serious problems (Ulrich, 1991; and Ulrich et al., 2004). According to Lawton et al., (2000), personal control is one of the eight core dimensions for the design of environments for the aging. Having personal control of the surrounding

environment, communication, and daily routine, is one of the key considerations before death (Cohen & Leis, 2002; Swenson, 2009; Lindqvist, 2012; Waller et al., 2008; Tan et al., 2005; and Anderson, 2008). It is significant to understand a dying patient’s wishes and to allow exploring choices (Lindqvist, 2012). The environmental characteristics that enable nursing home residents to exercise choice and personal preference have been studied and well identified by many researchers (Cohen and Weisman, 1991; Lawton et al., 2000; Grant, 1996; and Norris-Baker et al., 1999), but no literature had been found that focuses on identifying these dimensions for dying patients — until today. This study objective was to identify the environmental dimensions of hospice care settings and this article presents partial findings of a doctoral dissertation (Kader, 2016) that specifically are relevant to support dying patients to exercise their choice and preference.

Research Methods

As mentioned above, this article represents partial findings of a doctoral dissertation (Kader, 2016) which considered a qualitative research design with mixed methods of data collection: literature review, expert opinions, and case-study surveys. The methods are discussed in the dissertation extensively and only a synopsis is presented here.

Systematic Literature Review:

This study employed the literature review approach developed by Hawker and colleagues (2002), which outlines a process to systematically and objectively review research from different paradigms. A search of seven electronic databases was conducted from 1998 to 2012 including PubMed, PsycINFO, Social Science Citation Index, the Science Citation Index, ProQuest Dissertations & Thesis, Avery, and Cochrane Library. A short version of the literature selection process is presented in Figure 1. A total 48 pieces of literature were selected for review. For an extensive version of the literature review methods and findings, see Kader and Diaz Moore (2015).

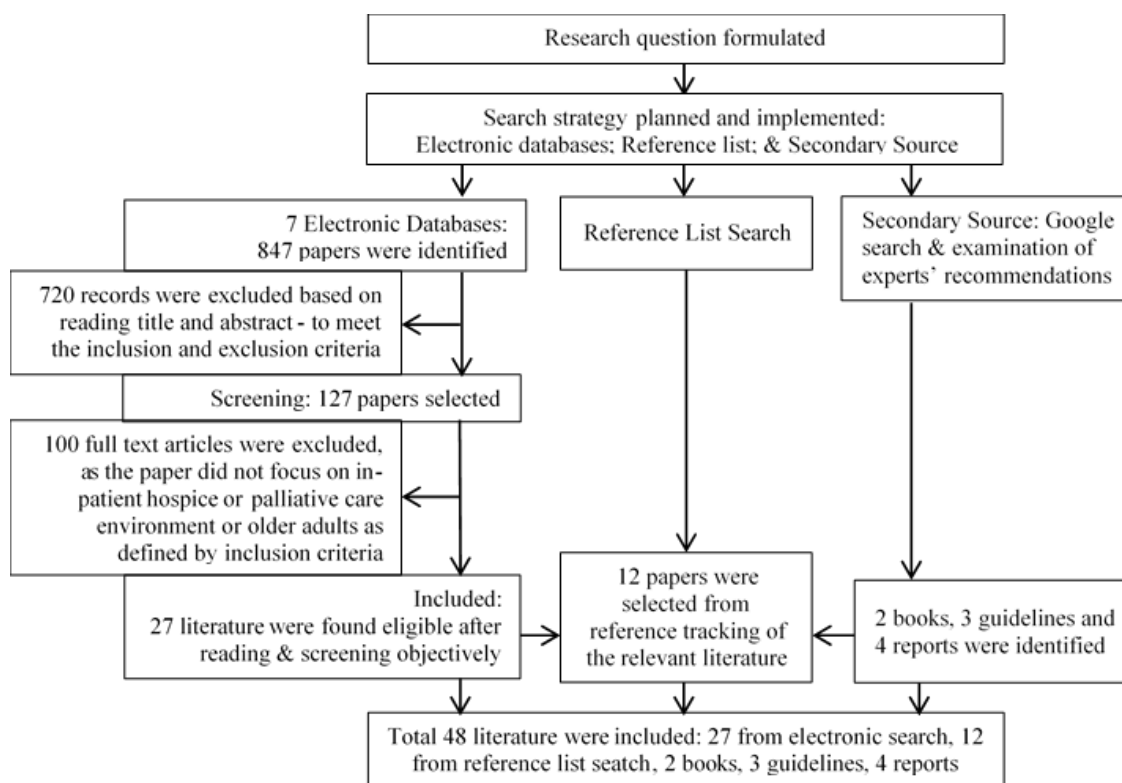


Figure 1. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flowchart (adapted from Kader and Diaz Moore, 2015).

After analysis of the literature, eleven therapeutic goals were identified (Kader and Diaz Moore, 2015): continuity, access to nature, privacy, social interaction, safety & security, autonomy, sensory stimulation, spiritual care, family accommodation, support after death, and support for staff.

Expert opinion:

To gather the expert opinions, a panel of ten members was selected using the purposeful sampling method with a reputational sampling technique. To obtain an interdisciplinary perspective, this study comprised an expert panel mixed with practitioners and researchers from three disciplines: architecture, landscape architecture, and interior design. Short biographies of the selected experts: (1) a university professor who is a book author on hospice environment; (2) an architect who is a book author, researcher and designer of hospice facilities; (3) an architect with 20 years of experience including hospice or palliative care; (4) an architect and researcher of hospice facilities — one hospice project was showcased in the

American Institute of Architects (AIA) magazine; (5) an architect with more than 15 years of design experience including one hospice project receiving an AIA award; (6) an architect with more than 12 years of experience including one hospice project receiving an AIA award; (7) an architect with more than 15 years of work experience including hospice projects; (8) interior designer with seven years of experience including remodeling a hospital wing into a hospice unit; (9) a landscape architect whose one hospice project received several awards from AIA and other landscape design associations; and (10) a renowned landscape architect and researcher who published a book with a chapter on hospice gardens.

All the experts were interviewed over the phone with a duration of 45 minutes to two hours and asked to provide their feedback about the eleven goals. The two landscape architects were asked to provide feedback only about “access to nature.” All the interviews were recorded, transcribed manually, and analyzed to develop the themes and subthemes.

Case Studies:

Five case-study surveys were conducted to strengthen the validation of the findings, to identify the organizational and social influences on the physical environment, and to identify how the hospice care providers were using and modifying the space characteristics. All the experts were asked to nominate at least one or two hospice facilities in the United States. Five hospice facilities were selected among the nomination list based on the following criteria to achieve diversity: design quality, weather zone, size, location, building age, purpose built or renovated, facility type based on care model (in-hospital hospice or palliative care unit, or medical center-affiliated free standing hospice, or non-hospital-affiliated autonomous hospice, or hospice home). The locations of the five case studies are in Georgia, Missouri, Oklahoma, Texas, and Wisconsin. The study data were collected using multi-methods: first, an interview with the hospice administrator; second, a walk-through survey with the staff while taking photographs; and third, field notes from the conversation and observation during the tour. The tours were one hour to two hours long. Like the expert interviews, all of the interviews were recorded, transcribed manually, and analyzed with the field notes and photographs.

Findings

From the literature review, four main objectives of environmental design were identified that enable patients to exercise choice and personal preference: (1) scope for personalization; (2) control over micro-environment; (3) control over patient daily routines and activities; and (4) scope to accommodate a patient's "last wish." The recommendations from literature, experts, and case studies are discussed below;

Scope for personalization:

End-of-life care settings should offer environments where the shifting boundaries of home could be re-created to achieve meaningful surroundings and to ease transition from home to institution (Larkin et al., 2007). Patients should have opportunity and encouragement to bring familiar items from home to

create a personal dwelling space; it also works as cueing device for orientation (Nakashima, 2002; Larkin et al., 2007; NHS Estates 2005; and Spichiger, 2008).

Literature. Design should provide wall shelves, picture hooks, and adequate space to accommodate patients' own belongings, photos, paintings, special chairs, rugs, mementos (Moorhouse, 2006; Verderber & Refuerzo, 2006; and Hospice Unit Generic Brief, 2000).

Expert opinion. All the experts supported this objective. One mentioned, "in the bedroom, there should be scope for furnishing, bringing items, rugs, picture of their children and family. Mainly photographs!" Another explained, "it is important in places like a hospice to have a shelf for a photograph of a family because what's going on in that room in many ways is about reconnecting with the family and thinking about all the stories of a long life." To accommodate this scope, two experts suggested to provide enough space in patient room. But two experts showed concern about under-utilization of this scope and said that it may be difficult for family members to decorate hospice patients' space due to possible short length of stay. To accommodate flexibility and choice, two experts suggested flexible furnishing in a patient room and one expert provided two options to arrange patient-bed in a project, but one expert suggested for built-in furniture in patient rooms as it reduces risk for nurses to trip at night.

Case Studies. All the case studies mentioned that their facilities try to accommodate any request from patients and the families to provide opportunities for personalization. From the walk-through surveys it was noticed that photo frames, cards, and flowers are the most common items. In the interviews, three cases recognized incidences where a patient family brought one piece of furniture (chair, refrigerator, or lamp). One case mentioned that families were more enthusiastic to decorate the patient's room than patients. There were references to some patients'

comments who didn't see any point or significance of decorating their rooms. Three cases also pointed out that due to the short length of stay, they often found no attempt for personalization.

Control over micro-environment

Patients and their families are going through a stressful situation; lack of control over patients' surrounding environment causes discomfort and dissatisfaction (Spichiger, 2008; Hospice Unit Generic Brief, 2000; Brereton et al., 2012; Anderson, 2008; Vohra et al., 2006; Stajduhar et al., 2011; Hawker et al., 2006; Moorhouse, 2006; and Kayser-Jones, 2003).

Literature. Window design should consider the control of glare, climate, and ventilation (Hospice Unit Generic Brief, 2000). Dimmer switches and operable curtains provide greater control over lighting levels (Warpole, 2009; Hospice Unit Generic Brief, 2000; and Moorhouse, 2006). Noise from different sources (television, phone, bells, staff speaking loudly, patients groaning) needs to be addressed by designing sound containment throughout the entire facility (Cohen et al., 2001; Brereton et al., 2012; Brazil et al., 2004; Moorhouse, 2006; Department of Health and Children, 2005; and Sargent, 2012).

Expert opinions. All the experts found control over temperature, noise, glare, and airflow significant. They mentioned that individual temperature control is preferable as one patient might want warmer temperatures, whereas another may want a cooler temperature. One expert used the Variable Refrigerant Flow (VRF) technology in the HVAC system (even though expensive) to address this issue. Another expert suggested having a proper humidification system. Four experts supported providing an operable window in a patient room to allow control over fresh air. But one avoided it while designing an energy-efficient building, and mentioned that control over air quality can be achieved through airflow, or ceiling fans. All experts suggested good acoustic design. One complained, "the hallways are always noisy", then suggested designing hallways with acoustic materials

and soft furnishings to avoid echoing. In regards to glare control, providing blinds and curtains are the basic design considerations mentioned by most of the experts. One expert suggested having black-out curtains. One used different types of artificial light in patient rooms with dimmer switches to provide control over creating the desired environment. Another expert discussed a research study where the patients would be able to change the color of their lighting according to their own preferences and which would help the circadian rhythm cycle, which affects patient sleep and mood. To avoid odors in the hospice facility, two experts point out the kitchen as a source of smell and suggested locating the kitchen further away from inpatient units. But another expert used it as a positive stimulation, "The smell in the kitchen — like the cookies, popcorn, or the apple pie — all these smells will trigger a memory. So you can smell it and it will feel like home."

Case Studies. All the design considerations were confirmed. All the cases had individual room temperature control systems, except one, which had no control over the temperature and airflow (the HVAC system was central to the hospital). During the walk-through survey in one facility, it was noticed that the inside temperature was hot and uncomfortable, and all the rooms had a paddle fan. No smell was noticed during surveys in any cases. In fact, two facilities mentioned that they utilize the smell of freshly baked cookies and coffee as a positive stimulation to create a home environment.

Control over daily routine and activities:

Patients in hospice care are mostly bed-bound and most of them are sleeping or may be in a vegetative state, even though there might be a good number of patients who are conscious enough to practice their choices and preferences in daily routines and activities.

Literature. Though control over daily routines and activities mostly depend on operation and management policy of a hospice facility, some design considerations revealed are supportive to achieve this objective:

having a spa room or specially equipped room for patients' bathing and hair washing (Hospice Unit Generic Brief, 2000; Moorhouse, 2006; Verderber & Refuerzo, 2006; and Sargent, 2012); single rooms with an attached bathroom to provide privacy for a patient for socialization, praying or meditation, or getting various therapies (Worpole, 2009; Moorhouse, 2006; Swenson, 2009; Verderber & Refuerzo, 2006; Rigby et al., 2010; Hospice Friendly Hospitals, 2010); provision of private TV and radio (Rigby et al., 2010); provide enough space in patient rooms to accommodate a large number of visitors to sit and to stand around a dying patient's bed; in a single room, a convertible piece of furniture for family to stay overnight, and in shared rooms a comfortable and easily moveable chair for each bed (Hospice Unit Generic Brief, 2000; NHS Estates, 2005; Anderson, 2008; Moorhouse, 2006; and Verderber & Refuerzo, 2006); door should be wide enough to take patient's bed out and the pathways to outdoor landscape should consider hard surfaces to facilitate wheelchairs (Hospice Unit Generic Brief, 2000; and Moorhouse, 2006); and designated indoor or outdoor smoking areas are supportive to patients and their families (Moorhouse, 2006; Hospice Unit Generic Brief, 2000).

Expert opinions. All the experts suggested designing patient rooms large enough to provide enough space around patient beds to accommodate any kind of social activities, therapies, or spiritual activities (e.g., bed-side prayer or rituals by family members). All the experts suggested providing more than one spiritual care space, one formal sanctuary, chapel, quiet room, or meditation space, and one informal space (e.g., veranda, patio, outdoor retreat areas).

Case studies. All the facilities had 24/7 family kitchenettes and vending machines, which provided flexibility to the family to prepare food for their patients anytime. These facilities also had a spa room or a specially equipped bathroom with sink for patient hair washing. The cases accommodate patients' control over their entertainment by providing private TV, CD player, DVDs, Wi-Fi, phone, etc. They also provide control

over socialization by facilitating a single large room, 24/7 visiting hours, phone, etc. All the facilities tried to cater to individual preferences of spiritual care. There are multiple spaces in each facility to take patients to outside gardens for meditation. For smoking, some facilities allow patients to smoke inside their room and some allow them in a designated outdoor area (patio).

Scope to accommodate patient's "last wish":

As discussed before, hospice and palliative care programs try to provide service to dying patients to make their last journey better.

Literature. A few examples were recognized in literature which are related with patients' last preference about their moment of death and after death. For example, patients might want to die in a garden (Worpole, 2009), or families might want to perform bedside rituals (Moorhouse, 2006), or something else — "the wife lies on the bed next to her dead husband and holds him" (Lindqvist, 2012). Important design considerations revealed are: having at least one operable window in patients' room to support the belief "the spirit can be let out of the room after the resident dies" (Swenson, 2009); control over room temperature to cool down, as the deceased may remain in their beds for a certain amount of time (Moorhouse, 2006); and a dedicated storage space for personal belongings while waiting for collection by family or estate (Moorhouse, 2006; and Department of Health and Children 2005).

Expert Opinions. About providing an operable window, one expert said, "It was one of the issues considered to respect their beliefs." Another expert mentioned, "in New Mexico, the Navajo don't allow a person to die in a building, so have patio", and suggested to design accordingly so that patient beds can be taken out. Three experts also supported this notion and designed a patio with each patient room in their projects to allow access to outside nature. But, three experts mentioned that the windows in their designed facilities are sealed to make the air conditioning system efficient.

Case studies. Each facility described its own unique protocol to facilitate and manage an event of death and a patient's last wish, such as a patient wanted to see his horse, or a Native American family wanted to have a fire dance. Most of the design considerations suggested by the literature and experts were confirmed. Four facilities try to accommodate an operable window or door in patient rooms to "allow the soul to leave", one facility has

a fixed window to comply with the hospital HVAC system. Two case studies mentioned the necessity of having designated storage space to keep deceased's belongings.

Recommendations

The following checklist was developed based on literature, expert opinions, and case studies:

Table 1. Design checklist developed from literature (L), expert opinions (E), and case studies (C)

| Objective 1: Provide scope for personalizing patients' immediate surroundings. | L | E | C |
|--|----------|----------|----------|
| Provide bedside table top, counter top, shelves, or window sill to display photos, paintings, cards, flowers, and religious artifacts according to personal preference. | X | X | X |
| Provide picture hooks, a tag board, or any other opportunity to hang wall decorations. | X | X | X |
| Provide adequate space in a patient room to bring their own belongings (e.g. lamp, chair). | X | X | X |
| Objective 2: Control over micro-environment (air, temperature, noise, light, smell, etc.). | L | E | C |
| A single room provides a patient better control over micro-environment. | X | X | X |
| (Noise control) Good acoustic design to create sound containment throughout the entire facility by using acoustic material in wall, floor, ceiling, door and window. | X | X | X |
| (Noise control) Good acoustic design by planning layout with presence of buffer zone between patient rooms and corridor (such as foyer, toilet, wall closet). | | X | X |
| (Noise control) Locate children's play area a little further from inpatient units. | | X | X |
| (Noise control) Consider lawn mowing sound near a patient room in landscape design. | | X | X |
| (Glare control) Presence of daylight in all spaces with appropriate amount and control system (blinds or curtains) to avoid glare. | X | X | X |
| (Control over artificial light) Provide various types (moods) of artificial lighting in patient rooms with dimmer switches to have control over creating desired environment. | | X | X |
| (Control over visual privacy) Provide enough curtains or blinds for patient-room windows or glass doors to control visual privacy from outside gardens or pathways (especially for ground floor rooms at night). | | | X |
| (Smell control) Provide frequent rounds of fresh air in HVAC-system to avoid bad odor. | | | X |
| (Smell control) To avoid food smell from kitchen, locate kitchen a little further than inpatient units and equip with high quality exhaust fan. | | X | |
| (Smell control) Provide opportunity to open door or window in patient rooms to bring fresh air from outside. | X | | X |
| (Airflow control) Provide ceiling fan with dimmer switch in patient rooms. | X | X | X |
| Objective 3: Control over daily routine & activities. | L | E | C |
| (Eating) Provide 24-hour kitchenette for families to prepare food for patients anytime. | | | X |
| (Eating) Provide vending machine so that families can bring patients' favorite food. | | | X |
| (Bathing) Grab bars in patient restrooms and showers on all sides. | X | X | X |
| (Bathing) Provide a specially equipped spa room for patients' bath. | X | X | X |
| (Recreation) Patient rooms should be large enough to accommodate a music therapist, a pet therapist, or a message/touch therapist. | X | X | X |
| (Recreation) Provide a TV, CD player, DVDs, Wi-Fi, and a phone in patient rooms to have control over entertainment and communication. | X | | X |
| (Recreation) Electric outlets in appropriate location for laptop, TV, CD, DVDS, etc. | | | X |

Table 1 continued.

| Objective 3: Control over daily routine & activities. | L | E | C |
|--|----------|----------|----------|
| (Socializing) A single room provides better opportunity to interact with family and staff. | X | X | X |
| (Socializing) A patient room should have enough space to accommodate a large number of visitors to sit and stand around bed. | X | X | X |
| (Socializing) Provide comfortable chairs and daybeds for family members for relaxation and overnight stay. | X | X | X |
| (Socializing) At least one room should be big enough to provide opportunity to convert into a double room to accommodate an infirm spouse or family member. | | X | X |
| (Socializing) Provide access to computer, phone, Wi-Fi internet connection | X | X | X |
| (Socializing) Provide a semi-outdoor (patio or veranda) with privacy so that patients may have private time with families. | X | X | X |
| (Socializing) Provide shading device for comfort in extreme sun. | | X | X |
| (Spiritual retreat) Provide enough space around patient’s bed to perform bedside prayer, worship or rituals. | X | X | X |
| (Spiritual retreat) Provide more than one spiritual care space: formal (sanctuary or chapel, quiet room or meditation space) and informal (veranda, patio, outdoor retreat areas). | X | X | X |
| (Spiritual retreat) Spiritual spaces should be accessible by wheelchair or bed. | X | X | X |
| (Spiritual retreat) Provide bed-accessible outdoor spaces with wide doors and pathways. | X | X | X |
| (Smoking) Provide a designated smoking area with bed accessibility, fire and weather protection, security, and visual privacy from other part of the facility. | X | | X |
| Objective 4: Scope to accommodate patient’s “last wish.” | L | E | C |
| Patient rooms need to be large enough to accommodate a large gathering around the bed for rituals or any other activities. | X | X | X |
| Provide an operable window or door to “Allow the Soul to Leave”. | X | X | X |
| Access to an outdoor space. Sometimes patients want to die there. | X | X | X |
| A semi-outdoor or patio space where patients can take their last breath; also they can meet their exceptional visitor (such as horse). | X | X | X |
| Store patients’ belongings so that their family can collect those even months afterwards. | X | | X |

Summary and Conclusion

Even though most of the design considerations were confirmed through triangulations, some issues and questions were discovered needing further research to develop empirical findings. For example, the scope for personalization was found to be significant but questions remain. Is there any relationship between patient length of stay (LOS) and scope for personalization? How much scope should be provided for hospice patients? What types and how many personal belongings should be brought by patients and their families? What should be the optimum limit to provide this opportunity? Another issue is bed accessible pathways to outdoor landscape areas,

which are significant for patients to enjoy nature, but construction cost is high. Further study is required on the utilization rate and how far a bed-accessible pathway should be provided in outdoor gardens. Maybe patient beds should be accessible to a certain part and the rest of the garden space might be utilized for staff and family members. Though individual temperature control systems were found satisfactory, more research is needed to quantify satisfaction rate since providing this opportunity is expensive. The last — and one of the most significant concerns — is how to provide an operable window in patient rooms while making the hospice facility energy efficient, especially when the hospice facility is located in the southern (hot) states, such as Texas.

The study has numerous limitations and should be considered an initial effort. Patients' and their families' perspectives were considered from the literature reviews, and in the future more participation from these two groups would be beneficial. Also, the findings were based on qualitative research and further quantification is needed to support the qualitative findings.

In conclusion, I would like to say that there is no time at which we are more vulnerable and the environment so latent with meaning than in our last places. In an era of an increasingly aging population and cancer patients, the growth of designing new hospice facilities and remodeling the old ones is inevitable. This study cultivates new territory in attempting to enhance our ability to design more thoughtful and efficacious hospice environments.

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Urban Sprawl and Dynamics of the City Edge, a Study of Nairobi

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This study has adopted the Michael, B, et al (2003) definition of urban sprawl as being “Uncoordinated growth: the expansion of community without concern for its consequences, in short, unplanned, incremental urban growth which is often regarded unsustainable.

1. Introduction

Since the close of the 19th century, cities all over the world have experienced massive increases in human population. This has brought about horizontal expansion of some (Rowland, 1966; Gugler, Gilbert, 1987; Girardet, 1996). Few cities, such as Chicago, have resisted the force. They have had to achieve this by developing instruments that they can rely on to deter this. Population increase brings with it problems, such as demand for housing; crowding; decay of the old districts; increase in the rate of crime and promiscuous lifestyle (Rainwater, 1973; Mumford, 1989). With these, there are those without options who will stay to confront the situation. Some among the population will move on to parts of the city that are still considered to harbor good vices (Mumford, 1989). Others who are willing to live outside the periphery of the cities will move and settle there (Gugler, Gilbert, 1987; Mumford, 1989). With most cities, the edge is still green. It is viewed as being un-spoilt. Here, most times greenery is part of the environment. Recreation, commercial and manufacturing facilities have also set their roots in the suburbs. In the beginning of such a program, such elements would be sited outside the respective urban boundaries. Urban sprawls first occurred in the cities of the west. It has since become a part of the factors that propel the growth of cities worldwide.

By the middle of the 21st century, more than 60 percent of the global human population will be residing in cities (Gugler, Gilbert, 1989; Girardet, 1996). Most of these will be in Africa and other countries that are considered as developing. In Nairobi, between the years 2000-2010, the population has increased by more than 54 percent (<http://citymasterplan.nairobi.go.ke>.) By the year 2030, it is estimated that Nairobi’s population will have risen to 5.2 million from the current 3.6 million. This will pose a great challenge to the city in terms of demand for services; housing delivery; employment and necessary amenities.

Cities are viewed to be places that harbor opportunities (Gilbert, Gugler, 1987). A majority of urban migrants are from the rural regions. Compared to the rural life, in spite of the low salaries that may be experienced in the city alongside the harsh living conditions, life in the former is preferred. Tales about life in the city that are churned out by those visiting from there alongside the attractions are convincing enough (Mumford, 1989; Girardet, 1996). Most of the former are almost creation of the gossipmonger. Stories about the capital city Nairobi are viewed favorably by the rural population. Nairobi is the social, political and economic capital, hence the euphoria. From here ideas find their way to the rest of the country. Regulatory institutions — for example the Kenya National Theater, the Supreme Court and the big malls and the Stock exchange houses — are located in Nairobi.

Densifications of inner parts of the city together with movement by city dwellers to settle outside the boundary of the city are efforts to address population increase and demands. In the inner zones of the city, poor family members will struggle together to live within a limited space (Rainwater, 1973; Gilbert, Gugler, 1987). Some people would squat on the empty spaces that are next to their dwellings (Fig. 1). Such conditions will with time breed evils such as promiscuity and crime (www.nation.co.ke, July 5, 2015, pg. 18. “Everybody will die someday! Meet the gangster girls of Nairobi’s



Fig. 1. Addition of structures to old public housing blocks in old Nairobi, Ziwani, by some of the old residents to create a source of income (Source: Ochieng).

Eastlands.” The few who are empowered would escape these situations.

Emerging urban conditions drive some of those who are living in the inner city and especially the middle class to seek and to settle outside the city. The environment here is viewed to be safe, unpolluted and half urban, half rural. Although some will usually be located far away from the town, with time, the two are conjoined and are one.

Being located outside the city, traditional urban sprawls would have ample space around the facility (Wayte, 1958). These would be for gardening and parking, among other needs. The garden would symbolize freedom and nature from what was viewed as a crowded, dangerous inner city. This concept would hold for a while.

Urban sprawls can devour the natural landscape (Lowe, 1999). Usually from the onset of the urban

edge is the dominant natural landscape. This helps to moderate the environment of the city. Its destruction will definitely affect the environmental balance. Demands by the sprawl (for example, construction of more facilities) would readily contribute to the destruction of nature.

Both in Johannesburg and Cape Town in South Africa there are neighborhoods such as Hillsborough and Mannenburg both long surviving that have since witnessed escape by the middle class, only leaving the poor behind (Rainwater, 1973; <http://www.dailymail.co.za> April 30, 1999, “A place that can be hard to call a home”, and “Tackling Poverty for a better city”). In these two neighborhoods houses are in deplorable conditions, and crime is the order of the day. This has brought about flight from these places to the edges by those who are able.

Due to demand for lifestyle at the edge of most cities, in the in the northeast of the U.S., there are six cities

that have since been physically joined. These are Boston, New York City, Philadelphia, Baltimore, and Washington, DC. These have since formed one long conurbation. It is almost impossible to identify the boundaries of each.

Horizontal growth of cities is aided by delivery of services, infrastructure and transport planning and availability of fossil fuel. At times, sprawls are located slightly out of the main city. Communication between the two is facilitated by availability of efficient road and rail networks and massive consumption of fuel. Preferred location for locating sprawl would be along transport infrastructure (Scheid, 1999).

To an extent, the involvement of the state is a determinant in the delivery of facilities such as infrastructure (Persky, Wiewel, 1996). The cost of delivering and sustaining some of these (for example, the roads) can be prohibitive. In the developing world, delivery of such is a duty to the citizens. Contrary to this, in the developing world, this is a political tool.

From the mid-twentieth century, the middle class have shifted attention to the edge of the city (Daniela Tom, 1996). It is a flight that has been assisted both by the willing land seller and a buyer. Compared to the cost of land in the inner cities, at the edge in the beginning, land would be relatively cheaper and thus affordable. With time, this is bound to rise. The flight to the edge has been assisted by the availability of transport.

Transport can play an important role in the success of urban sprawl. In recent years in Tijuana, Mexico, the government, keen to avoid urban sprawl, constructed houses in remote places that are located outside the city (Al Jazeera News, June 11, 2015, 0400 GMT). The government did not deliver roads and transport means. Since moving into their homes, greater than three quarters of the beneficiaries have since abandoned them and moved back to the town.

Urban sprawl has since been embraced by commercial as well as recreational facilities (Jenifer Steiner Hauer, "On Long Island, the mall as a history book," New York Times, Dec. 21, 1997, Section 3, page 1). These are among the facilities that are capable of pulling the masses out to the suburbs. They house some of the popular stores and facilities such as those that are for recreational activities.

The village market in Nairobi has a mall; a hotel; bowling; sports facilities; private offices and aquatic facilities (Fig. 2, Village Market). It is built in a parcel of land that was originally a coffee plantation, and is within the small township of Kiambu. Other farm lands that were surrounding the Village Market have since been destroyed and in their place stand up-market homes. The entire neighborhood has since become a part of Nairobi city. This was aided by the existence of a road that passes at the edge of this neighborhood from the nearer tiny town of Limuru and on to the inner city of Nairobi.

With expanding population, sprawl is a foreseeable dimension of urban growth. Apart from affecting the environment; it is organic and thus requires control. The success of any sprawl is dependent on the delivery of infrastructure and services and availability of fossil fuel.



Fig. 2. Village Market, the recreation facilities (Source: Ochieng)

2. Problem Statement

Founded in 1897, Nairobi city is slightly more than 100 years old. It is the financial, social, and political capital of the country. With passing time, parts of the city have decayed, become insecure and are home to promiscuous lifestyles. Also, with time, the middle class population of Nairobi has increased in number. This can be seen in the demands for facilities and the kind that are being realized. The original city has since expanded in size. While a few of these physical expansions could have been planned for, majorities have not been. They sprout in an informal manner.

In ten years between 2000-2010 Nairobi's population has grown by more than 56 percent. As the leading shining example for the cities in the region, it is the reception town to a majority of rural migrants. There are also migrants from other cities. During reception, migrants would move in to live with relatives and at times with friends who hail from their rural setup.

Some of the facilities (for example the buildings that are located both within the old sectors of the inner city)

have done their shelf life. Structures are almost falling apart. Infrastructure and services are in a decaying state. Buildings are populated by a generation of early descendants who lead a promiscuous lifestyle. Majorities are youths who have since given up hope in life. They have turned to a life of crime. Those who are able have taken flight to other parts of the city that are considered to be relatively safe.

The flight by the residents of the city is mostly to the settlement zones that are located outside the boundary line. First, these are zones that have always been considered to be basket and also serve as a source of oxygen for the city. The presence of farmland and greenery around the city greatly boosted Nairobi's motto of "green city in the sun." Second, these new settlements are located within territories of the small towns that encircle Nairobi. They are not within the legal jurisdiction of Nairobi. Some are located slightly far off from the mother urban set-up and thus receive very little attention except for the revenue collection. The urban sprawl that has been witnessed in Nairobi has not been accompanied by the delivery of services and infrastructure. For example, waste disposal,

supply of fresh water and sewage disposal are left to individuals and to private entities. They lack the necessary resources that are required to fulfill some of these. The achievement of the sprawl has been privately driven.

3. Hypothesis

3.1 Nairobi's urban sprawl is driven by the dynamics of socio-economics.

3.2 Nairobi's urban sprawl will only be successful if the government gets involved in the process.

4. Methodology

Data were collected through qualitative case study method. Selected urban sprawls of Runda to the northwest, Ongata Rongai to the southeast and Kitengela located to the northeast were studied. These have undergone growth for a reasonable period of time. Except for Runda, whose growth was guided by a development control plan, the other two sprawls initially started as nuclear but have since nucleated. The sprawls are made up of different typologies of buildings. The three have become mega suburbs.

Data were collected through the internet, telephone discussions and face-to-face discussion with the residents. Participants were selected from three groups: ordinary residents, landlords, and the government administrator. The ordinary residents were selected through snowballing. They were met inside public transport buses; long term residents; government administrators, security personnel; landlords; and property developers. Participants were selected through snowballing.

Among the shortcomings of the study was the time factor. Research was undertaken on the weekends and for a limited period of one month. Thus there was hardly enough time to verify some of the issues.

Data were collected through discussion, photography, and measurements. Through these, the collected data have been transcribed and analyzed.

5. Cities and Urban Sprawl

Towards the closing years of the 19th century, cities were already becoming dysfunctional. The forces at work (for example, population increase and setting up of industries) were bringing about rapid changes. The inner cities, then considered the symbol of hope of the city, were becoming dysfunctional. There was a call for city residents to move out of the center and to build in the land that was outside the city (Mumford, 1989; Peuvsnier, 1979). These would free them from the pressure of the city. It will give them opportunity to live in an environment that was virgin. The inner city was viewed as being permanent. It could not be changed.

Both Tony Garnier, a French architect of the nineteenth century, and Ebenezer Howard, an English architect of the same era, thought of cities as being permanent. As a solution to the physical development of the city densification, in his model of Cite Industrielle, Garnier proposed abandoning the old city and starting a completely new city (Johnson-Marshall, 1966; Peuvsnier, 1976; Girardet, 1996). The new city would accommodate industry; workers' houses; green spaces; and the transport hub (Fig. 4). Realizing the industrial pollution, he separated industry from other functions. All the structures were to be realized from reinforced concrete. The city population would be fixed at 36,000 people.

Also during the 19th century, the English architect Howard proposed garden cities that would be constructed outside the boundary of the main city. The cities each would house a maximum population of 35,000 people. New cities would be constructed when one gets filled. Each of the cities would have a garden for the residents (Fig. 4) (Rowland, 1966; Girardet, 1996; Peuvsnier, 1976, Mumford, 1989; Malgrave, 2005). The cities would be part rural and part urban. In the proposal, he failed to consider the dynamics of the nineteenth century era and the medieval periods.

Faced with emerging urban problems towards the late nineteenth century, the city of London embarked on constructing 25 cities outside London (Girardet, 1996).

People were migrating into town. They provided the much-needed labor for the emerging factories (Rybczynski, 2005; Bruegmann, 2006). The new cities would ease pressure on London.

In the proposal for the city, to be known as Broadacre city, Frank Lloyd Wright saw the current city as being permanent (Peuvsnor, 1976; Daniels, 1999). He proposed a new city whose planning would be influenced by new means of transport. It was to be accessed by trams and cars. Among the features would be farmland for the residents.

Cities such as Johannesburg and Cape Town that had their populations and growth controlled by the ideological laws have since accepted urban sprawl (strategic development info GIS Department, December 2002. City of Cape Town accessed: www.capetown.gov.za/ee/stats/documents/2011%20census/2011_census_cape_town_profile_change_from_2011_2011.pdf). South Africa's political independence had opened up the gates of the cities to the immigrants. They moved to the cities in millions. There was increased demand for facilities. In Cape Town alone, the urban area has increased by 40 percent.

Developing a city outside the edge would readily cause it to lose the green environment that surrounds it (Howard, 2002). Apart from moderating the environmental conditions, Greenland is the food basket of the city.

On recognizing that urban sprawl is unavoidable, residents of both Cape Town and Johannesburg came together and prepared for it (Lowe, 1999). They held consultations. There was the need to clearly define the city that they wanted. The relation between this and the natural environment was going to be very important. They were interested in protecting the environment. A city like Chicago, with the motto, "city in the green" has had to relate all its physical developments to achieving this (Turnbull, 1999). Realizing the destructive nature of urban sprawl, the farmland

has been adopted as a major contributor to the environment. With this, the city maintains all the farmlands on its immediate edge. The edge has been identified as an endangered asset.

In the northeast of the U.S., Tokyo, and Buenos Aires, urban sprawl has caused cities to lose their boundaries. For example, in the U.S. the suburban growth of cities such as New York City, Boston, Philadelphia, Baltimore, Washington, DC, and Richmond have brought about one long strip of a city. Modern means of transport (trams, railways, metros and private cars) readily move between these towns. Evidence of urban sprawls points to an organic component of urban dynamics that should be planned for. Issues such as delivery of services and infrastructure and protection of the farmlands and green environment are necessary.

6. Results

6.1 Summary of Data

Urban sprawl of Nairobi is a thing from the early 1980s. Then, the inner city and the old Nairobi had begun to decay. Some of the people who had been in employment and living in the old city had reached retirement age. Some of them decided to purchase land next to the city and to settle there. They wanted a bit of rural and also of the city. During the same period, the few members of the middle class were beginning to assert their presence in terms of choosing their residency. They got willing sellers in farmers who were willing to trade their property. The whole process was assisted by the then glut in the Kenyan market of second-hand cars that were being imported into the country from the Far East and some European countries.

By the 1980s the old sectors of Nairobi, including sections of downtown were quickly losing their old character. This was especially true of the welfare structures that were located to the east of the city. The structures were deteriorating at a great pace, and crime was beginning to take root. The government turned its back on the old city.

The old neighborhoods had become dangerous. Rape, mugging, robbery and all sorts of urban crime were beginning to take root in the old part of the city. Seeing the old part of the inner city as not being safe, there was a flight of the middle class to the territories that bordered the city.

The 1980s also saw the mass retirement of people who had been employed just before and after the political independence. Some of these people chose to construct and reside next to the city. Apart from their residences, some constructed retail stores that would be for the neighborhood.

For those people who had land that was immediately next to the city boundary, there was the choice for one to continue with an agricultural lifestyle, or to sell the land and then venture into an urban lifestyle. Most people have since disposed of their land. This marked the beginning of the disappearance of the green urban edge.

There has been no better driver for the rapid development of Nairobi's sprawl than the import of second-hand cars into the country from Far East and European countries that were then sold at affordable prices. The cars were bought by individuals for personal use while those with slightly bigger seating capacity were used to carry passengers in the informal transport sector. The growth of Nairobi's sprawl would succeed after consuming millions of liters of fossil fuel.

Emergence of the middle class would help to drive the sprawl. Feeling unsafe and being eager to have the freedom that is associated with shelter, majorities of the middle class have chosen to settle outside the edge of the city.

For Nairobi, these are the dynamics that have been driving the sprawl. Most of these are time bound and can be regulated. In this way the process will be orderly and beneficial both to the city and to the sprawls.

6.2 Physical Location

The three case studies are Runda, Kitengela and Ongata Rongai (Fig 6). Runda is predominantly a suburb for the wealthy while the other two are for the middle and upper-lower class people. At one point all three were located outside the city. Development of structures in each of these has, with time, caused each of these to be joined to Nairobi, and to form a relationship.

Runda is located within fertile Central Kenya, approximately 20 kilometers from the inner city. Formerly the place was a coffee plantation. Construction started here in the early 1980s. Development is controlled both by the resident association and also by the local government. In the beginning of the sprawl they were permitting a single dwelling unit in a half acre of land. This has since been brought down to a single dwelling unit to be built in a quarter acre.

Kitengela and Ongata Rongai lie approximately 30 kilometers and 20 kilometers respectively from the inner city. The two are within the Kajiado city. Construction of sprawls in the two sites started in the early 1980s. Then, Ongata Rongai and Kitengela were cattle holding grounds. There are no physical development controls of these two sprawls. This is in spite of the Kajiado local authority demanding payment from the developers for approval of all developments.

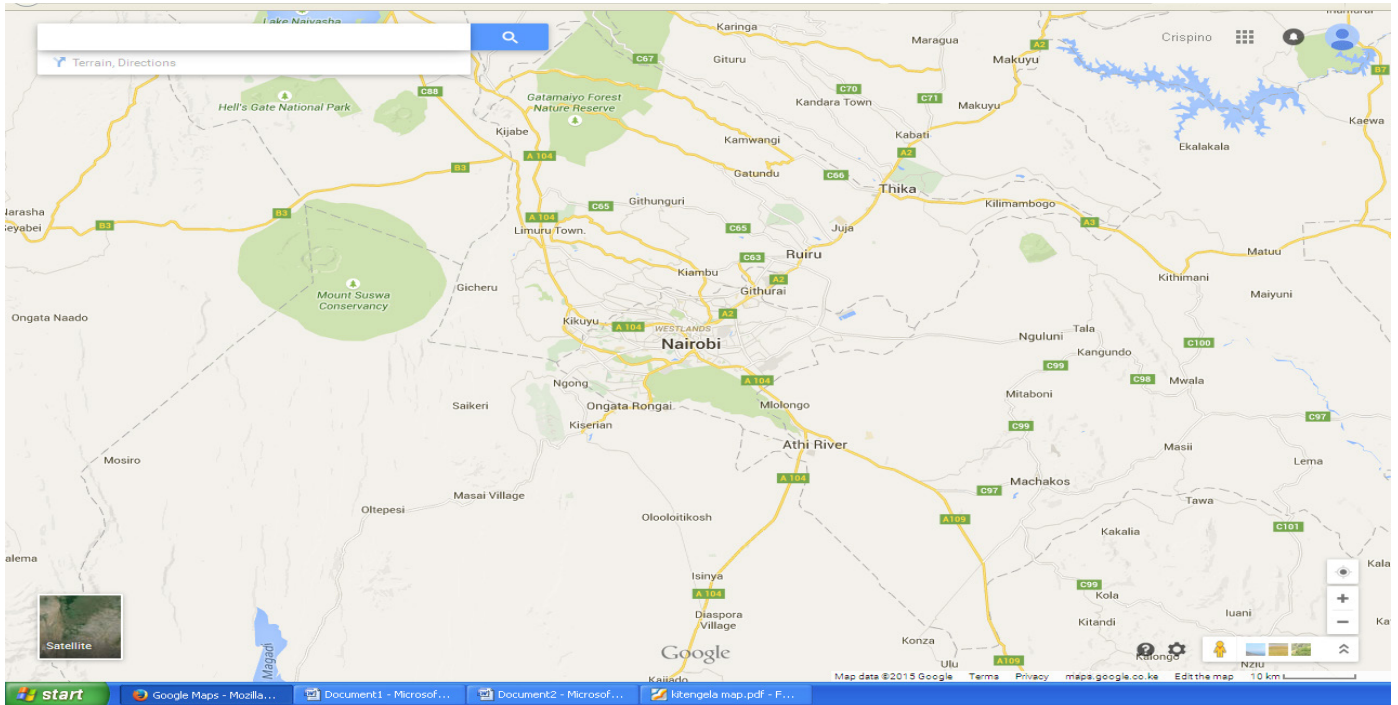


Fig. 6. Nairobi's Map (Source: <http://citymasterplan.nairobi.go.ke>)



Fig. 7. Typical County House, Runda (Source: Ochieng)



Fig. 9. Banking Facilities along the main street in Kitengela; Source: Ochieng)

Among other facilities, the sprawl in Runda includes free-standing family housing units; a mall; a classic hotel; and an upmarket hotel. Among the neighbors are the United Nations Habitat headquarters; learning institutions; and a flea market. There is an upcoming Two River Mall under construction. Upon completion it is reputed that it will be the largest in the region.



Fig. 10. Town House within a quarter of an acre, CHUNA Cooperative Union Housing, Kitengela (Source: Ochieng)

6.3 Infrastructure and Services.

The three case studies are linked to the inner city through a series of road networks. More than 50 percent of these primary roads are in disrepair. Apart from being in need of repair the road that links Runda to the inner city is very narrow. For Ongata Rongai, one section of the road is very narrow and can hardly handle the increased traffic. Services are delivered both by the public as well as the private sector. Most of the private deliverers are by the requirements.

Runda is linked to the inner city through both the Limuru road and Kiambu roads. Both are single lane roads. There is a dual carriageway bypass that leads to central and eastern Kenya. The two primary roads give way to a network of service roads within the sprawl. For safety and also for security reasons, some of these are cul de sacs. In spite of these, some of the residents prefer to travel to the airport by helicopter. This is to avoid being inconvenienced by the unending Nairobi traffic jam. On a clear day, the journey from the inner city to Runda would hardly take half an hour.

During the morning and evening jam sessions, the journey would take a minimum of three hours.

Kitengela lies on the road that links Nairobi city and Kajiado, a township. During peak hours, a journey from Kitengela to the inner city of Nairobi would last an average of one and a half hours. Some sections of the Kitengela-Kajiado road are narrow and not well maintained. Part of the road cannot handle the volume of traffic that plies it.

Ongata Rongai lies along the outdated Magadi Road. The road was constructed during colonial times by the then Magadi Soda Company. Literally, it was targeted to handle only the lorries that would ferry soda ash between Lake Magadi where it was harvested and the railway station in Nairobi and a few company vehicles. Currently during the peak hours, a journey from Ongata Rongai to the inner city would last an average of four hours. This would normally last for half an hour.

Both inside the settlements in Kitengela and in Ongata Ronga, access roads are missing. Un-tarmaced road reserve and footpaths are relied upon to navigate around the settlement. During rainy season or in case of an accident, accessing these two settlements is a big problem.

For fresh water services, Runda is readily served by Nairobi local authority water department. Both Kitengela and Ongata Rongai depend on private services. Some of the residents have constructed boreholes from where they deliver water at a cost to the neighborhood. Water is a basic requirement and it can be expensive, especially when it has to be purchased on a daily basis.

For sewage disposal all three sprawls depend on the service of a localized septic tank. In Runda, there is a septic tank for each half acre parcel of land. Each construction has its own septic tank. It is a local government requirement that each construction includes this facility.

In Kitengela and Ongata Rongai, for each developer there is a septic tank. Septic tanks are almost everywhere. Managing these is a problem. When the septic tank is full, residents pay private companies to dispose of it. Most of these companies, being irresponsible, will dispose of these in the many river beds and forest areas around these settlements. For example, the waste from Kitengela would likely be disposed of in Athi River bed during evening hours when most people are not around. Sewage waste from Ongata Rongai would likely be disposed of into some of the rivers that run into the Nairobi National Park or its environs.

In Runda, security requirements are well taken care of by the community. Among the measures taken has been to equip the local police with a patrol van. This has been reinforced by the private guards that guard the individual facilities. Within the settlement, movements of people are monitored and crime is very rare here.

Both in Kitengela and in Ongata Rongai, there is only one police post with minimum number of police officers in each. Although there are reports of organized gangs in both settlements, in Kitengela the rate of crime is still lower. Ongata Rongai is a crime hub. Here murders, robbery, and mugging are daily occurrences. In both settlements, there are private guards, but they are not well equipped to deal with the crime.

6.4 Functional Typology

Each of the three sprawls started as nucleus. These were individual homes or groups of houses; Strip Mall and a Mall. These have since nucleated and formed large settlements.

Runda started as a planned housing settlement for the elite. Settlement density has been four dwelling units per acre. This leaves ample ground both for recreation and for car parking. With time, the original sprawl has influenced development in the land that is outside its boundary. The original settlement has since nucleated into an area that is several times the size of the first nucleus. They include a large mall that is for high-end customers; numerous townhouses that are independent of each other; a church; numerous houses for the expatriates and United Nations workers; recreation facilities and a luxurious five-star hotel. Facilities are located in a way that they are independent of one another.

Kitengela started a shopping center along the Kajjado-Nairobi road. This was to serve the nearby prison facility and also, it was a stopping station for the long truck drivers from Mombasa. It has since been nucleated and a township formed. With time it has grown to house other facilities — large malls, banks, corporate office blocks, places of worship, recreation facilities, a private university, and country houses in CHUNA zone (a controlled development settlement). Ongata Rongai started along the Kajjado road as a strip mall. This was assisted by the nucleus houses that were being constructed by individual settlers (Fig 10). Soon the settlements would be nucleated to form large settlements. The thriving quarry mines that are located



Fig. 11. A Strip Mall in Rongai (Source: Ochieng)

within the sprawl have also been able to attract migrants.

Both in Ongata Rongai and in Kitengela, there is promiscuity in building types. For example, recreation and residential facilities for families can be next to each other.

With time, Ongata Rongai has grown physically to join Nairobi and to be a suburb of the city. Among the facilities are both strip mall and malls; recreation facilities; two universities; places of worship; finance houses; single dwelling units and apartment blocks (Fig. 11).

7. Conclusion

The study set out to delineate urban problems that result from Nairobi's urban sprawl. This was achieved through documenting the efficiency in the delivery of services, infrastructure, levels of security, and the typology of the built forms.

In Nairobi, development of sprawls is driven more by individuals rather than by the government. This shows up in the poor delivery of services, infrastructure, and in development planned. Both in Ongata Rongai and in Kitengela, lack of development control has ended up in settlements that lack proper coordination in terms of building typologies. Individuals lack the necessary resources that might enable them to deliver some of the requirements. These require resources that only the government can guarantee.

Neglect by the government has made it impossible for the people to be able to sustain some of the environmental issues. For example, with individualization of the septic tanks and the boreholes, the ground has been made unstable. This is not taking into consideration the pollution of the environment that is a result of some of the action that is brought about by these facilities. The action thus destroys the environment.

Lack of development control has brought about promiscuity in building typology. Such typology can

expose the youths to bad behavior. Thus the youths grow up to be irresponsible.

For the cities, urban sprawl has come to stay. The question is on bringing order to it. This is a process that only the government has the muscle to bring together some of the resources that may see the urban sprawl being of value.

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A User Definition of the Near Home Open Space

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Abstract

The user definition of the Near Home Open Space in Public Housing in Egypt is the main concern of this study. This space is defined by theorists as a part of the public realm that should be available for all residents where they are meeting and saluting, practicing exercises, riding bikes and kids are playing. However, in the case study of public housing in Zagazig city, Egypt, where low-income people are living, the residential activities and small enterprises are spreading; in addition, the residence units in the ground floor have been adjusted to expose private spaces to the public. Theoretical debates have revealed that the space which is addressed by users is different from what is known to designers, and both have their own definition for the same space as a result of their different schemata. The aim of this study is to find out a user's definition of NHO space.

1. INTRODUCTION

The focus of this research is the Near Home Open Space (NHO) in public housing in Egypt. This space is defined theoretically as an open space that is available to use or share by all residents and not restricted to private use (Madanipour, 2010). This space is important to fulfilling the residents' social and cultural needs — where it is dominated by a chance of meeting neighbors, children playing or pedestrians and vehicles passing through (Biddulph, 2007). This space is located between public space on one side and the private space on the other side and it plays an important role in the separation and secure and smooth transition between indoor closed private spaces, which require a high degree of privacy, and open outdoor public spaces which should be exposed and available to everyone without personal or administrative restrictions (Madanipour, 2010). The aim of this study is to find out the user definition of

NHO space and investigate the definition mechanism which causes the user's practice to be different than what theorists and designers think. The objective of this study is to provide focus on the user perception of the (NHO) space beyond his/her practices. In the NHO space in the public housing in Zagazig city, Egypt, the spread of residential activities like sleeping, cooking, and having lunch in the near home open spaces (which are supposed to be shared by all residents and specified for social and cultural activities), in addition to the exposure of some indoor private spaces especially on the ground floor for the public, is noted. When the user adds some adjustments to his/her residence unit to link between indoor and outdoor spaces, it became common to see a family practicing the daily residential activities in the private spaces while wandering in NHO space. Some residents are much more dominant on the NHO space, where they have established small enterprises and add permanent or temporary structures or pieces of furniture. The user's adjustment of spaces he/she uses daily is widely studied from different aspects: economic, social and spatial, but the main issue in this study is these practices forming a new relationship between public and private realms, when the private realm is exposed to the public deliberately and the public and social spaces are dominated by persons. The NHO space is located between public and private spaces — where the smooth transition between the two realms is there to assure that each space does its job without interruption.



Fig. 1. The interruption between private and public realms in Al-Zeraah public housing
Source: Author, 2015

2. LITERATURE REVIEW

2.1. Perception/Behavior Interrelationship

Ecological Psychology studies have focused on perception and expected behaviors (Carmona, 2010). Mccaan stated that the user has a different practice than expected by theorists and designers; because the user's behavior is a reflection of his/her mental map "Schemata". The mental map has been formed through life experience, gained knowledge, cultures, habits, traditions, religion and customs (McCaan, 1999). On the other hand, the designer also has his/her own mental map that has been formed through the knowledge he/she gained from theories and practical experiments and he/she perceives and acts accordingly (Bilgic, 2013).

Rapoport (1990) explained that the method of designer interaction and the user towards a space is completely different, because they each have a different mental map. This refers to different visions by the designer and the user towards the NHO space and this is expressed in the language they are using.

2.2. Three Approaches to Define the Space

The philosopher Lefebvre discussed the different conceptual visions of space in his book, *The Production of Space*. As he wrote, space has three approaches to define; the first is the conceived space or the space of philosophers, which is known by theorists and

designers and represented in theories, plans, and laws. The second is the lived space; this space is practiced by people and is substantially different than the first one and affected greatly by the third one. The third space is the perceived space as a group of images and thoughts in people's minds. The lived, conceived and perceived spaces constitute a coherent whole in the appropriate circumstances, when a common language and a consensus can be established (Lefebvre, 1991).

2.3. Designer Space: Conceived Space

Roberts (2015) stated that the lecture theatre inside designers' heads is theirs alone and the reality out there is on a different wavelength. The conceived space or the theoretical definition dominates the design process, especially in the absence of contact with users. And the larger the size of the project or the number of users, the weaker the connection between the design process and the user. The user is almost unknown to designers, especially in the development phase of initial ideas for the project, so the most important determinants for the designer are the legislation and laws set by the state. Those put the main axes of the program of the project and the design get inspired by the theoretical thought, to compensate for the lack of easy communication with user. If the designer must create a design that turns to the daily lives of many people, draws them their steps and

decides them, he/she should return to think with reality and interact with the real needs of the user (Lawson, 2005). The designers should discover the true reality practices instead of trying to mimic ideal images in their minds and producing exotic spaces (Alexander, 2013).

2.4. User Space: Lived & Perceived Space

Based on his/her mental map, the designer develops proposals for space formation. When the space gets constructed, the user receives a group of mental signals sent by the designer. The user responds to received signals depending on what is realized, what is suitable to his/her values) and culture and fit his/her needs. The user may not notice these signals nor understand them, may notice them but not respond, may reject them, and sometimes he/she sends counterproductive signals by changing the space. The user uses his/her mental map to translate signals that reach his/her mind and these signals are transformed to codes. The mind tries to solve these sent codes through the built space and translate them into meanings consistent with the mental map. The user selects the suitable behavior based on this mental process (Rapoport, 1990).

2.5. User or Designer Definition?

According to Rapoport (1990), the user's mental map is most important — not the map of the designer. The user's mindset is considered most important in the process of production and definition of the space, which is responsible for guiding the user's behavior through the space.

In addition, urban theories are dominated by designers, not users (Rapoport, 1990). And to rely on available theories and ideas, without delving deeper into the nature of society, is a use of old templates that have proved effective in specific circumstances (Bhatt, 2003). Lefebvre (1991) warned designers to produce what he called "abstract space" when space design is dominated only by conceived space without regard to the user perception.

The compatibility between definition of the designer and user of the space is a necessary principle and a first step to achieve consensus between the designer's vision (conceived space) and the user's practice and will be reflected on the appearance of civilization of the built environment. Recognizing the difference between the two definitions and understanding the mechanism of user definition contributes to addressing the study phenomenon.

2.6. The User Definition

The literature review has shown the importance to learn the user definition and highlight his/her ideas about NHO space which cause him/her to behave in a certain way; this is because he/she is the main purpose of the design process and his/her thoughts should be considered. Lefebvre (1991) assured that the user's lingual definition of space is based on his/her own ideas and represented in their behaviors. In this point it is important to distinguish between the concept, the term, and the definition. The concept is an idea or mental image affected by education and knowledge acquired by the individual's life and experiences, and it differs from the term in that the concept focuses on the mental image, but the term focuses on the semantic of the concept in users' minds.

The definition includes the conceptual image of the space and the used term, which reflects a certain concept in the mind of the user. The use of certain terms of users to express the NHO space reflects a mental perception they have. This research relies on both the word used to express the NHO space and the concept behind this term so the search adopts the definition of the user, which includes both the word and the perceived concept behind this word.

The user definition will be constructed through four dimensions addressed by Madanipour (2010) and Carmona (2010): property, accessibility, uses, and structure. The naturalistic methodology is used in this study.

3. RESEARCH METHODOLOGY

3.1. Study Methods

The main goal of this study is to find out the user definition of NHO space, and another goal is to understand the mechanism of user definition. As the study hypothesis is "The difference between the user behavior in NHO space in public housing and what is proposed by theory and expected by the designer is due to the difference in the user's perception for this space." The research assumption was the practical addressing of the urban designer for the space influenced with his acquired knowledge, therefore this addressing is a reflection of urban theories. This hypothesis was based on the existence of two variables; the first variable being the user behavior which is independent variable, while the second variable is the theory which is the dependent variable, and the basic principle is that the theory "dependent variable" changes to suit the user behavior, "the independent variable."

The Naturalistic Method was followed; this method is considered a qualitative research method. It is based on studying the phenomenon in its natural context, this confirms the research objectivity. The researcher collects primary data and records his/her notes on the phenomenon and how it occurs and the time and place. The used tools were sound recordings and photo and video camera. The Naturalistic Method aims to study the phenomenon in its human and built environment in different times, random or systematic, and observe human behavior in different situations. The Naturalistic Method has some difficulties, like the difficulty to control the time and place and how this phenomenon happens, and sometimes difficulty to understand certain behaviors. These difficulties have been overcome by observing people's behaviors for different periods of time and interviewing them. Also, people may act differently when they know that they are observed or under study, and they are trying to act for the researcher is satisfaction or what he/she expects or wants. The solution is to not inform people they are under observation, or not to tell them the expected results so they will not direct their answers.

Another difficulty is to note and follow up people's lives in every minute, so the researcher could use a representative sample to collect the needed data.

Triangulation Method was used in verifying the results. "Trustworthiness" is attained by using three different research methods or a variety of data resources; if the methods or the different sources lead to the same results. Trustworthiness has been achieved. (Lincoln, Guba, 1985).

3.2. Case Study

The Single Case Study of Al-Zeraah public housing has been selected, as the single case study is more detailed than the use of multiple cases and it needs to focus deeply for understanding of a certain phenomenon (Baxter, 2008). Al-Zeraah Public Housing, Zagazig city, Egypt, was selected from different choices after doing a survey for several reasons. It is inhabited by low-income people, famous for urban and social problems, narrow residence units and few rooms (2–3) for the large families, bullying, and theft. The most important reasons are the ease of access for the researcher, it is considered one of the most prominent areas that has affected by the study phenomenon, and it is considered an example for the public housing that is specified by the Egyptian Government for low-income people to match their needs.



Fig. 2. Google Earth map of Al-Zeraah public housing
Source: Author, 2015

3.3. Collecting Data

To reach the user samples, there were some tips to follow — like starting with a trusted guide who knows the study area and the people know and trust him/her. Vigilance and caution are very important for research success especially where crime is prevalent in the study area. In addition, the researcher interviewed and questioned users after separating them in terms of gender to female or male groups for cultural considerations. Three methods were used to collect data from users:

1. Visual Observation, which is considered a direct method to collect primary data from the study area, and a suitable method when it comes to studying people's behavior in detail for a period of time. The advantages of this method are that the behavior to be discussed is happening in context. It is a necessary prelude before meeting people and asking questions (Bailey, 1987).
2. Focus Group Interviews: Focus group is a method to learn how people think, feel, know, believe, or expect, by asking questions directly face-to-face, and it can be used to discover the depth of how people deal with a specific situation, what they classify as important, what drives a particular behavior in a specific context, and how they feel about it. This makes it the perfect method to find out what people think about the NHO space, how they perceive, and therefore deal with it according to this perception. One of the most important features is the presence of several people at the same time: this motivates them to talk, especially if they know each other, and that a number of people in the same room facilitates the function of the researcher, because one of them could stimulate others to talk, and encourage others to express themselves and their opinions. Also among the disadvantages is the "leader" effect, which is that each group shows an individual or two who are louder and exert more control; such an individual can direct the interview to another purpose, or prevent others from speaking, so the interview manager must

control the speakers, without the dominant person feeling the influence, so that affects the interview badly (Eberhard, 2006).

Twelve focus groups were organized with five female members in each to be easy to manage. Each group presents a specific feature of the residents. Two groups represented ground floor residences, two groups represented ground floor residences establishing small enterprises, two groups represented upper floor residences, two groups represented upper floor residences establishing small enterprises, two groups represented educated residents, and two groups represented non-educated groups.

3. A questionnaire with 60 male members has been conducted. The reason to choose that number is to have the same number of group members, and randomly selected in order to confirm the trustworthiness. In addition, it was an individual effort which makes it difficult to have a large number of samples. Individuals whose wives or mothers have been interviewed were excluded, in order to have a chance of meeting a greater possible number of households. A set of clear questions has been organized and some help and explanations were provided for questionnaire samples because some of them are unlettered. Because of the lack of education, this makes focus groups more effective.

3.4. Data Analysis

Ethnomethodology methods are used mostly by social researchers. It concerns the everyday language of individuals to express their point of view in the world around them and depends on visual observation in addition to interviewing people. The main objective of this approach is the study of how community members in social interaction, use expressions that have meaning, these expressions of their own, and are derived from their context. Among the most important features of this methodology is the possibility of an explanation for why people responded to the questions in this way (Bailey, 1987). This method has been used

to document and interpret the words and phrases used by individuals and groups.

4. RESEARCH RESULTS

4.1. User Definition

It has been possible to understand the user definition of the NHO space and understand his/her thoughts. The user definition of the NHO space depends on his/her concept of the relationship between public and private realms and their roles where the space is located in the transitional area between them. It facilitates the separation or connection between them and the user select what is appropriate according to his perception.

4.1.1. NHO Space Uses: The space uses have been recorded many times by visual observation of the study area and confirmed by meeting users. Residential activities like sleeping on the porch, cooking, having lunch and studying, breeding domestic and nondomestic animals and birds, meeting relatives and neighbors, small enterprises, playing for kids, mini buses parking and any activity that matches user needs and values and space potentials are considered as space uses. It is a place for anything and everything as the people mentioned several times in different terms.

4.1.2. NHO Space Property: The user defined the space property from his/her own view: for example in the study area, the users mix up the concept of private property and illicit gains, what one built, established and took care of and for these reasons he/she became responsible for, and the user is ready to defend it and the others recognize his/her gained rights even if he/she does not actually own it. While he/she believes that the public property is outside his/her control possibility, such as a public road and open spaces distant from the residence unit. It is worth mention that the public property concept for the upper floor users is what is directly outside the doors of their units.

4.1.3. NHO Space Structure: The physical structure of the space including borders, juxtapositions and overlapping between public spaces and private spaces

is based on the function of the NHO space and the users' needs that require a connection or separation between the spaces and each other.

When the user alters the function of indoor or outdoor spaces, like opening a door and linking between private spaces exposing personal life to the public and using private spaces for selling or whatever, it therefore changes the role of this space and the nature of the relationship between the private and public realms as defined theoretically. The new role of the indoor space requires a new relationship with the outdoor space and a direct connection between them. The designer believes this is a deliberate distortion of public spaces.

However, some of the ground floor residents made various changes such as expanding the internal spaces, building a high fence, or adding a courtyard or small garden which enforces the separation between private and public spaces, and achieves the privacy theoretical concept. It is also noted that the concept of privacy as a need is strongly influenced by the relationship between the individual and the others. Also, users have shown flexibility in dealing with space boundaries during different hours of the day; what is public in the daytime may be private at night and vice versa. A re-arrangement of the functional relationships between the indoor and outdoor spaces has been established in order to achieve the users' needs.

4.1.4. NHO Space Accessibility: In terms of space accessibility, the user believes that the NHO space is not a public space or even a social or semi-public space, and this is allowable for presence and access for women on ground floor who are establishing enterprises. Other residents — like men, young women, and women from upper floors — may access under certain conditions.

4.2. Definition Mechanism

The user receives visual signals from the built space sent by the designer, and he/she responds to these signals in different ways, some of which are understood and the user responds accordingly,

others may not be understood, or perhaps the user understands but does not respond for some reason. The theoretical review showed that users' behavior depends on their understanding of the concept of NHO Space: this concept consists of the designer sending visual signals and they passed by the mental filters of the user, and the user forms his or her own concept based on this process, and he/she defines the space in word and deed. These filters are as follows:

4.2.1. Unsaturated Needs: The users in the NHO space are looking for how to satisfy their needs. It emerged through applied study how users justified their practices in the space because of the need, whether these needs were spatial, economic, social, or psychological.

4.2.2. Space Physical Potentials: In order to achieve the unsaturated user's needs in the NHO space, he/she resorts to satisfying these needs by taking advantage of the physical and social potential of the space, which could help him/her in fulfilling these needs, such as the sidewalk in front of the residence unit, balcony or having a unit which is attached to the public road, etc. He/she uses the mental schemata in understanding and exploiting the potential of the NHO space, developing and reusing it in new aspects.

4.2.3. Societal Values: Despite the availability of the need factor and the perceived potentials of the space, societal values play an important role in the formation of the user definition and pushed him to take a specific behavior or deter him from another reaction. The individual is committed to his/her community by following these values, which is a group of gained traditions accepted by this society and habits (such as the importance of promoting work and helping the a husband find a livelihood, not accepting the idea of women riding bikes, or girls of marriageable age and men in the NHO spaces to stay in the space for a period without a reason). However, these behaviors are accepted in other Egyptian communities.

4.2.4. Individual Characteristics: Differing characteristics led to different mental maps among users, such as education and gender. This stage is following the process of understanding the designer's signals and translating them to choose the appropriate behavior as the user knows. For example, educated persons showed different ideas about the space and appropriate behaviors; young women show more acceptance for the idea of riding bikes; women of the upper floor without enterprises showed jealousy and malice more than ground floor residents with enterprises who felt satisfied.

These mental filters are weaved and work together to form the final definition of the user. There are some individual differentiations between users' perception and definition — but there are still common themes that most agree upon, like the right of the NHO space goes to the ground floor residents, the full control of the women on the intended space insomuch is called and titled by women names like "Ebrahim's mom" space and for this space only Ebrahim's mom (Om Ebrahim) as they called who has the right to allow who would access, stay, or use her space.

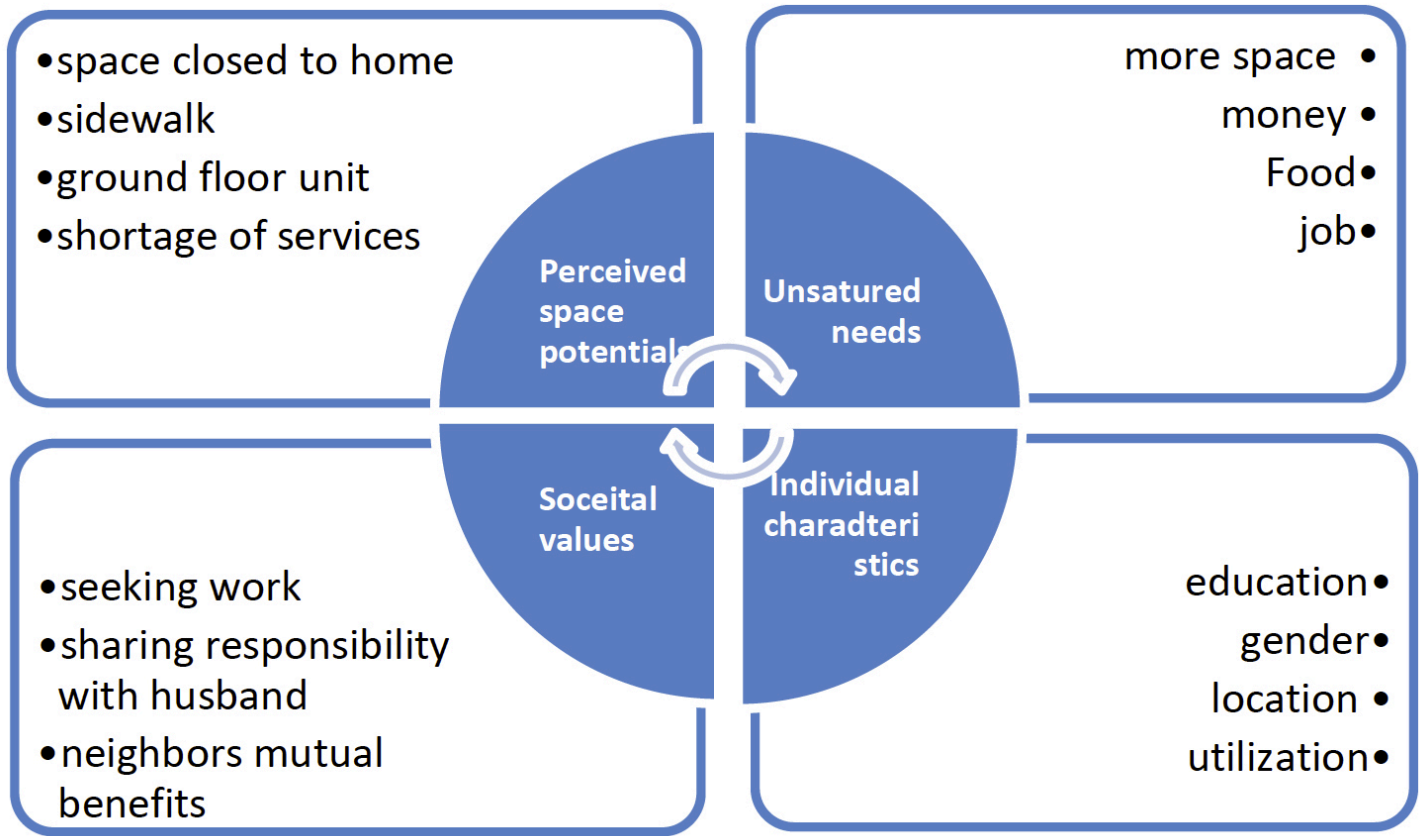


Fig. 3. Mental Filters
Source: Author

5. CONCLUSION AND RECOMMENDATIONS

Therefore, the theoretical definitions and the relationship between the private and public are not limited and restricted and could vary depending on the situation. Furthermore, the user contributes significantly to the formation of this relationship and the theoretical boundaries between the private and public realms are worthless when it comes to the user needs and values. It also depends on the space potentials.

Also, it is worth mentioning that understanding of the user definition has several benefits. First, it enables decision-makers like the designers and urban officials to have a deeper understanding of the user vision, which is the goal from the design process with difficulty of contacting the user, especially in the housing projects, and therefore produce designs to be compatible with the user definition. Second, it enables the designer to employ the potentials of the space

to serve the user needs, which means more efficient designs and directing the project budget in achieving its objectives which are serving the low-income user, and reducing the changes made by the user on the NHO space that deplete part of his limited resources and affect the urban character of the place. Third, guiding the researchers' and designers' attention to the necessity for a flexible approach to the theoretical definitions and understanding the differing spatial and humanitarian conditions in which they arise, and the necessity to search in our local society needs and theoretical frameworks that are compatible with them.

The researcher recommends addressing the factors affecting the user definition for this space; these recommendations are focused on reconsidering the design of the near home spaces and the residential units on the ground floor, and the flexible handling of theoretical definitions, in addition to the importance of

focusing on the woman and involving her in decision-making processes, educating her, developing her capabilities and support for the small projects, also raising awareness in society for the meaning of the public, and the value of community rights and justice. The study concluded with new axes for research such as search for the gender factor impact on the public spaces, the use of roofs as near home space, and the local language used in the practical reality among users.

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The Value of a Service Learning Studio: Making Voices Heard in the Struggle for Equitable Food Access

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This paper details the ongoing design studio efforts within the School of Architecture and the Department of Landscape Architecture at [redacted], with a local, non-profit organization, the FEED & SEED. The FEED & SEED's mandate is to mitigate the social inequities present within the disenfranchised neighborhoods of West Greenville, South Carolina through providing affordable, nutritious, and locally-grown foodstuffs to these at-risk areas. The organization has engaged the university to conduct a series of collaborative design studios focused on providing a holistic and systematic rethinking of how food production operates within the City. In addition, the FEED & SEED has an educational component to its mission, informing local growers regarding the best current practices of urban agriculture, and providing nutritional meal planning, cooking lessons, and additional vocational training for interested residents. The civic interventions and productive community landscapes are meant to create both compelling spaces and urban places that are valued and regarded as shared civic assets. The design interventions illustrated throughout this work are the culmination of research across a wide range of diverse topics, which ultimately, seek to make the community's voice heard.

As the educators and investigators behind these studio projects, we fundamentally believe that our students and the communities that they are working with are engaging in an alternative model of traditional design practice. This perception is born out of the understanding that, at the most basic level, architects, landscape architects, planners and designers are

fundamentally critical thinkers and creative problem solvers. Our students can offer the communities centered around West Greenville real and viable alternatives to the existing conditions that denote the area as a food desert. A "food desert" is defined by the United States Department of Agriculture (USDA) as a geographic area whose population lacks the necessary level of income such that they do not have adequate access to fresh and whole foods.¹ The studios utilized and channeled the energetic passion of millennial students to engage in meaningful and thoughtful debate concerning issues of economic equity, community building, and social justice while still having the practical question of how to mitigate the insidious and pervasive effects of the existing food desert.

Ultimately, it appeared that the most successful design projects had the greatest social utility, and directly addressed the issues of sustainability and resiliency of entire communities, not just selected individual component pieces within the larger geographic area. Instead of focusing on the products or design outcomes that are usually generated by a studio by students for professionals, this utilitarian perspective of sustainability and resiliency offered more credence to the design discipline's understanding of how to measure our impact as practitioners and activists. Design that has social impact and utility does not necessarily have a predetermined, professional audience. Instead, almost by necessity, such projects weave through communities, creating real change that affects the lives of all citizens. The following projects gave the community a way to make their specific concern a part of the city's robust conversation — making their voices heard.

Food Deserts and their Impact on Community Health

The design projects described here are based within the City of Greenville, located in the "Upstate" region of South Carolina. While Greenville has been

¹ United States Department of Agriculture: Economic Research Service, Food Access Research Atlas, located at <http://www.ers.usda.gov/data-products/food-access-research-atlas/documentation.aspx>. (Accessed September 4, 2014.)

identified as one of the fastest growing areas in the country, many communities are being disenfranchised and removed from the economic benefits associated with such rapid growth.² This is not an unusual occurrence within certain areas of South Carolina, and is a common problem found in many cities across the United States. These disenfranchised communities are frequently the home of the most vulnerable and at risk citizens, and in turn, they are the probable location of a potential or existing food desert. The USDA estimates that 23.5 million people, including 6.5 million children, live within food deserts in the United States.³

By definition, food deserts are inextricably linked to areas of significant poverty, and limited access to fresh food. When these two factors mutually coexist, the obesity rate with affected communities usually increases. According to the American Journal of Preventative Medicine, adults who have neighborhood access to stores that sell fresh foods have a 21% obesity rate, compared with 32-40% for those living in neighborhoods with no such access.⁴ South Carolina shares the country's food access problem, and according to a recent South Carolina Community Loan Fund study, one million South Carolinians are without adequate access to grocery stores that sell perishable goods, geographically removed from fresh food markets or lack accessibility to affordable and convenient transportation networks to get to such critical places.⁵ These disturbing statistics contribute

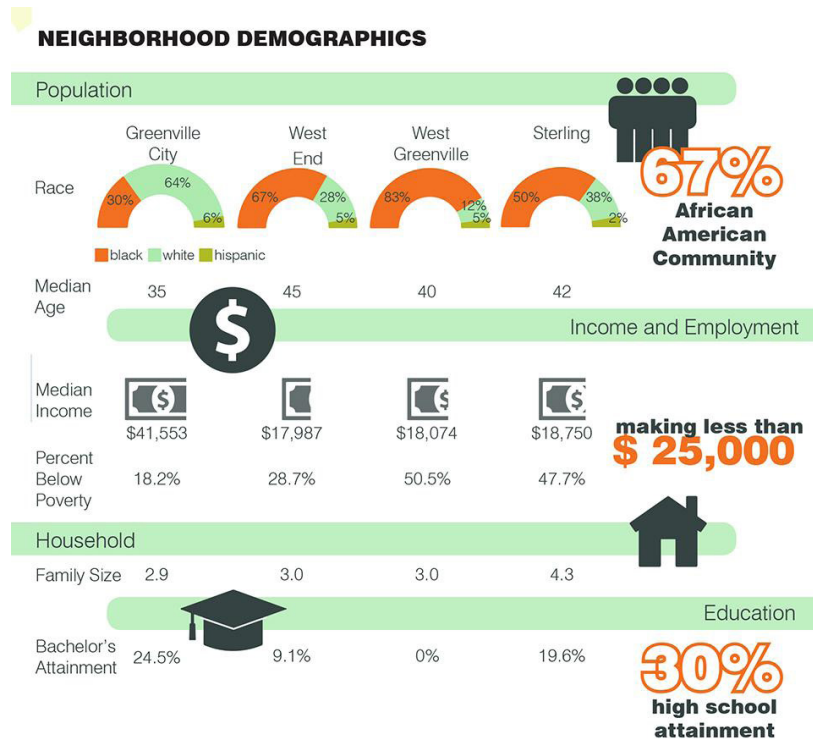
to an obesity rate of adults in the South Carolina Upstate of 67.9%.⁶ While this epidemic may not seem to be a traditional issue within the professional sphere of architecture and landscape architecture, it is the position of the authors that the health and well-being of all members of a community is of paramount concern for those design disciplines that deal with the built environment. As designers, we feel that we are well suited to envision cities where landscapes and civic spaces can encourage and support local food production. A problem this pervasive and overwhelming will only be solved through collective action at a host of levels.

The Community of West Greenville

The West Greenville neighborhoods of Sterling, West Greenville, and West End possess qualitative characteristics that indicate that they are either existing food deserts or are susceptible to become a food desert in the immediate future. These neighborhoods have less than half the median income of the City of Greenville, have a larger number of residents per average household, and have less formal education than their more affluent counterparts.⁷ All of these factors contribute to the likelihood of obesity among the residents, with the absence of a local neighborhood grocery store compounding the problem. While these neighborhoods face challenges, they each possess a strong sense of identity, history and community. These neighborhoods are 50%-83% African American and are home to the oldest churches and the first African American high school in the area.

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FEED & SEED — Community Partner

The FEED & SEED organization is attempting to address the community’s challenges of obesity, general health, and food access from a regional perspective by positioning themselves as a food hub. The USDA defines a food hub as a regional business or organization that actively manages the aggregation, distribution, and marketing of source-identified food products primarily from local and regional producers to strengthen their ability to satisfy wholesale, retail, and institutional demand. In essence, food hubs are a “scaling up” strategy that allow an expanded reach into communities for locally grown and produced food.⁸

Currently, South Carolina has one food hub, Grow Food Carolina, located in Charleston — approximately 200 miles southeast of Greenville. Charleston, and the adjacent coastal areas of the state, provide ideal growing conditions for vegetables and other consumable crops, while the Upstate region is best suited for livestock production. Grow Food Carolina and the FEED & SEED envision working together across

the state to maximize the local consumption of South Carolinian grown and raised food.

The FEED & SEED plans to rejuvenate the local food system in a number of fundamental ways. First, the FEED & SEED intends to provide a large warehouse facility, complete with refrigeration, that will meet the wholesale demand for foodstuffs as well as provide access to individual residents and families in the form of a market selling fresh produce, meat, dairy, and baked items. Second, the organization intends to educate the community at large and the farming community in the advantages and processes of sustainable agriculture. To that end, the warehouse facility will have an educational urban farm in the surrounding landscape. Finally, food distribution locations will be located throughout the region in order to distribute the fresh food items into the at-risk communities and to lessen the effects of existing food deserts. The following student projects identify and address key concepts about each of these components: the food hub, the urban farm, and the food desert distribution locations.

⁸ Park, Scott. “Feasibility Study: A Case for an Upstate (SC) Food Hub, Greenville County, December 2014.” Available at http://www.greenvillecounty.org/apps/LongRangePlanning/uploads/Feasibility_Study.pdf. (Accessed February 22, 2016.)

Feed & Seed — Food Hub

The first interdisciplinary studio course, entitled FEED & SEED Studio: Reconnecting Farms, Markets, and Tables was completed in Fall 2014, and provided a holistic approach to address food access issues as well as social, economic, and environmental concerns. These ideas were specifically addressed by students in order to generate possibilities for a more sustainable, increased equality, and overall, healthier city. The studio addressed and evaluated existing farm-to-market conditions, and looked for opportunities to increase effectiveness and efficiencies within the local food system. The studio also sought to answer the question, “What role does architecture play in the local food community?” Ultimately, the purpose of the studio was to generate financially viable solutions and capitalize on potential alternative conditions for the non-profit FEED & SEED which would allow it to function in areas where traditional groceries saw little chance of profit. This was also undertaken to gain a working knowledge of how these neighborhoods functioned as a community network. This information included, but was not limited to, understanding the broader potential impact that the FEED & SEED could have on the existing communities, possible site strategies, programmatic development ideas, as well as ideas for how the building and site themselves could become civic assets.

The students soon discovered that the failure rate of food hubs in the United States is quite high, and realized that in order for the FEED & SEED to be a successful enterprise, it would need to become an integral part of the community. In turn, the students sought out specific ways to incorporate the voices and the larger concerns of the community within their projects. During the process, students became aware of the multitude of challenges faced by the communities in addition to the lack of fresh food access. A majority of these additional challenges were addressed by the student design work, and in turn, these additional limiting conditions often made the student’s final projects stronger. There were three basic design strategies that arose from these additional concerns voiced by the communities; create an extension of the Swamp

Rabbit Trail recreational corridor and connect it with a major transportation and leisure corridor in the city of Greenville to address limited transportation options; integrate an understanding of the site as a former mill and incorporate the mill’s rich social and industrial history with that of the neighborhood residents who once worked there; and create an integrated building and site strategy which reveals all of the necessary cycles associated with farming and food production, in order to educate the community about the processes and requirements of urban agriculture. Two of these strategies are presented below.

Food Hub Design Solution 1: Food Cycle

By Brianne Burdy, Yue Ren, Sarah Stumpo

This project recognized that the surrounding community lacked not only access to fresh foods, but also suffered from inadequate transportation connections with the other areas of Greenville. The design team discovered that one in five African American households did not own a car and that bicycle usage by African Americans effectively doubled from 2001 to 2009 and was continuing to be adopted at a rate five times faster than cycling among whites.⁹ The students also discovered that the Greenville bike share program was more affordable, accessible, and flexible than the current public bus system. The economic investment and accessibility of these two systems was startling in contrast — the price of the bike share program is \$0.16/day, compared to \$1.35/day for the bus system. The bike share program is accessible from 5:00 am to 11:00 pm everyday of the week, while the bus suffers from limited hours of operation: 5:30 am – 7:30 pm Monday through Friday, 8:30 am – 6:30 pm on Saturday, and no rider services are offered on Sunday and official holidays.^{10,11}

The students proposed a synergistic relationship between the food hub, the bike share program,

9 Tantum, Plural. “Biking Advocacy and Race: Where’s the Disconnect?” located at <https://pluraletantum.wordpress.com/2011/02/24/biking-advocacy-and-race-wheres-the-disconnect/> (Accessed September 15, 2014.)

10 Greenville B-Cycle. Upstate Forever and Greenville Health System, <https://greenville.bcycle.com/rates> (Accessed September 27, 2014.)

11 GreenLink. City of Greenville, <http://greenvillesc.gov/1204/Schedules> (Accessed September 27, 2014.)

and the popular Swamp Rabbit Trail recreational corridor. The addition of bike share stops, complete with available bicycles located at the food hub and urban farm, provide the local community with more flexibility and an affordable transportation alternative compared to the current public bus system. In addition, a bicycle service encourages increased physical activity, improved access, and expanded connectivity to the other parts of the city, enabling community members to take advantage and participate within Greenville's growing economy. The connection with the Swamp Rabbit Trail allowed the community to access Greenville's most valued active recreation asset. Such civic recreational opportunities are scarce in the neighborhoods of West Greenville. The triangulation among increasing resident's access to fresh food, the ability to live an active lifestyle, and improved transportation opportunities addressed multiple health issues found in at-risk communities from a holistic, and common sense, perspective.

Food Hub Design Solution 2: Exposure

By Kathleen Peek and Aaron Peter

The second student design team saw a parallel between the fact that Americans are uneducated when it comes to the cycles of food production, and the reinvestment necessary when considering construction, maintenance, and cycles of buildings and site infrastructure systems.¹² This lack of basic understanding of how food is grown, handled processed, stored, and transported leads to uninformed and poor decisions, which often can lead to poor and unhealthy food choices. Chronic diseases associated with a poor diet account for 75% of all health care costs, which could be redirected to other aspects of prevention and treatment if the basic diet of Americans were changed.¹³ The design team recognized that while poor food choices contributed to poor health,

¹² U.S. Farmers & Ranchers Alliance, "Nationwide Surveys Reveal Disconnect Between Americans and Their Food." PR Newswire, published September 22, 2011. Located at <http://www.prnewswire.com/news-releases/nationwide-surveys-reveal-disconnect-between-americans-and-their-food-130336143.html>. (Accessed September 2, 2014.)

¹³ "Do You Know Where Your Food Comes From? An Interview with Michael Pollan." The Oprah Winfrey Show. February 1, 2011. <http://www.oprah.com/oprahshow/Do-You-Know-Where-Your-Food-Comes-From> (Accessed, September 2, 2014.)

poor building designs and wasteful infrastructure decisions also lead to terrible implications on the environment and economic systems.

The students' design solution revealed shared commonalities between the cycles of farming and building construction by using transparent materials and weaving public space throughout the food hub facility and urban farm. No part of the production system was hidden from public view and, in turn, such visibility encouraged the community to watch and engage with the processes of each. The design thinking that radical transparency in how the food was produced, handled, processed, and distributed would ensure a degree of trust from the local community, and a renewed attention to actively solving problems rather than disguising or hiding them from public scrutiny.

The students realized that architecture's role in the local food community was more than simply creating usable spaces for the selling of fresh food products. Rather, architecture and landscape architecture offered unique opportunities to integrate meaningful, local food spaces into the community. By understanding the programmatic needs, specific challenges of the communities, and by revealing key moments in what is otherwise an "invisible" and "closed system," the designers ensured that these new spaces gave a voice to the community.

Feed & Seed — Urban Farm

In the Spring of 2016, an undergraduate landscape architecture site design studio examined the land intended for the establishment of an urban farm operated by the FEED & SEED's main food hub facility. Part of the FEED & SEED's mandate is to serve the public good through the sustained commitment to provide educational classes. Such topics include the growth of organic produce, safe food handling procedures, seasonal planting strategies along with the best practices of companion plantings. In addition, cooking classes and primers on how to start small scale restaurants and other food focused businesses are planned for the immediate future.

The benefits to the neighboring areas are at least fourfold: the facility will provide affordable and nutritious fresh food to nearby residents at competitive prices, thus mitigating the effects of the current food desert present within West Greenville. The FEED & SEED is forecast to provide educational classes that are based upon the topics of food and nutrition, food security, environmental sustainability, and economic development. These classes are intended to range from simple and informal workshops to certificate programs run and administered by a local community college. The facility will function as a new civic entity, providing a venue for community events, complete with an industrial kitchen and all the necessary amenities to host up to 300 people. Finally, it will also be a source of economic development for the area, providing a much needed source of employment for locals, while also capturing revenue from people outside of the area who use the Swamp Rabbit Trail and stop at the facility for a meal or a cup of coffee.

Urban Farm Design Solution 1: Visualizing the Hidden Cost of Soil

By Austin Allen

One student became preoccupied with the practical logistics and the economic requirements of the urban farm and examined whether the FEED & SEED could be a viable entity based upon the limitations of the site itself. The facility was an abandoned storage facility, located along the banks of the Reedy River, and adjacent to the Swamp Rabbit Trail Greenway. The site used to serve as a storage facility to a once-active rail line, and in turn, has multiple locations of hazardous pollutants on site, with the most pervasive being the presence of coal ash. Coal ash is a common term for the waste produced through the burning of coal for industrial purposes leaving such toxins as mercury, lead, arsenic, and other heavy metals as byproducts. The remediation of sites that contain coal ash can be laborious, expensive, and must adhere to the Environmental Protection Agency's (EPA) significant regulations with regards to proper storage and approved mitigation strategies. While the Welborn Street facility has only slight traces of coal ash on site

compared to other adjacent sites, it effectively removed the possibility for the existing land and soil to be used as a medium for the growth of produce intended for consumption.

Austin Allen discovered that the clean soil required for use as a growth medium would be one of the FEED & SEED's largest capital expenses. Based upon projected estimates by the FEED & SEED, an acre of land would be required to grow the fresh produce needed for the facility. It was this thorough attention to the specific requirements of the facility that reinforced the value of soil to the students and to the larger community who often took access to clean soil for granted. His work articulated not only the economic reality required to make the facility feasible, his work also amplified the almost mute voices concerning long-standing environmental justice issues within the community.

Urban Farm Design Solution 2: Kintsugi

By Allison Chan

Allison Chan's project used the idea of kintsugi, a form of Japanese pottery that uses a gold lacquer to hold the fragments of broken pottery together, as a symbolic gesture of repairing the broken food system within Greenville. Chan's thoughtful investigation of how to reveal the past, erroneous farming practices indicating how the land was mistreated, and how habitats were destroyed, is an important step in recognizing how many unspoken and unreflective farming practices are unconsciously transferred from one generation of farmers to another without significant reflection or scrutiny. Her use of kintsugi as an art form of repairing and restoring a broken object highlights the necessity of not discarding the majority of farming practices, but rather indicates that the insertion of new principles and best practices can restore a broken system back into a useful, even beautiful, entity. In this particular design, restoring the nearby wetland assisted in generating greater biodiversity, and in turn, provided habitat for local insect populations that would pollinate the produce grown at the FEED & SEED. Chan's work acknowledged and expanded the understanding of who the residents are in this community, allowing for

other species and their habitats to be included within this definition of community.

FEED & SEED — Food Desert

The mitigation of the existing food desert proposed by the FEED & SEED relies upon a collaboration with a private and locally-owned gas station chain known as Spinx. The Spinx convenience stores are located throughout the region, and are often situated directly within these identified food deserts. These gas stations frequently contain convenience stores, and have an established system for distribution and delivery of material goods, food, and beverages. These stores are often the closest thing to a traditional grocery store that low-income residents have nearby, and as a result the Spinx chain stocks a higher percentage of food items where these residents can spend their SNAP dollars on state approved food items. In discussions with company representatives, we learned that the Spinx company owns many undeveloped land parcels adjacent to their existing service stations and stores. Part of the FEED & SEED's food distribution strategy seeks to place fresh food products grown by the FEED & SEED within the Spinx convenience stores and to extend the idea of the urban farm into that of community gardens, which will inhabit the land adjacent to these stations.

This project was completed in collaboration with the Communications Department at Clemson University, in the form of a Creative Inquiry course entitled Site Specific Messaging: Communicating Food, Identity, and Culture. Using ethnographic interviews and focus groups, as well as regional historical research, students identified and researched key audience segments and populations who are adjacent to the existing Spinx stores. The resulting projects included the content and design of the physical spaces as well as opportunities to communicate the message of the FEED & SEED to the community as a whole. It was necessary that each of these design interventions be appropriate to the specific communities where they were to be located, as the residential areas across the region are vastly different in terms of ethnicity, food culture, educational

levels, and disposable income. It was imperative that these designed spaces be accepted as being part of the surrounding civic fabric in order for the members and stakeholders of the neighborhood to take active ownership of the community gardens.

Food Desert Design Solution 1: Our Backyard

By Colin Bland, Sally Dunaway, Taylor King, Sana Mirza, Josh Rowell

The first design team noted that communities with residents who had low incomes and lower levels of formal education have reduced access to parks and other recreational spaces, and had reduced quality leisure time.¹⁴ By interweaving recreational spaces into the community garden, the garden reconnects the community with active food production while providing areas where the community can remedy its lack of public parks and open space.

Our Backyard identified the need for quality recreational areas and provided a series of leisure spaces for three neighborhoods — West Greenville, West End, and Sterling — to come together to play, grow, and relax. The student design team worked to develop playful, creative, and appealing signage, messaging, and architectural designs that would engage the community as a whole. The particular intent was to develop strategies that would encourage children to play, adults to relax while supervising their children, and to encourage the elderly to enjoy the outdoors while feeling like a vital part of an intergenerational community. The desire was to allow everyone to grow through shared activities, enhance social bonds across all groups, and encourage overall healthier and active lifestyles.

¹⁴ Moore, Latetia; Roux, Ana; Evenson, Kelly; McGinn, Aileen; and Brines, Shannon. "Availability of Recreational Resources in Minority and Low Socioeconomic Status Areas." *American Journal of Preventative Medicine*. February 2008. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2254179/>. (Accessed February 21, 2016.)

the history of the neighborhoods while simultaneously addressing the lack of fresh food by making culturally appropriate foods available.

Benefits for Community

There are multiple benefits for the communities where these projects are based that extend beyond the design product being proposed. While the design work for the food hub, urban farm, and community gardens is essential for the FEED & SEED given the extremely tight budget and the small and dedicated staff, we witnessed the transformative power of the design process for both the organization and the community.

The benefits included:

- 1. Education:** The design projects allowed the FEED & SEED to understand the project's process rather than simply being provided the finished and finalized design product. The studio not only educated the organization about the larger design process but also assisted them in understanding the scope of work, indicated the limits of professional responsibility, and provided a primer in how to obtain professional expertise in the future. In this particular case, the studio provided a grounding of the finances that would be required before hiring a professional architect. With regards to the food hub projects, the students developed the working program for the facility, and in turn, the executive director of the FEED & SEED was able to use that student work to obtain realistic bids from design and building professionals.
- 2. Communication:** The community-centered projects allowed for the non-profit organization to reach out to the larger community and start a conversation around persistent and serious issues that were often unknown concerns to those within the FEED & SEED. Community members were open and friendly with the students, and these projects allowed the community to take part in the project in a "grassroots" manner, rather than having the organization or the city solicit opinions



Food Desert Design Solution 2: Create Greenville (History)

By Hannah Harrison, Amanda Hill, Taylor Shank, Lindsay Wehmeier, Logan White

Greenville is a constantly evolving and expanding city, with the downtown and the immediately adjacent areas undergoing the most radical and intense transformations in terms of land use and population growth. This project provided the neighborhood with a strategy to allow the existing culture and identity to be preserved, even in the face of rapid development in the city. Create Greenville aimed to establish a community hub for West Greenville by drawing specifically upon its rich history to maintain the original community character and culture while still updating and reinvesting within the neighborhood.

Create Greenville found that the surrounding neighborhoods to the downtown were the most historically significant, and engaged African American communities in the region. The first African American high school in Greenville County was located in the area, as well as many of the oldest, and most significant traditionally black churches.¹⁵ This rich history is important for the community to recognize while looking ahead to future opportunities. The community garden design incorporated ways to tell

¹⁵ Arnett Muldrow & Associates, Ltd. Sterling Community Master Plan. July 2010. https://www.greenvillecounty.org/gcpc/pdf/sterling_neighborhood_master_plan.pdf. (Accessed February 17, 2016.)

from a skeptical community. This also benefited the nonprofit, as it built a degree of trust, familiarity, and community buy-in that is required for a successful endeavor.

3. Trust: The engagement allowed for the establishment of trust to be developed within otherwise disparate social groups and neighborhoods where trust and cooperation did not exist before. Not only were the student presentations ways to hear about community concerns, they provided a new opportunity for the organization to build trust, relationships, and social networks within the neighborhoods.

4. Made Voices Heard: Unexpectedly, the student design projects not only developed designs for the FEED & SEED's physical spaces based upon their needs and requirements, each design project brought to light a related issue or concern that existed within the larger community. Such issues centered on transportation, education, economics, cultural practice, history, and recreational space and opportunities. This wide range of diverse topics gave the community a way to articulate their voices and have their concerns heard in an untraditional manner.

and the dialogue concerning economic equity, issues of community building, and ways to create socially equitable spaces. With the continual fragmentation of society, where economic opportunity between the haves and have-nots widens each and every year, we need to be aware, concerned, and engaged regarding the political and economic decisions being made to ensure our work within the urban fabric is not contributing to or accelerating this already great disparity. This is the real value we are giving society — educating future designers to become engaged citizens and knowledgeable about how their decisions and impacts can affect others.

Conclusion

The student projects detailed throughout this paper address a range of social justice issues that are both intractable and invaluable within the context of a design school. While it is often immensely difficult to challenge some student's perceptions of the people who face multiple social and economic challenges on a daily basis, such exposure provides students the opportunity to become engaged and socially empathic citizens. We encouraged the students to realize that they were not designing for these communities, rather we asked them to design with these communities. This understanding of how designers should operate — being more than just the creators of products or places — situates designers as the integral and empathetic center of the decision-making processes that constitute neighborhoods, cities, and regions. Designers bring multiple useful skills which can expand the discussion

Community Participatory Design Process for an Autism Clinic: Role + Pedagogy + Reflection

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Introduction

This paper discusses a community participatory design process for a clinic for children with Autism carried out in a sophomore interior design studio in spring 2016 at the University of Minnesota. The interior design sophomore studio typically focuses on community-engaged projects with the aim to bridge the gap between theory and practice by providing students with design experiences in authentic settings. The instructors believe that the design problems grounded in local community issues enrich students' learning and help them gain disciplinary and civic benefits while problem-solving on the projects. The instructors approached an international architecture and design firm that has a local office in Minneapolis about a community project. One major goal of the firm is socially responsible design, and their local office is extensively involved in pro bono work.

The interior designers from the firm introduced the instructors to their new pro bono client, Fraser. Fraser is one of the largest and most experienced providers of autism services in Minnesota. Fraser also provides mental health services and other assistance to children and adults with special needs through health care, education, and housing. Their programs are nationally recognized for their high quality, innovation, and an individualized, family-centered approach. The goal of this project was to renovate the first floor of their 10,000 square-foot clinic.

Autism spectrum disorder (ASD) and autism are both general terms for a group of complex conditions of brain development. These conditions are characterized, in varying degrees, by difficulties

with social interaction, verbal and nonverbal communication, and repetitive behaviors. Autism statistics from the U.S. Centers for Disease Control and Prevention (CDC) identify around one in 68 American children as being on the autism spectrum — a ten-fold increase in prevalence in 40 years. Autism is four to five times more common among boys than girls. An estimated one in 42 boys and one in 189 girls are diagnosed with autism in the United States.

Interior designers are responsible for creating environments that accommodate the needs of all types of users. Therefore, it is imperative to understand how the designed environment can affect a child with special needs like autism to increase their chances of being successful in the environment. This article describes a pedagogical approach that was employed to help students explore users' experience and existing research, and to develop design solutions for the Fraser clinic for children with autism. The outcomes of the project are discussed in the context of the benefits to the various user groups. The students, client and architectural firm's reflections on the project are also presented.

The Project

The methodology for this project employed a community-based participatory design process that sought to actively involve stakeholders from a variety of backgrounds to inform the development of the clinic (Wallerstein & Duran, 2006). The overall idea was to promote a participatory process as a means of capturing multiple perspectives and practice wisdom from diverse stakeholders to develop a successful design. The instructors introduced the renovation of the Fraser clinic for children with autism as a seven-week studio project with an overarching learning goal that the project will increase students' sensitivity to and empathy for challenges and issues related to ASD, as well as bridge the gap between design theory and practice through experiences in this authentic setting. The students worked in teams of two or three to understand ASD, their client, and the diverse users of the clinic (children with autism, their caregivers, and

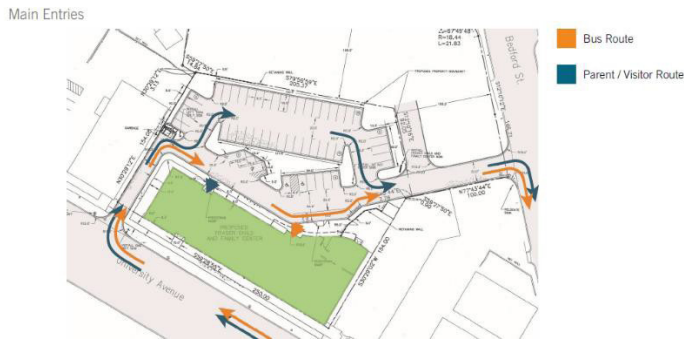


Figure 1: Site Plan

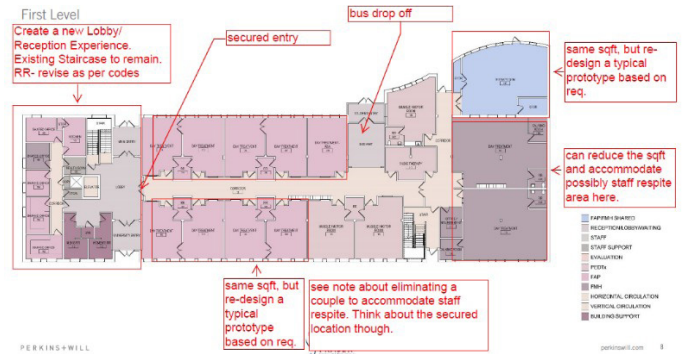


Figure 2: Scope of the Project

the care providers) to provide the most fitting design solution for the first floor level of the 10,000 square-foot clinic (Figures 1, 2, and 3). The programmatic requirements were provided to the students along with the existing drawings of the space. The programmatic concepts which the students had to consider were: flexibility, sociofugal and sociopetal zoning both in public and private space to accommodate various needs, acoustics, sensory stimulus zoning (high and low), color, and light.

Process

The project occurred over a seven-week period with class meeting two days a week in spring semester 2016. During week one, students were introduced to the project and they researched and familiarized

themselves with the project requirements. In week two, students visited the existing Fraser facility in Minneapolis to understand the role of the built environment in supporting the educational process and overall learning experience of children with autism. Student debriefing and reflection after the visit uncovered additional information about the project. Next, students were asked to review four journal articles on ASD and chapters from a reference book. Students reflected on the readings in small group and were presented a lecture on designing spaces for children with ASD. In week three, students immersed themselves more into research on ASD, this typology, and understanding the users, their needs, and constraints.



Figure 3: Pictures of existing spaces

During week four, students presented conceptual and schematic solutions to Fraser staff and designers from Perkins + Will. After receiving feedback from them, the students refined and developed their design solutions further for two more weeks and presented their finalized design drawings to Fraser staff, Perkins + Will designers, their peers, and instructors in week seven.

Student Project Outcomes

Each student team provided a unique and sensitive design solution that addressed the needs of the diverse users. They delved into the WELL Building Standard™ which focuses on human health and well-being. Key issues which every group addressed in their design solutions were: a sense of entry; spatial sequencing; design of treatment rooms, escape spaces and sensory zoning; ergonomics for children; acoustics; and wayfinding and color.

Sense of Entry: In terms of the sense of entry, the reception/lobby space was designed to create a sense of welcome and showcase the Fraser brand. Their design solutions focused on the strategic use of light, color, and spatial composition, allowing for both visual and physical control of the front door while avoiding an institutional impression (Figure 4).



Figure 4: Proposed new entrance by a student team reflecting the Fraser's brand and various seating zones for users (Source: Hofmann R., Hurinenko K., and Shuck G., 2016).

Spatial Sequencing: When designing for children with autism, the idea of spatial sequencing requires that areas to be organized in a logical order based on the typical schedule of the spaces (Mostafa, 2008). In the proposed solutions, the students designed the spaces to flow seamlessly from one activity to the next through one-way circulation and the use of transition zones, thus creating minimal disruption and distraction (Figure 5). The transition zones help the user recalibrate their senses as they move from one level of stimulus to the next (Mostafa, 2008).

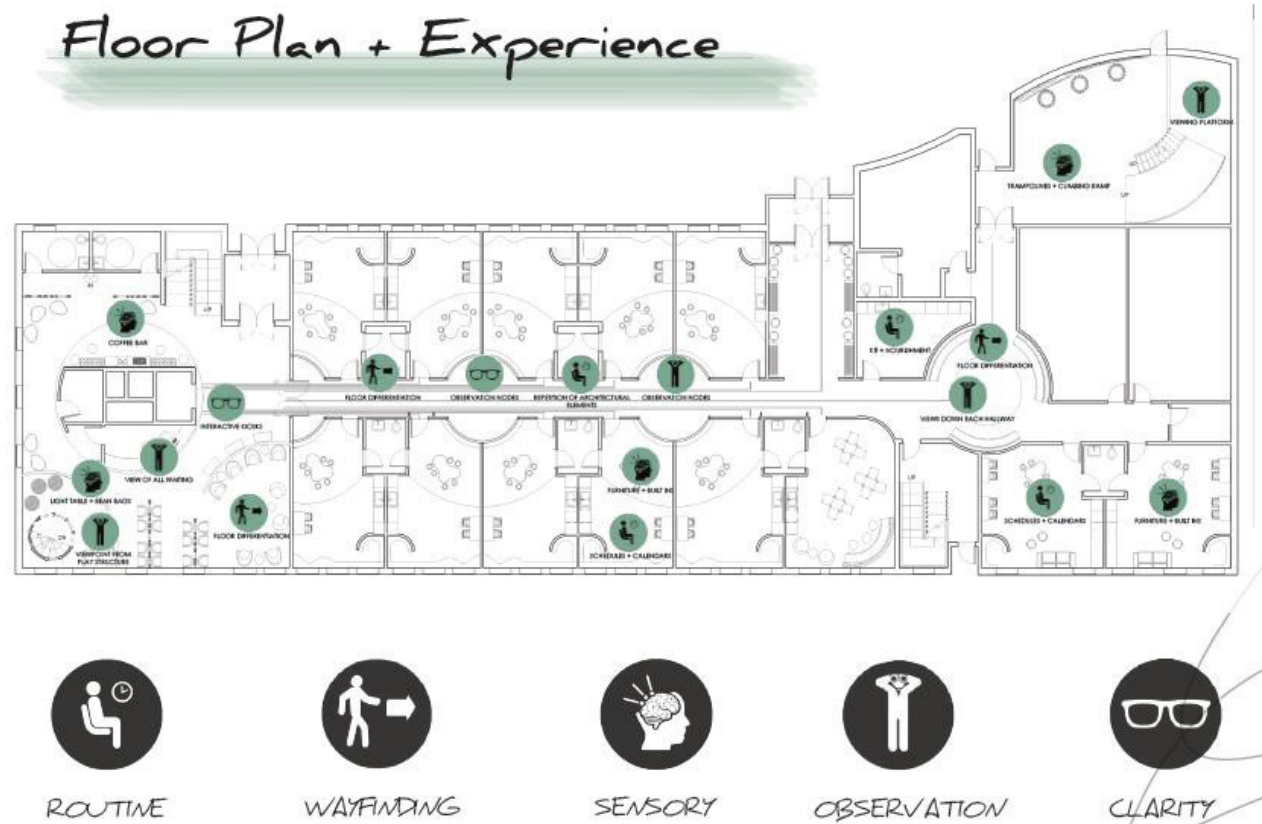


Figure 5: Proposed new design by a student team reflecting spatial sequencing (Source: Sosalla, L. and Dunn, A. 2016).

Design of Treatment Rooms, Escape Spaces, and Sensory Zoning: Research from several sources indicates that the treatment rooms for children with autism should be compartmentalized to define and limit the sensory environment of each activity (Paron-Wildes, 2013; Mostafa, 2008).

The Fraser team reinforced this concept and desired that each compartment should include a single and clearly defined function and sensory quality. In their design solution, the students’ functionally zoned the treatment room with the use of color, material, and ceiling transitions.

This will help provide the children with autism sensory cues as to what is expected in each space, with minimal ambiguity (Figure 6). The objective of escape spaces is to provide respite for the user from the overstimulation found in their environment.

Empirical research has shown the positive effect of such spaces, particularly in learning environments (Mostafa, 2008). The students addressed this by proposing small partitioned area or crawl space in a quiet section of the treatment room, or throughout a building in the form of quiet corners in hallways. When designing for autism, spaces should be organized in accordance to their sensory quality, rather than the typical architectural approach of functional zoning. It is important to group spaces according to their allowable stimulus level to organize spaces into zones of “high stimulus” and “low stimulus” (Paron-Wilde, 2013). Students addressed this spatial organization grouping in their design solution for the treatment rooms and escape spaces (Figures 7 and 8).



Figure 6: Proposed new design by a student team reflecting appropriate treatment rooms (Source: Coleman, M., McNamara, M. and Kloth E., 2016).

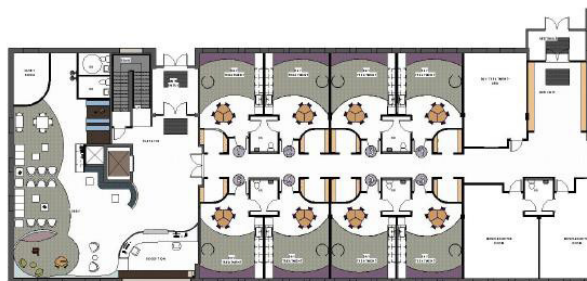


Figure 7: Escape nooks in hallway (Source: Kasner, M., Gavol, E. and McKinley, M., 2016)



Figure 8: Escape nooks in treatment rooms (Source: Jorgaqi, R., Williamson, E., and Erickson, J., 2016)

Ergonomics for Children: Within the treatment rooms in the student design solutions, attention was given to providing flexible work surfaces, seating, and storage to accommodate a wide range of users. The student teams were attentive to the anthropometrics of the grade school student user groups in their design solutions. Their furniture selections addressed these needs by providing maximum adjustability wherever possible.

Acoustics: Empirical research has shown that by reducing noise levels and echo in educational spaces for children with autism, their attention spans, response times and behavioral temperament, as measured by instances of self-stimulatory behavior, are all improved. This improvement reached in some instances a tripling of attention span, a 60% decrease in response time, and a 60% decrease in instances of self-stimulatory behavior (Mostafa, 2008). Some of the proposed



Figure 9: Use of color in hallway for wayfinding
(Source: Jorgaqi, R., Williamson, E., and Erickson, J. 2016)



Figure 10: Use of shape in hallway for wayfinding
(Source: Sosalla, L. and Dunn, A. 2016)

improvements in the acoustic quality of the treatment rooms in the student designs included soft flooring surfaces and new ceiling systems with higher STC (sound transmission class) ratings.

Color and Wayfinding: The students selected a calm and unsaturated color palette with hues of green and blue to create a comfortable environment and ensure easy wayfinding in the design. Harsh sensory elements were avoided and soft absorbent materials were selected to control sound (Figures 9 and 10).

Conclusion

The Fraser group, Perkins + Will collaborators, and instructors were pleased by the richness of the learning experience and the depth of the students' investigation of the design problem and their research on ASD, and how the research informed their design proposals. In their reflection exercises, students reported an understanding of the role of the built environment in positively supporting the learning experience of children with autism. While some of the design solutions were more successful than others, each of the presentations addressed some of key criteria that were identified through the programming phases. Some of the key criteria implemented in their design solutions

included creating a sense of entry; spatial sequencing; design of treatment rooms, escape spaces and sensory zoning; ergonomics for children; acoustics; and wayfinding and color. In their reflection, the Fraser and Perkins + Will representatives indicated that they were impressed with the design process, resulting design ideas, and final presentations. They were hopeful the design solutions generated by the students will be used to raise interest and support for moving the project forward.

In terms of academic benefits, this project uncovered the process of teaching interior design students how to understand the role of the built environment in supporting the learning experience for children with autism and creating a positive experience for their care providers and families. Students were able to guide the project outcomes from the beginning of the project because they were able to define the problems that needed to be addressed for the various user groups. Each stage of the project provided students with new skills and understanding of the problem and design process. This project offered students a real-life setting, users, and design criteria to work with. It also provided students an opportunity to define the problem and project goals based on observable environmental variables, user input, and research. Overall, the

experience increased students' sensitivity and empathy to challenges and issues in the community, as well as bridging the gap between theory and practice through a design experience in an authentic real-life setting.

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Social “Coding:” Urban Processes and Socio-Computational Workflow

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INTRODUCTION AND OBJECTIVE

The urban environment that surrounds us is not only built and formal; human and environmental phenomena inhabit built form to create a cohesive medium of urban experience. Some argue that the city may no longer be understood as a whole but rather a system of related processes [1]. As ubiquitous urban computing increasingly integrates the part physical and part phenomenal worlds, human and non-human interactions occur in two ways: (1) between humans and the urban environment via information interfaces such as Twitter, and (2) in the design and analysis workflows that increasingly connect architects, landscape architects, planners, ecologists, and economists that make up the complex, interdisciplinary work of urban design today.

New research gaps and emerging opportunities exist regarding users and mobile computing interfaces as tools of computational urbanism. In particular, social relationships as distinctive as cultural backgrounds may now be incorporated into computational urban design work through the use of new multiplatform methodologies to collect, codify, analyze, and begin to design for the processes of social phenomena in cities.

URBAN PHENOMENA AND SOCIO-COMPUTATIONAL WORKFLOWS

Urban designer William Whyte in his 1980 film *The Social Life of Small Urban Spaces* used on-site video to understand how the social behaviors of people interact with the built physical environment[2]. Theorists today such as Juhani Pallasmaa speak to architecture’s ability to engage the senses [3] and Bruno Latour’s ideas of atmosphere and attachment in the context of digital social media allow us to think of an urban

design approach not as one that yields petrified physical form but as one that adapts to the time-based phenomena of people and built environment [4]. From these theoretical understandings and the ubiquitous integration of urban computing and human experience, new fields of urban robotics and smart city design have emerged. Traditional urban design understandings of land use, urban form and transit have given way to the manner in which people and natural resources coexist [5] and metabolic understandings by biologist Salvador Rueda of the Barcelona Agency of Ecological Urbanism in his *Methodological Guide to Sustainable Planning* that outlines: land use, public space and sustainability; mobility and services; urban complexity; green spaces and biodiversity; urban metabolism; social cohesion; and management and governance [6].

The research presented here investigates a methodological workflow to (1) “codify” twenty-two qualitative characteristics of cultural background, business access, and architectural infrastructure data to geospatially quantify the nuanced differences of adaptive urbanism; and (2) develop an IronPython script within Grasshopper to automate social coding and geospatially visualize the urban data. The word “coding” used here will describe the translation of qualitative in-person interview responses to numerical data using binary 0/1, rating, numerical count, typological, and relative evaluations.

SOCIO-COMPUTATIONAL METHOD: CSV DATA TO GIS WORKFLOW

The research around the content of food carts and food trucks, respectively, in Portland, OR, and New York City, was initiated as a systematic way to collect and process in-person interview data of mobile cuisine owners between two teams of investigators working separately. Three features of mobile cuisine were studied: the food, the business, and the vehicle, including its use of space and time. Data was drawn from interviews conducted with 40 operators of mobile food trucks in New York and 42 operators of stationary carts and trucks in Portland. The work continued an ongoing collaboration in the investigation

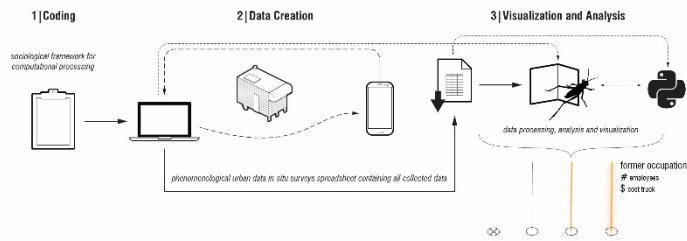


Figure 2, Left: Photo of Taste of Transylvania. Figure 3, Right: Diagram of Methodology Chart.

| |
|--|
| “Coding” |
| Objective: To establish sociological and human-scaled framework for computational processing. |
| Actions: Creation of researcher-conducted surveys to be deployed via online platform Formhub through mobile application ODK Collect. |
| [Product: Quantifiable survey.] |
| Data Creation |
| Objective: To collect phenomenological urban data through in-situ surveys of mobile cuisine owners. |
| Actions: On-site, researcher-conducted interviews; data uploaded to Formhub’s servers for later data processing. |
| [Product: Downloadable spreadsheet containing all collected data.] |
| Visualization and Analysis |
| Objective: To aggregate downloaded data for geospatial realization and analysis. |
| Actions: Data aggregation in Excel, data processing, analysis and visualization in Grasshopper and GHPython. |
| [Product: Geospatially-visualized urban data.] |

Chart 1, Methodology chart.

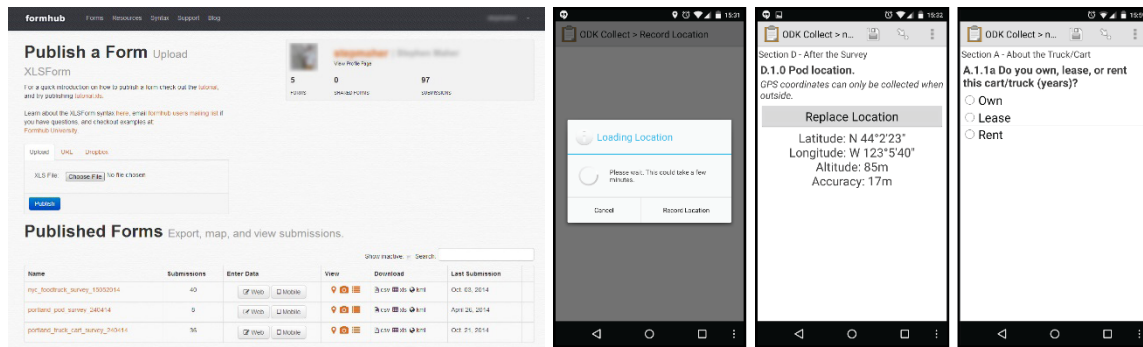
of public space between one of the authors providing geospatial computational expertise and an urban sociologist located in New York. The methodology described here was used to geospatially understand the distinctive urban qualities of mobile cuisine for the book chapter “Food, Time and Space: Mobile Cuisine in New York and Portland” for *Ethno-Architecture and the Politics of Migration* (2015).

Additionally, the work contributes to the idea of an Internet of Things (IoT), specifically Mark Wieser’s prediction that computers and computation will become less and less visible, and more integrated into a complex web of relationships between people, space and behaviors [7]. The inclusion of characteristics of the business owners via the mobile survey workflow makes effective these qualities in an urban design process where designers are more and more comfortable finding data off-site. The computational coding, GIS work and use of mobile smart phone device with sensors described here empowers designers who do in-person interviews to systematically reach broader applications. It affords a human and non-human workflow when the individual components

of people, mobile devices, online interview software, and the study of GIS already exist independently. These aspects of design process are no longer autonomous, but are interconnected.

Sociology Workflow: Ideas, Research Questions, Survey Questions and “Coding”

The creation of new data from scratch [8] relies on a clear sociological protocol to data collection. The presented research ideas and survey questions were developed, under the leadership of the urban sociologist, to gather data via in-person interviews with business owners of food carts and food trucks, respectively ‘pods’ in Portland, and ‘rallies’ in New York City. Early research questions focused on the ideas of food (cuisine), business (entrepreneurship), and architecture (infrastructure). Questions were categorized and articulated to elicit systematically comparative answers such as years, yes/no, number of employees, rating (1 through 5), and ‘match expected answer,’ with each ‘coding’ step carefully framing and recording the protocols of the original survey questions. The method is very conscious to carefully not flatten any information at the point of researcher interviews.



Figures 4 and 5. Formhub interface and ODK interface (GPS and multiple choice question).

Data Creation: Survey Interface Formhub, Mobile App ODK Collect and On-Site Smart Phone Collection

To systematize the data collection, all interviews were aggregated into one spreadsheet. Efficiently working across the United States, the research team used Formhub [9] online survey service hosted by Columbia University’s MODI lab. Smartphone survey interface types using the Formhub syntax included specific ways, to skip irrelevant questions, dropdowns of ‘yes/no,’ numerical answers, 24 hour and 60 minute scroll-downs for times, check boxes for days of the week, image capture, and GPS to record latitude and longitude data (figure 3). A variety of challenges and problems were faced including coding syntax in Formhub and the need to develop survey questions short hand for cell-size legibility in Excel. In-situ surveying with the ODK Collect application created other challenges, such as calibrating the tedious scale of scroll down times, recording data before knowing the owner was available, GPS accuracy, the aggregation of different survey uploads to one CSV file, and the intermitted access to Formhub’s MODI remote servers. Formhub’s online map interface allowed manual adjustments of data points to manually correct any GPS accuracy within five to ten feet. Overall the Formhub and ODK applications provided user interfaces to compare survey data, facilitate on-site interviews, and access smartphone sensors such as GPS to geospatially measure urban phenomena.

Data Dictionary, Aggregate and Non-Spatial Analysis in Excel

An initial aggregate analysis of the answers to each question provided numerical averages and ranked occurrences, contextualizing the data between Portland and New York, and was used as numerical data to highlight observed trends in the aforementioned book chapter on ethnicity and architecture. This workflow step at the scale of cities was an important collaborative moment to bridge the qualitative social understanding and the quantitative computation. The answers to each question were organized using a data dictionary including column headings for Variable/Quality, Indicator, Coding Type, Unit, Notes and Idea (Chart 2). The coding types provided the most important understanding of coding translation, categorizing answers to formats such as does it match (ethnic/cultural), match, number, similar to (ethnic/cultural), specific reason (Ex. 2008 crisis), match (USA or not), or rating type. All of these answers were translated into numerical format units of 0/1, dollar amount, or other numbers. This step revealed that numerically aggregated, non-spatial data may be more effectively analyzed in spreadsheet format rather than in Grasshopper. Use of the two programs together, finding thresholds to analyze data first in CSV formatted tables, allows greater efficiency for geospatial analysis in Grasshopper. The use of the data dictionary allowed the emergent pattern of categorization clearly into cuisine, business, and architecture/infrastructure, used in subsequent test analysis for each food cart/food truck.

| Category | Variable/Quality | Indicator | Coding Type | Unit | Idea |
|-------------------------------|----------------------------------|------------------------------------|--------------------------------|--------|--------------|
| Cuisine | Type of Food | Food Description (ethnic/cultural) | does it match(ethnic/cultural) | 0/1 | Diversity |
| Cuisine | Is it ethnic/non-local | Food type | match | 0/1 | Diversity |
| Cuisine | cost_high | affordability | number | \$ | Access |
| Cuisine | cost_low | affordability | number | \$ | Access |
| Business | Entrepenuership | ~their own business | similar to (ethnic/cultural) | 0/1 | Micro |
| Business | Entrepenuership | ~their own business | specific reason (2008 crisis) | 0/1 | Micro |
| Business | Type of Business | Food Description (ethnic/cultural) | match | 0/1 | Unique |
| Business | recipe_origin | origin | match (ethnic/cultural) | 0/1 | Unique |
| Business | birthplace_owner | country | match (USA or not) | 0/1 | Unique |
| Business | birthplace_parent | country | match (USA or not) | 0/1 | Unique |
| Business | Business name | name | similar to (ethnic/cultural) | 0/1 | Unique |
| Business | Food Matches cultural background | analysis' | match | 0/1 | Unique |
| Business | Brick and Mortar | yes/no | match | 0/1 | Micro |
| Business | Brick and Mortar_desire | yes/no | match | 0/1 | Micro |
| Business | time of ownership | number | number | years | Access |
| Business | cost of truck | affordability | number | \$ | Access |
| Business | Staff | overhead / micro business (prefer) | match | 0/1 | Micro |
| Business | Staff_how many | overhead / affordability | number | number | Access |
| Architecture / Infrastructure | Regulatory issue_city | grey | any | 0/1 | Ease |
| Architecture / Infrastructure | Regulatory issue_private owner | type | type | 0/1 | Ease |
| Architecture / Infrastructure | Virtual Presence | type | type | 0/1 | Access (know |
| Architecture / Infrastructure | cost of truck | affordability | number | \$ | Access |

Chart 2, Data Dictionary.

Formulation and Visual Parameters

Traditionally, data is visualized as points at the scale of a city, district, or neighborhood. However, the fine-grained data presented here is capable of being differentiated at the small scale and shows vastly different qualities of information to the user, such as cuisine, business, and infrastructure, that is not conducive to traditional modes of urban representation. The sociological protocol would warn against mixing data, both numerically and visually, though formulation used various indicators for a single category. For example, aggregating business access data using (1) cart/truck cost, (2) number of employees and (3) job training via previous occupation, the three primary areas of cuisine, business, and infrastructure would not be mixed. The work of Carlo Ratti’s SENSEable Cities Lab and Manuel Lima provide some visual organization through order or coloration to create a single language that carefully shows varied information to the user. At a closer look, they maintain the distinctions of qualitatively unmixable information. A general unit for each cart or truck was visualized as a vertical line along the z-axis with three parameters: (1) height, (2) color, and (3) weight. Unlike many GIS analysis across cities with evenly distributed data such as rental costs, building heights, or demographics, this new phenomenological data was highly grouped in the pods or rallies and often spaced vastly apart. This

new fine-grained and human-scaled data is therefore best understood at the scale of the urban room often centering around one to two blocks, an empty parking lot, or on-street parking. The resulting visual analysis would provide clues to differences of urban design characteristics including building morphology, built fabric densities, street structures, and regulatory support of private and public space that is otherwise not detectable at the traditionally larger urban planning scale of GIS visualization.

VISUALIZATION ANALYSIS

Socio-computational workflows at the human and time-based scale of social phenomena required new scales to understand the city. When point-based z-line data was first viewed at the city scale, distinct lines and small visualization differences of height, color and line thickness, with various calibrations, could not be distinctively understood. The work of urban design suggests the valued ecological technique to “use a good helicopter” [10] to zoom far in and far out to understand cities. Visualizations of data at the scale of the city of Portland and of New York revealed certain differences of business access while not showing significant differences of cuisine qualities within each city (figures 4 and 5). However, clear differences between east and west Portland as well as Manhattan and Brooklyn New York, are evident. Whether these

are economic such as the cost of food trucks (figure 7), ethnic related to immigrant and first-generation status (figure 6) or morphologically different (figures 8a and 8b), they are understood upon viewing smaller scales of information. At the scale of the city, the locations of the pods and rallies reveal clues to situating these businesses, often gathering along major vs minor streets, easily differentiated as separate categories of OSM data introduced from the Grasshopper Elk plugin (figures 6 and 7).



Figure 6. Portland, city-scale visualization.

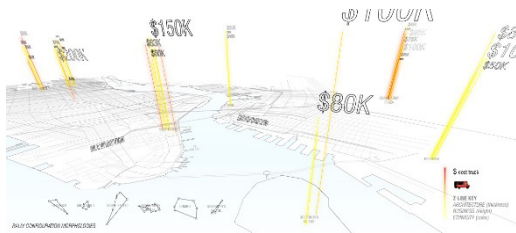


Figure 7. New York, city-scale visualization.

The fine-grained differences of data resulted in two approaches to clearly understand the information: The first, at larger city and district scales, showing either individual indicators such as the number of parking tickets received in New York or visualized combined information such as business access (cost of truck, number of employees, ‘yes or no’ of previously related occupation). In the second approach, at the urban room scale, the pod/rally was studied to understand the quality of that place. The latter can visualize block and street morphology differences via OSM data from Elk, including key clues to the location of pods and rallies in public or private spaces. In Portland, for example, most food cart pods on the denser west side were located in parking lots, one as large as an entire block, with each cart facing outward along the street right-of-way, reinforcing normal sidewalk storefront economic relationships (figure 8a). Meanwhile, on the sparser east side of Portland, most pods were located

near, but not directly on, major commercial streets of previously historic street-car lines, facing inward within the private parking lots, creating a more private experience that did not include the socio-economic life of streets (figures 8b and 9). In New York, where the food trucks are far more transient than Portland’s food carts, owners predominantly use parking spaces often subverting the residential or park zoning use, but similarly activating the sidewalk with economic and social food services from the street side. The result is the ability to visualize any one or combination of twenty-two indicators of distinctive mobile cuisine establishments in the city, resulting in a careful urban computational understanding to control various 3D visualization possibilities in the Rhino/Grasshopper environment. In traditional planning interfaces, such as ESRI ArcGIS [11] there is less access to the user in a more closed, top-down workflow. The push and pull between traditional scales of urban design and the new scales for the users of urban ecological design interface of dynamic processes with this new information workflow became the critical and informative results of this last analytical phase of the computational design work. Existing Yelp, Google and other individual websites, Facebook and Twitter do not have these twenty-two indicators organized as metadata. A designer could choose any indicator. The research method encourages designers to meet the owners in-person which, for sociologists, is always important. Additionally, economic data is often not made public with the aforementioned social media but in person the design researcher was almost always provided such information.

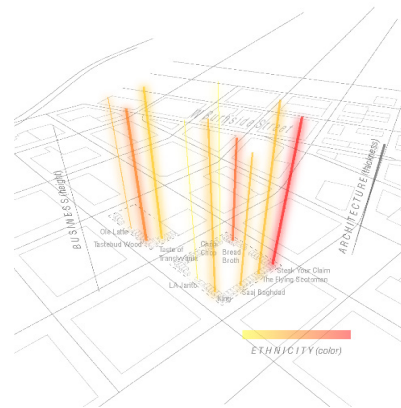


Figure 8a. Urban room pod visualization, Portland, OR. Alder Street Pod.

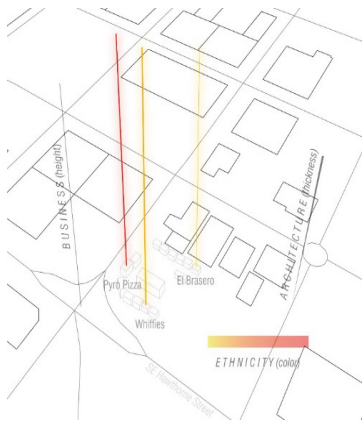


Figure 8b. Urban room pod visualization, Portland, OR. Cartopia Pod.

The visual analysis of “social coding” presented here involved an initial workflow of data inputs from both an OpenStreetMap OSM file for existing major streets, minor streets, buildings, and waterways, along with the custom twenty-two cuisine, business access and infrastructure indicators in a separate CSV file. The workflow allowed certain non-spatial calculations such as overall indexes on a scale of 0 to 1 for each cuisine, business, and infrastructure indicator to occur in Excel. While this did not burden the Rhino/Grasshopper platform with complex calculations, twenty-two data types for approximately fifty mobile cuisine locations in each New York and Portland enabled simple data visualization for these three categories for all of the pods/rallies (figure 3). Other challenges within the formulation included determining how to interpret null sets of information

within the calculations. Determining the 0 to 1 domain for the cost of the carts/trucks for example required a standard deviation calculation using the maximum and average costs of trucks for that city. This would then provide a localized normalization in New York vs. Portland, but future research would benefit from greater statistical protocols.

The resulting visualizations (figure 12) added greater resolution and careful differentiation of visual language, especially at the scale of the urban room. Cuisine, business, and infrastructural information could be separated along the z-axis: (1) business access at the top including the cost of truck/cart, number of employees, previous occupation; (2) cuisine or ethnic identity of food at the bottom including place of birth, parents place of birth, where they learned their recipes, and name of the truck; and (3) infrastructure ease located at the middle including the number of parking violations. The newer New York visualizations still use the line height, color, and line thickness for the overall indexes of each category.

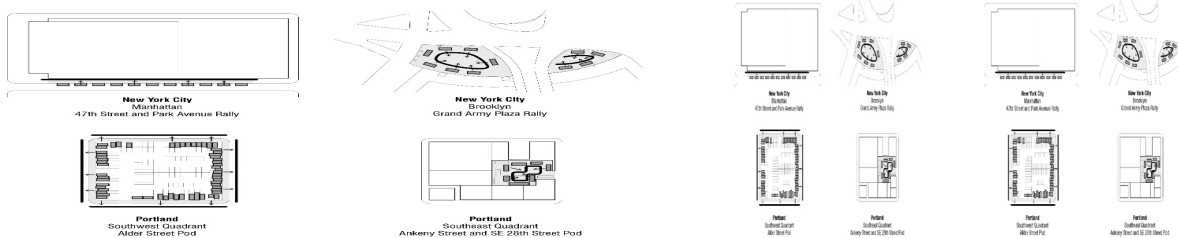


Figure 9, Food Truck Rally and Food Cart Pod geometries.

The quantitative translation of qualitative information in the 'social coding' of this work offered the greatest challenges but also the most contribution. The sociological protocols were influenced by the advice of and long-term collaboration with an urban sociologist, stressing the importance of in-person interviews on-site because they allow reflection of non-prescriptive data collection and iterative revisions of the data collection process. Moments of the greatest possibility to misunderstanding information occurred when combining dissimilar information, such as Walkscore's [14] numerical scoring versus its breakdown of various indicators, and when combining visual graphics, but Manuel Lima's Visual Complexity [15] provided a basis for the combination of visual information. The intersection of the framework of cuisine, business, and infrastructure, combined with the computational workflow, can best be understood as an investigation of these types of urban phenomena to observe the compatibility of qualities and numbers. Seen as a tool within an overall discipline of geospatial computational design, this tool attempts to contribute to the identification of visualizing agent-based urban ecological phenomena.

The visualization of social phenomena affects urban design indirectly via design strategies, directly via value sets for parametric input, and in real-time feedback.

Indirect Design Integration

Indirectly, the workflow and yielded data may be used to identify urban design strategies that respond to geospatial patterns of social use, such as immigration or business accessibility values. At the city scale, research results included more immigrant owned food cart or food trucks in Portland (58%) than in New York (44%), but more first-generation U.S. citizens owned in New York (40%) than Portland (10%). The cost access of trucks versus brick and mortar restaurants \$20,000 vs. \$200,000 demonstrated easier access to ownership, the average vehicle in Portland costing only \$26,500 and in New York \$68,000. At the plaza scale in Grand Army Plaza in Brooklyn, a strategy of new paving pedestrianized a location of food truck rallies and

Saturday farmer's markets. More Portland operators desired to open brick and mortar restaurants (88%) than in New York (35%), and with more owners had multiple food trucks in New York. These findings suggest indirect urban design strategies including: 1) additional paving types to mark pedestrian food truck rally areas, 2) eliminating or centralizing parking costs as done in Portland with Car2Go, and 3) adding nearby pedestrian areas with seating or tables for eating food. In Portland, owners responded more positively to regulatory support, including designated parking areas from the city government, as strategies to enhance cultural diversity for both food culture and business, creating a top destination for tourists and locals. New York operators subvert the traditional planned use of parking spaces by using them as commercial spaces, and 86% report parking fines, some everyday. They take advantage of truck mobility, with 85% changing locations during the day and on weekends to cater events such as weddings and corporate events. These phenomena and strategies of adaptive urbanism are closely related to the use of Twitter, Facebook, and Instagram allowing customers to follow them over changing locations, menus, and times of operation.

Direct Design Integration

Designers may use the integrated information to design the support of specific qualities of new food cart or food truck design, in the design of trucks themselves or the infrastructure for mobile cuisine. Directly translating parking ticket data in New York, for example, designers can create new regulatory support per neighborhoods or even physical environmental changes conducive to the city's mobile cuisine market. Strategies could also include smart lighting responsive to truck proximity, mobile application user data to affect behavioral change, or stepped parametric seating reorganized with different uses. In Grand Army Plaza, for example, immigrant owners seem to aggregate in one circle and U.S.-born owners in another. Perhaps parameters exist for each food truck design related to rear or side openings of the truck or integrated seating. Such direct urban design workflow directly connects analysis with design synthesis.

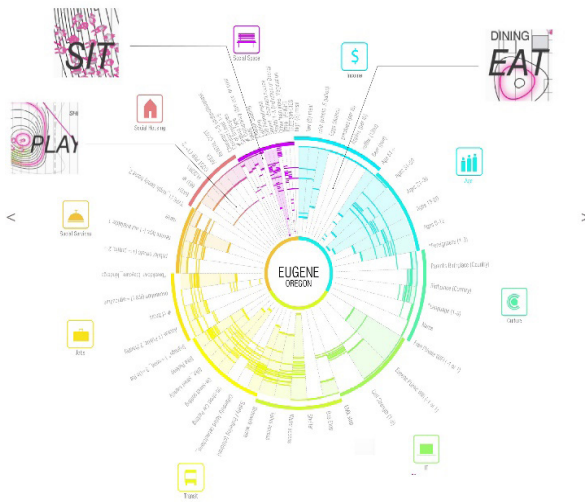


Figure 13. Hult Public Plaza

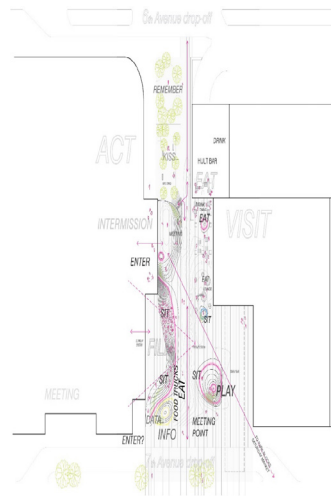
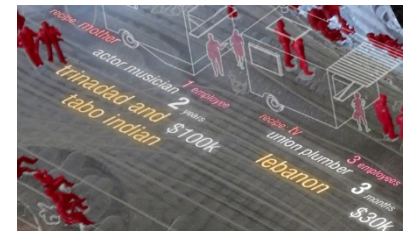


Figure 14.



Real-time Design Integration

Real-time information about cuisine, business and infrastructure may be integrated into design using the social and economic data framework. Associated colors of light or text may be displayed in various aspects of public space design. An example of this may be seen in the Hult Public Plaza design following a similar design protocol (figures 13 and 14), where white light across the plaza illustrates one set of values and colored light at each mound represents another. Values include owners' place of birth, origin of recipes, the number of other vehicles, previous occupation or highest and lowest cost of a meal (figure 14). This design illustrates all three data design integration approaches: (1) indirect strategies of sit, eat and play from similar data analysis and visualization (figure 13a), (2) direct design in the placement and data topography of values for stepped mounds for sitting, eating, playing and meeting near food trucks (figure 13b), and (3) real-time interaction design open to data using illuminated light and text for cuisine, business or infrastructure (figure 12), or natural phenomena such as air, water, or heat/light (figure 14). Future research will develop an interactive circle diagram for public participation for the public to select a desired program and location, using a mobile application or large touch screen.

The data may also be made actionable to affect behaviors in public space by using Human UI [16] to create a tool interface directed at non-Grasshopper users in design offices, mobile applications and situated technologies such as kiosks for everyday users, and a website for business owners to plan or adjust their operations.

As cities change through the subversive and unplanned use of both public and private space, there is an emerging layer of urban design, namely sociological phenomena and resulting data, that is conducive to incorporating into already advancing methods of computational urbanism. The constant shifting of human and non-human information leaves us unsure of the relevancy of existing methods to understand our cities. Processes that break the barrier between sociological and computational workflows offer hope of a new discipline of urban design that may support a greater connectivity between people and place.

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Making Voices Heard through a Generative Practice of Land Development

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Abstract

This paper is a call to action for implementing generative land development practices. Generative processes adapt to existing conditions and unfold over time. Generative community design theory suggests that successful communities must be designed, planned and built incrementally, with current and future users participating throughout the process. This paper further explains the author's research of generative land development as practiced and encouraged by Christopher Alexander. This includes new roles for the developer, planner, designer, financier, and resident. Some potential roles for skilled planners and designers are proposed, such as using GIS analysis to determine land-use suitability. These are combined with resident-defined processes, such as staking the ground to determine road, building and open space layouts. It is argued that this mixed-model of generative development provides multiple benefits: residents custom designing their new environments, residents fine-tuning their environments over time, and designers and planners providing expertise when and where needed.

Keywords: generative development, participatory community design, bottom-up development

Some authors criticize typical top-down land development processes and call for an approach embracing the desires, needs, and adaptations of a community's future residents (Alexander, 2002a; 2002b; 2004; 2005a; 2005b; Salingaros, 2000; 2006a; 2006b). However, these theories of generative design and planning proposed by Christopher Alexander and Nikos Salingaros are complex relative to typical development processes (Alexander, 2002b; 2004; 2005b; Salingaros, 2000; 2005). Because

of these complexities, it might at first seem easier and preferable to implement strictly top-down design and planning processes. Indeed, this study claims that there is a place for incorporating the benefits to top-down planner and designer expertise. Also, simultaneously achieving the positives of urban planning and the positives of organic, bottom-up development will not always be achievable within the context of modern development practices. Nonetheless, a hybrid system of development incorporating both processes is possible if development processes change. In fact, Alexander claims that the development processes must change if we are to have a world that respects the human environment and responds to users (2002a; 2002b; 2003; 2004; 2005a). He claims that the complex structures inherent in the world — the complexity that gives rise to wholeness, beauty and living structure — can only be made successfully through generative techniques (2002a; 2003). Also, Alexander cautions against static masterplans:

The effect of time on the process of adaptation is huge, and leads to types and styles of order quite different from any planned arrangement. Even in this first very small increment of construction, the dynamic time-dependent process creates and maintains relatedness. The static master-planned process does not.... Thus, the main problem of community development, of growing a neighborhood, is to do it in the dynamic way not the static way. That is the big challenge. How can it be done? (2005a)

If planners believe Alexander's statements are true, then it is imperative that design and planning processes incorporate generative techniques. The rest of this paper answers how this might be done by presenting Alexander's theories and applications of generative development processes and postulating how they might be applied.

Alexander's Generative Development Process

Alexander gives examples of generative development processes implemented in real projects — both in developed and developing countries (2002b; 2004; 2005a). He details these step-by-step processes — both how they are similar and unique to their context. All of these processes are guided by Alexander's understanding of living processes. If these techniques were to be used in another planning scenario, all generative processes for a development would be guided by Alexander's ten features of living generative processes:

1. A living process is a step-by-step adaptive process, which goes forward in small increments, with opportunity for feedback and correction at every increment (Chapter 8, 2002b).
2. It is always the whole which governs, in a living process. Even when only latent, whatever greater whole is latent is always the main focus of attention and the driving force which controls the shaping of the parts (Chapter 9, 2002b).
3. The entire living process — from beginning to end — will be governed and guided and moved forward by the formation of living centers in such a way that the centers help each other (Chapter 10, 2002b).
4. The steps of a living process always take place in a certain vitally important sequence, and the coherence of its results will be dependent to a large extent on the accuracy of this sequence which controls unfolding (Chapter 11, 2002b).
5. Parts which are created during the process of differentiation must become locally unique; otherwise the process is not a living process. This means that all repetition is based on the uniqueness of the locally shaped parts, each adapted, by the process, to its situation within the whole (Chapter 12, 2002b).
6. The formation of centers (along with the sequence of their unfolding) is guided by generic patterns which play the role of genes (Chapter 13, 2002b).
7. Every living process is, throughout its length and breadth, congruent with feeling and governed by feeling (Chapter 14, 2002b).
8. In the case of buildings, the formation of the structure is guided geometrically by the emergence of an aperiodic grid which brings coherent geometric order to built form (Chapter 15, 2002b).
9. The entire living process is oriented by a form language that provides concrete methods of implementing adapted structure through simple combinatory rules (Chapter 16, 2002b).
10. The entire living process is oriented by the simplicity transformation, and is pruned, steadily, so that it moves towards formation of beautiful simplicity (Chapter 17, 2002b).

These processes might seem relatively general, but they nonetheless form the framework which can guide generative development. However, a more specific step-by-step process, or generative codes, are outlined by Alexander, et al. in regards to the procurement process and project management of a developments:

- The creation of a neighborhood always starts with respect for, engagement in, and careful enhancement of, the community life of the neighborhood even in its smallest details.
- Clients and users had a major part in the creation of the pattern language which was the basis for the generative code.
- To feel genuine satisfaction and identity with a neighborhood, the clients themselves and users must, physically, play a significant role in laying out buildings, streets, dwellings, and public spaces.
- Further, it makes a real difference when people do this on the ground. That means walking around together on the land itself, placing strings, stakes, and markers, and reaching a state, in their minds, where they almost feel that the buildings are already there.
- It also makes an enormous difference to the success of the project if the plans are drawn from the stakes left in the ground (the opposite of what

happens in typical production processes and housing construction procurement today). This can be achieved economically by use of high-tech surveying methods which allow a direct translation of the field position of a stake, to the digital drawing which defines the project.

- Possibly the biggest single factor is the control of the project through construction management, not by a general contractor, but by a project manager who directly controls budgets, and subcontractors, and who is in touch all the time with the members of the community.
- Further, it makes a great difference if money enters explicitly into the process, and the contract documents control the total contract price, but allow flexible reassignment of line item costs while the process moves forward, so that matters of importance can be addressed during construction, without raising costs.
- It is also vital that subcontractors are directly controlled by the architect and families, within the constraints of a project manager, so that many hundreds of small adaptations can be made as the project advances, without causing delays or cost overruns.
- In conclusion, we believe that even when housing has to be built without community and without real people as clients, the creation of the housing must be handled in a form which introduces community and unfolding from the first minute of the first day. And the project as a whole must be seen as a human endeavor, not as a technical endeavor, and this human endeavor must have as its continuing, principal object the day-to-day enhancement of each individual in the community, so that they can then give back to the community the well-being that they have received from it (2005b).

Alexander's project in Santa Rosa de Cabal, Colombia provides an anecdote to developing countries' development where planners lay down an orthogonal grid which ruins the organic coherence (Alexander, 2005a). In this case, as in Salingaros's example, the roads are laid out first (Salingaros, 2000). However,

the roads are laid out on site by the residents and the planners. These staked out streets then formed the plan drawing, not the reverse in which the drawn plan determines the site. Also, this plan was the one used for submission to local government authorities. The result is an organic road structure that is at once responsive to the residents' desires, needs and feelings, and also is informed by the planners' expertise.

The previously mentioned processes outline and practiced by Alexander and his colleagues do not rely on rigid and prescriptive top-down planning and design, such as that practiced in New Urbanism. Nonetheless, a master plan and/or form-based-codes of some kind — ones that ensure unit numbers, height restraints, etc — might help satisfy municipal planners, developers, and bankers in some cases. In his Colombian project, Alexander points out the troubles they encountered when bankers and the umbrella organization supporting the project worried that houses were not uniform enough. He and his team eventually convinced them of the value of unique houses designed, built and adapted by the residents (Alexander, 2005a). Thus, in many current land development paradigms, generative codes may not satisfy funders and project approvers. Alexander proposes the following "ways of modifying the bank-development-society machine" in order to satisfy clients, residents, builders, banks, and developers:

- Project management is a major way of driving this approach.
- Developers must have a social license (i.e. society starts to require this of them).
- Discussion of characteristics of developers who have been able to implement generative codes.
- Cooperation with planning authorities, separating cases where owners are resident from cases where owners are non-resident.
- Establish a basis in law, which requires greater responsibility and responsiveness from developers.
- Insurance from uninvolved non-profit trusts which are willing to underwrite the risks.

- An analog of the Grameen Bank model, based on a system of small loans helping people fix up their houses and extend them.
- Local codes or zoning ordinances which require just those characteristics of process which will make generative codes possible and implementable.
- Making the local authority pay more attention to families and communities than to the developers (2005b).

Alexander's new development process and language can be implemented on a large scale — but it will be difficult. The aforementioned example of Alexander's project in Columbia involved seventy-six families/houses (Alexander, 2005a). His work in Peru seems to be of a similar scale (Alexander, 2002b). These do not provide great precedent for very large scale projects. However, Alexander makes the case for generative processes guiding "giant projects" (2005a). He sees high-volume, high-efficiency production, coupled with careful craft and adaptation of detail, as key to making giant projects affordable. Some of the key features include:

- Extensive use of computers.
- Extensive use of handcraft and hand-eye sensitivity translated to component manufacture through computer-intense technology linkage.
- Partial prefabrication undertaken to allow detailed on-site adaptation and adjustment.
- Off-site production.
- Off-site testing of partially completed configurations.
- Use of ultra-high-technology cutting and forming equipment.
- Further adaptation on site at time of installation.
- On-site modification of pre-formed components.
- Adaptation in off-site mockup facilities.
- Subtle adaptation of shape, color, geometry, and form of components as the on-site space develops in shape and degree of completion (2005a).

The use of these processes, although presented in the context of an architectural project, could also be modified for large scale urban design processes. The main key to successful implementation of generative development processes in large-scale projects is coupling high-speed and efficiency with craft and adaptation. Thus, although materials are fabricated through efficient, modern means, the development process (at all scales) is generated, not fabricated. Convincing a large developer of the value in this may prove difficult. Nonetheless, it is possible.

Potential roles for the designer and planner

Some specific ideas for inserting designer and planner expertise into organic and generative development processes include conducting a site analysis typical in landscape architecture. In particular, Geographic Information Systems (GIS) could be used to determine suitability for development. In the classic McHargian overlay process, all the inputs of a site could be empirically weighed with each other, such as soil types, steep slopes, aspect, groundwater recharge rates, tree and plant species to preserve, etc. (McHarg, 1969). This process could be used to help mitigate the potential negative effects of organic, bottom-up settlement growth, such as building on unsuitable soils. Also, values from the residents could be entered into the GIS to accommodate their particular desires, needs, and values. For example, perhaps a community values a public water well as a community gathering spot (for both practical and social reasons). The most suitable locations for wells could be mapped and overlaid with the other development suitability criteria. The result of the GIS analysis would be that residents, designers, and planners, as a cooperative group, would understand the most suitable sites for development. The residents could then use that basemap as a guide when they are staking out their sites as Alexander proposes. That is, the residents guide and control the process within the parameters of site suitability partially set by designers and planners. In such a development process some of the best features of urban planning and landscape architecture

can be combined with some of the best features of informal settlements.

The site analysis and GIS environmental land analysis could also help in developing a site that unfolds over time. The GIS base-map could determine development suitability scenarios. These could be mapped. After that, an initial road network could be laid out by the residents and planners in a cooperative effort (similar to Alexander's Colombian project). Sites that are deemed suitable for development can be staked out by families over time. Also, room for expansion might be included so families can expand if their income increases (or can expand and rent out part of their property).

However, plans cannot be too prescriptive or proscriptive or they will squelch the benefits of generative processes that unfold and adapt as needed over time.

One note is that the planners using GIS data and site analysis should be careful with value-laden map layers and data. For instance, preserving a watershed for the development might be something a planner can point out to residents, but not prescribe. However, features that could affect the health of people or ecosystems (e.g., not building on poor soils) may be something more objective and absolute in value. Thus, GIS development suitability analysis might be divided into two categories: features that are more objective and those that are more subjective and open to debate and interpretation by the residents.

Perhaps another way to develop a site incorporating the best features of planning and generative settlements is to create a development algorithm. This would mean that one development decision requires certain actions — actions that are dependent on the previous actions leading up to them.

However, an algorithm may be too prescriptive to allow the generative planning process to unfold in a coherent way. It might assume too much predictability on the part of the planner, much as a master plan might be too rigid. As such, Alexander's

aforementioned ten features of living generative processes provide a better step-by-step approach that enables more flexibility.

Conclusion

A combination of resident decision makers and planning guidance can create a hybrid development process that can be called emergent, organic, and/or generative. However, implementing a generative process for growth and development may be difficult with the realities of today's land development size and procedures. Nonetheless, a change in the processes, as mentioned before, can occur. Implementing Alexander's methods likely will not happen in most developments. However, this should not and need not be a reason to not try to implement these generative processes wherever possible. Indeed, if future communities are to contain the complexities and richness of organic development, then we must practice this new, human-centered, emergent development model within the context of successful planning and design techniques.

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Abstracts

ACTIVE LIVING BY DESIGN

Walkability and Bikeability in Small Rural Towns: A Literature Review

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Almost half of the U.S. adult population lives with chronic diseases, a major cause of morbidity and mortality and the source of 86% of health care spending. Although physical activity decreases the risk of many chronic diseases, only half of U.S. adults meet the recommendations for physical activity. Rural populations are less physically active and thus more at risk for lifestyle-related diseases. Research has shown that urban environments are positively associated with increased physical activity levels, in particular active travel (availability and accessibility of destinations, path availability and connectivity, convenience, streetscape, supportive urban form, safety, and aesthetics). Much less is known about environmental determinants of active travel in rural towns although the conditions of the physical environment may be very different and hinder peoples choice to exercise and maintain healthy habits: (1) dependency on urban centers for jobs, higher-level services, and social networks; (2) poor public transportation systems and infrastructure that hinder social and economic development; (3) automobile-oriented streets and thoroughfares and high speed; (4) limited availability and poor pedestrian accessibility to key destinations; and (5) limited financial resources for improvements.

The literature review was conducted in 2016. The findings suggest that:

1. there are indications that the physical environment in small rural towns may contribute to a higher prevalence of inactivity;
2. more research is needed to further understand the

complex associations between choice of travel modes and environmental affordances in rural settings;

3. the research focus has mainly been on urban settings and populations, but less on rural areas and subjective matters that concern perceptual experiences of place;
4. active travel research is scattered among many disciplines (mainly public health, planning, and transportation), each with its own research approaches; and
5. there is a need to increase the share of environmental and community design (natural, built, socio-cultural, and experiential factors) in the discussion of health promotion in rural settings.

To further help us understand rural/urban disparities in diseases related to physical inactivity, the review was used to develop a systematic classification of environmental determinants of active travel in rural settings that will guide data collection in Wisconsin.

Physical Attributes of the Environment, Travel Mode to Work, and Attentional Functioning

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Research in environmental psychology and public health suggests that urban residents who walk more in outdoor spaces have relatively higher levels of well-being compared to those who walk less. It is unclear, however, the extent to which routine travel modes to work are associated with a sub-component of well-being, attentional functioning. Understanding these associations can shed light on possible ways to improve urban residents' well-being through restoration from mental fatigue.

This study focuses on urban residents' attentional functioning, and how it may differ depending on the way participants get to work or school on a daily basis. A random sample of 434 Chicago residents

participated in a survey using a five-point rating scale to respond to a wide variety of questions on these concepts. Exploratory factor analysis resulted in two distinct measures for physical attributes of the environment including proximity to green/social space and amount of nearby green features, and attentional functioning. The attentional functioning measure was adapted from three scales: Social Connectedness, Positive and Negative Affect Scale (PANAS), and Attentional Functioning Index (AFI).

Analyses showed that the average level of attentional functioning among those who walk to work or school is significantly higher than that of those who drive or use public transportation (bus or train). Additionally, a strong association was found between the proximity to green/social spaces and attentional functioning. Given the significance of travel mode and proximity to green features in relation with attentional functioning, this study suggests more in-depth examination of outdoor spaces to find out possible ways of improving walkability and nearby green features in residential neighborhoods and encouraging the residents to walk more frequently. The next step is to test the extent to which travel mode mediates the association between proximity to green/social spaces and attentional functioning.

CHILDREN, YOUTH, & ENVIRONMENT

A School for the Future Challenges the Culture of Control

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Most public schools in the U.S. were built in the second half of the last century. Their buildings typically distinguish between classrooms and narrow, locker-lined hallways. The former clearly belong to the teachers and best support lecture-style instruction. The latter are the locations for social interaction between students during their breaks. Many educators, administrators, and researchers worry about teenage behavior in high schools. Student peer culture is commonly understood as problematic. In response, break times typically are minimized, supervision routines are designed to be seamless, and educational policies regulate disciplinary institutional responses to acts of violence between students.

This study's goal is to get a deeper understanding of the problem, which student behavior during the breaks seems to create in the spaces between classrooms, in the hope that this knowledge could lead to more sensible solutions. The ethnographic case examines the relationships between high-school student break behavior, local disciplinary practices, and a contemporary school building designed to blur the boundaries between lounge-like social spaces and informal educational spaces. Over the course of six months I spent forty-two school days with Orbit High's teenagers in the spaces between classrooms. Primary sources of data are field notes, log entries, behavioral maps, and open-ended interviews with twenty-four purposefully chosen participants.

Using a two-phase coding process, I found an environmental mis-fit between the extraordinary pedagogical affordances of the building and the

perception of adult stakeholders to be responsible for the enforcement of an environment that eliminates opportunities for conflict. Interestingly, the favorite social spaces — sites of the best social experiences between students — were also likely locations for physical fights. These results suggest that architects and educators involved in the design of the next generation of schools need to consciously consider user needs that in the current culture of control might appear contradictory.

An Approach to Capture the 'Voice of the Customer' During the Design Process: An In-depth Case Example of a Neonatal Intensive Care Unit Renovation Project

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This study captures the 'Voice of the Customer' (VOC) for a Neonatal Intensive Care Unit (NICU) renovation project at a major academic medical center. A systematic approach was devised to collect pre-occupancy quantitative and qualitative data that truly represents the VOC. To do this, customized questionnaires were distributed to both staff and family members to understand significant predictor variables of the indoor built environment related to work performance and perception of care. For example, predictor variables include noise level, electric light, amount of work surface area, and availability of work stations.

Then, 60-minute semi-structured focus groups were conducted with three different user groups: staff, parents of previous NICU patients, and parents of current NICU patients. Focus group discussions were structured around key findings from the questionnaire. In addition, images were provided to support design concepts.

Audio recordings of the focus groups were transcribed and coded to identify common themes. Data collected was then utilized to create a design criterion with themed categories that truly represents the VOC. The VOC criterion was used by the design team to help evaluate prototypes and mock-ups.

The new NICU will be opened in Fall of 2018; it consists of six pods, each with 12 single family rooms (SFR). The intent of these pods is to create care communities among staff and families within the larger unit, a key VOC category. Within each care community there is a dedicated team huddle space to foster staff collaboration, along with immediate access to supplies, medications and infant milk storage to increase workflow efficiency. Another VOC category expressed by families includes visibility, safety, and security. To achieve this, SFRs are visible by multiple nurses within each care community through decentralized nursing stations that are positioned between sliding glass doors of two rooms.

Evidence-based Trauma-informed Design: Interdisciplinary Teamwork to Create Places of Safe Inclusive Refuge within an urban Middle School

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For 50 years school design research has generated insights such as furniture arrangement, effects of windows, and density for students' behaviors and learning. Yet it is estimated that 25% of youth today experience substantive trauma that alters their neural processing abilities, thereby impacting school experiences. How can evidence-based, trauma-informed design be implemented in an urban middle school? The aim is to document this evidence-based design (EBD) project and increase understanding of optimal design-related approaches for trauma-sensitive schools.

This project uses a participatory, action approach, with an interdisciplinary team consisting of a community-based organization of counselors, the school, and design masters' students. Therefore, project goals are to: (1) maintain authentic relationships across the entire team; (2) conduct formative evaluations through observations, counselor and youth input, and existing evidence; (3) facilitate increased sense of ownership and dignity through EBD renovations for two rooms (refocus and individual counseling); in order to (4) create exemplars to garner funding for anticipated redesigns; (5) assess design solutions' efficacy through summative and post-occupancy evaluations; and (6) contribute evidence to EBD research for populations needing trauma-informed design.

Initial design suggestions include those that offer a sense of order, are suitable for students with verbal challenges and preschool level emotional maturity, promote place attachment through student generated 'who am I?' collages, and create safe refocusing spaces (for example an 'aggression booth') to facilitate release of challenging emotions.

Under-resourced, unpleasant school settings increase stress and anxiety for students already challenged by trauma-exposure. Implementation of trauma-informed, evidence-based design solutions via an interdisciplinary team likely leads to better understanding of the process for achieving urban school environments. The long-term goal is to create scalable optimal school environments based on rigorous evidence-based design research, without resorting to a one-size-fits-all set of guidelines.

Hearing Unheard Voices: How Growing Up Boulder Improves City Planning through Youth Involvement

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In Boulder, CO, a small group of citizens from the dominant population consistently shares their voice in city planning. They are able to attend public meetings and use online engagement tools because they know how to navigate power structures. However, many other important voices within the community, including children and youth, traditionally have less opportunity to make their voices heard on issues that affect them. Growing Up Boulder (GUB), Boulder's child- and youth-friendly city initiative, seeks to balance the loudest voices in the public discourse with those of the city's children and youth.

Based out of the University of Colorado, GUB is a partnership between the University, the City of Boulder, and the local school district. GUB works with children ages 0-18, with a focus on children from underrepresented groups. Over its 8-year history, GUB has developed a successful participatory planning process that involves three steps: 1) establishing children as experts on a given planning topic, 2) deepening children's knowledge on the topic, and 3) children synthesizing their ideas and deliberating about the topic with decision-makers. The process continues when city leaders share the children's ideas with the larger public, communicate how they will use the young people's ideas back to the young people themselves, and finally integrate the children's ideas into city plans.

We will examine this participatory design process through several case studies. In one project, children's requests for nature, water, and adventure play led to a more balanced park concept plan in the face of organized sports groups' exclusive requests for ball fields. Young people's desires to see and touch nature helped another park design overcome planning board resistance. Finally, learn how youth pushed planners to consider inclusion when they requested gender non-binary bathrooms and supportive spaces for homeless in the public domain.

More Fences, More Freedom? Exploring the Impact of Environmental Features on Parents and Other Caretakers' Strategies for Supervising Children in Public Play Environments

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The purpose of this exploratory sequential mixed methods study was to identify how environmental features in play areas at two destination parks in the metropolitan area of Raleigh, NC, may affect the monitoring behavior of caretakers of children two to 12 years old and consequently the amount of freedom and autonomy the children experienced. Researchers have theorized that children's ability to "disappear from the supervision of adults" and "get lost" may benefit their physical and mental health (Brussoni et al., 2015). Children in the presence of adults in public parks are significantly less physically active than other children. (Floyd et al, 2011). Children also take fewer physical and social risks when adults are watching (Kemp, 2015). Gray (2011) reasons that learning to negotiate such situations without adults teaches self-control.

Floyd et al. (2011) hypothesized enclosing play areas, "could encourage parents to allow their children to freely explore their surroundings, providing more opportunities for physical activity" (p. 263). Both parks in this pilot study were physically enclosed, but in different ways. In park 1, the play area had a single uncontrolled entrance to its fenced areas while the park 2 play area had two entrances and lacked visibility between them. Twenty focused interviews were conducted with a representative sample of caretakers

in park 1 in an attempt to identify other factors that may affect caretakers monitoring behaviors including age, gender, environmental features, and caretakers' concerns. These interviews informed a survey in both parks (n1=87, n2=48, time-based cluster sample). Eighty-five percent of park 1 caretakers and 76% of park 2 caretakers reported that the play area's enclosure encouraged them to give their child more freedom of movement. Only 37% said it encouraged them to watch them (in a literal sense) less closely. Caretakers also reported surfacing, visibility, and area affected their monitoring behaviors.

Participatory Design and Landscape Stewardship: "I Like that I was Part of Something."

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Enhancing a school yard through a participatory design project can be seen as one form of landscape stewardship that engages teens in the improvement and care of their local environment. With an emphasis on collaboration and skill building, such school-based projects may build efficacy for local environmental stewardship. In post-industrial landscapes with little economic affluence or political will, building efficacy for local landscape stewardship may support the care of much needed safe public green space. This presentation shares the perspectives of eight 9th-grade students from a post-industrial Midwestern city, who helped re-design and construct an outdoor classroom on their school grounds. A concurrent case study explored the potential of such projects to build collective efficacy for future landscape stewardship. Post-program interviews and participant observation highlight how perceptions of self-efficacy and collective efficacy for improving the local landscape are closely intertwined. Findings reveal that skill-building competencies, particularly those of garden creation and amenity construction, as well as an expanded social network, supported self and collective efficacy for landscape stewardship. Furthermore, teens'

collective efficacy was bolstered by the perception that adults in the community would support their efforts, but mitigated by their concerns that the new newly created spaces would be vandalized by older youth. The study suggests that school-based participatory design projects that incorporate a design build component — in which young people can help construct what they helped design — can strengthen social networks and support collective capacity for future urban landscape stewardship. Findings from the study guide suggestions to help designers, educators, and youth advocates support the efficacy of young people in low income communities, with few green amenities, to become stewards of local landscapes.

Place Identity: Neighborhood Stigma and Adolescents' Self Identity

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Adolescents from a large urban area, a small urban area, a suburban neighborhood, and a rural community ranging in age from 11 to 15 were individually interviewed over a period of 4-7 weeks about their activities and experiences in their home, school, and neighborhood environments. We chose this age range because it is a period of shifting experiences for young people as they transition from childhood to adulthood. All interviews were conducted by the same interviewer so that a level of trust was established. The interviews were open-ended, taped, and later transcribed. Analysis of the interviews was based on the ground theory approach (Glaser & Strauss, 1967). Initial analysis (presented at EDRA 2016) of the interviews revealed concern about safety and noise. Safety concerns were expressed by all youth but differed by neighborhood type. Some youth had concerns about violence in their school or neighborhood, others were fearful of the police and some felt unsafe when they were home alone. A few

had safety concerns about the physical condition of their home. Noise was a source of annoyance and interruption in the home and a source of disturbance in school.

Further analysis of the interviews reveals two distinctly different types of neighborhood experiences for the participants and is the topic of this year's presentation. Adolescents' self-identity and self-esteem and neighborhood type are discussed in the context of place identity theory which states that children develop a sense of identity based, in part, on the character of their primary environments of home, neighborhood and school (Proshansky, et al., 1983). Those living in public housing in small and large urban communities acknowledged the stigma associated with their communities. However, those living outside of these communities recognized the stigma of these neighborhoods as well. Stigma was also associated with rural communities.

Places of Tolerance

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We live in a time of thrilling but also challenging tumultuous change in which a return to social solidarity, tolerance, and participation increasingly gains in importance. The author sees landscape architecture and environmental design as having the potential power to manage social conflicts and migration, and establish debates and live democracy. Yet the classical design process is still characterised by a clear division of the roles between designer and client. This is most evident in existing consultant fee schedules imposed on architects, landscape architects, and engineers, always following one clearly predefined project path.

This presentation shows a series of pro-bono community projects in Winnipeg, Manitoba. The humble projects have allowed the author the luxury to radically ignore the conventional procedure. Low budgets are normally a challenge, but these community

projects offer exemplary value and demonstrate a pioneering character with regard to budget, participation, execution, and outcome.

The author integrates design experiments and interdisciplinary innovation into his landscape architecture practice to inform new methods and engage the public. The results are spatial experiences that employ alternative design and building techniques and open up new perspectives in the process of making. As a form of 'hands-on architecture,' it encourages interested people to get involved without losing the integrity of the umbrella design.

The hands-on architecture is characterised by the application of construction techniques and materials which allow volunteers including children, teachers, students, and families of any skill and commitment level to get involved in building, while learning and laughing together. These projects do not aim to reach an ideal state but rather to record the changes and everything that has happened to it. The results facilitate community, beauty, and learning through the life and health of a non-domesticated environment.

Putting Puzzles Together: Sensory Integration, TEACCH, and ASPECTSS Role in Design for ASD

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Sensory integration is a neurobiological process involving interpretation and integration of sensory stimulation of one's body and the surrounding environment. "Sensory integration refers to how people use the information provided by all the sensations coming from within the body and from the external environment" (Lindsey Biel, 2005). Designing a space for individuals with autism require careful integration of sensory elements that will be sensitive to the person's challenges. "Sensory integrative therapy is a holistic approach; it involves the whole body, all of the

senses, and the entire brain" (Ayres, 1979). Space design and teaching pedagogy are interdependent for communication skills, socialization, and independence of individuals.

TEACCH

Treatment and Education of Autistic and Related Communication Handicapped Children (TEACCH) uses several techniques and methods according to individual's personal needs and emerging capabilities. A TEACCH classroom is usually very structured, with separate defined areas for each task, such as individual work, group activities, and play. It relies heavily on visual learning, a strength for most children with autism and pervasive developmental disorder (PDD). Goals of TEACCH are to help autistic children:

- grow up to a maximum autonomy at adult age,
- understand better his/her environment, and
- communicate for comprehension and expressions.

ASPECTSS

Architect Magda Mostafa developed seven design indexes to answer challenges of design for autism. The seven ASPECTSS (Acoustics, Spatial sequencing, Escape space, Compartmentalization, Transitions, Sensory zoning, and Safety) closely follow sensory integration requirements while supporting teaching pedagogy essential for training children with autism spectrum disorder (ASD).

The presentation is an attempt to integrate sensory integration challenges and TEACCH methods along with ASPECTSS indexes to formulate spatial needs and design guideline for learning spaces for ASD. It will include literature review and case studies of the current facilities available in elementary schools in selected school districts. Holistic approach and understanding spatial challenges, sensory integration, teaching pedagogy, and design indexes are essential for designing spaces that may be a "best fit" and flexible enough to meet the ever-changing needs of children with ASD.

Speaking with the Trees: Harnessing the Potential of Informal Learning Environments by Individuals with Autism Spectrum Disorder (ASD)

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This proposal extends the research that was presented at EDRA47 as a mobile session, which featured the outdoor Hide Away Woods exhibit at the Museum of Life and Science located in Durham, NC. This current data is reflective of the participation of individuals with autism spectrum disorder (ASD) in the Museum of Life and Science during 2017, and especially April 2, 2017, World Autism Day.

The researcher collaborated with staff of the Museum of Life and Science and the TEACCH Autism Program, which is an affiliate of the University of North Carolina Department of Medicine. The TEACCH Autism Program is innovative for the fact that it developed the concept of the "Culture of Autism" as a means of conceptualizing the characteristic patterns of thinking and behavior evidenced by individuals with ASD. "The NCTEACCH approach is a family-centered, evidence-based practice for autism, based on a theoretical conceptualization of autism, supported by empirical research, enriched by extensive clinical expertise, and notable for its flexible and person-centered support of individuals of all ages and skill levels."

Traffic Calming around School: Voices from Children in Eight Primary Schools in Quebec, Canada

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Many local authorities promote walking and cycling among children as a strategy towards healthier lifestyles and more sustainable mobility. Making the route to school safer is an important dimension of this strategy. Inspired by initiatives like Safe Routes to School, Vélo Québec (a non-profit organization) has carried out the "On the Move in the Community" program since 2005. Implemented in nearly 900 schools across the province, the program includes educational activities and action plans to produce built environment changes (traffic calming) around schools. A growing scientific literature evaluates the impact of these traffic calming devices in terms of mobility, behavior, and safety. However, little is known about the way children perceive them. What do children think about different traffic calming measures and their effects on travel and safety?

Our study (2013-2015) draws on data gathered through eight focus groups, followed by walking tours with Grade 6 children (n=65, 27 boys, 38 girls) from eight primary schools in Montreal and Gatineau, Quebec, where the program "On the Move in the Community" was implemented. Selected schools are located in different urban contexts, from central multifunctional areas to suburban residential neighborhoods. We transcribed the group discussions and analyzed them using qualitative methods.

The study found that (1) vehicles' speed is the main perceived threat for children in all contexts, while illegal parking appears as meaningful only in mixed

land use neighborhoods; and (2) children are confident about the effectiveness of traffic calming devices that reshape the street geometry (speed bumps, street narrowing, sidewalks widenings, etc.), but they are skeptical about the effectiveness of mere "informative" measures (street markings, signage, etc.). Our findings help to understand the importance and the limits of programs such as On the Move in the Community. They inform public policy for a more effective promotion of walking and cycling among children.

CITIES & GLOBALIZATION

Moving Beyond the Informal Settlement as Dystopia and Utopia

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Informal settlements are a burgeoning reality of 21st century urbanism throughout the world. A number of environmental design and planning scholars and practitioners are poised to expand teaching, research, design, and planning in these communities. In order for these scholars and practitioners to have informed community engagement, they should understand common perceptions of informal settlements. Informal settlements have undergone academic analyses and normative treatments often depicting them as either dystopias or utopias. This discourse often transitions from framing these communities as maligned to problematic to celebrated environments. This study contextualizes historic and current treatments and studies of informalism as a typological utopia and dystopia. A review of design, planning and policy theory, and praxis approaches are evaluated, both generally and specifically with the case of Istanbul informal settlements. For example, from the perspective of designers, scholars, and planners, the informal settlement has gone from an urban fabric to be destroyed, to "housing that works," to an ecological and social catastrophe, to a utopic solution for 21st century cities. This study reveals that most of these utopian and dystopian labels and treatments have come from perspectives outside the informal city. The permanent residents and builders of these places tend to reject the utopian/dystopian themes perpetuated by scholars, planners, designers, and policy makers. Instead, interviews and a review of literature reveal that they eschew labels of good or bad environments, but look instead to the pragmatic mitigation of poor elements and the celebration and fostering of good

elements. A discussion further posits the consequences of the dystopic and utopic perspectives of informalism on the residents, citing both general consequences, as well as specific examples from Istanbul's informal communities. The study concludes with suggestions for how researchers and practitioners can apply this understanding to teaching, research, design, and planning in informal communities.

Public Art and Climate Change: Learning from "High Tide," an Installation on the Rose Kennedy Greenway

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Appropriately designed art in public spaces may be able to increase public awareness of the local effects of climate change, but examples of this are not currently well documented. Using a specific art installation as a case study, our research question is: does public art in combination with appropriate signage engage the public in considering the effects in climate change? If so, how?

The case study for this project is an art installation by Carolina Aragon on a very prominent site in Boston's Rose Kennedy Greenway. "High Tide" resembles a natural marsh at high tide, with 500 white fiberglass rods as grasses, and 1500 dichroic Plexiglas circles representing the predicted volume of the water in future flooding caused by climate change. A sign describing the concept of the project is located nearby. The project is designed to be visually attractive through its dynamic and colorful engagement with light, and thought-provoking in its embodiment of a likely and risky climate future.

The research methods are participant observation of passersby, interviews with stakeholders, and an online survey targeted to local residents. Our participation observation has found that about 10% of passersby stop and look, and of those about one-third read the signs. Given this, it is clear that for public art to make a difference it will need to be installed in high-volume areas and signage will need to be simple and very prominent. The arresting visual quality of the work appeared to encourage observers to stop and attend to the programmatic climate content. Our interviews and online surveys give further insight on whether the installation changed the perspectives of those whose neighborhood it described. The findings will help inform other environmental designers who seek to encourage public awareness of the dangers of climate change.

Segregation by Design: Historical Analysis of Segregation and Potential Mitigation Strategies

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Segregation by Design (SBD) is a course jointly offered by Washington University in St. Louis and Harris-Stowe State University (HBCU). SBD is the result of a novel interdisciplinary and inter-university curriculum development grant supported by The Divided City Initiative — a Mellon Foundation program to encourage research on segregation. It examines the causes and consequences of segregation in six metropolitan St. Louis neighborhoods, and develops potential mitigation neighborhood plans in collaboration with community-based organizations.

The premise of SBD is that an analysis of segregation from diverse disciplines will lead to a holistic understanding of the role of planning/design in promoting segregation and its social, economic, and environmental ramifications. The goal is to model resilient communities from a triple bottom line

sustainability perspective. It is hypothesized that a transdisciplinary approach is the way of undoing three centuries of segregation in America, and to take the comprehensive neighborhood plan from the classroom to implementation.

The course is structured in three parts: (1) an examination of design and planning policies and practices that have led to segregation in America, (2) an exploration of the consequences of “American Apartheid,” and (3) the development of mitigation strategies from policy, planning, and design perspectives.

Teams comprised of two students from each university and two mentors from the design/planning and history/policy fields work collaboratively through a series of exercises supported by lectures from academics and professionals in the region, a robust reading list, and fieldwork experience. The selected neighborhoods represent a range of segregation situations and possible goals (e.g. equity, inclusion, or integration).

A travelling exhibition and catalog showcases the work through the semester. The intent going forward is to expand the number of students from regional universities, and to use the course as a platform to stimulate discussion of segregation in metropolitan St. Louis.

Teaching Community Engagement through Tactical Urbanism

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“First life, then spaces, then buildings, the other way around never works.” – Jan Gehl

For a series of collaborative, multi-disciplined studios in interior design, landscape architecture, and historic preservation, we took on a community engagement

project through tactical urbanism. Across the courses, students increased their breadth of understanding of space in its attendant architectural and landscape frames and populated by the objects and artifacts of human experience. Working individually and in groups of varying size, we looked at mixed-use buildings in the Southland commercial area in a series of iterative, related, community-based design interventions. Developed in the 1950s, the commercial area sits at the middle of a 1000-house neighborhood. The commercial area has experienced a renaissance in the last ten years, focusing on attracting Kentucky-based businesses to its core. One of our community partners, the Southland Association, offers programming that puts life on the streets and in the storefronts and provides a way for students to see how design connects to the city at various scales.

We asked students to situate their designs in the local and everyday through the human-centered design process and maintain awareness of global connections and permutations. In total, we worked in the traditional interior (a retail space), in the interior of the streetscape (with partners in landscape architecture and historic preservation), and in the various processes that impact human beings where design reaches them (design research, public process, and historic context).

For this presentation, we will share our process for dynamic engagement with the community through design. Utilizing both the human-centered design process and the models offered by Gehl Architects (people-centered design) and VIA Studio (branding solutions), we will demonstrate how it is possible to achieve great results from a semester-long engagement across disciplines in scale from interior design to the urban landscape.

Two Cities Struggle with the Legacy of Urban Renewal and Highways in the Age of Google Fiber

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The 1949 Housing Act's goal to eliminate urban blight and the 1956 Highway Act to facilitate inter-urban movement synergistically had mostly negative impacts on the livability of urban centers and on mostly low-income communities. This article parses the effects of these two programs using the twin cities of Kansas City, Kansas, (KCKS) and Kansas City, Missouri, (KCMO) as case studies.

The federal government approved projects in both cities during the first round of funding. KCMO had enacted enabling legislation in the 1930s and 1940s (to address blight, create a housing authority, and allow eminent domain) and completed the first projects in the 1950s — demolishing the area east of the Civic Center and planning a loop of highways to increase accessibility. Kansas' enabling laws were challenged in court until 1955 and implemented only in the 1960s. By then, the negative aspects of urban renewal were already becoming known. Nonetheless, KCKS demolished not only blighted (African-American) areas, but also most nineteenth-and-early-twentieth-century buildings, including the Carnegie library.

KCMO has been hampered in its current development by the highway loop that leave less than a square mile of area in the downtown core. The city is starting to consider the removal or capping-over of parts of this loop of highways. In KCKS, the highways paralleled the railroad lines and did not infringe on the urban center, but new downtown development did not start until the 1970s, when the first suburban shopping mall opened, leaving the heart of the city moribund.

Using extensive local and national archives, newspaper-and-journal articles, and interviews, this paper explains the reasoning of architects and planners in supporting both the highway program and “Urban Renewal” after World War II and the impact of these decisions on two cities that are struggling to reinvent themselves as creative cities in the age of Google Fiber.

Urban Resilience Metrics: Toward Landscape Design Evaluation

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Many of climate change’s worst shocks — storms, floods, habitat destruction and threats to biodiversity — are water-related events. The resilience of cities depends significantly on the effective management of water: interventions that focus on improving urban ecologies and the advocacy for greater landscape literacy. How water is designed to travel across and seep through the urban landscape has tremendous consequences for urban resilience or capacity to prevent, survive, mitigate, and adapt to climactic challenges today. To what extent citizens and decision-makers participate in and support water-related processes will determine the sustainability of water management initiatives in the future. Evidence and transparent metrics that indicate progress towards resilience play an important role in sustainable development and design of cities and urban landscapes facing climate change. With the objective to delineate an approach to measure, compare, and visually represent urban resilience, I hope to support policy makers with new evidence-based tools and to advance the knowledge base on urban resilience and design evaluation. This research will identify and propose a standard set of metrics or index by which water management efforts and designs can be examined across different urban contexts. The index will be based on existing data that cities and conservation authorities already collect and will build on an existing theoretically-grounded framework

for urban resilience. This will contribute towards a comparative framework for cities to evaluate the impact of sustainable landscapes designs for water management on urban resilience.

Competing Claims for Residual Urban Space: Reappropriations of Residential Back-alleys in Inner Suburbs of Melbourne

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This paper examines the capacity of residual urban space to be repurposed for new uses, as illustrated through a case study of reappropriation of residential back-alleys in the inner-suburbs of Melbourne, Australia. Back-alleys are a common urban feature in Melbourne, located predominantly in older inner-suburbs that have high populations but low open-space densities. They are leftover infrastructure from the 19th century that was established for household waste collection. The alleys lost this function with upgrades to urban infrastructure in the early 20th century, and since then their purpose has been ambiguous. Currently, they are liminal spaces with overlapping public (streets) and private (back yards) social boundaries. They are a part of what is called ‘residual urban space’ (underused, derelict, and/or obsolete space that was produced by abandonment, demolition, or planning by-laws). The functional and symbolic purposes of such space are not easily perceived because they are not commonly regarded as appealing. Also activities that take place in them are informal and not conventionally productive. Reappropriations of such space often emerge through bottom-up actions by community members and without official approval from planning agencies. This paper focuses on residential back-alleys in Melbourne’s inner suburbs, discussing findings from fieldwork observations and qualitative content analysis of three community surveys. This study shows that there is a vast range of uses and claims made with regards to residential back-alleys, but most

of these practices are “unknown” to, or viewed as illegal by, local governments. This paper summarizes the ways in which residential back-alleys and other residual urban spaces have the capacity to enable community practices, as well as how such practices are constrained by existing planning regulations.

COMMUNICATION

Forced Perspective Signs as Wayfinding Aids: Testing the Usability of Theme Park Scenarios Using Virtual Reality Technology

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This pilot study aims to explore the potential of forced perspective messages as an innovative wayfinding aid by comparing two types of wayfinding aids in the theme park environment: Forced Perspective Signs (FPS) and traditional signposts. FPS are proposed as a novel wayfinding aid that relies on written wayfinding information that is only visible from a single specific viewing perspective. Theme park scenarios were adopted for their unique characteristics such as their arbitrary layouts and the fact that users are often first time visitors without a good sense of orientation from prior experience. The theme park is an environment in which wayfinding is of paramount importance since the enjoyment of theme parks is largely dependent on locating and navigating to attractions. Therefore, the need for effective wayfinding aids in the theme park environment is imperative, which has been established in previous studies (Hsu et al., 2008; Wen & Wenfei, 2012; Hashim & Said, 2013).

The concept of usability was used to measure the capability of wayfinding aids to enable the users to achieve wayfinding goals with effectiveness, efficiency, and satisfaction (Yoon, 2008). Two interactive virtual theme parks were created using SketchUp and Lumion 3D software. The theme parks, each with two versions of wayfinding aids, FPS and traditional signposts, were tested using a 2x2 experimental design. Twelve voluntary subjects participated. Each subject was invited into a quiet lab setting and asked to perform

given wayfinding tasks — locating and navigating to a specific attraction, using a joystick to move through the virtual environment on a 60-inch 4K resolution LED display. In addition to pre- and post-trial questionnaire responses, task completion time and the number of errors were analyzed. In this presentation, the potentials of FPS in improving the wayfinding and usability outcomes from the findings are discussed.

The Impact of Visibility on Teamwork, Collaborative Communication, and Security in Emergency Departments

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The aim of this study is to examine the influence of visibility on teamwork, collaborative communication, and security in emergency departments. This research hypothesizes that with high visibility in emergency departments, teamwork and collaborative communication will be improved, while the frequency of security issues will be reduced.

Visibility is a critical design consideration and can be directly and considerably impacted by emergency department's physical design. Teamwork is one of the major related operational outcomes of visibility. Teamwork involves nurses, support staff, and physicians and affects efficiency and safety. Additionally, the collaborative communication in an emergency department is another important factor in the process of care delivery. Furthermore, security is a behavioral consideration in emergency department designs, which includes all types of safety including staff safety, patient safety, and the safety of visitors and family members.

This mixed-method study adopted a relational study design, where levels of visibility, teamwork, collaborative communication, and security events in an emergency department was explored using qualitative and quantitative methods. Corresponding data analysis were implemented by using computer plan analysis, observation record analysis, and qualitative content analysis.

The findings of this exploratory study provided a framework to identify preferable levels of visibility in emergency departments. High levels of visibility impact productivity and efficiency of teamwork and communication and improves the chance of lowering security issues in emergency departments. The findings of this study supports that higher visibility may promote teamwork and collaborative communication and reduces security issues in emergency departments.

CULTURAL ASPECTS OF DESIGN

Place as an Agent of Social Inclusion

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Buildings serve a function and send a message to their users. Organizations that operate public buildings often have the best intentions of attracting and serving the diverse populations of the neighborhoods in which they are located. The purpose of this study is to better understand how public buildings serve as mechanisms for providing a sense of inclusion for a diverse community. How does physical space play a role in promoting social inclusion?

The site of this study is a community center on the Lower East Side of Manhattan. As the neighborhood demographics have changed over time, so have the services and the facilities of the community center. For this research, data was collected using field observation, interviews with different stakeholders, focus groups with building users, and a participatory mapping exercise. Dynamic narrative analysis was used to explore how the building serves the users differently based on their cultural background, primary language spoken, physical abilities, degree of volunteerism at the site, and length of time as community members. The study revealed that the community center staff and users had a shared awareness of the larger political forces behind changes in the neighborhood, but the views of how these forces manifest themselves in the building varied based on the subject's cultural background and role she played at the community center. Each stakeholder group had a different concept of the needs and degrees of access that the other groups had of the spaces in the building. The analysis also revealed that the members' primary language and their physical

abilities impacted their perception of the design features in the building.

Utilizing the methodologies of mapping, field observation, and narrative analysis allowed for the discovery of a rich set of experiences and relationships that people have to the other members of a space-sharing community.

Cross Cultural and Generational Investigation on Attitudes toward Senior Housing in the U.S. and China

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Aging has become a global issue. Both the United States and China have rapidly increasing elderly populations. By 2020, both countries will have more than 20% of population above 65 years of age. The United States and China have traditionally different approaches and attitudes toward aging and accommodations for the elderly. However, along with the trend of globalization, Millennials in China are gradually becoming westernized in their ideology. It is unclear to what extent the Millennials from both countries differ in their attitudes toward senior housing. Moreover, little research has evaluated the preference of Millennials regarding living environments for their parents (baby boomers) versus for themselves when they age. Hence, a 21-item survey was developed and distributed to 60 architecture students from three universities in China and the United States. The survey had two sections: the first section inquired about their visions of senior housing for their parents' generation, and the second section asked their visions about senior housing for their potential future self when they reach 65 and older. Both sections solicited

students' opinions toward various models of senior housing, including both age-restricted communities and intergenerational housing; ranking of preferred design features and amenities for an active community for aging; and preference of living close to elderly parents.

The results were analyzed using the t-test function in SPSS Statistics 22. The results revealed cultural impacts on different preferences of design for aging. Interestingly, more similarities in preferences for housing and community were discovered within their own generation from both countries. This study will provide reference for planners and designers for developing future senior housing in both the United States and China.

Handiwork: Toward an Embodied Practice in a Digital Age

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As digital technology has reached a level of ubiquity in its proliferation into our everyday lives, how does this shift our understanding of the world and of ourselves in it? The normalization of digital and technological proliferation highlight the complex intersections of the physical and virtual, where the demarcation between what is physical and digital is not a clear boundary. Rather, the physical and the digital are complexly intertwined rather than clearly separate domains.

Even as the world has been becoming increasingly digitized, there has been a simultaneous rise of interest and participation in handicraft and making. What is the role of the visceral, physical, and material, and how are connections and meaning made as we continue to have our corporeal and situated existence conflated with the transcendence of geographic and temporal spaces as a result of continuing technological development and increasing digitization? By looking at creative makers working in digital and physical

mediums, this paper examines space more broadly construed through the lived experiences of people and their negotiations and navigation of identity and space through the mediations of the physical and the digital.

The physical aspect is rarely incorporated into the examination of digitality, which often only looks at materiality in terms of technology. Simultaneously, the literature on craft rarely questions its own mediation by the digital, often only speaking of the digital as connection via social media rather than addressing how digitality may be reshaping the physical practice itself. Seeking a qualitative understanding through participant observation and in-depth interviews, this research hopes to contribute to putting these two bodies of literature in conversation and deepening the understanding of engagement and aesthetics, handcraft, and digitality all as co-creative actors, and what that means in practice and in space.

Legitimizing Squatters' Traditions: Sustainable Practice in Spontaneous Vernacular Environments

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Spontaneous settlements, also called squatter slums, shantytowns, and informal settlements, are a type of contemporary vernacular environment. The general perception associated with these settlements is that they are not socially, environmentally, or economically sustainable. While research indicates that some of this may be true, spontaneous settlements, as places built by, lived in, and owned by ordinary people, have generated their own form of 'organic' sustainability. In this paper we discuss the sustainable dimensions of spontaneous settlements in terms of ecology, equity, and economy. We use the Ahwahnee Principles developed by New Urbanist practitioners to frame the sustainable practices in spontaneous settlements.

People in informal settlements have generated ecologically sustainable practices such as recycling materials, capturing rainwater, and following the natural topography of the land. Beyond these, informal settlements are also socially sustainable because sharing construction knowledge promotes equity, social networks are intact, development is socially and physically compact, and the urban fabric is connected and diverse. Finally, they have devised economically sustainable approaches through fine-grained and adaptable economies and an incremental approach to development. The discussion is based on an analysis of case studies of spontaneous vernacular environments in the South American context, primarily the favelas in Brazil. We argue that the people in these settlements have developed their own sustainable practices and a knowledge base on those practices, which is shared among them and transferred to future generations and to new arrivals into the settlements. Using a theoretical framework built on the work of Amos Rapoport, Paul Oliver, and other scholars on vernacular design, we analyze and argue that knowledge in sustainable practices developed by the people in spontaneous environments could be recognized as a legitimate vernacular tradition.

Photovoice: Providing a Voice for the Voiceless: Looking at the Needs of the Children of the Compounds in Lusaka through Their Own Eyes

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The College of Architecture at the University of Oklahoma is a multi-disciplinary college including architecture, landscape architecture, interior design, construction science, and regional and city planning. In a culture now requiring multi-disciplinary solutions to the complicated issues we are facing, the ability to develop multi-disciplinary teams in one school gives an advantage in training students to understand and

participate in the kind of design process that multi-disciplinary teams allow.

Four years ago the college developed a multi-disciplinary course taking faculty and students to Lusaka, Zambia, to engage with a ministry focusing on educating the children of the compounds of Lusaka. The OU teams came in with the desire to help this ministry evaluate and understand the issues and alternative solutions to both the layout and the construction of future buildings.

Through a visit, the college defined projects to be tackled over the next three years. The first year's project was designing a prototypical orphan village housing up to 1,500 children in separate boys' and girls' villages for children, and a primary school for those children. The second project was to design a prototypical primary school. The final project undertaken was to develop a prototypical secondary school for 3,000 student since their children had only the government school option which required them to be in classrooms with 100 students per teacher.

Photovoice, a participatory action research methodology that connects designers and clients, helped the students understand their clients better. It also made the design process more successful, giving them a better understanding of the special needs of this unique group of clients.

This presentation will look at the design outcomes developed through the use of Photovoice

The Other: Social Construction through the Campus Edge

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The early 21st century marks a critical time in the evolution of America's higher education institution. Beginning with an 'arms race' of burgeoning growth

on campuses, institutions compete for students and faculty among ever-increasing online education opportunities. This competition heightens the importance of placemaking and the selling of an experience in addition to an education for place-based institutions across the nation. However, equally important to this experience is the college town. While there is a broad range of knowledge on placemaking on American campuses, little attention has been given to the municipalities which house these institutions.

Geographer Blake Gumprecht (2008) defines the college town as one which has a post-secondary institution within the community and creates its own form of culture, with the institution wielding a dominant influence over the town's character. College towns often exist in a dichotomous relationship with the higher education institution, where the institution serves as the principal party and the town as the other. This is apparent in the social, economic, and physical makeup of college towns, and is also portrayed through the term 'college town.' In recent years, there has been an increased interest in the improvement of town-gown relations. Yet increasing student enrollments and expanding campuses continue to challenge this relationship.

The goal of this study is to provide an analytic framework for examining the evolving social and physical structures of town and gown, and more specifically how projects related to the built environment at shared physical edges can serve to transform perceptions of both campus and community. The framework stems from two bodies of knowledge, including campus planning and town-gown relations, as well as the concept of otherness. Results might inform how town and gown can effectively work together on physical design and planning projects towards an environment of mutual partnership.

CYBERSPACE & DIGITAL ENVIRONMENTS

Exploratory Look at Consumer Behavior in Real and Simulated 3D Virtual Reality Environments

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More than half of consumers' purchase decisions aren't made until they are physically present with the product. It is thereby important for retail spaces to be designed in ways that are easily navigable and browsable. Unfortunately, systematically testing different store layouts and designs is at best impracticable and often infeasible for physical environments. In this regard, utilizing digital environments which can be experienced through virtual reality technology may provide a new means for these types of studies. In efforts to explore the validity of such a practice, this project compared consumer behavior between a physical and virtual replica of a retail environment. For the physical and virtual experience, the view of the shopper was captured and analyzed. Participants' impulsivity was measured before each experiment, and their navigated paths and attention were monitored for their shopping experience. Both environments demonstrated an effect between impulsivity and navigated path in which highly impulsive individuals wandered more than less impulsive individuals. However, the differences or deviation in paths were far greater in the virtual environment demonstrating that navigation in the virtual environment may have been more difficult than in the physical environment. Furthermore, in the virtual environment consumers tended to select larger items compared to in the physical environment. This study demonstrates the considerations designers should think about when using virtual reality systems for the study of consumer behavior.

Immersive Tangible Landscape Modeling: A Step Toward the Future for Integrative Ecological Planning

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Emerging paradigms in ecological planning and design advocate integrative approaches to identify trade-offs and win-win situations between ecological integrity and human experience of landscapes. However, for designers, accommodating the trade-off analysis in problem-solving process can become highly challenging and cognitively taxing, in that for each alternative solution, they need to reflect on both human-scale experiences (e.g., aesthetics, coherence, complexity) and large-scale spatio-temporal processes (e.g., run-off management, biodiversity). The latter requires advanced domain knowledge (e.g., soil biology, hydrology), complex analytics (e.g., species distribution modeling, hydrological modeling), and computation software (e.g., ArcGIS, QGIS). Tangible Landscape, a user interface for GIS, lessens these cognitive demands by enabling a more natural and intuitive interaction with geospatial data and simulations. Immersive Virtual Environments (IVE), on the other hand, are powerful tools for realistic representation and assessment of human-scale perceptions and behaviors. In this presentation, we introduce Immersive Tangible Landscape Modelling, a collaborative open-source platform for parallel simulation and visualization of human-scale experiences and geospatial analytics. We coupled Tangible Landscape with an IVE so that users can

reshape a physical model of landscape by hand, receive real-time feedbacks on ecological simulations (e.g., erosion, water-flow, pollution remediation), and experience human-scale views of landscape rendered on a display, or via head-mounted displays. We will first provide an overview of the TUIs and IVEs and the rationale behind our proposed coupling, and discuss its implications on integrative ecological design and research. Then, we will describe the system's physical setup, software architecture, and supported interaction features such as manipulating the landform by hand and drawing landscape features (e.g., water, forest patches) with a laser-pointer. Finally, through a landscape design case-study, we demonstrate how users utilized the system to explore optimal solutions between aesthetic (e.g., view-sheds, vantage points) and ecological dimensions (e.g., waterflow).

Immersive Virtual Environment Technology in Environmental Design Research: Experimental Methods and Procedures

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Immersive Virtual Environment (IVE) technology has enabled a major leap forward for research assessing people's perceptions and behavioral responses to natural and built environments. By evoking a high degree of realism or presence, IVEs provide a much higher ecological validity compared to conventional representation methods, such as photographs and videos. At the same time, they benefit from the robustness of lab-based research by allowing full control over the stimuli content (e.g., manipulation) and experimental condition (e.g., randomization). This presentation will provide an overview of the IVE technology and its use as a methodology to complement environmental design research. First,

we will introduce the technology and its implications for design research, and discuss a method for capturing 360° panoramic images and displaying them in head-mounted displays. We will then present three research studies to demonstrate how IVE can be systematically programmed to support (1) experimental designs (i.e., factorial, mixed factorial, repeated measures); (2) stimuli development (i.e., non-manipulated, manipulated); (3) response-data acquisition methods such as survey, rating, ranking, and feature-selection; (4) participant interaction methods such as verbal responses and joystick; and (5) post-processing the response-data for creating heatmaps, or mapping perceptions across the study setting. In the first experiment, verbal responses to eight randomly displayed IVE scenes of an urban park were collected to assess the impacts of spatial enclosure on perceived safety. In the second experiment, perceived restorativeness survey (PRS) was implemented in IVE to investigate vegetation arrangements that enhance psychological restoration in urban spaces. Participants experienced 18 manipulated scenes and responded to PRS statements using a joystick controller. Finally, the third study utilized the feature-selection method. While experiencing random representation of agricultural landscapes, participants pinpointed their preferred landscape components using the joystick. Selected features were aggregated and draped over the panoramas to create heatmap visualization of landscape preferences.

Supporting Design Decisions for Efficient Health Care Layouts

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With the rapid development of computational technology, there has been a surge of interest in applying digital tools for design evaluation and design decision support. Most of these tools have been used for the evaluation of building performance, such as structural analysis and building energy simulation.

Somewhat less attention has been given to the analysis of spatial configurations and the implications on organizational performance.

Health care designers and managers are under great pressure to provide more efficient designs while maintaining or improving the quality of service. Many studies have demonstrated that physical environment has great impact on a wide range of performance issues, such as patient safety, staff efficiency, equipment allocation, etc.

Due to the complexity of health care design, designers have to rely on process flow and discrete event simulation in health care systems, and space syntax analysis tools to facilitate their decision making. Most of these tools rely on highly specialized operators and vast amounts of input for their operation. We have developed a new approach for embedding health care design analysis directly into BIM CAD environments. Unlike traditional computational tools for spatial layout analysis, this knowledge base system BIM automates most of the process through the use of domain specific algorithms and the use of space-based simulation. We have also developed simplified protocols for end users to input staff operational processes that can be stored or easily modified for "what if" scenarios. This allows the software to analyze several key metrics that have been proven to be important in inpatient unit design, including average walking distance from nurse station to bed, area per bed, spatial adjacency of key functional areas (including nurse station, med room, clean supply, and soiled room), predicted total walking distance based on process map, and visibility from nurse station to all patient rooms.

The Development of the Laboratory Ventilation Design Assistant (LVDA)

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This paper details the development of computational tools for the estimation of environmental systems performance in laboratories. We describe new methodologies for embedding engineering expertise in Building Information Modeling (BIM) tools. This tool is built around domain specific operational constraints and is capable of automating some environmental systems design operations, therefore operating as a Knowledge Based Design (KBD) assistant.

The environmental conditions in laboratories play a crucial role both in maintaining the environmental safety of the facility and in its overall energy consumption. The correct planning of spatial adjacencies for these facilities, particularly during early stages of design, can positively impact the performance of environmental systems and their management.

The Laboratory Ventilation Design Assistant (LVDA) is a lightweight building performance analysis tool that enables designers to evaluate the impact of conceptual level design decisions on the performance of the environmental systems of ventilation intensive building types. For its development we have created computational strategies in order to automate a number of processes required to support the necessary environmental evaluation — evaluation that in traditional processes can only be performed during late stages of design. Among the new strategies: the automation of input value assignments and the derivation of spatial adjacency organization in the design.

We describe here how this new technology can be used not only to avoid errors when designing the

laboratory layout, but also how designers can use it to evaluate the effects of design options on the environmental conditions of the facility. We use three traditional laboratory building typologies to evaluate the performance of our tool, and compare it to traditional building simulation tools used to assess the environmental requirements of building. We evaluate not only the environmental systems requirements estimation but also the speed of the engineering feedback during concept design workflows.

ENVIRONMENT-GERONTOLOGY

Collaboration Across the University: Perspectives from a Senior Design Studio

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This paper considers synergies between interior design (ID) and occupational therapy (OT) fields in a design studio setting. Are there interactions that can be leveraged in designing assisted living environments? A perception exists that occupational therapists (OT) are not as involved with accessibility as they could be. There is also a lack of awareness on the part of other professionals regarding the skill set of occupational therapists. Occupational therapists may not recognize their own abilities in this area, because of a lack of accessibility education in occupational therapy programs. Interior designers (ID) frequently do not understand contributions that occupational therapists can make to inter-professional design solutions.

ID and OT students partnered to design sections of an assisted living and memory care facility. Students located in two cities communicated electronically. Experience was gained by consulting and collaborating with peers. Client challenges were viewed through an evolving perspective and expanded knowledge base.

Student surveys prior to this project and after completion were used to assess degree of learning and insight into learning using a mixed methods methodology. Findings were that OT may be ideally positioned to contribute to the area of accessibility and to create inclusive environments, due to their skill set and unique perspective. ID students appreciated insight from OT students acting in a consulting role and realized the value they brought to the project. While there was evidence of attitude change, there was

confusion as to design process roles prompting further research.

The shifting realities of large scale retirement and the specialized needs of the aged require new tools for ID professionals. Through learning about assisted living and memory care in a project setting, students' awareness was extended. Better equipped to navigate exponential growth in the aging population, students learned new tools in inter-professional collaboration.

Dementia-Friendly Acute Care Environments: Results from the Remodeling of a Hospital Ward

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Dementia is present in a significant number of older patients in acute care hospitals. Their enforced passivity during hospitalization may lead to reduced functioning and result in a move to a nursing home. In these settings, dementia-sensitive care concepts have been well established. A large body of research supports the relationship between the design of the built environment and outcomes of people with dementia. Building on these findings, environmental interventions in a hospital environment were investigated in this study. It was conducted in a ward for internal medicine exhibiting a high prevalence of dementia patients in a German acute care hospital. Baseline and follow-up data were collected over a period of five weeks, totaling 80 hours each. Patient observations through behavioral mapping and interviews with ward staff were the methods used. Target outcomes were spatial orientation and the frequency, duration, and location of active behavior among patients with dementia. After collecting the baseline data, a guidance system was implemented in the hallway using color and photographs. Further, a centrally located activity zone was created in

the hallway close to the nursing station. This zone consisted of a sitting area and was enhanced with a variety of opportunities for activity. Findings show significant changes in the activities of patients with dementia. The environmental changes led to increased activities of patients outside their room, mainly walking, sitting, watching, and chatting. Prior to the changes, walking was the main activity patients would perform outside their patient room. Further, results of the behavior mapping showed that the activity zone serves as a spatial anchor point, leading to a decrease in the number of patients leaving the ward by themselves. Staff reported increased work satisfaction, being able to provide better care to the patients with dementia, including improved supervision and validation of behavior.

Designing Intergenerational Communities Supporting Aging in Place

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Housing has traditionally been designed for various age groups and demographics-specific groups: married, married with children, single, single with children, young professionals, and seniors. Whatever demographic, it seems that for the most part, housing has had to be clustered into like-grouped groups. The problem is that builders and developers are slow to recognize changes in the demographics. Case in point: today in Oklahoma only 50% of the households are married with children but for the most part builders are still building for marrieds with children.

Because of the aging of our population, everyone is talking about how many people are turning 65 each day — 10,000 to be exact (and there are already 54 million in that category). The housing type being developed for this group is largely made up of senior housing complexes: independent living, assisted living, long term care, memory care, and nursing care. These are expensive alternatives to living at home.

Research is showing that living in intergenerational neighborhoods that are accessible is the most cost effective and satisfying for all participants. It is also showing that this structure is instrumental in keeping seniors healthy and independent.

With that in mind, I have been working with a number of developers to build pocket housing in core areas to provide accessible housing units to fit the demographics of seniors, millennials, and small family groups. I have also been focusing on senior home owners who want to age in place, so making modifications to their existing house is the goal.

This presentation will be an up-close look at the designs of the housing units being developed as well as the neighborhoods they are being built in, to discuss how these designs improve the client options for aging in place.

Environmental Support of Walking in Senior-living Facilities

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Healthy living in senior living facilities is a critical focus for the residents, families, and service providers. Built environment in the facilities is one obvious mechanism for maintaining residents' health. However, little is known regarding environmental factors significant to residents' healthy behavior (e.g., walking) in the facilities. Previous studies focused on the influence of facility-level conditions on residents' walking, overlooking detailed room-level characteristics, which may have a more direct impact on residents' walking.

This research intended to identify both facility-level and room-level environmental correlates of residents' walking in senior-living facilities.

Data were collected from six assisted-living facilities in California using GIS, questionnaire survey, and on-site observation. Survey questions and observation tools

were adopted from previously validated research. Focusing on residents' daily walking, survey responses were collected from both the residents and caregivers in the facilities. Key attributes of environmental design were summarized and measured at the site, building, and room levels. The Statistical Package for the Social Sciences were used to analyze the objective data. Bivariate tests and multivariate analyses were conducted to identify factors significant to walking frequency and duration per occurrence. Frequency and content analyses were conducted to analyze participants' suggestions and preferences.

Confirming findings from previous research, factors significant to residents' walking included sunshine, window view, indoor-outdoor connections, green areas, walking-routes, and destinations for walking. The importance of accessible and walkable indoor and outdoor areas was highlighted by most participants.

Meanings of the research findings to design for healthy senior-living will be discussed through the eyes of designers and academic researchers. Guidelines for creating healthy senior-living environments will be presented.

Evaluating Design Factors in Seating Solutions to Increase Safety among Elderly Patients: An Experimental Approach

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Significant improvements in health care, nutrition, and technology have resulted in a larger elderly population and an increased demand for health care services, environments, and products appropriate for older patients. The elderly are far more prone to get sick

and are more susceptible to injuries. One of the most serious and widely discussed injuries that threatens older people is falling. In hospital rooms, patient chairs are one of the locations where falls occur when the patient is trying to sit down or stand up. Despite the fall risks, patients are encouraged to leave their bed, move around their room, and sit in their chair to accelerate the healing process. In fact, a patient chair is a critical point in patients' transition to independence and functional status. The ultimate purpose of this study was to decrease the risk of fall among the elderly patients by making it easier for them to sit in and stand from their chair. The study examined the impact of manipulating the horizontal and vertical position of armrests in a test chair on physical effort during Stand-to-Sit-to-Stand (St-Si-St) transitions among fifteen elderly women. As indicators of physical effort, electrical activity of engaged skeletal muscles, exerted force on the armrest, and time to complete the transition were measured in a series of trials and compared. Study findings showed that changing armrest height and distance causes a change in physical effort that follows opposite patterns in arms and legs. The characteristics of identified patterns will be discussed. It was also found that the optimum levels of armrest height and distance might be higher and wider than those available in the market. These results and their multiple implications for designing for the elderly and future research will be discussed.

Microclimatic Design of Outdoor Places for Seniors

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Aging adults are increasingly making their homes in long-term care facilities. There are physical, mental, and social benefits to seniors who remain active, and long-term care facilities have responded by providing outdoor areas for physical activities. However, these spaces are often underutilized, a problem that can

be linked to the subtle design and arrangement of the amenities and features within the space.

One key area that may contribute to this underutilization is in how microclimatic-responsive design solutions are not well understood or addressed in these spaces. Seniors are particularly sensitive to environmental changes and their tolerance to thermal extremes is lower than that of younger adults. For example, outdoor courtyards in the full sun may be a barrier to use by seniors since their ability to regulate body temperature is slowed.

To assist designers and care facility managers, two audit tools have recently been developed. First, the Seniors' Outdoor Survey Tool offers the ability to evaluate usable outdoor spaces for their potential to support the activities, needs, and preferences of aging residents. Secondly, the Shade Audit Tool identifies how the landscape affects the amount and type of solar radiation that a person would receive. Direct solar radiation can cause an elderly person to become overheated long before their body tells them they are in danger, while ultraviolet B radiation can cause sunburn even when a person is sitting in the shade.

Toward the goal of promoting positive change in the lives of older adults, this paper will present design strategies based on these tools to assist designers and care providers. Understanding key outdoor space design parameters and the importance of microclimatic-responsive design strategies will allow care providers and design practitioners to connect older adults to outdoor environments that considers their health and well-being.

Neighborhood Walking, Yard Activities, and Aging-in-place at Home

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The health and mobility benefits of engaging in appropriate physical activities (e.g., gardening and walking) for older adults are widely known. However, the sequential influence of physical activity on their aging-in-place at home is unclear.

Focusing on un-institutionalized older adults, this research aimed to explore the correlations between their physical activities in nearby outdoor environments (residential-lot and neighborhood) and their years of aging-in-place at home (after age 65 and before moving to a senior-living institute).

Using the Social Ecological Model, this research involved personal, social, and environmental factors to investigate the impact of physical activity on aging-in-place at home. Retrospective surveys of 218 cognitively competent older adults were conducted in 11 assisted-living facilities in Texas. Participants were asked about their outdoor physical activities when they lived in their community dwellings and perceptions of the environments. Measures of physical activity included the frequency and duration (per occurrence) of yard activities (including walking, gardening, and yard work on residential lots) and neighborhood walking. GIS was used to verify survey responses and examine objective measurements of 112 sample environments.

With personal, social, and environmental factors in hierarchical linear modeling, the durations of yard activities and neighborhood walking were significant to the years of aging-in-place at home. Compared with their counterparts, participants who engaged in longer durations of yard activities (30 minutes or longer per occurrence) aged-in-place at home 2.71

years longer; those who engaged in longer durations of neighborhood walking (one-hour or more per occurrence) remained at their homes 5.41 years longer. The frequency and duration measures of a physical activity were positively related.

Engaging in physical activities in nearby outdoor environments may help older adults to delay moving to senior-living facilities. Neighborhood walking and yard activities should be promoted in older adults for their aging-in-place at home.

Understanding the Role of Built and Social Environments in Promoting Physical Activity in Community-Dwelling Older Adults

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Physical activity (PA) throughout the lifespan confers numerous health benefits, including resistance to disease and disability (Sattelmair, Pertman, and Forman, 2009). Despite confirmed health benefits, objective assessment has revealed that less than three-percent of older adults achieve nationally recommended levels of PA (Troiano et al., 2008). An ethnographic study was conducted via face-to-face interviews with older adults to assess their perceptions of characteristics of the home and neighborhood environment that promote or impede engagement in PA. The participants included eight community-dwelling New York state residents who ranged in age from 66 to 74 ($M_{age} = 69$ years). Following data collection, a content analysis was performed, which revealed several factors that influence the type, frequency, and duration of PA performed by older adults in the home setting and community more broadly. Respondents reported a majority of their activity expenditures arising from performing household chores, personal hobbies, and through opportunities for socialization. Furthermore, the results suggest that older adults encounter ambiguities with respect to

person-environment fit, wherein they strive for greater independence and PA, but fear adverse consequences that may result from physical overexertion, and are therefore stymied by indecision. Lastly, respondents expressed an interest in using digital technology to mitigate the person-environment relationship, but emphasized that in order to increase the adoption rate of digital technology solutions by this population, affordability will need to be prioritized.

ENVIRONMENTAL & ARCHITECTURAL PHENOMENOLOGY

A Community-level Investigation of a Conceptual Framework of Sense of Place

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Multidisciplinary attention has been given to understanding the psychological construct of sense of place in relation to spatial cognition. To contribute to this line of inquiry, we propose a conceptual framework of sense of place adapted from Jorgensen and Stedman's (2001; 2006) spatial variables (i.e., egocentric and allocentric navigational strategies) and Lynch's (1960) notion of place imageability (i.e., nodes, paths, landmarks, districts, edges). We investigated sense of place and spatial navigation strategies as they were experienced by residents of a historic urban neighborhood with a distinctive diversity of place imageable features. Place imageability was assessed in terms of different levels of sense of place, as well as the type of navigational strategy that was used most often, to test the proposed framework. Specifically, participants self-reported, using a questionnaire, their levels of sense of place for three photographic examples of their neighbourhood, as well as how they navigated between selected locations within each photograph. Nodes, edges, and landmarks were the most meaningful place imageable attributes for the residents' spatial understanding of their neighborhood. Significantly more allocentric than egocentric strategies were used in each of three (low, moderate, and high) place imageability conditions. Finally, significantly stronger sense of place was reported for the neighborhood setting with a high (as opposed to moderate or low) number of place imageability features (and a greater diversity of place imageability). These findings will inform future environmental psychology

researchers as they consider spatial navigation and place imageable attributes in relation to sense of place in urban environments. Planners may benefit from these results as they respond to human spatial needs while facilitating a sense of attachment and identity toward, and compatibility with, city spaces.

A Methodology for Evaluating Spatial Variability

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The "social logic of space" is widely debated in architecture with scholars such as Bill Hillier and Julienne Hanson arguing that space shapes the society while being shaped by it. As such, in the field of architecture, research on environmental behavior explores the interrelationship between physical characteristics of environment and human behaviors. The core assumption made by these studies is that the spatial variability of a setting may potentially account for variability in its users' behavior. However, research studies evaluating the impact of spatial components on social and behavioral factors fail to make use of this core concept (i.e. spatial variability) as a solid basis in choosing an appropriate research setting. This research addresses this gap in the literature through proposing a methodological approach by which the variability of the spatial properties of research settings can be quantified. This study analyzes the spatial properties of three research settings based on measures gathered with the Depthmap software (Turner, 2004), which is based on the theory of Space Syntax (Hillier & Hanson, 1984). The variability of spatial properties will be evaluated statistically to compare and contrast the research settings. This study argues that the setting with the highest spatial variability can be chosen as the research setting because it can potentially account for more variability in the behavior of its users. In conclusion, this study sheds light on the importance of spatial variability of research settings as an important criterion in choosing an appropriate setting for

research studies conducted on the interrelationship between physical characteristics of environments and human behaviors.

Eco-feminist Philosophy and Outsider Plant Ethics: What is it Such Philosophies at the Margins Bring to the Design of Sustainable Environments?

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In this paper I will explore the work of two contemporary environmental philosophers: Gernot Böhme, celebrated for his work on architectural atmosphere, although known less for his work on ecological aesthetics; and Luce Irigaray, a French philosopher, renowned for her work inspiring a generation of feminist scholars, but less well discussed for her most recent work on environmental ethics. For the philosopher Gernot Böhme, our designed environments are experienced through atmosphere, and through atmosphere we feel our own presence in a built environment and feel the environment in which we are present. He establishes an approach to design dependent on "feeling" experienced through being in space, rather than seeing it or imagining it. Nevertheless, as with many others within this tradition of thought, his dialogue is gender neutral. Perhaps he is celebrated because he maintains this safe and traditional perspective on gender. But while architectural atmosphere is a contemporary conversation that is positioned as a counterpoint to performance-driven methods and a technical agenda in environmental design, ecological aesthetics, significant in merit in addressing the dominance of a technical perspective in environmental design, is marginal. Luce Irigaray is an influential feminist philosopher, now in her eighties, whose work has been pivotal to feminist thinking and who has, over the course of her career, shaped a generation of feminist theorists. She works in this tradition but distinguishes experience as different

between the sexes. Her philosophy is provocative and challenged by many and while on the margins of Parisian intellectual society, she still works, teaches, and writes prolifically about environmental ethics. She remains one of the most important feminist thinkers of her generation. This paper examines how two of the most contemporary and challenging, but marginalized ecological philosophers can benefit the field of environmental design.

Investigation of Environmental Preferences of PTSD Population and Future Research Considerations

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The purpose of this study is to investigate the environmental preferences of people with combat-related PTSD (Post Traumatic Stress Disorder) regarding perceived spatial enclosure and volume.

The increasing population of soldiers returning home with combat-related PTSD has far reaching implications. The lack of current published research on this PTSD population within the field of environmental design creates an immediate need for this investigation. Designing for the well-being of this population requires designers to have a keen, in-depth understanding of PTSD characteristics as well as environmental needs.

This study uses three subject groups: veterans diagnosed with PTSD, veterans without PTSD, and civilians without a PTSD diagnosis (control group). Three levels of assessments are used. Firstly, the PTSD Symptom Checklist (PCL) is administered to screen if a participant currently meets criteria for PTSD or not. Secondly, the Adult Sensory Profile® is used to determine sensory thresholds, classifying the modality and level of preferred sensory stimulation. Lastly, an

environmental preferences survey was developed to measure scaled preferences of interior environments by displaying various ceiling heights and window sizes, and to identify possible triggers related to the built environment.

Though the study did not yield enough data to justify seeking statistical significance, a phenomenological approach to interpreting the qualitative data will be presented to explain differences among the three groups regarding the relationship between sensory thresholds and preferred environmental characteristics. In addition, presenters will share special considerations about studying this PTSD population, as recruiting veteran participants diagnosed with PTSD has been a daunting task. Lessons learned from this current research study may facilitate future researchers to develop research procedures more rigorously.

Findings from this study may contribute to the body of knowledge on potential restorative impacts of interior environments for veterans diagnosed with PTSD.

The Gestalt Revisited: Making the Unseen Imagined, the Unheard Felt

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The concept of gestalt has been favored in studies of environmental perception and design, but its theoretical and methodological principles need reexamination in the context of urban landscape. The paper aims to review the ontological significance and pitfalls of gestalt theory and design principle, and their relevance and applicability to social communication and participatory design principles. Lynch's classic notions of imageability and durability (1960, 1981) are analyzed for conceptual test and methodological validity.

First, the paper argues that imageability provides descriptive criteria that help to detect cognitive cues and metaphors in space; durability provides guiding references to a more engaging, visceral, and empathetic design in action. Imageability is "a quality of attention, association, and sensation through a two-way process: between the observer and the observed" (1960). In contrast, the notion of durability remains value-neutral and unexplored, although it offers a phenomenological view regarding biological, social, and ecological functions and meanings in life and for good urban performance.

Second, the paper seeks the practical character of durability to test its applicability in light of the experiential gestalt. Vitality is a metaphor for the biological and emotional force in a living body. Sense is all about memory, feeling, and value. Fit refers to a personal ability or a sense of competence and adequacy. Access means maintaining the appropriate social and ecological relationships within the city's organic function. Justice and efficiency serve our sense of well-being.

Finally, the paper concludes that Lynch's notion of durability and principles for good city form are not only important percepts, but also affect the empathetic capacity and visceral character of a city. As the experiential gestalt it helps us to make the unseen imagined and to make the unheard felt, and thus it promotes truly participatory communication and trans-active contribution to the wholeness of a community.

The Microfoundations of Architecture: Interactionism and Affect in the Design and Actuality of Weiss/Manfredi's Center for Architecture and Environmental Design (CAED)

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The life of a building begins when its construction ends. The people occupying the building make the place into a complex of social networks and centers of activity, memory, and attachments. Weiss/Manfredi's new Center for Architecture and Environmental Design (CAED) was designed as a setting for designers who occupy the building and react to its various intentional features. The building was envisioned as a didactic environment for environmental design education. Its recent completion and current occupation make it a ripe environment for discovering the balance between the intentions and intuitions of the designers and the hard actuality of how occupants use the building.

Mental mapping, direct and participant observation, and informal interviews with the building's users locate spaces where occupants interact and exchange ideas. The research utilizes Symbolic Interactionism and Affect Theory as methodologies for analyzing ways individuals attach meaning to their environment and how a given environment influences interaction and affects feeling. By connecting these two theories, we suggest that individuals act within and attach meanings to objects, boundaries, and spaces. In the case of the CAED building, use differs from what the designers intended — unexpected qualities have emerged and unplanned place attachments have occurred. The study presents discrepancies between the design and actuality of this example of contemporary architecture.

This research, by using Weiss/Manfredi's CAED design, extends beyond typical post-occupancy evaluation techniques and explores additional variables when studying human-environment relationships. This mix of methods offers factual reinforcement for critiquing the "design-by-intuition" strategy of the architects and reveals underlying gaps between what the designers intended socially and how the place actually performs.

ENVIRONMENTAL DESIGN RESEARCH EDUCATION

Architecture Students Share Insights about Open Plan Studio Environments

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The design studio is the primary instructional environment in schools of architecture that encourages team-based learning. It is essential for academic settings to foster collaboration to reach effective group learning objectives. This mirrors efforts in practice to facilitate more collaborative work environments for increasingly complex projects and teams. The open plan design studio has been proposed as a model to facilitate collaborative learning. However, there are impacts to individual learning in this type of environment. A review of recent literature in the design of office environments provides a rebuke to the open plan environment movement meant to foster teamwork and interactivity, but to the detriment of employee productivity. Students working in design studios perform a comparable amount of individual and group tasks to office workers, which would indicate a similar critique of the open plan in the studio environment. There has been a limited amount of research that gives a voice to the students who use the open-plan layout in a school of architecture.

A case study of a recently completed and nationally awarded school of architecture was undertaken to investigate the factors contributing to privacy & interaction within the studio environment. Multiple data collection methods were used for this study including observations of students' use of space, designer and client interviews, survey of student perceptions of the space, and a follow-up student focus group.

Findings from this study will highlight the strengths and limitations of the open plan studio environment for achieving learning objectives in architectural education. Finally, lessons learned will be translated into practical recommendations for designing design studios that balance both privacy and interaction requirements for students.

Building Capacity at the State Level: Toward a Resilience Approach in (Architectural) Design Education

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Developments in architectural design and building technology are intertwined as preferences and availability in the use of materials fluctuate through time and place. Through these changes technological knowledge is either lost or improved, affecting the capacity of communities to respond to changes of diverse sorts (i.e., resilience). Communities that preserve embodied technological knowledge integrate tangible and intangible aspects of culture, improving their capacity to address change by understanding interactions between global vs local aspects.

Current approaches in architectural design and building technology, influenced by an established sustainability paradigm and the emerging notion of resilience, provide a stimulating environment for exploring educational strategies that address tangible and intangible aspects of technology and culture in relation to local resources and conditions. On one hand, sustainability has become a default requirement in architectural design, linking environmental, cultural, economic and social dimensions in the built environment and establishing a network approach to managing visible intertwined parameters. On the other hand, resilience is emerging as an architectural design approach toward building the capacity of communities to address change.

This paper presents the experience at the undergraduate level of a professional architecture degree program aiming toward building capacity at the state level through a resilience approach in design education. Experiences in a design studio with a building technology emphasis link functions (e.g. fire station; market) and materials (e.g. concrete masonry; wood) to broader challenges and opportunities related to identity and place (e.g. forest fires; agriculture; economic development; heritage). This resilience approach emphasizes that becoming (building) technology savvy implies the recognition of such interactions in the design solutions proposed. Strategies implemented in the content and delivery of the design studio are presented, introducing preliminary findings of a resilience approach: Interactions between tangible and intangible aspects of technology and culture, challenges and opportunities, and differences with sustainability efforts.

Education and Existing Knowledge of Architects in Germany about Accessibility and Building for the Older Generation

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A prerequisite for the development of architecture's potential to support safe and independent living for all people is the planning of demographically sustainable buildings. In practice, however, there are currently great obstacles to realizing buildings for the older generation. Essential starting points for overcoming these difficulties are the improvement of the education and further training of architects. The interdisciplinary research project MATI: Mensch – Architektur – Technik – Interaktion für demografische Nachhaltigkeit, funded by BMBF (Federal Ministry of Education and Research), was aimed at finding out whether, and where, there are obstacles for architects to implement more demographically sustainable buildings.

To evaluate the role of accessibility in the work of architects, the education at the architecture faculties of nine leading technical universities in Germany (TU9) was analyzed. Additionally, architects were asked in an online survey to assess their knowledge of building for older adults and disabled people.

The barrier-free building is often underrepresented in the education at the architecture faculties of the TU9, and accessibility seems to be an unattractive topic there. Although the offered courses, which are dealing with this issue, are very well accepted and attended by the students, the universities only partially recognized the importance and potential of the topic.

The majority of the architects who participated in the online survey stated that they have a good knowledge about barrier-free planning. However, accessibility often often a negative connotation for architects.

In summary, it can be stated that accessibility and design of demographically sustainable buildings should be an obvious part of architectural education. It is important to break down current prejudices among architects, and to take a step toward an integrated, inclusive understanding of design that takes account of the occupants' needs.

Phytotechnology to Redesign Abandoned Gas Stations

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Phytotechnologies in the U.S. were generally named and formally established in the 1980s. These technologies were applied as an alternative method using plants to cleanse contaminated soils on site in a more economically and environmentally friendly way than removing contaminated soils off site. High expectations and mixed performances, with failures outnumbering successes, led to a decline in environmental research funding by the early 2000s.

Phyto: Principles and Resources for Site Remediation and Landscape Design, by landscape architects Kate Kennen and Niall Kirkwood (2015), recently invigorated phytotechnologies by reintroducing the subject with a more approachable set of planning, engineering, and design tools, combined with cultural practices that can assist multiple professions in engaging with the reuse of contaminated sites. They include natural systems, consider multiple scales between site and region, emphasize prophylactic approaches, include green infrastructure, and address the need to incorporate cultural values.

The focus of this paper is the redesign of abandoned gas stations through phytotechnologies by applying and expanding Kennen and Kirkwood's framework. Abandoned gas stations are a commonly occurring site with a history of perpetuating land contamination. They are highly visible, and remediation costs can hinder redevelopment. We explore the potential to reclaim these contaminated sites using phytotechnology through planting typologies such as stormwater filters, irrigation systems, green roofs, interception, and degradation plantings.

This is a research-by-design method expanding on the spatial-aesthetic and cultural aspects of redesigning abandoned gas stations. This method includes case studies of reused or redesigned gas stations, process-oriented strategies such as staging, and communication tools in brownfield remediation.

Phytotechnologies create an aesthetic experience while being culturally and ecologically sustainable. The design solutions showcase viable options to be used across the country and worldwide. Phytotechnology as a means for remediating small sites polluted with organic chemicals is a step in promoting this technology and proving its worth for other larger and more complicated brownfields.

HEALTH

Aligning Inpatient Needs with Quality Outcomes for an Inpatient Unit Design

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The goal of lean process improvement is to streamline care delivery and standardize workflow to create a more productive work environment and safer care delivery. Oftentimes actions are not taken to ensure process improvement strategies were successful. Design research can play a crucial role in validating the significance of lean impact.

This study evaluated the effectiveness of Lean process improvement design strategies implemented in a new Midwestern medical-surgical unit that opened in early 2015. To do this, a mixed-method approach was developed that involved surveying staff and shadowing nurses, both pre- and post-occupancy. These methods best evaluated the significance of critical inpatient needs established by the design team during pre-design to help guide design decision-making. Inpatient needs include location of charting activities, team collaboration, staff satisfaction, quality of care and privacy. To evaluate the effectiveness of each need, the team identified specific measures including time spent in areas, common workflow paths, and staff satisfaction.

Results demonstrate that nurses' time spent charting did not change, but the location of the charting did. In the existing environment nurses' spent 49 percent of their time charting on portable workstations on wheels (WOWs) parked in the corridor, whereas in the new decentralized environment charting occurred at dispersed collaboration hubs (50 percent). This eliminated corridor clutter and the potential of cross-

contamination created by WOWs when pushed from one patient room to the next. In the existing environment, approximately 75 percent of nurses' workflow paths involved stopping in the corridor to access WOWs, compared to a more streamlined work path in the new environment between collaboration hubs, medication rooms, and patient rooms. In addition, the overall unit design and overall patient room designs had significantly increased ($p < 0.001$) staff's perception of work performance by 43 and 30 percent, respectively.

Assessing the Built Environment of Shelter Homes for Survivors of Domestic Violence

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Across the world, 20 to 25% of all women are victims of domestic violence or abused by their partners. Survivors are abused where they should be the most secure – their own homes.

In such situations, they turn to shelter homes for safety and security. There are around 1,800 shelter programs across the entire United States (National Network to End Domestic Violence, 2015), but are often crowded, involve communal living, offer little or no privacy, and include numerous restrictions that come with such a living condition. The spatial qualities and setting of shelter homes should have a positive impact on health, recovery, and well-being of the survivor, but it is clearly evident in the literature that the existing facilities do not promote healing. The aim of this study is to explore qualities of the physical environment of shelters that influence and support the survivors in recovering from this traumatic experience.

Four facilities have been identified within the state, and a study is being conducted to understand needs of the victims, the problems they face, their perspective, services offered in the shelter homes, and the behavioral implications of the built environment

on the residents through surveys, interviews, and observations. Each facility is being assessed based on the design themes derived from the literature (convenience and accessibility; privacy and control; safety, security and surveillance; homelike and comforting; therapeutic). These are crucial in understanding what psychological and design factors aid in helping survivors to be competent and self-sufficient once again. The study aims to develop a set of design considerations and therapeutic guidelines for design of shelter homes.

Connecting Research and Design: The Development of an Evidence-Based Tool for Designing and Evaluating Exam Rooms

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A growing body of evidence is available to support design decision-making and design evaluation in health care. However, research is often technical and complex in nature, and can be overwhelming for busy design practitioners to interpret and apply in their projects. Furthermore, practitioners may be strong believers of research-informed design, but the knowledge they seek is often difficult to access. To effectively address this gap between research and practice, a research team has created evidence-based tools that convey existing design research in an actionable format to facilitate pre-construction design decision-making and post-occupancy evaluation.

The speakers will build on a presentation made previously regarding tool development focused on inpatient rooms (i.e., medical surgical, intensive care, and maternity care patient rooms). The proposed presentation covers the second phase of this ongoing research initiative, focusing on the primary care exam room. The exam room is the cornerstone of most outpatient settings, whether located in a hospital or medical office building. With radical changes in health

care legislation prompting the growth of outpatient services, this may be the first time in decades that we see changes in how we think about this common and repetitive space. Caregivers must respond to changing care models, team practices and patient centered care, while also considering flexibility and advances in technology. Using key findings from extensive literature reviews of peer-reviewed publications, as well as valuable insights from multi-disciplinary experts, this web-based interactive primary care exam room rendering provides a toolkit for designers and health care practitioners to better understand how design can improve health care outcomes. Eighteen design elements annotated with research findings in four key topic areas are featured in this diagram.

By facilitating the use of evidence, the tools may help support the voice of the research advocate toward a better process of designing and evaluating clinical care settings.

Cross-cultural Study on Adolescents' Environmental Preferences on Patient Rooms: Korean and American Adolescent Patients

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Hospitals are meant to be healing places where patients feel comfortable and supported both physically and psychologically. By incorporating patients' preferences, values, and cultural backgrounds into hospital planning, a physical environment with a suitable ambience may be created for patients' psychological well-being. Although adolescents are a relatively healthy population in comparison to young children and the elderly, there are a number of adolescents who face challenges in both physical and social activities due to their health status. Adolescents' health issues and their stage in life may create a unique set of needs from other

patient populations. However, there is little research findings on adolescents' preferences in hospital settings. The purpose of the study was to investigate age-appropriate design attributes and examine the relationships between adolescents' preferences and cultural backgrounds.

The study surveyed a total of 87 adolescent patients (40 Korean; 47 American) individually who were in hospital beds at the time of the survey. The ages of participants ranged from 14 to 18 years. Data was collected in three categories: demographic data, self-reported environmental value survey, and environmental preferences. Ten patient room photos and sixteen word pair semantic differentials were used for preference examination.

The findings revealed that there are significantly different responses between Korean and American adolescent patients. While 'staying in a single room' is the third most important value to American adolescents, it is the least important value to Korean adolescents. Semantic differentials results showed that each group perceived 'privacy,' 'roomy(crowd),' and 'brightness' of patient rooms differently. While Korean adolescents valued being 'able to see friends' the highest, American adolescents valued 'privacy control' as the top priority. Although the majority of adolescents from both groups chose semi-private rooms as their favorite rooms to stay, American adolescents responded to 'privacy' and 'comfort' with much lower scores on favored (semi-private) rooms than Korean adolescents.

Design and Operational Considerations for Improving Emergency Department Waiting Experiences

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Advancing the quality of the waiting room experience with opportunities for positive distractions can lead to reduced stress, improved satisfaction, heightened mood, and a likelihood of referral for patients. This cross-sectional study explored the impact of distraction activities (reading, watching TV, phone interactions, etc.) and non-distraction activities (talking, not engaged, etc.). Data collection involved behavioral observations of patients using the DOTT® application. In addition, semi-structured interviews were conducted with five team members. The observer systematically walked through the emergency department and recorded patients' behaviors, gender, and use of mobile technologies. The DOTT® observational findings revealed that most of the time, patients were engaged in conversations (24.07%, N=558), looked around (22.13%), were in motion (21.49%), interacted with phones (14.22%), or watched TV (8.89%). Men watched TV 4% more compared with females (11.21% and 6.88% respectively). Only 24.13% (n=159) of observed behaviors were of distraction activities. Distraction activities were 8.5% higher in males than females.

Team members had the following design and operational suggestions for improving patients' waiting experiences: (1) Spatial: include visual cues or signage to improve wayfinding (n=3); increase waiting area size (n=2); improve comfort of furnishings; heighten visibility of the waiting area (n=3); move waiting areas closer to care stations; (2) Communication: provide continuous information updates to patients (n=4); coordinate team member shifts to reduce congestion and bottlenecks; (3) Patient flow: improve behavioral health patient flow to decrease wait times for other patient types and improve patient satisfaction (n=3); (4) Safety: hire public-safety officers; adopt technology to control traffic to triage; (5) Policy: verse team members in customer service.

The findings are useful for health care team members and designers who want to improve the design of emergency department waiting areas. Future studies should further explore how gender differences, mobile

technologies, and patient flows impact the patient and family waiting experience.

Designing for Clinician Teamwork: What is Decentralization is Doing to Your Team?

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Clinician teamwork has been widely demonstrated as a cornerstone of delivering safe, high-quality patient care and reducing staff burnout. This two-part study looks at the physical care environment as part of the ecology of care to more precisely understand the specific attributes of the environment that impact teamwork and its associated outcomes.

First, a systematic literature review was conducted by searching Pubmed, Web of Science, and Cochrane databases for empirical studies published between January 2000 and January 2016 in English. In a review of 89 abstracts, 11 met the inclusion criteria and were reviewed. The MERQSI tool was used to appraise methodological quality and PRISMA-P reporting protocol was followed. Findings indicate that physical environments that reduce the ease of access (i.e., physical or visual access) between team members are linked with feelings of social isolation, reduced staff-to-staff communications, and reduced perceptions of teamwork. There is a clear need for more research given the limited number of articles and study heterogeneity.

Second, an empirical study of three nursing units at the Princeton Medical Center examined the impact of decentralization on teamwork. The study combined onsite observation, behavior mapping, shadowing, questionnaires, and space syntax in evaluating the relationship between physical environment and teamwork and staff perception. Behavior observation with the Dott® tool was used to track clinician

communication, while validated teamwork instruments provided a better understanding of staff perceptions of teamwork and team cohesion. Validated space syntax metrics of peer distance and team-based distance were used in evaluating the impact of space and nurse communication. The preliminary results support the findings from earlier studies that physical and/or visual access between team members are key to care team communication and teamwork. This two-part study advances the understanding of the important role the built environment plays in the ecology of clinical teamwork.

Developing Methods to Observe and Analyze Behaviors in Operating Room Environments

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Operating rooms (OR) are complex environments with multiple team members performing high-risk procedures. The built environment is an important latent factor impacting patient and staff safety in the OR, requiring rigorous methods to study these environments. Observational methods are effective for developing a robust documentation of common issues within the ORs; however, it can be challenging due to a variety of factors including patient and staff privacy and confidentiality, space constraints and patient safety. This presentation will share a methodology that was developed to study the OR environment. This investigation aimed to understand the environmental factors intertwined with the regular tasks performed in the OR and those with the potential to impact workflow. Given the sensitivity of the context and access constraints, the strategy for observations required diligent planning to maximize the quality of the

collected data. Therefore, a video-recording approach was adopted to allow for detailed observations. To uncover safety and workflow issues in the OR, 35 surgeries (pediatric, general, and orthopedics) were recorded, upon IRB approval.

A coding protocol was developed with the goal of understanding activities of different team members and their locations in the OR at different phases of surgery. Additionally, any disruptions to the flow of the surgery were coded and categorized. A multidisciplinary team of researchers from architecture, industrial engineering, and management, with consultation of the medical facility under study, collaborated on the development of the coding protocol. A coding guide was developed and coders were trained to ensure higher inter-rater reliability. Sample videos were also coded to ensure higher reliability. Using R statistical software, the observation data were transformed to a master dataset, which allows for further dataset customization based on specific research questions. This study offers methodological insights on how to approach OR research or similar sensitive health care units.

Examining the Restorative Potential of Urban Green Spaces Utilizing Immersive Virtual Environments

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The experience of nature can help reduce stress (Hartig & Staats, 2006; Van den Berg et al., 2010) and increase chances for psychological restoration. However, since it is not known which specific green space attributes support these effects, the empirical evidence has limited potential for translating those findings to practice (Hunter & Askarinejad, 2015). This study examined how spatial arrangement (number

of enclosed segments of a square shaped boundary) and permeability (number of trees in each segment) affect individuals' perceived restorativeness. We manipulated 360° panoramas (captured from two sites in Raleigh, NC) to generate 18 stimuli that varied in level of spatial arrangement (1, 2, and 4 segments), permeability (1, 3, and 6 trees coupled with understory vegetation per segment) and setting type (urban plaza and urban park). Research participants experienced these stimuli through Immersive Virtual Environments (IVE) technology. Using a 3 x 3 x 2 mixed-factorial design, ninety undergraduate students were randomly assigned to three experimental groups based on permeability levels. Within each group, participants experienced six IVEs, including three spatial arrangement levels by two setting types. A modified version of Perceived Restorativeness Scale (PRS) (Hartig et al., 1997) was used to measure perceived restorativeness components (being away, fascination, and coherence). After viewing each environment, participants used a joystick controller to rate six PRS statements randomly displayed in IVE. The analysis indicates the main effect of spatial arrangement on each dimension of perceived restorativeness is significant. Results also indicate permeability and arrangement significantly interact with each other and with setting type to affect perceived restorativeness. The findings imply higher levels of enclosure in urban setting are regarded as more restorative, but that level of spatial arrangement does not play a role in natural settings. As cities are becoming increasingly densified, understanding how to maximize the impact of limited green space can be of critical importance.

Green Infrastructure Impacts on the Neuroanatomy of Attention Restoration Measured by fMRI

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Exposure to nature enhances the resources necessary to replenish our directed attention. Although access to nature is often inadequate in urban areas, residents are increasingly exposed to nature through green infrastructure (GI). Previous studies have shown that some types of GI (e.g., trees, roof gardens) promote attention restoration, but we know essentially nothing about the extent to which other types of GI (e.g., bioswales) promote recovery from mental fatigue. Moreover, we do not know the neural pathway of attention restoration. This gap in our knowledge reduces our capacity to design urban settings that promote health and well-being.

In this study, we set out to understand the impact of three types of GI on attentional functioning by conducting an experiment using high-definition functional magnetic resonance imaging (fMRI).

We recruited 45 participants for the fMRI study. After two initial scans and a baseline test measuring participants' attentional functioning with the sustained attention response task (SART), participants were given a proofreading task designed to fatigue their attentional capacity. Next, we tested participants with SART again to determine the extent to which proofreading degraded their attentional functioning. Then participants were randomly assigned to watch one of three five-minute videos as the nature treatment. The video treatments showed a) urban settings with no GI, b) the same setting with trees, c) the same settings with trees and bioswales. Following the video, participants took the 3rd SART. During the 40-minute experiment, participants' brains were continuously scanned to record their neural responses to tasks and the nature treatment.

By studying participants' neural responses, we expect to identify the kinds of GI that trigger attention restoration. We expect our results will encourage designers, policy-makers, and administrators to employ GI that promote recovery from mental fatigue.

Impact of Ambulatory Surgical Environments on Stress and Coping for Children and their Parents: A Systematic Review of the Literature

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Due to technology developments and advancements in surgical and anesthesia techniques, a growing number of children experience ambulatory surgical procedures each year. For those children and their families, the surgery experience can be a stressful event that produces feelings of anxiety, depression, and fear. Moreover, the health care environment itself can contribute to these feelings, significantly impacting both the child and their parents experience during the ambulatory surgical process. Over the last thirty years, research has increasingly demonstrated that the physical design of health care environments plays an integral role in either mitigating or intensifying the multitude of stressors associated with the health care experience. With more surgical procedures being conducted each year within the ambulatory care environment, it is imperative that the design of these facilities meet the needs of the children who experience those procedures and their parents who care for them throughout the surgery experience. A literature review was conducted exploring the stresses associated with the ambulatory surgical experience for children and their parents, as well as the coping strategies leveraged by each, extending equal regard to both the child and parent perspectives. Additionally, ways in which the built environment can help mitigate child and parent anxiety and support coping strategies within health care environments were also examined. Findings from this literature review will be discussed, as well as how these findings have informed the research design of an empirical study examining how the built environment either intensifies or mitigates perioperative anxiety for children who are undergoing an ambulatory surgical procedure and their parents.

Recognizing a Breast Cancer Patient Culture in Identifying Environments that are Supportive Cancer Partners

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Cancer diagnosis and treatment are life-altering events. Although breast cancer strikes one in eight women, the first occurrence is often unexpected, and complicated by the newness and vulnerability of the cancer patient who has to navigate the medical system, manage the disease and its consequences, and learn how to live with a cliched 'new normal.' During a cancer journey, a new cancer patient has much to navigate as relationships are negotiated with oneself, one's family and friends, medical teams, and one's everyday environments. In this paper, three breast cancer patients who are also environment-behavior researchers draw upon their personal observations in their homes, workplaces, and medical settings to illustrate the emergence of a breast cancer patient culture. They use empirical examples and theoretical concepts from their own research – socio-spatial analysis of residential, health care facilities and restorative environments – to illustrate how their everyday environments were adjusted to the needs of the cancer patient, and revealed aspects of the cancer patient culture. Also embedded in the analysis in this paper is a reflection and critique of three space types – the residence, the workplace, and the health center – that together create a system of settings for a cancer patient. How can a house be a home that helps the cancer patient maintain continuity of self? How can the workplace enable continuity of a disrupted career? And how can a health center negotiate a fine balance between patient privacy and need for social support? Questions like these will be raised and addressed as a new environment-behavior research agenda –

environments as supportive cancer partners in the journey – is formulated and strengthened.

Spatial Implications of Essential Surgical Flows in Ambulatory Surgery Centers

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As part of the Realizing Improved Patient Care through Human Centered Design in the OR (RIPCHD.OR) learning lab, a comprehensive research approach to contemporary OR suite design, this study outlines surgical flows and ways in which they inform the design of ambulatory surgery centers (ASCs). Surgical flow, which includes the sequence and dynamic directions of activities of people and objects in the surgical process, does not imply specific types of spaces, adjacencies, or physical distances between spaces. Rather, flow designates the essential steps within the surgical process that must take place to successfully perform surgical procedures and provide cost effective, efficient, and high quality care. The sequences of steps for the different flows inherent within the surgical process were first abstracted from empirical studies and solidified through field observations conducted by the RIPCHD.OR research team. Surgical flows were then categorized and mapped into idealized flow diagrams. Case studies were conducted at three health care organizations through facility tours, physical assessments, and interviews with key members of their surgical team to understand the design implication of these idealized flows on various spatial configurations and how they are shaped by different service models. The application of key flows in these facilities, depicting the variation in how the built environment supports the surgical process, will be shared along with lessons learned from each case study. Design considerations

will also be discussed to inform future ASC design to not only increase efficiency and reduce cost but also to improve the experience of patient and staff throughout the ambulatory surgical process.

The Impact of Examination Room Design on Patient-Centered Outcomes

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Contemporary changes in health care policy and delivery necessitate health care settings that are efficient, patient-centered, and accommodate outpatient care. However, there is a lack of original design research of key spaces within clinics, such as examination rooms, and their impact on patient-centered care. The purpose of this literature review was to identify existing refereed studies that measure the impact of examination room design features on patient-care provider communication, patients' perceived quality of care, patient satisfaction, patient self-disclosure, care provider work flow, and operational costs. A comprehensive online database search was conducted from Web of Science, Google Scholar, PubMed, and Science Direct using a combination of synonyms of the terms, such as "examination room," "communication," or "examination table." Refereed articles in English, published from 2009 to 2016, were selected for the literature review, yielding a total of 59 relevant studies. Several of the findings had direct implications for examination room design. Studies revealed that patients' positive perceptions of the examination room's ambient conditions (e.g., noise, lighting) were linked with patients' satisfaction, perceived quality of care, perceived wait time, and quality of interactions with care providers. Innovations such as dual entry exam rooms and patient-self-rooming strategies reduced noise and cost expenses, as well as enhanced privacy, flow, and staff satisfaction. Compared to smaller rooms, larger spaces

were more positively perceived. Individuals responded to spatial intrusions by readjusting their posture, interpersonal distancing, and avoiding eye contact. Levels of room lighting correlated with disclosure and relaxation by patients. Multiple studies implicated the need for adjustable examination tables or alternative examination table solutions. Information sharing, patient participation in care, and patient satisfaction were impacted by orientation of computer monitors, and seating arrangements. These findings suggest that a sharper design research focus on examination room design is very promising for design standards and the patient experience.

The Impact of Exposure to Nature on Components of Attention

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It is shown that exposure to natural environment influences humans' capacity to pay attention, and helps to recover from attentional fatigue. With the rapid growth of urbanization across the world and the growing demands on people's attention, the need for more green spaces has become increasingly important. Attention underlies our ability to learn, plan, evaluate, solve problems, and initiate and carry out tasks. It also helps us monitor and regulate ourselves and have effective social functioning. The problem is that we live in a world that regularly fatigues our attentional capacity, leaving us error prone, irritable, and impulsive.

Attention Restoration Theory (ART) (Kaplan, 1995) postulates that exposure to nature will help people recover from attentional fatigue. While a growing body of research has demonstrated the role of exposure to nature in attention restoration, it is still unclear which aspects of the attention may be affected. The attention system includes three main interacting

networks. These networks include alertness, orientation, and the executive system (Fan, 2002; Raz, 2004). We examine the impact of exposure to nature on each component of the attention system through two experiments. In the first experiment, participants are exposed to urban scenes with and without nature using attentional measures. Then they are tested for the three subsystems of attention.

In the second experiment, we use the same set of images, but explore their impact on brain functioning using high-definition functional magnetic resonance imaging (fMRI). With fMRI, we track neural activity associated with each component of attention. In this paper, we report only on the first set of findings and conclude by proposing recommendations for future work, including an inquiry into which specific elements of the natural environments impact human brains and mental health.

Iranian Women's Perception of Safety and Security in Urban Spaces: A Qualitative Study

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Safety and security are considered as basic human needs and fundamental rights. Women, who are among the most vulnerable groups need more safety and security in urban spaces. Using a conceptual model, this study explored features contributing to women's perceptions of safety and security in Iranian urban spaces in order to be more active and engaged. In the context of Tajrish square and the Panzdah Khordad pedestrian way of Tehran (Iran's capital city) a qualitative method was applied. The qualitative method was based on the responses of 20 women to semi-structured interview questions up to data saturation; the responses were analyzed applying content analysis to draw a model. In sum, the results revealed that women's perception of security in the urban spaces was associated with three main

features; individual security, social security features, and environmental security due to qualities of built environments.

HISTORIC PRESERVATION

A Critical Review of the Living Heritage Approach for Preserving Historic Environments

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For the conservation of historic environments that are still inhabited and used for everyday living and other functions, UNESCO has developed a heritage management approach called Living Heritage Approach (LHA) as a paradigm shift from the conventional ways of characterizing and managing cultural heritage as a monument-centric and expert-centric process. The LHA emphasizes continuity of cultural heritage and traditions in a locale, while recognizing that change in that culture is inevitable. It promotes a community-led approach to heritage management, based on a definition of a core community and utilizing their traditional means of taking care of historic environments. The goal is to facilitate a long-term sustainability in safeguarding heritage places and practices by an empowered core community. In this paper, we take a critical look at the LHA, using four case studies of historic environments from the South Asian context as a framework to delineate its strengths and limitations as a heritage management approach. The case studies include: Bhaktapur, Nepal; Trivandrum, India; Galle, Sri Lanka; and Kandy, Sri Lanka. We argue that, while the LHA as currently formulated is relevant and useful for the conservation of living historic environments, its application is in fact limited to more specific historic places that are small-scale, isolated, and definable entities with socio-culturally homogeneous population groups with shared history. Its key tenets and people-centered approach become more complicated when applied to historic environments that are influenced by intense globalization and inhabited by socio-culturally

diverse populations. Its eponym 'living,' therefore, requires a clearer definition that delineates its limited application to certain distinctive cases of cultural heritage. Nevertheless, its applicability in living historic places could be improved, when its key concepts are assessed against multiple scenarios of heritage sites and are broadly and incisively articulated.

Decoding Unprotected Heritage through Community Based Heritage Value Assessment: A Case Study of Tamil Brahmin Settlement in Thiruvananthapuram, Kerala, India

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Unprotected heritage of India includes vernacular houses, traditional settlements, and vast cultural landscapes that are constantly under the threat of urbanization, negligence, and inept development strategies adopted by the government and the local communities alike. Conservation and management of this unprotected heritage require an understanding of the way local communities who live and use such historic areas value their environments. In addition to expert-based heritage values, such community-based heritage values are critical to constructing a sustainable heritage management framework. This presentation provides an example of decoding community-based heritage values of an unprotected historic area in India. The site is a Tamil Brahmin settlement in the Fort Area of Thiruvananthapuram in the state of Kerala. This 200-year-old settlement is located around the historic Padman abhaswamy Temple and has a distinct character of its own, evoked by the architecture of traditional row-houses, known as Aghrams, and the lifestyle of the 'high' caste, Tamil-speaking, Brahmin community who serve the Temple. The qualitative approach adopted included interviews and surveys

with locals and heritage experts, analysis of archival material, and observations. Findings reveal that the Brahmin community attaches primarily social, historic, and spiritual values to the place. These values are severely affected by some of the recent development trends happening in and around the settlement, such as the increased security around the Temple, tourism, and rapid urbanization. Inadequate attention to and recognition of the key elements contributing to the sense of place of the locality, the community's sense of place attachment, and their memory of the place are negatively affecting the heritage of Agrah arams and of the Fort Area. These aspects require immediate attention in order to maintain the authenticity and integrity of this settlement for future generations.

Historic Architecture in the Age of Instant Reaction: The Efficacy of Voices from Social Media

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In a time when access to information, past and present, is instantly at our fingertips, so too is our ability to judge a work of architecture when we encounter it online on social media. An increasing trend with online architectural publications is to post images of newly built works instantly to their social media feeds without context or written content. For an instant gratification society, this means likes, shares, and comments abound before a project is fully unveiled. All posted work is subject to judgement, but in the realm of historic preservation and adaptive reuse, projects are judged more harshly by online critics (page followers) who are designers and laypeople alike. Culture, history, and significance often get lost in an online debate spurred by aesthetic value, but with the weight of personal identity. Where commenters do find time or space to address these issues, boldness knows no bounds in creation of more critical responses in an era of populism and xenophobia. This study critically examines the online commentary and social media

statuses of several recent works from ArchDaily, an online architecture news and publication site. Each work is a mix of adaptive reuse, historic preservation, or attempt at modernization which has received some sort of criticism, praise, cultural, or contentious commentary. Using recent theoretical discourse on online identity and boldness, public perceptions of historic buildings, and the ways we use commentary to analyze the success of built works, this study will expand upon how media and image presence of historic and adapted architecture is portrayed and understood online. This study is an opening to other possible discussions about how we can understand criticism from non-designers, how online architectural imagery portrays culture and significance, and to what extent social media matters in architecture of the past, present, and future.

Historic Preservation in Interior Design: A Case Study of Two Iconic American Victorian Style Hotel Resorts

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This paper examines Victorian resort hotels in the United States built in the 1800s as a manifestation of historic preservation and successful adaptation. The paper discusses a brief history of Victorian resort hotel development, the developers, and forces behind their creation. As hotels struggle to survive, little is known about how some have managed to thrive for over a century in the cutthroat business of hotel management. A case study methodology was used to investigate if historic preservation combined with wise adaptation increases the probability of success. Further, how can hotels founded on different principles each be successful? Two examples from opposite coasts are used to demonstrate how historic hotels have adapted while preserving interiors and integrating modern amenities. The first example, Mohonk Mountain House in New Paltz, NY, was constructed during the late 1800s.

The hotel is based on a combination of Stick and Queen Anne styles of architecture on a lake in the mountains north of New York City. The second example, the Del Coronado Hotel in San Diego, California, was built in 1888. It is located on an ocean beach on Coronado Island and is a combination of Shingle and Queen Anne styles of architecture. As these resort hotels enter into their second centuries, they evidence distinct paths to success. Hypotheses were confirmed despite surprising differences in hotel operation. Historic preservation and faithfulness to original architectural design intent have been central to their success. Pioneers in the introduction of electricity at their inception, they continue to innovate. The addition of spas and other amenities has occurred without sacrificing their original character. Further research is needed to ascertain if new hotels can be designed to increase probability of becoming iconic and to adapt to future change from the start.

How Can Environment/Behavior Literature and Research be Used in Historic Preservation Practice? An Analysis of the Required Skills and Abilities Found in Historic Preservation Job Announcements

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This paper tries to answer how environment/behavior literature and research could be used in historic preservation practice. Historic preservation practice can be broadly grouped into four areas: (1) work dictated by compliance requirements (i.e., what is required by law); (2) work in construction management, architectural design, and materials conservation; (3) work that focuses on the objective interpretation of the history of places; and (4) work that advocates for saving/protecting historic buildings and places. In order to answer this question, the author conducted a content analysis study based on a survey of six months of historic preservation

job announcements, grouped into these four areas of practice, to see if certain skills and abilities lent themselves to the use of environment/behavior literature and/or research. The results indicate that required skills in conflict resolution, working with people from different cultural backgrounds, stakeholder engagement, interpretation/exhibit design, and design review all have elements that could be improved through better understanding of how environments impact people's perception, behavior, and values. In particular, the requirement for "environmental review" required by the National Environmental Protection Act (NEPA) is perhaps one of the strongest areas for the use of environment/behavior literature and research. There is, however, a lack of evidence that environment/behavior literature or research is used in historic preservation practice, including in NEPA. This paper will conclude by attempting to connect relevant academic literature (i.e., theory) with practice that impacts the historic environment and how this connection might be actualized by practitioners.

INTERIOR DESIGN

Designing Environments to Promote Healthy Lifestyles for Children from Marginal Communities

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Growing evidence suggest that poor diets, technological obsessions, and lack of healthy lifestyle opportunities plague children around the U.S., particularly those living below the poverty line. Given the increased awareness of how the built environment may have a negative effect on a user's health and well-being, it is vital to educate and expose interior design students to diverse user needs and the opportunities that exist to positively impact marginal communities with design. Mindful of these needs and opportunities, students will come to appreciate that environmental design is, indeed, a social determinant of health.

Recognizing the important role the built environment plays in health and well-being, the author created a student design project based on the greatest needs of children from impoverished neighborhoods in Savannah, GA. The design project involved the creation of an urban wellness retreat for children. The initial phase of the project consisted of working with community partners to identify marginal communities where children's well-being was in jeopardy. Research was conducted by fourteen students to understand factors such as: community demographics, children's access to healthy food and lifestyle options, and safe areas for play and physical activity. In addition to researching the assigned communities, the student groups conducted precedent studies for built environments that aligned with the six dimensions of wellness (physical, emotional, spiritual, occupational, social, and intellectual). Completing the urban wellness retreat design required consideration of each of the

wellness dimensions. A variety of final wellness center designs were presented to the community partners and displayed in the local library to obtain feedback on appropriateness, potential impact, and viability.

The urban wellness retreat for children project represents a shift in design education to a greater focus on recognizing the idea of environmental design as a tool for positive change in community wellness.

Emergency Departments at the Time of Disasters: What is the Impact of Physical Design?

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While many emergency departments (EDs) already function at or near their maximum capacity, this section of health care facilities is at the front line of any disaster (natural or man-made). These disasters are recognized as Mass Casualty Incidents (MCIs) or events in which the number of patients exceeds the resources of a treating facility resulting in limited or no care for a portion of the injured. The first objective of this study was to identify the physical design factors to improve surge capacity in EDs during MCIs. A systematic review was conducted of literature on all tested and discussed solutions. Our findings show that several policy- and resource-related factors were demonstrated to have a positive impact on surge capacity, including changes in protocols, personnel's knowledge, drilling, specific and non-specific equipment, and communication. However, physical design factors were only discussed (not experimentally tested), including expanding care areas (e.g. utilizing hallways, adjunct clinics, or storage areas) and one exit/one entrance strategy. Not all of these suggested design solutions are applicable during MCIs due to a significant difference in event characteristics. The second objective of this study was to characterize

these differences, including the different distribution of patients, dual wave phenomenon, convergence phenomenon, different demographics, and different diagnoses. Further data will be collected by conducting a survey of ED medical doctors and nurses in order to (a) gain a better understanding of MCIs' unique characteristics from caregivers' perspective, (b) identify additional design factors for improving surge capacity of EDs, and (c) evaluate the potential of design solutions suggested in the literature. The outcome will be a quantitative analysis of the effectiveness of the MCI specific physical design factors in increasing ED surge capacity.

Mathematics and Space Planning

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Thinking and knowing at a quantitative level can significantly increase efficiency in design. This research explains how mathematical thinking could be employed in the early stage of design, often called the "programming stage," to ask the relevant questions and analyze quantitatively the relationship between variables.

Design often serves two purposes: function and aesthetics. While the search for new aesthetics has been a constant effort, functional study has not progressed at the same speed. The era of big data presents a tremendous opportunity to research more about the functions of spaces — movement of humans, goods, and service — to arrive to optimal design solutions. In order for next-generation designers to adequately study the functionality of future cities, buildings, and airports, they need to be prepared with adequate scientific knowledge, especially mathematics, which is the foundation of modern science.

Design is not an isolated discipline. It has always been influenced by other disciplines, including mathematics. There are endless examples of the results when mathematics has been applied to design: forms

and orders in ancient times and topology in recent years. However, the methodology and analysis of mathematics have rarely been applied to design.

In order to rediscover design, new approaches are needed. This research reestablishes the connection between mathematics and space planning. In this research a space-planning project for an outpatient hospital's ground floor is analyzed. Permutation is employed to complement the use of bubble diagrams and to logically eliminate undesired solutions. This research offers some different perspectives of what space planning really is and how designers can confidently proclaim that they have achieved optimal solutions.

Not All About the Classroom: Exploring Preferred Learning Environments in Higher Education

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Higher education requires a comprehensive discussion around informal learning spaces as active learning pedagogy takes hold and mobile technology transforms the teaching and learning process. Today, technology enables students to remain untethered to specific physical locations and learn in spaces not possible in the past. However, the focus continues to be on formal learning space design (i.e., classrooms), while little attention is paid to informal learning spaces where students spend most of their time and are free to come and go as they please. This study seeks to illuminate where students visit, what motivates their choice of space, and how physical components of the spaces impact preference. Student voices speak volumes in assisting design practitioners as they plan for environments that align student preferences and needs with the design of physical spaces.

This study was conducted with 32 students. Each student completed a digital preference survey using their cellphone to provide immediate feedback on the

experiences in each of their favorite locations. Students were instructed to record images and narrative to document usage patterns, and identify contextual factors of the environment they like or dislike most. Afterward, observations were conducted to evaluate site conditions at two popular locations and give context to the student voices. The analysis results revealed patterns of preference appearing across all spatial types in eight key areas: restoration/comfort, affordance, privacy, sustenance, place attachment, autonomy to control physical space/personalization, internal pressure to perform, and territory.

As students search to “find their place” on college campuses and higher education struggles to meet the needs in a rapidly changing educational trends and environment, design practitioners can tune in to the voices of users to create environments that matter to the current population and those to come. The study serves to highlight tools and techniques to accomplish this goal.

Quality Evaluation of Architectural Studios in University of Tehran Based on Students' Personality Types

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Design studios are one of the spaces which are commonly used in architectural education. Although design studios are crucial in the process of learning architecture, these places are unfortunately minimally studied. The aim of this study is to evaluate how students who prefer to work in groups perceive their personal spaces in architectural studios and whether they are satisfied with the present condition of their architectural studios. To make this evaluation, students in two undergraduate architectural studios at the University of Tehran, located in Iran, were observed for approximately 50 hours during the spring

semester 2014. To assess students' perception on studio environments, a paper-based survey with 31 three-point Likert-type-scale (satisfied, almost satisfied, not satisfied) questions were adapted from studies conducted by Demirbaz and Demirkan (2000) and Huang (1998). The survey was pilot tested with 16 architecture students prior to the main evaluation for reliability validation. Total of 80 architecture students from the studios under study completed the questionnaire. After data analysis, the results indicated that in competitive environments such as architectural studios, group-oriented students favor a larger personal space than students who are not group-oriented. Furthermore, the results indicated that about 52% of the group-oriented students were almost satisfied with the present condition of the studios. Among students who were not group oriented, 56% were almost satisfied while 22% claimed that they were generally not satisfied with the studio setup. Based on the results, we propose a design solution which allocates more gathering spaces in the studio while the rest of the space is divided by working cabinets or partitions at students' desks. We believe these design implementations in architectural studios will better suit students' personality types and needs with a potential to improve their learning outcomes.

Wayfinding Strategies Among Elders with Dementia in Assisted Living Facilities

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The ability of elder residents with Alzheimer's disease or a related dementia (ARD) to reach desired destinations on a daily basis in assisted living facilities is considered a basic physical, psychological, and social human need, which directly affects their personal autonomy and quality of life. Spatial memory or visuospatial processes were the focus of most studies that examined “getting lost” behaviors in persons with ARD. In particular, more than one-third of persons

with Alzheimer's disease were found in previous research to have disabling visuospatial disorientation, which directly inhibits their ability to reach desired destinations. Thus several research studies address dementia-friendly design, environmental design cues for elders with dementia, and supportive design for floor plans and outdoor wayfindings. However, there is the lack of study about wayfinding design focused for elders with dementia so research studies relevant to wayfinding need to be synthesized to better understand wayfinding strategies for elders with dementia, who have memory impairment, and impaired spatial cognition. Also the operational requirements of assisted living facilities in relation to floor plan typologies and environmental design cues such as adequate lights, colors, and furnishings need to be investigated. Because of an overall aging society, the further development of evidence-based design for people with dementia will become increasingly necessary and appropriate design applications should be described for improving wayfinding difficulties and spatial disorientation. The purpose of this study is to address the importance of wayfinding strategies for elders with dementia in assisted living facilities and to provide appropriate application through synthesis and literature review on wayfinding design. The literature review and synthesis of wayfinding design will be used as references for other relevant studies. As a result, applicable strategies are addressed contributing to generating guidelines for future studies and to evaluating current assisted living facilities for improvement.

INTERNATIONAL HOUSING RESEARCH

Potential for People-centered Housing Recovery in Post-Yolanda Resettlement in Tacloban City, Philippines

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On November 8th, 2013, Typhoon Yolanda caused devastation across the Philippines. In Tacloban City, housing recovery focused on residential relocation, with new housing provided through support from various governmental agencies and non-governmental organizations. To what degree is Tacloban's housing recovery people-centered – does it support residents' actual needs and participation? Three years after Yolanda, this research investigated how relocation to new permanent housing has affected residents' lives, and compared houses and living environments of permanent resettlement sites.

Families of informal settlers from typhoon-devastated coastal communities are the beneficiaries of new housing, mostly built in North Tacloban as part of a large-scale resettlement. The National Housing Authority (NHA) plans to build more than 13,000 houses; 2,600 houses will be built by donors/NGOs, through coordination with Tacloban City. As of October 2016, over 1,100 families were living in three NHA housing sites; over 1,000 families were living in six NGO/donor supported sites.

93 respondents from the nine inhabited resettlement sites were interviewed in late October and early November 2016, using a semi-structured questionnaire, about their housing recovery process, changes in livelihood and living environments, and evaluation of permanent houses. Previous site visits

and interviews with community leaders and other stakeholders in housing provision complemented this information.

The majority of respondents described their new concrete houses as "safer/secure/comfortable" compared to former homes, although 30% of residents in NHA housing identified poor quality materials/unreliable structures. People in semi-detached houses or with setbacks highly valued the space around their houses. For all sites, distance from downtown/work/children's schools caused significant financial pressures. Residents from only one site were involved in house construction, and none in planning and design. Although potential house expansion and modification varies by each sites' design and regulations, residents' ability to modify their own houses may be a significant way houses can better reflect their needs.

Social Housing for Korean Young Households as Alternative for Public Affordable Housing

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Social housing can be defined as affordable rental housing that is provided by non-profit organizations in the private sector. Although Korean central and municipal governments have generated a number of housing policies since 1963, they are still struggling with housing stabilization, especially among the young adult population. Currently, young households are struggling with the severe housing cost burden, spending 55.8% of their income on housing. 22.9% of them and 36.2% of single youths are housing poor because of housing expenditure (Choi et al., 2014). Due to the potential benefits on self-sustainability in the housing market system, the city of Seoul has adopted

the concept of European Social housing policy into its housing welfare development program, and expects positive outcomes. Therefore, the present study is to investigate how current social housing in the city of Seoul has been implemented in the rental sector of the private housing market, and the current balance between demand and supply.

In this inductive approach study, 23 cases of social housing and eight non-profit organizations in Seoul were examined and analyzed using the content analysis method. Also, the literature related to these cases and organizations was collected and analyzed. The analysis was based on the three categories: social housing supply system, occupancy management, and residents' quality of life. Regarding housing systems, housing provider about construction or remodeling, social housing stocks, and financial support were analyzed. For occupancy management, tenants' daily living rule and education, communal living program, and housing maintenance were inspected. To measure quality of life, residents' living conditions, stage of life, and value system were examined. Based on the findings, the study proposes the guidelines for housing stabilization policy. Further, the characteristics and the value of the Korean social housing are discussed.

PARTICIPATION

Make it a Better Place: Community Gardening in Prague

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In the Czech capital city of Prague and in other places, there is a new trend emerging: urban community gardens. Based on the inspiring examples from the United States, western or northern Europe, groups of citizen activists – or at least people with an interest in finding a place to grow their own food – are establishing community gardens. The first two gardens of this “new” type were established in Prague in 2012, and others flourished in Prague and other cities and towns of the Czech Republic during the following years. In the 2016 growing season, there were already 17 community garden projects in Prague and other 16 community gardens in the rest of the country.

The results of the interviews with community gardens’ organizers in Prague proved that all the community gardens in Prague were created by the bottom-up approach, by the activity of particular individuals or citizen groups. The aim to create a better place, improve the quality of the environs, or enliven the public space lies behind the formation of the majority of these gardens. The weak points of the community gardening are mainly the worries about the sustainability of the garden from the financial point of view. As a threat, most gardeners perceive the deadline of a rent agreement or an insecure prolongation of the rent agreements.

In my paper, I document the current struggles for a place to garden with a case study of an inner-city community garden in Prague and its fight for survival within the urban spatial and political mosaic. The broader community and civic movements need to have a stronger voice in influencing development outcomes.

Successful cases of newly emerged community gardens have proved that this type of garden in the city can have many benefits overlapping their sole productive function.

Participatory Design Research and Adults with Mental Illness

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This presentation will discuss a participatory design research exercise completed with clubhouse members in a Midwestern county. Clubhouses are non-profit community centers that provide holistic, cost-effective solutions for adults living with mental illness. Complementing available psychiatric treatment, clubhouses assist members with transitional employment, education, housing, wellness, meaningful relationships, and quality of life. Accredited clubhouses follow the International Center for Clubhouse Development (ICCD) Clubhouse Model, included in the Substance Abuse and Mental Health Services Administration’s (SAMHSA) National Registry of Evidence Based Practices and Programs (NREPP). Clubhouse models are cost-effective, increase employment rates and tenure, improve well-being, and reduce hospital stays and incarcerations. Clubhouse members additionally benefit from a work-ordered day, social interaction, empowerment, and outreach.

Although the ICCD model has proven successful, it offers little guidance concerning facility design. Members’ work-ordered day often relies on a clubhouse’s proximity to public transportation, affordable housing, education opportunities, and local employers. Furthermore, the effects of building design on members and staff have not been well-researched. Recognizing the importance of the built environment, the Midwestern county clubhouse members and staff partnered with architecture students and researchers to inform the location selection and design of a future clubhouse facility. Students completed clubhouse

design proposals after talking with members, staff, and mental health experts and conducting research on existing lobbies. Then, a four-part participatory design research exercise was completed using students' proposals that included a questionnaire, an interactive feedback session, a needs prioritization exercise, and an ideal drawing exercise. Students taught members how to read architectural drawings and communicate ideas to designers, and members helped project students and project stakeholders better understand their needs and implications of proposed designs. Development, results, successes, challenges, and implications of the exercise will be discussed.

Planning Healthy College Campus Using 'Point of Decision Design' Approach

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Many young American adults do not meet daily physical activity recommendations while having a higher BMI (body mass index) than normal. Both physical activity and diet are influenced by the environmental design of daily settings. Considering college campuses are live-work-play environments for students, the impacts of campus design on student health are likely significant. Furthermore, collegiate adults begin to form their long-term lifestyles on their own. Students make many choices daily about physical activity (e.g., transportation mode, recreation) and diet (e.g., dining place, food item choice, cooking).

Our approach is to distinguish the points of decision (POD) from points of action. Thirty-six participants — including architects, facilities planners, public health professionals, and students — joined a whole-day ideation session for healthy campus planning. The session consisted of a journey-map exercise using

personas, POD identification, point-of-decision design (PODD) strategies, and applying the strategies in campus planning exercise. Tackling on PODs, the participants learned how healthy decision-making can be built into, or afforded by, our physical environments. Using effective design intervention strategies at critical PODs throughout college campus, we can make the healthy decision the default decision and be instrumental in positively impacting health. This, in the long run, can make the campus culture healthier. We will report the ideation session results compared to previous research findings and share our experience as organizers of an interdisciplinary ideation session.

Radical Walking: From Concept to a Community Engagement Tool for Environmental Design Assessment

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Radical Walking originates from a psychogeographical concept that provides an exploratory opportunity to experience everyday situations through oneself (Debord, 1958; de Certeau, 1984). Proponents value what others may consider insignificant to the greater majority. The structured rhetoric of urban disciplines has too often dictated how cities should develop. Radical Walking has been implemented in cities in varied forms to reflect citizen input in their visions. This study further structured Radical Walking into three part (the lens, the activities, and the outcome) so that it can be utilized by ordinary people to support environmental design decisions. It provides an opportunity for people to use their own bodies to collect information about their environment by using their basic five senses: sight, hearing, smell, touch and taste. The primary activities involve walking the built environment, experiencing the shared spaces and outdoor environment, and discussing the findings. As an engaged assessment tool, Radical Walking enables

the collection of subjective findings to provide valuable insight for the future of one's built environment.

This study found Radical Walking to be useful for trained participants to engage and structure objective information from subjective sensing. We found the range of sense-based data uniform in nature and conceptually grouped under several design ideas. Radical Walks help people verbalize their understanding. Some challenges with the outcome were that sometimes senses and emotions became mixed. However, aggregated findings can support and facilitate planning and design projects with a range of goals from healthier lifestyles to vibrant communities. This tool can be a generalized process that communities can implement with minimal training on their own for all environments.

Sowing Seeds of Political Engagement: The Value of Contentious Projects in the Design Studio

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As design educators, we prepare students of city-making disciplines for practice. The majority of our curricula ensures that students master technical skills so that they can succeed in contemporary workplaces. This produces efficient workers, but it does not necessarily prepare them to transform the world they encounter into one that is more just or sustainable. We may tell students that all design is political, but do we offer them opportunities to engage politically? How, for example, do they learn when and where to utilize their technical skills in a campaign for environmental justice? If we espouse the belief that design reveals and reinforces social and political relationships, and we hold that experiential learning offers transformative educational potential, then we must more thoroughly examine the value of engaging the political within design studio education.

Since the fall of 2015, design students at the University of California, Davis, have been engaging with a contentious community garden in nearby Sacramento. As with many service-learning studios, students learn by experiencing a place first-hand and by interacting with community members who bring local expertise to bear on possible solutions. Unlike many projects, solutions in this project have been elusive. Nonetheless, the results have been transformative for gardeners, other stakeholders, and students. By evaluating student work, gardener responses, and self-reflections, this presentation will highlight several values added by engagement with uncertain and contentious situations in the studio. Namely, while students struggled with design solutions and technical mastery, their confidence in designing inclusive participatory processes was enhanced, and their awareness of the political value of visual representations was heightened. Students, however, are not monolithic and bring to their education a diversity of worldviews and political stances. This presentation will also touch on the challenges of broaching difficult topics and modeling inclusivity inside and outside of the classroom.

The Classroom as Landscape Democracy Arena: Toward a Socially Transformative Pedagogy in Design and Planning

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Everyone has the right to access, belong to, and participate in decisions about the landscape of their communities. Design and planning professionals play a vital role in making cities sustainable and promoting greater environmental justice, yet they often see participation as an obstacle to their creativity or are unaware of its benefits. To change these perceptions, students and young professionals should be offered opportunities to learn about their agency in shaping democratic, supportive communities and practice participation.

Funded by the European Union, the Landscape Education for Democracy (LED) project is a three-year educational program educating design and planning students from five European universities about the theories, methods, and practices of landscape democracy. Students from other institutions can access the course as auditors thanks to a virtual teaching platform. The Spring 2016 online seminar enrolled 35 students worldwide to collaborate on a strategic vision for resolving a landscape democracy challenge within their communities. Twenty of those students would later participate in a ten-day intensive workshop where they applied skills and knowledge to help residents of the immigrant community of Zingonia, Italy, address challenges related to livability, food security, and environmental justice.

The performance of the seminar to reach its goals and ambitions was tested through pre- and post-engagement surveys. Results revealed that while the students valued the opportunity to learn about participation and landscape democracy in a multidisciplinary and cross-cultural context, both the discontinuous commitment of some group members and difficult to operationalize landscape democracy proved challenging. Nonetheless, they called for more opportunities within their university's curricula to refine their social agency skills. They also expressed doubts that they would be able to pursue this type of work in private practice. The paper ends with lessons for educators interested in democratic design and planning education.

The Future of Design Communication in Community-based Participatory Design: A Case Study from Volga, South Dakota

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Since the 1980s, a transdisciplinary movement known as Participatory Design (PD) has influenced practice in many design fields. Representing a broad philosophy and variety of methods, PD actively responds to the shifting market forces in the age of experience economy, where values such as individuality, locality, multiplicity, and ephemerality considerably reshape both the supply- and demand-side of design. Thanks to the scholarly endeavors of Henry Sanoff and his associates, the architectural world has embraced the PD movement through community-based participatory design projects, where community members are actively involved in decision making in various design stages.

Communication gaps between architectural professionals and non-professional community members pose a significant barrier to the adoption of the PD approach in community-based design. Existing environmental design literature is extremely underdeveloped on this subject, providing little theoretical support other than some vague guidelines inferred from anecdotal reports that lack methodological rigor.

This paper outlines an on-going investigation in the search for effective design communication means in community-based PD projects. Employing methods of in-depth interviews and qualitative content analysis, researchers from the Department of Architecture at South Dakota State University contacted six community participants of a community-based design initiative at Volga, SD, examining their perception and evaluation of three major means of architectural communication:

physical models, renderings, and virtual reality (VR) environments. The collection and analysis of qualitative data focused on six themes: interaction, immersion, sociality, manifestation, fidelity, and extensibility. The initial findings suggest that a fusion of Physically-Based Rendering (PBR) and VR technologies would greatly enhance communication and stimulate design participation. The paper concludes with a discussion of logistic and technological implications for architects to improve designer-user interactions for PD design projects.

The Impact of Communication and Social Learning on Project Implementation in Rural Communities

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Evaluation of impacts reveals the importance of communication and social learning in project building, supporting initiatives that emphasize empowerment planning strategies in rural Iowa. Advocacy planning, which emphasizes expert knowledge, is less successful in small communities, where decisions must be widely supported and understood among community members to be implemented. Communication extends the design to a broad audience, while social learning theory suggests that adoption of design must happen through established authentic and trusted sharing among socially connected community members.

This paper presents the results of a cross-case analysis of six small rural Iowa communities that completed a participatory planning process in which concept designs for transportation enhancements were developed. The six communities were selected from more than 100 communities with high rates of project implementation and were studied to better understand factors that affected outcomes. The research team used an expanded case-study approach building on existing

data. Review of follow-up interviews, press clippings, and social media posts provided a rich data set on how communication and social learning influence both the planning and implementation processes in rural communities. Communities that employed multiple communications strategies were able to engage large numbers of residents and successfully build several projects in a relatively short period of time. By engaging people through their social networks, these communities were able to build trust among residents and ultimately obtain buy-in necessary to implement design proposals.

The findings in this case study are supported by a longitudinal study of the conditions in 99 Iowa communities in 1994, 2004, and 2014 conducted by the Iowa State University Department of Sociology to develop a profile of Iowa small towns. The results are published in a report titled *Sigma: A Profile of Iowa Small Towns 1994 to 2014*.

PLACES OF WORK & HIGHER EDUCATION

Listening for Outcomes: Exploring the Impacts of Residence Hall Spaces on Students

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Many universities provide on-campus housing for students and the University of Memphis has been doing so since its founding in 1912. Over the past century the campus has added sixteen buildings to house the diverse study body including: women and men; freshmen and upperclassmen; legacy and first-generation students. While a great deal of literature is available to link on-campus housing with higher retention rates, fostering social integration, and stronger student outcomes, most publications focus on the relationship between residence life programming activities and academic success. Little is known about the influence that size, variety, cost, and spatial organization have on outcomes, retention, and on-time graduation of diverse populations.

This study looks at four residence hall settings at the University of Memphis and explores correlations between residence hall spaces, student academic performance, and student retention. The research uses a mixed methods approach, including ethnographic study, student surveys, focus group discussions, historical data, and an assessment of architectural attributes to explore provided residence hall space and the impacts on first-year residents. Preliminary analysis describes the relationship between space organization/type, student choice, and academic outcomes as well as the impact of resident choice on residence hall diversity and academic outcomes of first-year students.

This study has significant implications for future construction and renovation of student housing, as well as having the potential to significantly impact current students and university housing decisions. In addition to providing much needed information about student housing and first-year student outcomes, this study will create a framework that future research can build upon to encapsulate a complete picture of how physical spaces and spatial organization of student housing impact residents across their college career.

POE/PROGRAMMING

A Post-Occupancy Study of Student Housing on Freshmen's Social Well-being and Academic Success

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The higher education system has changed vastly in the past few decades, with increasing focus on developing independent critical thinking, social skills and team work capabilities. However, despite some improvements to accommodate for students' physical state and new technology, little research has explored the role of student housing design on students' social well-being and effect on academic performance. It is especially relevant for freshmen during their onboarding process.

This study investigated the impact of student housing on freshmen's academic and social wellness through a post-occupancy evaluation of recently completed Self and Oswald Freshmen Residence Halls at the University of Kansas. The POE was conducted using multi-methods in four phases. The data collection began with space syntax analysis of the layout that evaluated visual connections among various student activity areas. The second phase was a structured behavior observation of the residents' activities in public activity areas. The focus was on understanding the behavior pattern and spatial preferences for independent learning, group learning, and social interactions. Along with observation, a survey was conducted among residents to measure students' perceived academic and social well-being through three scales of involvement, academic achievement, and intellectuality based on University Residence Environment Scale (URES) (Gerst 1972). Lastly, further qualitative information was gathered in a focus group

interview to gain insight into students' perception of the environment in relation to their learning habits and social wellness.

The results suggest flexibility and variety as two key elements for a dynamic learning environment in a student hall. The observation demonstrated a clear stratification of individual versus group learning behavior in space. In addition, students tend to use their environment in the way that best complements their busy lifestyle, often prioritizing efficiency and convenience. These results point toward future design principles with considerations as unique as today's students' learning and lifestyle.

An Evidence-based Checklist for Wayfinding in Healthcare Environments

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The goal of the evidence-based design (EBD) wayfinding checklist is to provide designers and practitioners in health care facilities with an evidence based tool that can assist them in designing an effective wayfinding system, informing the design of future projects, and verifying the contribution of the design to the quality of wayfinding. The checklist addresses unique design principles for wayfinding in relation to patient experience in health care facilities, shows the significance of these principles, and develops a library of examples (both successful and unsuccessful). Thus, the purpose of this research is to share the experience of developing a systematic EBD wayfinding checklist for health care environments. This paper presents the first phase of the project that was based on a three methodological steps: systematic literature investigation for wayfinding research published between 2000 and 2015, a classification of the publications based on the EBD research quality criteria, and extracting wayfinding principles and

arranging it in an user-friendly checklist format. Using Excel spreadsheets, with internal and external hyperlinks, wayfinding principles were distilled and organized into sheets to cover four main locations in health care facilities: parking, entrance hall, diagnostic and treatment, and inpatient units. For each location sets of wayfinding principles were organized and classified under three main categories: building structure, interior design, and graphic communication. The next phase of the project is intended to improve checklist reliability by introducing the checklist to experts and practitioners to provide critical reactions to the draft checklist's accuracy, its potential, and usefulness for evaluating wayfinding. The results of the research indicated that most of the wayfinding principles were not based on empirical research. Not enough systematic research has been done to show the significance of different variables or principles in relation to wayfinding outcomes. Thus, more empirical research is needed to fill this gap.

Benefits of Multi-Firm Facility Evaluation: A Case Study at Parkland Hospital

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Health care facility decision-makers and owners should demand results from unbiased facility evaluations to inform choices pertaining to facility improvement and ongoing operations. While post-occupancy evaluations in the design and construction industry are most often conducted by individual firms, there is value in moving toward a multi-firm, collaborative model to increase validity and credibility of facility evaluation results. In the spring of 2016, individuals and firms involved in the planning, design, and construction of the New Parkland Hospital, an essential hospital serving diverse

communities in and around Dallas, TX, came together to pioneer a research coalition for conducting post-occupancy evaluation research. The research coalition, including a hospital facilities representative, has developed collaboration agreements and processes to vet each other's work in evaluating use and effectiveness of the New Parkland Hospital facility, which was occupied in Fall 2015. The research coalition's aims include streamlining and consolidating post-occupancy research efforts for efficiency and applicability, maximizing research value for the hospital organization, contributing with substance and validity to the body of empirical work informing evidence-based health care design, and setting a new bar in the industry for quality and transparency of post-construction occupancy evaluation research. The research coalition's approach to facility evaluation is intended to provide a comprehensive perspective on the effects of design and technology decisions on occupant experience and patient outcomes at the hospital. We present the approach as a viable and valuable model for post-occupancy evaluation efforts at other facilities. We will share the coalition's guiding principles and charter documentation, which can be adapted to other collaborative facility evaluation efforts. We will discuss how we developed an integrated and rigorous evaluation research plan, and will explain key decision factors in light of potential impact on evidentiary strength and applicability for the hospital organization and across the industry.

Comprehensive Post-Occupancy Evaluation: Human and Spatial Factors in User Satisfaction in the Built Environment

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Post-occupancy evaluation (POE) is one of the most well-developed examples of practice-based research and design tools that utilize data concerning

multiple users' satisfaction in conjunction with indoor environmental components to develop a better quality of human life. However, one of the limitations of POE that is frequently pointed out is its excessive reliance on surveys and generalized solutions, without a full understanding of the occupants' physiological characteristics and pertinent environmental performance and conditions. This lack of awareness may lead to irrelevant modifications and the occupants' dissatisfaction with indoor environmental quality (IEQ). Therefore, this study suggested a comprehensive POE that incorporated a quantifiable data set (such as thermal, visual, air quality, acoustic, and spatial performance) to indicate each individual occupant's satisfaction with each IEQ element. At 411 work stations in modern office buildings, on-site IEQ measurements and user satisfaction surveys were conducted. Statistical analyses of the collected data were also conducted within specific categories of building types, system/physical attributes, and human factors. These analyses revealed significant relationships that exist between human factors and IEQ satisfaction, as well as environmental conditions. These relationships could be ranked in accordance with the impact that sensitivities of individual IEQ elements have on human physiological conditions. Therefore, these results reinforced the necessity for a modified POE with regard to a practice-based approach and a specific-targeted solution. They also provided critical evidence that can be used to enhance indoor environmental conditions and user satisfaction through application of appropriate IEQ design principles.

Functional Programming and Operations Improvement

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Functional programming serves as the foundation for space programming. Accordingly, understanding

functional programming as a phase and as a process is extremely important for the development of facilities programming theory. While environment and behavior studies focus on building users and the socio-spatial interactions that ensue, the fields of management consulting and organizational design offer complementary perspectives on operational processes. The goal of this paper is to discuss the role of operations improvement in facilities programming and in particular in the area of functional programming. Our objective is to introduce environment and behavior researchers, architects, and planners to the concept of operations improvement as it relates to functional programming. As such, this study will analyze current practices of incorporating the operations improvement projects into facility planning projects and creating a new type of decision-making. This project also uses a multiple case study design whereby the case studies were designed in accordance with grounded theory epistemological and methodological requirements. High quality data were obtained using multiple qualitative research methods. These include in-depth interviews, document analysis, and observations. The analyses conducted also follow the recommendations of grounded theory. This approach allows us to bring together expertise and knowledge from several areas. For example, operations improvement is incorporated as it utilizes systems thinking, consideration of spatial interactions in the organizational redesign, and concerns for productivity and value added when facility planning decisions are made. This overall approach allows many typical facility development problems to be resolved in completely new ways. Often optimal solutions are invented not in the target subject area, but in a completely different and unexpected domain. This study concludes with an analysis of opportunities for the interdisciplinary integration of knowledge and skills regarding operations improvement and functional programming.

Hospital Programming: The Springfield Facility Case Study

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Private hospitals are extremely competitive regarding patients and market share. This industry has nearly reached a saturation point such that maintaining market share and current patients is very challenging. Accordingly, hospital administrators are now extremely aware of the importance of their facility organization for optimizing operations processes, quality of care, and the patient experience. These are some of the reasons why facilities programming in the field of health care has acquired a privileged status, as it attracts both a great deal of attention and resources. In such an environment programming practices thrive and grow ever more sophisticated. The objective of this paper is to document the process of programming in the health care industry by presenting the Springfield Hospital case study. The development of this study is intended to serve as a benchmark project that will orient future research. Because this case study's research design is based on the principles of grounded theory methodology, it also contributes to the development of a grounded theory of facilities programming. Its data collection methods include in-depth interviews and document analysis. The study highlights a unique programming process and provides a wealth of information for academics and practitioners. Specifically, in this case study programming procedures are clearly organized into four phases: process planning, functional programming, space programming, and approval of the final document. This study also reveals that most of the innovations that occur during the programming process occur at the functional programming phase. Extensive strategic decision-making, organizational redesign, and operations improvement are what differentiate this practice from those of ordinary

program providers. This study contributes to the growing body of knowledge in facilities programming and serves as a stepping stone to the next stages of this research project.

Making Voices Heard: Workplace Design Trends Case Study and the Link with Sense of Place

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An office worker turns off his computer at the end of a 60-hour week, considering the week that has passed and pushing aside the feelings of being stressed out. Laying out what he will need in the next week, he pauses to smile at the family photos on his desk. By personalizing and arranging of his assigned work area, he has used his assigned space to create a sense of place in his office.

Today, the workplace design trend creates desking communes, amenity spaces that showcase grand and flexible meeting spaces, and serving kitchens offering premium coffee drinks to lure the millennial worker at the cost of replacing an individual's reserved workspace. While the beautiful spaces are indeed a wonderful attractor for many, one has to wonder if these design trends will enhance employee satisfaction, or will these trends bring future discontent?

Many whitepaper research studies tout the newest live/work trend at the expense of individually addressed spaces, causing one to wonder if the changes really reflect sound organizational desires for the employee's well-being or for that of the organization's bottom line. This quantitative organization survey study analysis identifies worker values in terms of quantifiable workplace attributes and the workers' environmental preferences.

The study's 411 respondents provide documentation for researchers and practitioners to explore the linkage

between place and job satisfaction, while setting up developmental standards that current and future workplace trends might be able to integrate. The Place to Work scaled index (Andrade, 2013) features key business components found within Fortune 500 companies being correlated with the Environmental Preference Index (Ellis, 2015), resulting in outcomes that can serve to develop well-defined means of designing appropriate workspaces. The two scales seek to integrate an employee's abstracted workplace desires along with the interior's environmental attributes, creating a congruent organizational environment.

New Evidence for Mixed-Use Living Learning Center Design: A Post-Occupancy Evaluation

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College and university student housing facilities are taking a new shape by developing learning centers within student living environments. This trend has created innovative ideas, but the research on the efficacy of those spaces is missing in literature. This study addresses this issue with a post-occupancy evaluation of a newly constructed (2013) student housing facility that incorporates living learning components.

The ground floor level contains mixed-use functions such as a community learning center, game room, media room, convenience store, coffee shop, music practice room, tutoring areas, and classrooms; and are accessible to all campus students. The upper four levels are dedicated to housing accommodations and restricted to residents only.

The data collection process involved four methods: an online survey to measure residents' satisfaction (32% response rate), face-to-face individual interviews (30–45 minutes) with resident-assistants and

students, ethnographic observation by researchers for seven days, and focus group interviews with eleven stakeholder groups (e.g., academic partners, department of residence life, facilities services, energy services, residence education, housing conference, and tours) who were involved during the project planning and programming.

The study endeavored to determine what worked, what didn't, and possible areas of improvement. Major findings include: (a) the mixed-use model with various social-academic spaces invites more students for utilization, creates better social interaction and sense-of-community, and increases students' satisfaction; (b) the community learning center with advanced computer lab and multiple collaborative study rooms helps support students' academic success; (c) in the upper-accommodation levels, diversity in lounge design avoids feeling institutional, and increases mingling among students; and (d) combining kitchen, dining and living areas for community lounges provides feelings of home, opportunities for social cooking, and student interactions.

Post-Occupancy Evaluation of Students' Behavior in Relation to Built Environment in a Post-Secondary Institution

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Understanding the relationship of environment and the human behavior is critical for designers and planners to design spaces. Information based on prior information builds up-to-date knowledge in the field. This knowledge in return provides reliable basis for designers in decision-making process. In order to understand and identify student engagement in relation to surrounding built environment, a number of different spaces in a post-secondary institution were systematically observed, consisting of both indoor and outdoor areas. The purpose was to deeply

understand the user interaction with environment and relate these non-participant observations of different spaces with the environment and human behavior (E-B) theories. The goal was also to provide possible improvement ideas, if required, to make E-B interaction productive. For this purpose, a case-study was conducted by selecting two indoor and two outdoor spaces in a particular institute. A total of 16 visits were made to those spaces, for about one hour each space. Observations were done combining multiple observation tools on user-environment interaction. In order to improve environment and human interaction, both productive and flawed design aspects were observed, and recommendations were made accordingly. Several contributing environmental factors influencing students' behavior within each environment, such as overall space layout, furniture and seating, lighting, culture, weather, and temperature were observed. It was found that theory of privacy, personal space, territoriality, crowding, place attachment, and environmental stress were significantly playing their role. Among all the factors, furniture layout and interactive culture of a space influenced students' engagement with environment and their peers the most. It was also found that furniture placed in a group or face-to-face arrangement promoted greater engagement among students.

Students Perceptions on How Classroom Designs Promote Active Learning

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Due to an alarming dissatisfaction with traditional classroom environments, academic institutions are investigating new classroom models to support the latest learning approaches. One of the most widely accepted approaches is Active Learning which is transforming educational environments. Active

Learning, is a theoretical construct provoking a shift from a traditional, lecture-based teaching format to a more interactive, collaborative learning format. One model that fosters an Active Learning concept is "The Student-Centered Activities for Large Enrollment Undergraduate Programs" (SCALE-UP) (Beichner & Saul, 2003). This model has been adopted by universities nationwide at an increasing rate. The acceptance of this new model has been fueled by pedagogical objectives to reform instructional spaces to improve the learning experience for both individuals and groups.

The purpose of this study is to evaluate a classroom design concept based on the SCALE-UP model in a recently completed innovation center on a university campus. The goal of this new facility is to foster collaboration and innovation among students, faculty, and industry. The functionality of the classroom is critical and will be assessed by students and instructors to understand how the design aspects of the classroom support individual and group learning activities. The satisfaction of individual and group activities, both requirements for active learning, often compromise the functionality of the classroom. To assess the functionality of the classroom, a qualitative case study design approach utilized multiple data collection tools including floor plan document analysis, survey, and interviews. Classroom functionality in this study is evaluated across three areas: simulate hands-on learning, foster access to information, promote collaboration. The findings from this study will be translated into practical recommendations for the planning and design of future Active Learning classrooms.

RESIDENTIAL ENVIRONMENTS

The Importance of Visual Attributes of Residential Streets in Criminal's Decision-Making of Committing Crime

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Little research draws important links between visual attributes of the physical environment and crime, such as above eye-level fences, overgrown shrubbery, and other obstacles that can provide an offender with a potential location from which to see without being seen. This study focuses on two relevant measures: visual access and visual exposure, where visual access is the degree to which one can monitor his or her spatial surroundings by sight, and visual exposure is the degree to which one may be monitored from other locations. Using recently developed space syntax based computer software, visual access is measured by isovist area and controllability, while visual exposure is measured by occlusivity and maximum isovist radial. Stranger-to-stranger crime data was collected at an address level on a 12-month period for three residential neighborhoods in the city of Ypsilanti, MI. The results of this analysis illuminated two important issues in the study of crime. First, visibility attributes of streets are found to be important for criminals' decision-making when they consider whether to offend at particular locations. Second, accessibility, visibility measures, and the sociodemographics of residential environments should all be studied together in the analysis of crime. The author recognizes the importance of simulation tools made possible by Space Syntax techniques in community policing and prediction of hot spots.

Changing Sense of Place in Rural-Urban Fringes: Case Studies of Four Villages with Different Urbanization Levels in Beijing

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Sense of place (SOP) has been broadly explored in the last forty decades with abundant theoretical models, study instruments and case studies. But the impact of urban development on SOP is not notably explored in literature. In order to fill this gap, changing SOP in rural-urban fringes is addressed in this study because rural-urban fringes are places heavily impacted by the fierce and irrational urbanization in China. A 3D model was used to attest SOP differences among four rural-urban villages, as well as the changes in SOP during the past ten years. The findings prove that the overall SOP in the four rural-urban fringe villages increases during the past ten years' dramatic urbanization, though the more intensified a place is urbanized, the lower its SOP is rated. For the four villages as a whole, place dependence and place identity are consistent components of SOP, which manifests the success of Chinese urbanization in poverty reduction and physical environment improvement. The more urbanized a place is, the less consistent the influence of social bonds is to SOP. It seems that social bonds are dissolving during Chinese urbanization. In addition, a process of rebuilding place identity during Chinese urbanization is inferred from the research. This study sheds lights on the influences of Chinese urbanization to the rural-urban fringes while providing implications for future urban planning and design to enhance SOP, which include more continuity between past, present, and future, and more open spaces for socializing and community gardens.

Control through Architecture: A Qualitative Research Study of Correctional Segregated Housing

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This presentation is a follow-up to a 2016 presentation that introduced and framed the study. This presentation will focus on research findings as conducted at two correctional institutions. The research design utilized observations at both the oldest and the newest correctional institutions within a large northeastern state. Two sets of interviews were conducted with groups of administrators, architects, correctional officers and inmates. All had experience with segregated housing units, which we know as solitary confinement.

Learning objectives for this presentation are to understand the perceptions of architectural decisions within segregated correctional environments, the overall processes of how prisons work, the implications of design decisions upon both inmates and officers, and of the reasons chosen for a particular research design.

This presentation and paper will deal with issues related to security and the environment as well as the methods we use to do design research. The researcher, who is an architect, educator, and doctoral student, will discuss a recent qualitative research study that utilized a grounded theory approach that investigated how design and design research is done for segregated housing environments. Two medium-security state correctional systems were used. The goal of the research was to determine the impact of architectural design factors upon inmates in restricted housing units.

This study utilized interviews and observations among all relevant stakeholders in the process. The data was coded to enable shared theories to emerge from the different perspectives. The presentation and paper

will present this research work, discuss the goals, environment, and the methods used, and present and discuss the research findings to promote audience feedback.

Environmental Design Interventions for Teenagers' Health and Well-being in High-density Residential Environments

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Teenagers experience unique physical and mental health problems. These problems are systematically associated with increased risks for future chronic conditions. For example, half of all diagnosed mental health disorders occur in teenagers (Kessler et al., 2005). Some of these issues are influenced by the environments they experience every day, such as urban nature (Park, 2004) or high density urban environment (Park et. al, 2007). However, we do not know how to create design interventions that allow teenagers to thrive in high density urban environments. By neglecting these issues, environmental designers risk creating the environments that may produce unfulfilled adults.

To assess such issues, we conducted a multi-disciplinary literature review to investigate how design interventions at the neighborhood scale, building scale, and single unit scale can reduce negative behaviors and poor health risks in dense urban environments. We systematically searched empirical studies in urban design, geography, and public health and integrated the results.

We found that teenagers' health risks include physical well-being risks such as cardiovascular condition, obesity, and malnutrition, and mental health risks such as depression, anxiety disorder, and ADD. Behavioral issues including crime, delinquency, and substance abuse were also discussed.

Several empirical and quantitative studies suggested possible design interventions that improve health for teenagers in different scales, such as proximity to green spaces, cues of care in landscapes, and the arrangements of apartment's floor plans. Some issues may not be accomplished via design interventions alone, but requires help from the collective community and policy makers.

This review provides design suggestions for urban designers, landscape architects, and architects to develop design strategies that help reduce health risks for teenagers. However, teenagers have diverse needs and preferences, and many cultural factors should be considered when applying these suggestions into design.

Is Green Housing Also Healthy Housing? Examining the Evidence

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There is an assumption that "green buildings" also encompass healthy environments for occupants. But is that the case? Recent research by environmental health scientists caution that green design and occupant health do not de facto correspond and may at times conflict.

This presentation describes the process and outcomes of a systematic analysis of how green design guidelines of two national green certification programs reflect, neglect, or sometimes conflict with occupant

health concerns. Since homes are where the most vulnerable populations — young children, seniors, infirmed — spend most of their time, and hence where design should be most attentive to health concerns, this study focuses on residential buildings. The analysis used WELL Building Standard for Multifamily and National Healthy Housing Standard as reference frameworks for gauging building and design characteristics that promote occupant health. In short, how did the two green certification programs — LEED for Homes and Enterprise Green Communities Criteria — measure up when it came to building and design characteristics that foster occupant health?

The presentation describes the methods used to examine correspondence of the green building guidelines with the healthy building standards, including documentary research methods and graphic data displays. Results targeted six building/design categories: (1) Indoor Air Quality (IAQ) – Chemical, (2) IAQ – Biological, (3) Thermal, (4) Water, (5) Lighting, and (6) Ventilation. Overall, the green guidelines address a certain segment of occupant health concerns, but are far from being comprehensive, particularly in the areas of IAQ, water, and lighting. Ironically, they address universal/inclusive design and active living design, which were absent in the health-related building standards. The presentation concludes with recommendations for advancing building performance for occupant health through strategic use or potential integration of both green and healthy certification programs, integrated design process, and facility management.

Symbolic Meaning of Affordable Housing

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The design of affordable housing may affect a homeowner's willingness to allow it near them. Research in architectural symbolism suggests that

people infer consistent meanings from home exteriors, and that this inference may lead to certain judgements, decisions, or behaviors about it. Thus, this study explores how people interpret and perceive homes that are labeled as affordable housing, and how specific symbolic meanings influence people judgements. The survey included artist renderings of six different architectural styles (Tudor, Colonial, Contemporary, Farm, Mediterranean, and Saltbox), a rating scale on how likely or unlikely each style represented affordable housing, and open-ended questions related to physical qualities and design aesthetics that led to their judgment on their selected style. Results indicated that architectural styles that were plain in architecture, had few windows, and resembled apartment buildings, were most likely affordable housing. Whereas architectural styles that appeared more grand in style, and had more architectural detailing were perceived as least likely affordable housing. Results from this study can be influential in reducing the stigma towards affordable housing by designing affordable housing that resemble single-family homes and by blending them in to the existing neighborhood. Future research could examine other examples of the styles used, other architectural styles, other physical elements, other populations, and reactions of neighbors and passersby to actual affordable housing.

The Neighborhood Renewals Created by Migrants in Montréal, Canada and its Suburbs: The Exploration of Places, Spaces, and Roots within Residential Installation Processes

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International migration confirms the cosmopolitan character of Montréal, strongly marked in the centre but also in the suburbs. The variety of migrants' origins is relatively large, but residential segregation remains low. The immigration territories as well as the migrants'

profiles are topics that are well known. This is the case for historic European waves, but less for newer arrivals from diversified origins. Moreover, while we know the main geographic patterns, knowledge on the meanings that migrants associate with their home essentially remain to build.

The spatial mobilities give new scales to residential environments. These mobilities beyond borders are leading migrants to rebuild a home in an environment that is unknown and where they are stranger. This leads us to wonder about the features associated with the feeling of being home, especially the familiarity, attachment, and identity dimensions. The experiences of home are associated with spaces and refer to several emotional meanings closely related to social and individual identities. Thus, we explore how the home of a migrant is evolving in terms of meanings and how their residential projects could find a place in urban policies.

The migrants' residential installation is studied according to changes in housing arrangements, spatial and social uses, and home experiences. In-depth interviews (n=42) put into perspective continuities, ruptures and transformations of home territories and place experiences for four origins (France, Latin America, Haïti, Maghreb). Five figures of integration allow us to reconsider the scope of ethnic neighborhoods. Multiethnic areas are resources enabling migrants to project themselves into urban space, but these spaces are not necessarily defined as specific places. Then different types of urban hubs are observed throughout residential installations, those contributing to define and reconstruct migrant's home. These hubs would benefit from being confirmed in their status and through urban municipal interventions and actions.

The Role of the Built Environment in Supporting Casual Social Ties in High Density Residential Areas

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The number of people living in high density residential environments is increasing rapidly. More high density residential buildings are being built, however the social sustainability of these environments is unclear.

Residents living in high density areas may move more often, are less likely to have children, and in cosmopolitan cities such as Sydney, Australia, are likely to live in areas with high cultural and language diversity. These factors increase the difficulty of forming relationships with other people in the area, due to having less time and fewer opportunities to make connections, and encountering language and cultural barriers. Additionally, these residents are more likely to be living in one- or two-person households, with associated reduced possibilities for immediate aid and social interaction. There is therefore a need to examine how relationships in high density areas may be facilitated.

This presentation details preliminary findings from a study of shared spaces and casual social ties in large residential complexes with reported good sense of community in Sydney, Australia. Interviews were held with residents about their experiences of shared spaces in and around their complexes, their relationships with other people in the area, and the value of casual social ties. Observations of shared spaces identified in interviews as settings for casual social tie development were undertaken, attending especially to the standing patterns of behavior apparent in a space and the features of the environment that afforded these behaviors. Drawing on theories of assemblages, behavior settings, and affordances, the research examined the processes by which social ties are produced. The study contributes to understanding

of the value of casual social ties to residents in high density areas, and how the built environment is involved in the production of these ties. The research will inform the design and planning of more socially sustainable high density residential areas.

Using Consumer Voices to Inform Housing Innovation for People with Neurological Disability

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The range of current housing options for adults with complex (i.e., neurological) disability remains vastly under-developed. Due to a lack of assisted living options, many with brain or spinal injury, multiple sclerosis, or cerebral palsy, for example, are often forced to live with aging parents in the family home, are placed in group home settings with other people with disability, or are forced to live in residential aged care where they are removed from familiar places, people, and communities. With the recent political emphasis in Australia to more actively promote consumer housing choice, the focus of housing provision for people with complex disability has shifted from increasing the number of available dwellings to increasing the number of suitable dwellings that represent a range of housing options. However, housing priorities are rarely sought from adults with complex disability and others who interact with the residential environment (e.g., family/non-family carers), resulting in design 'solutions' that are provided for people with disability rather than by them.

This research sought to identify the housing priorities of adults with neurological disability and their family/non-family caregivers so that future housing developments may address their wants and needs.

A total of 24 semi-structured interviews (m=57.04 minutes) were conducted with consumers. The resulting analysis identified 341 features that are important to consider. These features (and consumers' priorities) related to design, tenancy, care structures, location, and the neighbourhood context, indicating that a holistic approach to housing development is needed to increase choice for people with complex disability. By breaking down housing into its basic composition (i.e., individual features) rather than examining broad housing models, and investigating the efficacy of mentioned features from the consumer perspective, this research can enable decision-makers to piece together different combinations of features to truly develop innovative, market-relevant housing solutions for adults with complex disability.

SUSTAINABILITY PLANNING, DESIGN, & BEHAVIOR

A Path to Wildfire Resilient Landscapes: Changing the Wildfire Risk Modeling Paradigm

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The expansion of homes and associated commercial development in the wildland urban interface (WUI) places property, assets, and human lives at risk from wildfires. Approximately 65% of the WUI is in high-severity or emerging high-severity wildfire risk zones (Radeloff et al., 2005). While only 9.4% of the land area of the United States is in the WUI, it contains 38.5% of the US housing units (Radeloff et al., 2005), promoting fire suppression policies. Yet many ecosystems rely on fire to maintain their health (Bar-Massada et al., 2014; Moritz et al., 2014). Research has shown that the resiliency and sustainability of the WUI depends on an integrated, multi-scalar response to wildfire: one that synthesizes fire science with WUI development policy and homeowner values (Field & Jensen, 2005; Radeloff et al., 2005; Theobald & Romme, 2007). Currently, federal policy encourages at-risk communities to develop Community Wildfire Protection Plans (CWPPs) though their effectiveness in implementing wildfire mitigation strategies is unknown. Wildfire modeling efforts do not adequately capture current and future wildfire risk in relation to dynamic land use and cover change, climate change, or vulnerable populations. Additionally, CWPPs are often isolated from other planning efforts and isolated from social vulnerability. As a result, the earth and wildfire vulnerable populations have lost their voice in the modeling efforts that inform the CWPP process. Preliminary results suggest that few communities integrate CWPPs into their primary planning initiatives (e.g., comprehensive plans), address projected changes in wildfire risk, and

adequately address vulnerable populations. However, there are promising clusters of communities to explore as effective examples. The outcomes of this study will help designers and planners describe effective CWPP implementation and provide a voice for vulnerable populations that is integrated in wildfire mitigation strategies.

Analysis of Climate Sensitivity of Public Space in Cold Climate Zone: The Case of Yakutiye Square, Erzurum

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In the last decade, climate sensitive urban design has become a popular research topic in most countries due to the changing climate pattern. But northern cities have always been experiencing stressful climatic conditions such as snow, ice, wind and darkness, and they always need to be ready for those conditions. From macro-scale to micro-scale, urban patterns should be consistent with cold climate conditions. Especially, public spaces should reflect winter city characteristics in order to extend outdoor uses. Residents should be encouraged to remain outside with the help of public space design maximizes the beneficial aspects of winter.

The main objective of this study is to explore the consistencies between the urban patterns of Yakutiye Square and cold climate conditions. In this process, the intent is to produce a thermal comfort model of the central square of Erzurum, Turkey, and determine the level of sensitivity of urban design to climate conditions. The main question is whether the urban patterns in and around the square eliminate the winter disturbances. In addition the capacity of square to transform this outdoor space into a center of attraction is discussed. In this context, a case study was conducted in the winter period. The analysis uses

the data gathered through morphology of the site, meteorological parameters, and time parameters. Thermal comfort mapping can be produced by a methodology based on these three issues and will give an idea of better public space design for winter cities. To calculate the models, ENVI-met were used. The findings show that Yakutiye square is not compatible with cold climate conditions and not taking advantage of the existing climate conditions. In conclusion, some urban design proposals will be suggested for the case study area.

Brownfield to Public(?) Park: Designer and User Narratives on the Creation of Open Green Space through Waterfront Remediation

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The transformation of dilapidated waterfront urban industrial infrastructure into green public park space via brownfield remediation can simultaneously aggravate and alleviate various pressures and tensions associated with existing surrounding neighborhoods. Many changes tied to park formation are often welcomed, such as reduced risk of exposure to toxic contamination, improved resiliency to storm surges, restoration of ecological systems, and increased resident access to outdoor recreational spaces. But such projects can also be contentious due to their potential to facilitate environmental gentrification, whereby existing residents can face increased housing instability due to rising real estate values. This study examines narratives from users and designers of a recently constructed public park created via brownfield remediation processes on a historically industrial urban waterfront in Brooklyn, New York City. Analyzing narratives of park users as well as designers who took active roles in finalizing designs of the park reveals differences and alignments of perspective regarding priorities for design elements, pressures impacting

design processes, and the role of public parks in a contemporary urban context.

Cognitive and Behavioral Affordances of Stewardship Behavior in Green Residence Halls

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As the green building industry has grown dramatically in recent years, the environmental benefits of these building techniques are well documented. Less well studied is the impact green buildings have on occupant stewardship behavior within the green building context. Recent research has shown that green building trends towards automation that minimize occupant control actually undermine occupant stewardship behavior (Murtagh, Gatersleben, Cowen, & Uzzell, 2015). Additionally, building features designed to educate occupants often do so passively by providing information, rather than facilitating occupant engagement in stewardship behaviors. Consequently, the benefits of energy efficient building techniques are limited by not fully leveraging the power of human behavior change. This presentation will propose a theoretical framework examining green buildings as potential "positive sustainable environments" (Corral-Verdugo & Frias-Armenta, 2015). Both ecologically and anthropogenically healthy, positive sustainable environments also promote long-term environmental conservation by engaging building occupants through a variety of cognitive and behavioral tactics. The presentation will offer a comparative analysis of successful behavior change interventions and how similar techniques are woven into the design of green buildings to create environments that afford occupant stewardship behavior. Lastly, the presentation will discuss the results of a pilot study featuring a LEED Gold certified graduate student residence hall and make suggestions for future research to evaluate the behavioral implications of green building design.

Constructing Ecological Behavior: Identifying Effective Building-scale Ecological Behavior Design Strategies

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The potential of individual buildings within urban areas to directly contribute to the ecological integrity, or health, of local and global natural ecosystems, via improving their ecosystem functions and/or biodiversity, is typically considerably limited. This is partly due to the relatively small size of buildings within urban areas, as well as their location within the urban fabric. Ecological behavior design strategies at the individual building scale can provide opportunities for the local community to indirectly, and in some cases directly, contribute to the ecological integrity of local and global natural ecosystems. Moreover, they can be considerably less costly.

Existing research on building-scale ecological behavior strategies tend to focus on personal resource consumption behaviors, such as reducing personal water and energy consumption rates in homes and offices. However, influencing the ecological behavior of occupants of one building typically is not effective, in terms of affecting the ecological integrity of local natural ecosystems. Furthermore, these types of strategies sometimes foster rebound effects, thereby negating, and in some cases negatively reversing, the impact of the strategy.

It is thereby more effective to focus on building-scale ecological behavior design strategies that have neighborhood- or city-scale impacts. Yet, there is scant existing research on these types of design strategies. This paper identifies and explores the potential benefits of several building scale ecological behavior design strategies that the results of existing research indicate can have substantial impacts at the neighborhood or city-scale. These strategies include landscape integrated mid-rise housing, microforests, design

for magnifier effects, design for addressing Shifting Baseline Syndrome, and design for recursive nature-experience feedback loops. The results of this paper highlight the potential benefits of further research into more effective ecological behavior design strategies, and can be used by design teams to improve the ecological performance of their design solutions.

Creating A Sustainable Living Environment in Villages-In-The-City in China: An Urban Design Perspective

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During the global second round of rapid urbanization, a distinct type of urban structure – the village-in-the-city (ViC) — has emerged in Chinese cities to accommodate the large influx of migrant workers from the hinterland. Unlike squatter settlements in most developing countries, the ViC is a unique product of the complex interaction between various social forces: the dual land policies, the central location of villages, the powerful clan-based management within villages, and unauthorized construction by indigenous villagers. The ViCs have played contradictory roles under these conditions: on the one hand, they have informally provided affordable housing and transitional jobs for the migrant workers; on the other, segregated from the formal urban system, the ViCs lack legitimate regulation and social support, which has further marginalized the living situations of the migrant workers. Faced with the ongoing agenda of redeveloping the ViCs, the urgent issue arises: how can this process meet the basic needs of the most vulnerable group to improve their well-being?

This paper aims to interrogate the agency of urban design in redeveloping the ViCs to facilitate social integration. Through a case study of Shuiwei Village in Shenzhen, China, I will examine how migrant workers interact with their living environment on different scales — neighborhood, village, and city. My observations

suggest that the changing social demographic features within the ViC are constantly transforming its social structure; yet the immanent spatial segregation on various scales has continued to marginalize the migrant workers. This paper thus argues that recreating places where migrant workers can embrace diversity, build social networks, and develop place attachment is crucial for the well-being of migrant workers, and a practical step toward social integration and equity.

Diagnosing the Urban Canopy: Utilizing GIS Modeling to Target Optimal Sites for Urban Forest Revitalization

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In Memphis, TN, and cities like it, increased urbanization has been at conflict with the health of urban tree canopy. High levels of imperviousness and soil compaction associated with development patterns of the past century have weakened the potential for tree growth. For Memphis in particular, this reality is chronicled through a series of tree canopy maps that document this urban forest fragmentation. Low Impact Development (LID) strategies and initiatives like LEED and SITES, however, offer viable solutions where a healthy urban forest can coexist with new development. Even more advantageous is that redevelopment of poor existing development using these LID methods can begin to repair portions of the urban forest that have become fragmented. For many municipalities, this can be achieved through incentivizing private development, strategic investment in public parcels and corridors, or a combination of both.

This presentation will describe methods for using GIS to target optimal sites for urban forest revitalization efforts in the Memphis metropolitan area. In addition, the presentation will discuss the federal, state, and local data used in this process, the approach to data analysis, and the digital tools used to manipulate that

data. The presentation will also examine the specifics of the GIS model utilized and speculate on its potential applications in related urban contexts. The discussion will highlight both a conceptual process for targeting areas for investment in the urban forest and the specific ArcMap tools utilized in the project.

Green Stormwater Infrastructure Impacts on Stress Recovery and Attention Restoration

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Many cities have implemented Green Stormwater Infrastructure (GSI), a system that uses plants to improve urban ecosystem health. While we know GSI contributes to a healthy environment, little is known about its impact on human health. There are several types of GSI, such as green roofs, bio-retentions, and urban forests. We know urban forests benefit human health, but we know essentially nothing about how other types of GSI impact human health (Hartig, Mitchell, de Vries, & Frumkin, 2014). It is possible that adding bio-retentions to urban settings will promote human health. But it is equally likely that people will see GSI interventions as harboring pests and vermin, and thus such interventions may be unhealthy for people. This knowledge gap hinders us from creating places in which both humans and nature can thrive. To explore this gap in our knowledge, we assessed 135 participants' stress and attention levels before and after they viewed one of nine six-minute videos showing different combinations of bio-retention and trees of varying densities. We used self-reported and physiological measurements to assess stress level, and cognitive attention tests to assess attention capacity. We are in the process of analyzing the data now.

Previous studies have shown that higher tree density is associated with improved stress recovery (Jiang, 2014; Jiang, Li, Larsen, & Sullivan, 2014), and thus we

expect to find that the higher density of either trees or bio-retentions will improve stress recovery and attention restoration. Since the combination of trees and other plants are often more preferred (Sullivan & Lovell, 2006), the combination of trees and bio-retention may work best for stress recovery and attention restoration.

By measuring the impact of GSI on stress and attention, this study will help designers and planners decide how much bio-retention and trees should be added to the urban environment.

How Voices Inform Design for Climate Justice and Green Infrastructure: A Case for Michigan's Huron River Watershed

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Environmental design requires both quantitative and qualitative social-ecological sciences to ensure sustainable design. In a previous study, our research team examined empirical evidence of climate justice patterns in Michigan's Huron River watershed through hydrological modeling of climate change impacts on flooding and environmental quality in relationship to spatial analyses of social vulnerability and distribution of green infrastructure open space. Three Michigan cities were identified as having the most climate injustice potential in the next five decades: Ann Arbor, Ypsilanti, and Wixom. To further understand the social and institutional capacity in implementing green infrastructure for climate change adaptation, this study draws from risk perception and environmental behavior research to gain insights from city planners through in-depth interviews as well as from residents in the watershed through online survey instrument. The results from interviews suggest that even though the three cities are facing similar climate justice patterns, each city has a different capacity for addressing

the issue. The outcome of climate justice could be improved with a greater level of access to resources in the institutional capacity to implement green infrastructure design. The online survey results suggest the watershed could enhance its resilience to extreme weather and climate change associated hazards through a greater awareness of climate change impacts and more incentives such as providing local successful cases and affordable costs for implementing green infrastructure design. This study supports the importance of the voices from planners and residents to inform environmental design decision-making to ensure social-ecological resilience and sustainability of communities.

Humble Bee: Using Smartphones and Bluetooth Beacons to Track Sustainable Behaviors in Context

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Recent developments in technology support the ability to track and analyze behaviors with increased location and time accuracy. With smartphones, we can gather a wide range of real-time data in behavioral contexts. This data may be more insightful than typical survey questions administered out of context, which generally ask participants to describe behaviors over a longer period of time and without regard to whether their various environments support this behavior. For example, asking "How often do you recycle?" doesn't take into account any conditions under which recycling is supported or inhibited in the physical environment where behaviors take place.

Humblebee is a smartphone application developed to help solve this problem by tracking when users are in spaces that support sustainable behaviors, reminding them what those behaviors are, and asking them to log their individual behaviors at that time and in that place. While this is still self-report data, it is self-report data obtained as behaviors take place. Behaviors are

logged in a database, which also allows for real-time modification of behavioral log options and place-based messaging. This messaging is delivered via the app when users enter the range of Bluetooth beacons placed through-out public spaces in Cornell University's College of Human Ecology.

In this presentation you'll learn about how this project was developed collaboratively to increase sustainability student engagement and also provide building facilities with behavioral hotspot identification. Furthermore, you'll learn how this tool was designed for use in multiple research projects. I'll review the technology needed, the design process, and how this project compares to existing uses of Bluetooth beacons in the built environment. Lastly, I'll discuss how this technology can benefit researchers interested in behavior within environments, and what tools are already available to help you in your own research.

Intergenerational Planning and Design for Sea Level Rise

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We examined the potential of a design game in facilitating intergenerational planning and design for sea level rise in eight community workshops in Seattle and San Francisco. The design game asks participants to take turns proposing or removing an intervention. A total of 66 participants engaged in 26 design games after having attended a briefing presentation on climate adaptation. The participants included 23 expert adults, 11 non-expert adults, 15 high school students without climate adaptation education, and 17 college students with climate adaptation education. Through an online survey, 17 participants shared their design game experience.

By examining survey results and design game outcomes, we found expert adults and college students proposed larger-scale planning solutions for the most part while non-expert adults and high school students

focused on smaller-scale site-specific interventions. Two expert adults and 17 college students with previous climate adaptation education proposed long-term coastal resiliency measures for sea level rise adaptation in situ while 21 expert adults, 11 non-expert adults, and 15 high school students proposed short-term projects that would require emergency evaluation in future sea level rise scenarios.

Most college students preferred mixing with expert adults because of the realistic insights they gained from experts, although the students tended to feel overshadowed by experts when working at the same tables. Separating experts and college students during design games led to more input from both groups. College students proposed sea level rise adaptation measures only when they had their own design game tables while these measures were missing when they worked with the other participants. This study demonstrates that intermixing generations during design games may not lead to an adaptation plan grounded in intergenerational consensus. Future studies should examine the effect of climate adaptation education on design game results for both mixing and separating generations at design game tables.

Teaching Sustainability through Architecture: Three Case Study Green Schools

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The modern green building movement looks to green buildings for more than technical environmental performance. Increasingly, scholars and practitioners are asking how green buildings can support human health, well-being, and culture change. Among the many possible psycho-social dynamics occurring within green buildings, this work looks specifically at the potential for green buildings to be educational, or “voices from the earth” in educating users about themselves and prospects for living lightly on the planet.

The goal of this study was to understand what students think and know about green buildings through a photography project with semi-structured interviews (n = 29). This study examined the experiences of middle schoolers in three unique green school settings that are on a spectrum of more to less green, where each school is given a pseudonym that evokes its core mission. The Ethics School has a well-established green campus and sustainability is deeply woven into the school mission. The Arts School has a new construction green building and a minimal sustainability mission. The College Preparatory School has no sustainability mission and a partial green building renovation.

A grounded coding process with interview transcripts yielded several key themes. The most prominent finding is that strong sustainability missions at the administrative level appear to make a difference for student environmental education outcomes. The study further illuminates the ways in which a school’s philosophy of sustainability becomes crystallized in the architecture and shapes student learning. This research additionally reveals the missed curricular opportunities, even on the greenest campus, to tie the green building

into classroom learning. Taken together, these results make a case for pulling sustainability deeper into a school’s mission, cultural practices, and curriculum to more fully realize the potential of teaching through green building design.

The Livability Audit. A tool for measuring perceptions of urban design qualities

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Worldwide, sustainable development and densification policies have prompted a renewed interest in livability, yet despite some efforts to assess the qualities that positively affect people’s livability perceptions a shared definition of the concept has yet to be agreed upon (Ewing and Handy 2009).

The livability audit methodology discussed in this paper employed 28 indicators of perceived livability identified through an extensive literature review. Students in the School of Architecture and Allied Arts at the University of Oregon were enlisted as auditors to collect measurements of walkability, compactness, connectivity, enclosure, imageability, safety, and vitality. The results were normalized into an index to contrast livability qualities around 17 transit stops in Eugene, Oregon, which were selected using space syntax software among those with high-, medium- and low-depth values. The validity and reliability of the model showed a general alignment in the scores collected.

The focus on bus stops filled a gap in traditional urban design research by considering them critical case studies of the presence or absence of livability. Findings point at livability, imageability, safety and quality of human experience as predictors of positive livability perceptions, which seemed to contradict those obtained through space syntax. More research may be needed to improve on a transferable livability definition and the refinement of the audit. The paper concludes with a

discussion of the challenges and opportunities of using environmental audits in urban design research and practice.

Traumatized Landscapes

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Humans have the capacity to perceive dangers that threaten their lives or personal integrity instantaneously. Before we begin to think, our bodies are programmed to react with quite specific survival strategies – for example the fight or flight response.

Landscapes cannot run away or cry for help when they are in danger of life and limb. It is therefore one of the fundamental tasks of a landscape architect to give a voice to landscapes in need. Many landscapes have gone through deeply searing traumatic experiences as the world's appetite for resources is forever unsatisfied. The methods used to exploit these resources are also violently demanding.

The mining of mineral deposits in Manitoba, for instance, is an important economic factor and continues to grow. For almost 100 years limestone has been extracted and processed from the unique geological formation next to the town of Stonewall. To date approximately 22% of the 2,900 hectare Rockwood quarry area has been disturbed by mining. In order to secure access to this valuable resource, provincial government policies guarantee quarry operations in forthcoming years.

Nevertheless it is less clear how to deal with the remnants of these industrial operations. A round table has been set up to coordinate the different interests of quarry operators, land owners, and farmers.

The author has joined the discussion and as a landscape architect he has made everybody listen to these landscapes. Speculative drawings contribute to the dialogue by attributing ecological and aesthetic

value after economical exploitation. In positioning interventions in the landscapes and designing new sediments, it is possible to review essential questions and, ultimately, to take positions to the emerging task. The dream is to turn this quarry district into a pilot region to test innovative concepts, as well as becoming a centre of excellence for post-traumatized landscapes.

Urban Agricultural Landscapes as a Codification of Grower and Sponsor Values and Mission

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Research into urban agriculture has largely focused on the benefit of these spaces on the social, economic, or eco-systems affecting the individual or community. This presentation shifts the frame from an urban agricultural site's impact upon the grower to look at the influence of the sponsor and grower on the purpose and shape of the urban agricultural landscape. Understanding the relationship between the actors influencing the utilization of the land allows us to gain insight into these places of urban agriculture as cultural artifacts and sites of symbolic value and everyday practice where negotiations of social roles may be read in the form of the landscape.

This presentation is a case study of Legends Farm, an urban agriculture incubator on the south side of Chicago, which provides certain infrastructure and support services for nascent business owners launching their ventures. The farm occupies part of the former site of the Robert Taylor Homes, a public housing development existing from 1962 to 2007. The non-profit Legends Farm is sponsored by a collection of organizations involved in development and horticultural education in the region. Participating growers have completed a nine-month training program. Intersecting goals shape the farm's physical form and its relationship to location.

Data were collected through interviews with sponsors and growers. The physical form of the site was documented, including character of spaces governed by growers or by the sponsor organizations. At the site scale, the sponsor's systems and regulations determine the form and organization of the major growing, processing, and social areas. At the plot scale, the individual plots demonstrate how each farmer adapts practices to the sponsor mission while expressing their values. The urban agricultural landscape of Legends Farm is an artifact of this push-pull of values and codifies the sponsor/grower negotiation in the land.

WORK ENVIRONMENTS

An Encampment for Digital Age Nomads

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In the spirit of critics who have come before, this design for the commons explores an alternate future, and the latent potential of equity and inclusion. This speculative project is part of the Atlanta Beltline, the city's most wide-ranging urban reunification effort. Within this framework, I examine public-private territories and interrogate socio-political issues using a multi-scalar approach. By marrying grass-roots experiential architecture with political engagement, I investigate the threshold between the human scale and urbanism.

Since the Beltline is a public-private partnership serving varied groups in a city, we must ask what is the responsibility of the municipal government in this endeavor? This is a call for economic parity. In light of the changes in these neighborhoods, how can design stimulate new forms of community and agency? Constant Nieuwenhuys' futurist sectors anticipated that our future-world would be comprised of gypsies. No one will have a home or job, as we currently define them. Technology will enable us to be free and play — to be homo ludens. As technology has become more pervasive, we may work anywhere. Constant's gypsies, "digital-age nomads," exist today.

A 1947 UN declaration stated that housing and leisure are human rights. Imagine a world in which the political climate has transformed, and the electorate has voted for politicians who advocate for these rights. In this future-world, digital-age nomads occupy this 19-acre site and have established an encampment that promotes a granular, tactical approach to development. These abandoned structures are sublime. The metal buildings' rusting skin is peeled

away for homeless refuge. These digital age nomads, traveling artists, migrant workers, and wanderers have reclaimed the land. Through strategic interventions they have created an encampment that suggests the ephemerality of Constant's Sectors. They reside in the margins of our economy and are connected by their common devotion to inclusive living.

Bringing Views of Nature Into the Workplace: Can Artificial Windows Improve Worker Performance on Vigilance Tasks?

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A variety of workplaces require that workers maintain high levels of sustained attention for prolonged periods of time. Previous research has shown, however that performance on these tasks declines as a function of time, increasing the likelihood of errors (Mackworth, 1948). Previous studies have also shown the efficacy of exposure to nature in restoring performance on sustained attention tasks (Berto, 2005). However, access to nature may not be a viable option for many workplaces such as laboratory settings. Therefore, the current study proposes an alternative intervention, which may serve to mitigate vigilance decrements in those environments.

The goal of this pilot study was to determine if, and to what extent, vigilance performance might be restored via use of short breaks in the workplace with an artificial window displaying scenes of nature. Eight participants were asked to complete two trials of a sustained attention task in a windowless environment. In both conditions, participants had a five-minute rest break in which they were free to look around. In the experimental condition, participants had a 63-inch 4K high-definition television displaying a natural scene. In the control condition, the television was left turned off. This was the only difference between the conditions.

The results from the pilot study indicated that reaction time improved over the course of the experiment in the experimental group but not in the control group. Accuracy did not significantly differ between the groups, which may have been attributed to ceiling effects associated with the chosen task. The results from the pilot study were significant enough to warrant further investigation with this paradigm. The full study will include a larger sample, psychophysiological measures, and will provide participants with a more sensitive vigilance task. Findings from the full study may be applied toward improving human performance in a variety of workplaces.

Exploring the Interplay of Environmental Factors and Student Learning Styles in Collaborative Design Problem Solving

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Learning outcomes in part depend on an individual's learning style and environmental context. Therefore, each learning style requires a tailored set of environmental accommodations. For example, Johnson and Johnson (2013) conducted a meta-analysis on work environments and performance and concluded that people perform better in a collaborative work environment compared to an individualistic or competitive environment, which persisted across gender and ability level. Moreover, learning styles influence the quality of task outcome, such that students learn more effectively in groups and pairs comprised of heterogeneous learning styles (Alfonseca et al., 2006). Despite the extensive body of literature concerning patterns and behaviors of different learning styles, there are no studies exploring how to best accommodate the needs of various learning styles in collaborative settings.

The goal of this research was to explore the role of proxemics for social interaction and collaborative teamwork in the field of design. To examine the impact of seating arrangement (i.e., congregated and linear) and learning style (i.e., balanced, active, and reflective) on group dynamics and performance, a 2x3 factorial design experiment was conducted with 26 undergraduate students. Mixed methods, including self-reported surveys, sociometric badge data, and instructor's assessment results, were employed to measure interpersonal behaviors.

Results revealed a significant interaction effect of the seating arrangement by learning style on interpersonal relations. Specifically, only the active learners who worked in the congregated arrangement showed higher perceived interpersonal relations than those who worked in the linear arrangement. The results also demonstrated a marginal interaction effect on effort levels, such that active and reflective learners who collaborated in the congregated arrangement reported higher perceived collective efforts than those in the linear seating arrangement. The results imply that social dimensions of collaborative processes can be augmented by simply manipulating the seating arrangement to accommodate a specific learning style.

Hospital Corridors and the Spatialization of Cross-professional Communication

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Numerous authors have described how individuals spatialize based on their workplace role. The present study looks specifically at the location of interactions among individuals with different roles: namely, where doctors and other health care staff talk with one another in hospital inpatient units. Communication gaps are recognized as a root cause of dangerous, expensive medical errors, and the present investigation

aims to illuminate issues in patient safety and satisfaction by adding to what we know about where communication takes place. Existing hypotheses indicate that corridors function as important mixing spaces where professional roles relax somewhat, thus promoting cross-professional communication. However, there is little empirical evidence that corridors act as the locus of cross-professional communication in hospitals. Additionally, corridor space can be surprisingly difficult to define with precision.

We proceeded by reanalyzing behavior mapping data for approximately 10,000 observations of individuals at three inpatient units in a large safety-net hospital in Texas. Fewer than 250 interactions between doctors and other staff were identified, a paucity which is in itself notable, especially when compared with other on-unit interaction frequencies. In terms of where these interactions took place, the rank order was the same for all three units; corridors, followed in descending order by nurse stations, patient rooms, and doctor stations.

Doctor/care staff interactions took place in patient rooms more often on the triangular racetrack unit than on two double-loaded corridor units. This may indicate that a less integrated, more fragmented corridor is less conducive to cross-professional communication than more legible corridor types. Space syntax analysis was conducted for both spatial zones and for the specific locations of the interactions to explore how the configuration of units contributed to where cross-professional communication took place. Finally, we discuss definitions of corridor space that consider social and perceptual boundaries, in addition to circulation function.

Identifying Work Style Groups to Maximize Workplace Design Effectiveness: An Innovative Analytic Approach

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Across the design industry, informal claims are made about aspects of successful workplace design. However, there has been a lack of dissemination and substantiation of methods used to inform workplace design strategies, as well as a paucity of empirical evaluations of workplace design impacts. It is generally accepted that work spaces should be thoughtfully planned around the workers who occupy them and the types of work they do. Our aim was to develop and share an analytic approach, adaptable to various organization types, to develop employee work style groups hypothesized to be relevant to effective workplace design.

Existing de-identified survey data, collected by HDR over a one-year period from employees at five distinct organizations (total n=1,200) included a range of measures and validated scales, such as work activity time allocations, collaboration effectiveness, personality type, confidentiality needs, and work mobility preferences. A k-means method of cluster analysis, in conjunction with the Calinski-Harabasz clustering criterion and visualization using plots of canonical discriminate scores and boxplots of the cluster distributions, determined the potential number and profiles of work style groups represented within each organization. Organization-defined job roles were placed into work style groups based on how closely they matched the groups' profiles. These groups were further refined with qualitative input from the organizations and from designers.

Although the number of clusters per organization differed, each displayed clear clustering patterns

relevant to designing supportive workspaces. The work style profiles are used to inform and develop design strategies to best support the various types of workers in each organization, within spatial and budgetary parameters.

This innovative analytic approach can identify work style groups that may not be intuitively obvious, but that are relevant to development of successful workplace design strategies. Further empirical study is needed to quantify actual impacts.

In-ground Workspaces: A Study in Cultural Ergonomics

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In-ground workspaces are very common in countries like India, where people sit on the floor to perform everyday tasks like eating, sleeping, cooking, sweeping, mopping, defecating, bathing, washing, shopping, and praying. While health hazards from simple chair sitting have been extensively studied, little is known about the impact that in-ground seating presents to human health and work performance. There is a need to study how age-old cultures perform tasks while sitting down and recommend interventions necessary to preserve human health and traditional ways of living and working.

In-ground workspaces require body squatting, kneeling and cross-legged sitting to perform work. There is a critical and growing need to undertake culturally-sensitive, evidence-based research to provide foundational data that offer alternatives to chair-sitting practices and inform space design. Cultural ergonomics is the science concerned with the 'fit' between people and work in traditional spaces. Research in cultural ergonomics must begin with observation, followed by scientific investigation rooted in tradition, site, and human ecology.

The study takes a careful look at in-ground seating ergonomics and human behavior to learn how people support life. It documents living practices in traditional India and raises important questions like: How does in-ground seating support performing tasks? How does body posture and movement frame the work envelope? Five in-ground workspaces were studied in Ahmedabad, India, for three days each using participant observation methods. Semi-structured user-interviews, annotated diagrams, and video-recordings complemented the observational study.

The findings from the observation include:

- In-ground sitting is dynamic; frequent postural changes reduce static muscle loads and maintain blood flow.
- Unsupported sitting helps maintain an erect spine; strengthens core muscles.
- Work type creates optimum work envelope while ensuring small-intensity movements.
- Workspaces take advantage of gravity to reduce physical effort.

Findings from this study add to the discourse on alternative and inclusive approaches to healthy workspace design.

Strategies for Implementing Stress-reducing Biophilic Design in Workplaces

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Duxbury and Higgins (2012) warn workplace stress is a serious health issue resulting in significant losses in workplace productivity. In a recent Express article citing the UK Statistics Authority, "More than 45 billion working days were lost (in Britain) due to stress, anxiety and depression in the past three years... costing the economy at least 2.4 billion GBP." Reports

in Canada (Lem, 2013) and the United States (ADAA, 2006) (Adams, 2013) point to a similar crisis. A growing body of research by Li and Sullivan (2016), Raanaas et al. (2011), Berman et al. (2008) and others suggests that design that provides direct or indirect exposure to nature, referred to as biophilic design, has restorative effects on memory and attention resulting in health, well-being and productivity benefits. This presentation builds on a 2015 Master of Interior Design thesis study by Callaghan, a workplace design practitioner with over 30 years of experience. Drawing on a review of literature from the neurosciences, environmental psychology, and biophilic design, along with case study analysis and experience from design practice, Callaghan (2015) identifies key biophilic design strategies for workplace stress reduction. Having identified these key biophilic strategies, the next question is: "If nature-based features and biophilic strategies are so good for reducing stress, why are they not used in every workplace design project?"

This presentation discusses the potential barriers and solutions to implementing biophilic design research into workplace design solutions in practice. Drawing from interviews, analysis of case studies, and reflections on emerging green building practice and delivery, the authors offer insight on potential strategies. Key topics include: (1) education and awareness, (2) risk aversion and evidence-based practice, (3) third-party rating certification, and (4) integrated project delivery (IDP) and contracts.

Welcome to Big Data: Augmenting Traditional Data Collection Using High-tech Sensors and Laser

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This presentation will serve two purposes: it will introduce a new research method, and it will show practical applications for both organizational and space design.

Traditional quantitative and qualitative research methods in social science have included the use of self-report surveys (paper or online), focus groups, interviews, as well as observations. While these methods have been vastly refined, their common drawbacks usually include user bias, low response or participation rates, and limited scope. They also involve a somewhat linear process: forming hypotheses, designing data collection methods, collecting the data (usually with several compromises), then analyzing the data and testing the hypotheses.

In the world of "big data," where data is abundant, and where usually only a small percentage of collected data is ever used, researchers are able to form and test hypotheses after the data collection. This opens up new opportunities, as well as allows for rich cross-analyses.

By using wearable badges with various sensors (infrared, accelerometer, voice power detector, etc.), as well as infrared and laser space sensors, we collected behavioral data at various client sites for several weeks. Data was passively collected 24/7, every second with 150–250 employees at various organizations. While each project was unique, focusing on solving different problems, in this presentation we will focus on exploring possible practical applications, rather than present a case study. We will explore quantifying face-to-face interactions in the workplace, deriving organizational network diagrams, then applying various network metrics to

look at group performance and innovation potential. We will also look at how such data can be used to objectively inform adjacency diagrams for blocking and stacking in architectural planning.

We will conclude the presentation with highlighting the possible drawbacks and limitations of using high-technology to collect data, and will challenge the audience for out-of-the-box thinking for future applications.

EDRA48 MADISON

Group Presentation Abstracts

CHILDREN, YOUTH & ENVIRONMENT

Behavior Mapping: Considerations of Technology, Procedure, and Evidence-based Design

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Presentation #1: Technology: Recording Methods

One of the first decisions to make when considering behavior mapping is determining the best technology to record data. Technology options include recording observations on paper, digitally or a combination of the two. Variables which influence the technology choice include availability of funds and technology, eliminating the opportunity for introducing error, logistics of using non-GIS software, and preferred method of data analysis.

In the presentation, technology options are explored, and the ramifications of the options are discussed.

Presentation #2: Protocol: Three Decisions to Make

The success of a behavior mapping protocol depends heavily on advanced preparation of the observation protocol as well as the selection of sufficient and appropriate attributes for observation that will support the target outcomes. This presentation will outline strategies for evaluating the entire target site and subsequently demarcating appropriate observation zones. The discussion will also include effective strategies for scanning observation zones to record behaviors, including conducting reliability checks for situations with multiple observers. Approaches will be demonstrated using examples of several

children's play and learning settings. The second half of the presentation will focus on strategies for selecting behavioral attributes or scales to use during observations of children's behavior, particularly in outdoor natural environments, and for successfully recording and preparing field data for analysis.

Presentation #3: Evidence-based Design: Preliminary findings from the Cincinnati Nature Center

Playgrounds are no longer comprised of only play equipment and safety surface. Nature playgrounds represent a new trend in playground design where play occurs with natural elements instead of manufactured play equipment. The Nature Playscape at the Cincinnati Nature Center is a premier destination for nature play. During the summer of 2016, data were collected regarding the play behavior displayed at the Nature Playscape. The presentation will focus on reporting preliminary findings from the behavior mapping research project and identifying ways in which the evidence can inform design practice.

Do Brains Grow on Trees? Studying the Impacts of Near-school Nature on Classroom Engagement and Academic Achievement

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Presentation #1: Does Teaching Children Outdoors in Greenspace Improve their Classroom Engagement after they Return Indoors?

Over the past 50 years, children have increasingly led indoor, sedentary lives. High-stakes testing has encouraged school administrators to cut down on recess time and increase homework loads. Up to 30 hours of a child's week is spent at school, and up to 92% of that time is inside and inactive. Yet a growing

body of literature suggests time outdoors in natural settings improves children's health, well-being, and academic success.

We conducted a crossover repeated measures study that examined how teaching outdoors in nature — as opposed to teaching indoors — might foster classroom engagement. Students in 3rd grade classrooms at a Midwestern environmental magnet school were taught a 40-minute environmental science lesson twice each week — once indoors and once outdoors — for 10 weeks, with the order of lessons (indoor or outdoor) counterbalanced. In the 20 minutes after that lesson, we employed four measures of students' classroom engagement: "redirects" — the number of times the teacher stopped instruction to address inattentiveness or disruption; teacher ratings of class engagement; student ratings of classroom engagement; and photo-based ratings of classroom engagement made by independent reviewers. Photo-based ratings were based on photos taken at two-minute intervals from the front of the classroom, with rater blind to condition (whether the photos were taken after an indoor or outdoor lesson).

For all measures except student ratings, classroom engagement was far better after outdoor than indoor lessons on average (Cohen's *d* effect sizes ranged from 1.0 to 1.3). These findings held while controlling for teacher, lesson topic, and week of school year.

Based on these results, we encourage administrators to prioritize naturalizing schoolyards, maintaining safe convenient greenspaces near schools, and providing in-service environmental education teacher training so students can academically benefit from outdoor education.

Presentation #2: Near-school Greenness and Academic Achievement in Inner City Chicago

In 2014, Wu, McNeely, Cedeño-Laurent, Pan, Adamkiewicz, Dominici, Lung, Su and Spengler reported that NDVI (Normalized Difference Vegetation Index) measures of green land use around

Massachusetts schools consistently predicted school performance on standardized achievement tests, controlling for student household income. An early attempt to replicate this exciting finding, unfortunately, revealed a number of errors and limitations in the original paper, and initially produced findings in which greenness predicted lower levels of academic achievement. This talk presents the results of a concerted investigation into the [greenness-academic achievement] hypothesis.

First, we test the hypothesis in a context in which academic achievement has been an ongoing and formidable challenge: Chicago Public Schools. In schools serving a population at high risk of academic underachievement with minimal resources, might school greening offer a low-cost way of helping children learn and achieve closer to their potential?

Second, we subject the [greenness-academic achievement] hypothesis to more rigorous examination, using substantially more accurate measures of green cover, taking into account important additional confounds, and addressing spatial autocorrelation likely to have reduced within treatment variation and thus contributed to the findings in Wu et al. 2014.

And finally, we flesh out the relationship between near-school green cover and academic achievement in ways that may help guide landscape policy and practice in and around neighborhood schools. We address questions such as: To what extent does schoolyard greenness versus nearby residential greenness contribute to academic achievement? To what extent do different kinds of "green" contribute — for example, street trees versus green open space versus ballfields? And, does the importance of green cover in the public realm depend on the extent of greenness on private property?

Presentation #3: Methodological Considerations in Measuring the Impact of Greenness on School Outcomes

The complexity of factors that go into successful learning are myriad. Urban landscapes are nearly as complex. Therefore, looking at the impacts of an urban landscape on school outcomes is complexity squared. In this presentation we discuss some of the methodological choices researchers face in looking at the impact of green on school performance, including the measurement of green cover and modeling spatial relationships between these variables.

Measuring Green. NDVI data has been used to measure canopy cover around schools. But NDVI data is a coarse measure of canopy cover, highlighting larger patches of green cover while missing individual trees and other street-scale vegetation. LiDAR data provides significantly more detail, including trees, grass, and shrub layers, but even LiDAR does not fully measure local greenness because of its focus on greenness from above. “Lived greenness” — the greenness of an environment as experienced at eye-level — is likely to be important, but assessing it requires time-intensive data collection procedures such as site visits or site-by-site image analysis.

Addressing spatial autocorrelation. Any given school will tend to share attributes with other, nearby schools — not just levels of academic achievement but also levels of green cover, income, and other factors contributing to academic achievement. This “spatial autocorrelation” must be addressed, but there are choices in scale (e.g. county? neighborhood?) and approach. For example, should space be treated in terms of neighboring “bins” such as neighborhoods, or point-to-point distances between schools? How are these spatial relationships best described, interpreted, and visualized?

We review the advantages and disadvantages of these and other methodological choices in the study of near-school greenness and learning.

COMMUNICATION

Digitalized Public Space

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Presentation #1: Digital Walls, Signage and Graffiti

Progressive developments in LED engineering have led to further development of media façades, media architecture, digital signage, and even graffiti. Advertising billboards use facial recognition to target shoppers. First introduced in Japan in 2010, billboard ads using facial recognition software to identify the shopper's demographic information allow marketers to target ads for appropriate products. This has been refined so that face-recognizing billboards have been developed to appear to the selected demographic only. Privacy is the most common concern associated with outdoor advertising and targeted populations.

Graffiti turned the urban fabric into a media façade before the LED screen and electronic technologies joined the panoply of urban media. The tools of the graffiti artist have been changed with the introduction of digital graffiti which enables the communicator/graffiti artist to create an interactive statement using specialized spray that "emits IR lights instead of paint which is traced by a computer vision sensor to recreate 'sprayed' image on a large wall with the help of a projector." As buildings gain greater capacity to communicate, digital buildings "provide a new element in the urban communication infrastructure." This paper utilizes media ecology theories to explore the human-structure interface, warranting a re-examination when

confronted with the new digital media environment of the street.

Presentation #2: Building Skins and Screens

The outside of a building was formerly thought of as static and relatively permanent. Today, the building, not simply the interior but the façade may be thought of as alterable and more agreeable to change. Media façades and screens have been identified as significant in creating a sense of place and identity. Beyond the obvious technological opportunities now presented, perhaps the people-environment relationship in the urban environment holds a key to understanding. Can media buildings speak loud enough to be "heard" in a cocooned "me media" environment in which people may encounter those structures? Can media buildings creatively bridge the divide? Understood and used creatively, these surfaces may reshape the reciprocal relationship between physical and media spaces. This paper will explore buildings which function as media screens—animated architecture.

Presentation #3: Design for Coexistence in Digital and Physical Environments

The proliferation of digital devices in our spaces and on our bodies has transformed people-environment relationships. Digital information is increasingly integrated into our built environment in the form of digital displays, networked physical objects, and personal mobile devices. This paper examines a university innovation space as a case study in the gap between our interaction with our digital and physical environments. Through observations and interviews with users of a technology-rich environment, this paper takes a human-centered approach to understand pain points and uncover insights for designing for coexistence.

Presentation #4: Discussant

Presentation #5: Discussant

ENVIRONMENTAL DESIGN RESEARCH EDUCATION

A Critical Examination of Social Science and Design Collaborative Models

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Presentation #1: Collaborative Models for Praxis: Architectural Design + Social Science Research

Social scientists have a decades-long history of impacting the architectural profession and the broader field of environmental design through collaborative efforts. Utilizing qualitative and quantitative data, the aim has been to develop and construct environments for and about people. Within the design field, the goal of this research project is to examine contemporary forms of collaborative praxis and identify distinct models of working with forms of social science research. Imbedded in this endeavor is the question, "Who are the social scientists working in design fields today, and in what capacity do they work?" As researchers, we intend to explicate what qualifies as social science research, who identifies as social scientists, and how this work relates to design processes.

Taking a critical stance on a contemporary form of praxis in the discipline of architecture, UDIG researchers intend to contextualize efforts of social scientists who work in collaboration with architects

and other design fields as proponents of social justice in the political economy of place. By interviewing professionals in the field and using grounded theory, the researchers intend to identify existing models of praxis and recognize interdisciplinary efforts. Our research team intends to formulate a set of current best practices for leveraging the architectural design field's ability to impact policies, and affect a broader range of practice intent on achieving a built environment built for people.

Presentation #2: Collaborative Models for Praxis: Architectural Design + Social Science Research [2]

Presentation #3: Collaborative Models for Praxis: Architectural Design + Social Science Research [3]

Presentation #4: Social Science and Architectural Collaborative Intervention

This study is designed to document the benefits and challenges of integrating social science research methods and architectural design in an educational setting. As a direct collaboration between social scientists and practicing architects, this case study builds on the overall goal of this symposium to understand how these disciplines can collaborate to create positive outcomes for clients and users. This approach to collaboration is designed to implement and critically examine methods designed to address challenges schools face related to individual and social well-being and how physical space influences wellness and behavior patterns. The study will focus on dynamics, use patterns, and social life in spaces outside the classroom, which have been less studied than the pedagogically-oriented classroom environments. The project is driven by three goals, which are to: 1) model and evaluate collaboration techniques between architects and social science researchers; 2) test ethnographic field methods for evaluating how features of physical and other programmatic and cultural structures relate to social

dynamics in educational environments; and 3) develop typologies addressing individual and social well-being that can be a shared resource for other projects.

Presentation #5: Social Science and Architectural Collaborative Intervention [2]

Presentation #6: Social Science and Architectural Collaborative Intervention [3]

HEALTH

Designing Preoperative and Postoperative Workspaces to Support Communication Between Patients, Staff and Care Partners in Ambulatory Surgery Centers: An Ergonomic Evaluation

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Presentation #1: Designing Preoperative and Postoperative Workspaces to Support Communication Between Patients, Staff and Care Partners in Ambulatory Surgery Centers: An Ergonomic Evaluation [1]

Presentation #2: Designing Preoperative and Postoperative Workspaces to Support Communication Between Patients, Staff and Care Partners in Ambulatory Surgery Centers: An Ergonomic Evaluation [2]

Presentation #3: Designing Preoperative and Postoperative Workspaces to Support Communication Between Patients, Staff and Care Partners in Ambulatory Surgery Centers: An Ergonomic Evaluation

Healthy Places: Using Behavioral Design to Enhance Active Living and Healthy Eating—An NCCOR Sponsored Symposium

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Presentation #1: Overview of Behavioral Design to Enhance Physical and Built Environments for Healthy Eating and Active Living

The National Collaborative of Childhood Obesity Research (NCCOR) initiated the Behavioral Design, Built Environment, and Human Health Project to explore how behavioral design can support healthy actions by enhancing our understanding and ability to communicate and operationalize strategies that alter the experience with the built and natural environment relative to healthy eating and active living. This project has been a transdisciplinary effort involving experts from key disciplines such as physical activity, nutrition, design, landscape architecture, environmental psychology, ethics, behavioral economics, and others. This presentation is based on a white paper that was recently released through NCCOR. The white paper provides an overview of behavioral design and development of a shared language across disciplines to facilitate this transdisciplinary work. It further describes and considers some of the key conceptual domains to determine relevance to developing behavioral design, including the scientific basis, current fields of active research, trades of application, and other areas that consider how behavioral design interacts with the human world. Finally, the paper guides research and practice in developing easy to use, effective, and sustainable behavioral design methods to enable and promote healthy eating and active living among children and families in the communities where we live, learn, work, and play.

Presentation #2: Informing Design Guidelines for Healthy Eating in Schools: Development of the Cafeteria Assessment for Elementary Schools (CAFES) Tool

With data from more than 35 low-income elementary schools in four U.S. states, this presentation discusses the development of the Cafeteria Assessment for Elementary Schools (CAFES) tool, a reliable, valid,

observation-based instrument to quantify attributes of elementary school cafeteria environments linked to selection and consumption of fruits and vegetables during USDA-funded school lunches. CAFES data measures elements at the scale of individual object, container, furniture and display, and room within school cafeterias. CAFES offers a practical, innovative, easy-to-use instrument for researchers, designers, and food service and school personnel, and will ultimately be available as both a mobile application and in hardcopy. CAFES results are linked to intervention suggestions, many of which are low- and no-cost and can be immediately implemented. By identifying environmental attributes associated with healthy eating at four environmental scales, CAFES results can be used to identify critical areas for intervention; assist in prioritizing the scale(s) of intervention; and contribute to guidelines for cafeteria design, food presentation and layout, and other behavioral economics strategies (e.g., food labeling and signage) aimed at promoting and increasing fruit and vegetable selection and consumption among youth participating in the USDA school meal programs.

Presentation #3: Schools that Move! Applying and Evaluating Design Strategies to Promote Physical Activity

Physical activity has profound impacts on the current and future health of children and youth. As students spend a large proportion of their waking hours in school, the school environment is an important and relatively accessible forum for population-based health interventions. As literature has drawn connections between school built environments and behavioral outcomes, we propose that school designs can function as health interventions to increase physical activity. We will illustrate applications of physical activity design guidelines for school architecture that were developed from a comprehensive review of literature and a collaborative effort between public health researchers and designers. We will then present and discuss both expected and unexpected results from a pilot natural experiment to test objectively-measured impacts of these design strategies on students' physical

activity and sedentary behavior outcomes at school. These results will set the stage for discussion about strength and application of evidence, and evolution of the evidence base informing active design practice. The importance of engaging in cross-disciplinary collaborations to evaluate school facilities will be highlighted.

Presentation #4: Considering "Meaning" in Behavioral Design for Healthy Eating and Active Living

Many working to prevent obesity through environmental design have been strongly influenced by recent ideas concerning human behavior. Behavioral economics, persuasive technologies, and choice architecture all tell designers to leverage human nature to "nudge" — rather than coerce — people into making specific choices. "Make the healthy choice the easy choice," is an evidence-based design practice. However, existing empirical studies provide the strongest support for architectural and interior design settings on one hand and policy solutions on the other. At the scale and complexity of the neighborhood, behavioral design has less support and is less predictive of human behavior. One way to bridge this gap is to acknowledge ways that social groups project cultural meaning onto neighborhood environments and how individuals act according to intersecting dimensions of social identity. Drawing from recent community design research, this discussion will present that a socio-cultural approach to community design serves well as a theoretical adjunct to choice architecture. We want to design environments that make the healthy choice the easy choice, but we also want to help create a culture of healthy choices. Thinking about how people make sense of the environments they inhabit — that is, how people understand and act on meaning in the environment — is too important to overlook in our rapprochement with behavioral design.

MOVEMENT IN DESIGNED ENVIRONMENTS: NATURE & ECOLOGY

Do Health Care Savings Grow on Trees? A New Line of Investigation for Environment Design Research

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Presentation #1: Calculating Urban Forestry's Return on Investment: Tying Residential Nature to Actual Health Care Expenditures

Our society spends more money on health care each year. These costs, estimated at 5.3% annually, are an increasing burden on individual members and society. The Federal Government now spends as much on Medicare as defense spending (17% of the budget), and these costs translate to higher tax burdens and national debt. Fortunately, nature – in the form of urban and community forests – may provide an incredible opportunity to combat these rising health care costs. Even small, regular doses of stress-reducing activities in natural settings have dramatic effects at no cost. But unfortunately, our cities spend relatively little on natural parks. A recent review suggested that most municipal Parks and Recreation Departments' annual funding was \$83 per resident — only 1:100th of the amount each resident on average would spend on health care (\$8,500). We are initiating a study that calculates cities' return on investment for urban greening and ultimately empowers cities to efficiently enhance the health economics of their communities. For our study we will link residential greenspace to actual health care cost data for over four million individuals in 22 counties, including cost data for inpatient, outpatient, laboratory, and pharmacy services.

Return on investment analyses will involve comparing cost savings per greenspace with construction and maintenance cost data from urban forestry organizations. The type and extent of greenspaces will be derived with LiDAR data, which allow us to map cities in 3D at 1-meter resolutions. Our study region is highly environmentally and socio-demographically diverse, and we anticipate our results will generalize to other parts of the country. From the findings we will construct a Natural Capital InVEST model which will allow policymakers to estimate health care savings in specific locales based on level of greening investment.

Presentation #2: Disentangling Poverty, Inadequate Access to Nature, and Disproportionate Health Care Costs: A Unique Opportunity

Consider the following: The health inequalities associated with poverty and ethnicity in the U.S. are staggering, with the shortest living groups living 33 fewer years than the longest living groups. Poverty is highly correlated with residential green cover. And Mitchell and Popham (2008) examined income-related differences in mortality for over 40 million UK residents and found that, when residential greenness was accounted for, income disparities in mortality were cut in half.

To what extent could the excess burden of morbidity and mortality associated with poverty actually be lifted through greening poor neighborhoods? This study works to disentangle the impacts of poverty, ethnicity, and access to nature on health care costs, taking advantage of a unique confluence of conditions for examining this question: geocoded data on health care costs for four million persons; detailed satellite imagery-based data on residential green cover; and a population with sufficient income and ethnic representation to examine these factors separately.

There is reason to expect the effects of residential greenness on health to be particularly strong in poor neighborhoods. The poor are likely to be limited in mobility and the impacts of their neighborhood may

be less likely to be diluted by time spent in other environments. And many of the health outcomes particularly associated with poverty have been tied to nature.

If residential greenness does disproportionately impact health care costs among the poor, this finding will have important implications for practice and policy. The poor are most likely to avoid seeking health care for financial reasons. Health care costs have the most devastating consequences among lower-income individuals, leading to bankruptcy and deepening poverty. And much of the cost of excess health care needs among the poor is ultimately borne by communities at large.

Presentation #3: Nearby Nature Experiences and Human Health: A Program of Quantitative Reviews

The experience of nature generates substantial psychosocial and physical health and well-being benefits across places, people, and urban situations. The evidence has been summarized in multiple peer-reviewed research review articles, a science outreach web site, and technical reports. The evidence is gradually being translated to community greening and environmental justice programs. Yet many agencies and organizations rely on economics to integrate such knowledge with broader policy and programs. Our collaborative team has translated benefits findings to economic expressions for the entire U.S. An initial conceptual framework merged distinct literatures about nature and health, and public health economics. A critical assessment then yielded 15 health outcomes having economic consequences. Our final analysis focused on a subset that span the human life course: birth weight, ADHD, secondary school performance, crime, cardiovascular disease, and Alzheimer's disease. Market and non-market approaches were used to derive valuations. We have since repeated the process focusing on the older adult phase of human life.

While the monetization sums (outlined in the presentation) represent but a fraction of annual health industry spending (more than \$2.9 trillion in the U.S. in 2012), there may be broader and greater impacts depending on locale and secondary savings associated with health promotion. Our analyses revealed a range of important conceptual and methodological concerns: consistency and replicability of both metro nature and health outcomes measures, discrepancies in scale between nature elements measures and archived health data, and the issues of doing benefits transfer valuations.

A new interdisciplinary approach that combines public health/epidemiology, natural resources, and economics is necessary to gain greater precision in benefit/cost analysis. Additional conceptual work and public policy are needed to develop a more productive nexus of public health and urban greening. With increasing urban-based populations worldwide, there is an urgent need for improved, integrated research and valuation methods.

Why Can't We Talk About Climate Change?

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Presentation #1: "This Changes Everything"

Why can't we talk about climate change? Because Naomi Kline said it absolutely right, "This Changes Everything!"

We live in a world of siloed responsibilities, in spite of the ever-present demand for collaboration. As an example, our anchor institutions seldom collaborate regionally and when they do it is a collaboration

designed to optimize the mission of each institution. Climate change is not mission-central to anyone at the most senior level of our major institutions. The sustainability officer of such institutions, if there is one, may be found in a variety of locations but not usually positioned to develop the relationships and authority needed for the mitigation of or adaptation to climate change. Sometimes a leader like Michael Crow, the president of Arizona State University, will elevate the focus on the subject and make it a central tenet of his or her definition of success. But a broad commitment to getting it done place by place is often defeated by the lack of consistent collective action and the required shifts in culture, and efforts likely are measured by the term of any given leader.

The elevation to a higher level of institutional commitment requires collective political action supported by evidence and by serious regulation and enforcement. The Pentagon calling climate change the largest threat we face to peace and stability in the world should help launch conversation elevating the crisis. Absent such elevation, the task of restructuring a non-fossil fuel based economy will be piecemeal at best or will not occur until climate change becomes so severe that it will change everything for us.

Presentation #2: Active Hope: How to Face the Mess We're in Without Going Crazy

Thanks to Chris Johnstone and Joanna Macy for extraordinary insights into how one can remain hopeful and still work on a seemingly impossible project. The future of the Earth is uncertain and yes, it is us, the humans, who have pushed and exploited the natural world to the point of breaking, uncreating the planet that nurtures and sustains us.

So what are we to do? I will share the creation of a coalition in Buffalo Niagara, started by the Sierra Club Niagara Group in August 2015, to educate people about the importance of Paris COP21 talks. We felt empowered by Pope Francis' Laudato Si and the reframing of climate change into a moral

issue about justice. We have grown a coalition of partners representing environmentalists, economic and social justice advocates, unions, the Working Families Party, and faith-based communities. Together we are developing power around climate justice and have engaged many different people through diverse strategies including films, lectures, social media, demonstrations, policy development and legislation, campaigns, and expanding the center of who is doing the work. Our goal is to find a way to make climate justice personal to lives of individuals and communities through education, outreach, and policy advocacy.

Addressing climate change through the lens of climate justice opens the possibility of "changing everything" (Klein). We have a moment in history to transform our exploitive relationship with the earth, with other beings, and with the global human community. Are we up to it? As individuals? As communities? As professionals? As parents and grandparents? We must be hopeful for we are, after all, the first generation to really understand the catastrophic impacts of global climate change, and we are also, perhaps, the last generation to do something about it.

Presentation #3: We Need All of Us: Transboundary Work on Climate Change

To address global climate change (GCC), we need to expand the scope of what we consider within the realm of "Environmental Design Research." To achieve critical mass in the time frame remaining to address GCC we need to think regionally and in collaboration with other disciplines, such as political science, economics, and public policy and administration. How do we change individual behavior on a large scale, including energy efficiency and clean energy adoption? How do we shift political and decision-making processes toward sustainability using evidence-based practice and knowledge? How do we scale up efforts that we have demonstrated can succeed? What kind of design interventions and behavior change incentives can be created to impact sustainability for the huge stock of existing buildings?

In the U.S., we need to learn more about the causes and dynamics of climate change skepticism and disengagement, and what interventions can be designed to overcome these. How can we create social norms and a sense of empowerment and efficacy among the public? How can we harness the psychology of risk assessment — which tends to work against response to distance threats — toward creating a sense of urgency about GCC? Similarly, how can we support approaches to long-term sustainable design in developing nations which, understandably, may prioritize dealing with immediate challenges of poverty, hunger, and disease? How can we integrate considerations of sustainability, climate mitigation, as well as adaptation and preparedness, into all facets of environmental design, make it standard practice, and treat it as a central facet of the trade? And how can we encourage leaders, whether of our professional or political organizations, to prioritize issues of climate change and treat addressing these as an integral component and a requirement of their success?

Presentation #4: Why Can't We Talk About Climate Change?

There are innumerable areas for exploration that deal with climate change and would benefit from the multidisciplinary perspective of the EDRA membership. Three that capture my imagination and reflect current and proposed work involve (1) the adaptations, expectations, and behaviors of people living in coastal settlements who will make permanent moves to new upland communities, (2) the need to understand and measure “the ‘culture of sustainability’ among populations associated with different types of communities ranging from universities to corporations to cities;” and (3) the level of understanding and means of adaptation to climate change among migrants from rural areas in China to new urban developments. The presentation will outline the problem for each and specify their policy issues and research questions. Where appropriate, the application of methods related to environments and populations will be discussed. The review of the second area of research will build on current

research designed to measure and monitor change in sustainability culture at the University of Michigan. The work has been underway since 2011 and captures the thoughts, experiences, and levels of awareness of various aspect of sustainability. These measures are dimensions of culture. Aspects of sustainability range from waste prevention to sustainable foods to climate change. The presentation will conclude with a listing of other potential topics about climate change where environment-behavior research could be explored.

Presentation #5: We need all of us: Transboundary work on Climate Change

NONE/NOT TIED TO A NETWORK

Unsettled: Place Attachment and Meaning in Changing Urban Landscapes

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Presentation #1: Displaced in Seattle: Listening to the Voices of Place in a Rapidly Changing City

Urban space has been theorized as a space of super-organic growth and constant, non-linear change (Arnaiz, 2009). What does such a conceptualization imply, and what does it afford us? Some have argued that this suggests that any and all urban change is inevitable and therefore wiser to accept. Conversely, others have used the notion of urban flux as a call for more radical structural socio-political change. Importantly, this conceptualization also seems to situate the city as antithetical to people's ability to develop place attachments and build lives for themselves in urban space.

Yet if we consider urban change through a frame of the "unsettled" and examine the various conditions that give rise to its existence, we can more readily recognize the coexistence of forces of both settlement and unsettlement. This allows not only for a critical response to different forms of urban change, it can allow for a more flexible understanding of how place meanings and attachments develop for urban residents (Manzo & Devine Wright, 2014).

This presentation will examine both processes of settlement and unsettlement in the rapidly changing city of Seattle. In particular, this talk will present the results of several empirical studies focusing on the impacts of public housing redevelopment on the low-

income residents who were forced to relocate as a result of redevelopment. Findings suggest that this dual framework of settlement/unsettlement enables us to stretch and redefine emerging social orders as well as urban residents' placemaking efforts. Indeed, more flexible, responsive understandings of urban change make room for more fluid types of place attachments and more flexible understandings about the processes behind the formation of such attachments.

Presentation #2: The Active Negotiation of Place Change and Place Meaning in the Context of Mobility and Social Change

This presentation will examine the problem of place and the dynamics of place meaning under different forms of mobility and social change. Mobility will be considered in several different contexts ranging from forced migration to the relocation of people of considerable means — i.e. cosmopolitans — freely exercising their power of choice. Just as various forms of mobility might differently impact the voices of place and place meaning, different forms of social change also need to be considered when considering the active negotiation of place meaning and place change. For example, within the same urban context, we may see both gentrification processes and the decaying of place — evidence of uneven development within the same city. Such conflicting and co-existing place dynamics reveal the complex and often contrary nature of urban change, as different interests compete for space in the future of the city. This talk will draw on the findings from several empirical studies on place change, mobility, and meaning that examine how changes to place are framed by different actors and are therefore actively negotiated among different interests. This underscores the necessity of listening to multiple voices of place and the socially constructed nature of both place change and place meaning.

Presentation #3: Constructing and Reconstructing a Shared Identity in the Modernist Utopia of Zingonia, Italy

Zingonia is a self-sufficient, privately-sponsored New Town situated at the outskirts of Milan's metropolitan

area. At the time of its founding in 1963, it was the prototypical Modernist development, featuring architectural prefabrication, an automobile-oriented road system, abundant open space, and thriving industries. Shortly after its opening, the economic and energy crisis of the 1970s and its structural political fragmentation across five municipalities led to the abandonment of its early residents, leading to a decline in property values. Fortunately, the city managed to preserve the majority of its industries and jobs. With jobs and affordable housing came immigrants, first from Southern Italy and more recently from North and Central Africa.

For the majority of its immigrant population, the Modernist towers have served as stepping-stones into Italian culture. Yet many residents have defaulted on loans and condominium dues. The limited tax base has prevented local governments from investing in and maintaining their costly public realm. This has greatly decreased residents' sense of pride and morale.

Beginning in 2008, the Zingonia 3.0's Participant Action Research project sought to engage residents to collectively re-think their futures. The project has spearheaded a rich array of interventions in urban agriculture, environmental literacy, and sustainable urban design. Preliminary findings of an ongoing impact assessment study involving project partners and their communities of practice reveal a conflicted place identity as a troubled community and as a laboratory for the multicultural Italian society of the future.

The project has operated at all scales from the individual to the family, from the home to the public spaces and courtyards. At the urban design scale, participatory workshops have contributed to the writing of these stories into a cohesive story, documenting the existing conditions, and laid out a long-term strategy toward a more livable, resilient, imageable, and economically vibrant community.

Practice-based Research: Yes, You Can!

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Presentation #1: PBR#3: An In-depth Time-and-Motion Comparison of Linear vs. On/Off-Stage Clinic Layouts

This presentation will focus on differing effects of two common clinic modules — linear module and on/off-stage module — as it relates to four practical assumptions regarding the on/off-stage module. A mixed method approach was devised that involves direct shadowing of nursing staff, indirect observation of patients and visitors, and surveying of patients and visitors. The on/off-stage module design assumptions included: (1) an increase in patient privacy since patient and staff activities are separated, (2) an increase in staff collaboration by means of communication since staff are now situated in close proximity to each other, (3) a decrease in patient wait times since the module promotes better visualization of care team members, and (4) a decrease in staff travel distances since 80% of supplies are located in a server inside each exam room. The study involved two clinics (linear and on/off-stage) from the same health care system located 4.5 miles from each other in an urban suburb of a major Midwestern metropolitan area. Both clinics consisted of family medicine, obstetrician, specialty, and pediatric practices. The 19,546 square-foot linear module clinic is configured around two double-loaded corridors that consist of 32 exam rooms, two procedure rooms, and a central charting station. The 17,694 square-foot on/off-stage module clinic has a total of 22 exam rooms and one procedure room. The facility consisted of two modules each with single-loaded public corridors (on-stage) and 11 patient rooms. In the center of each module is a staff core (off-stage) with 14 workstations. Results and findings will

be shared. The purpose of this post-occupancy study is to demonstrate how practical design assumptions posed by designers were investigated. Some were supported, while others showed no difference. Results have been disseminated to expand practitioners' knowledge-base and have been applied to future project work.

Presentation #2: Practice Based Research: Yes, You Can! [1]

The intent of this pre-intensive workshop is to offer participants an opportunity to learn more about design research conducted in practice (practice-based research) through didactic and active learning techniques. Practice-based research is an original investigation undertaken in order to gain new knowledge partly by means of [design] practice and the outcomes of that [design] practice (Candy, 2006). For the first part of the workshop, three researchers who work together at an architectural firm will present their approach to practice-based research (PBR) through sharing case studies. For the second half of the workshop, attendees will break into groups and be led through a participatory process to address their own existing or potential research studies. The latter will use tools such as mind mapping their own specific PBR process, brainstorming about best research methods or data gathering tools pertaining to their study; artifact creation to embody the practice-based knowledge, and wisdom exchanges and cross-group theming so all can share in the lesson learned. A brief survey will be conducted prior to and after the session to test the participant learning and empowerment.

Presentation #2: Practice Based Research: Yes, You Can! [2]

Architecture firms often use participatory pre-design and design approaches as a way of engaging the client in the decision-making process. Using 'design thinking' as a social process of identifying needs and enacting new design opportunities in the community, a national architecture firm engaged over 100 of its employees to rethink the design of their workplace. At the core of the 'empathy' phase was the data-driven

process of creating and iterating cross-generations, cross-departments, and cross-roles archetypes which forecast certain groups of end-users' thoughts, feelings, and actions as well as possible scenarios through which they interact with the final design. The 'define' phase was comprised of several focus groups exploring what they like and what they would change about four major workplace features: Technology, workstation, teaming spaces, and location relative to their social network. During the 'ideation' and 'prototyping' phases, each group was asked to create the ideal workplace configuration using the following materials: a game board which depicted a simplified version of the workplace floor plan, a number of chips representing different archetypes corresponding to end-users' demographics, and a series of kit-of-parts which included certain generic and modular furniture and space types. The analysis included the cross-comparison of different prototypes in terms of furniture and space types' square feet, configuration, and frequency of use. Final results were captured in three major architectural patterns: (1) Creative occupancy for hoteling and reverse-hoteling, (2) Resourceful zones between neighborhoods, and (3) Deep enclosed zones with back alleys.

Creating Supportive Environments to Bring out the Best in People: Practical and Empirical Insights - Part I

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Presentation #1: Promoting Healthy and Sustainable Behaviors: Sharing RPM

This presentation explores the use of the Reasonable Person Model (RPM) in a multidisciplinary environmental psychology course. Students employed RPM to address real world challenge or issue in their

field related to issues of health or sustainable behavior. Each student created a “product” or online tool to disseminate RPM and bring out the best in people. Projects addressed topics such as the daily car or bus commute, drug take-back behavior, and “reasonable food environments.”

Presentation #2: Tackling the Expertise Challenge in International Development

Despite mandates to incorporate local knowledge and values in international development, participatory approaches often fail to address local needs. This talk explores the role of human expertise in these failures, particularly addressing the divide between the “helpers/experts” and the “helped/laypeople”. The Reasonable Person Model offers guidance from a theoretical and practical perspective. First, it describes how different kinds of experience translate to different kinds of expertise and the implications of this for sharing knowledge between often vastly different groups. Second, it provides a toolbox to bridge the gap between experts and laypeople and improve the participatory process. Examples from development work in rural Peru will be shared.

Presentation #3: Enhancing the Experience of Student Volunteers

Volunteer program improvement and retention are a central concern for many non-profit organizations. Retention specifically is considered as a measure of success in volunteer programs because it indicates that the volunteers find the program satisfying and rewarding to the extent that they are encouraged to repeat the experience. Pressing questions regarding volunteer programs thus include how well the programs are working and how the volunteers feel about them, what motivates them to volunteer and to do it again, and how to make supportive environments for volunteers in order to improve retention. Practical answers to such questions are of key concern for program managers and directors. Based on empirical research to address these questions, the presentation provides a pragmatic example of the way the Reasonable Person Model (RPM) can be applied in

enhancing volunteer programs. In a collaborative project between reDirect and the University of Michigan’s Matthei Botanical Gardens and Nichols Arboretum, 133 current student volunteers responded to a survey regarding their experiences, reasons for volunteering again, and preferences for different types of volunteer projects. Survey design was based on hours of discussions with volunteer program directors as well as the three key concepts of RPM, which were then used as a framework for recommendations based on the results. The recommendations focus on issues including: meaning and impact, familiarity and predictability, clarity and exploration, and enhancing learning. While some of the results are context-specific, the project serves as a practical example of the usefulness of RPM for formulating more supportive environments in a context of daily concern to many organizations.

Presentation #4: Supportive Environments for Coping with Transition: RPM Insights from Group Nature Experiences with Military Veterans

Readjusting to civilian life is difficult for many military veterans. Making sense of military experience is only part of the challenge. Veterans can also feel out of place in the world to which they return. Key aspects of the military culture — respect, camaraderie, and attention to detail — often seem lacking in civilian contexts. And the meaning that comes with service can be difficult to replicate outside of the military environment. How do we help veterans deal with these challenges? Is it possible to create settings and experiences that ease the difficulties associated with transition? One option involves engaging groups of veterans in extended outdoor recreation experiences. There is plenty of research suggesting that natural environments can be supportive of well-being, but veterans, and group-based experiences, have not received much empirical attention. The unique training and experiences associated with military service may be particularly compatible with extended wilderness recreation experiences that would resonate with veterans. In order to explore this issue,

we worked with 98 veterans who participated in one of four organizations offering four-to seven-day outdoor recreation experiences. The study involved tracking changes in well-being, social functioning, and life outlook before, during, and after the outdoor programs. There are plenty of reasons why such modest interventions would fail to succeed. But they did succeed, showing notably positive results as much as one month later. The results suggest that there is more to the story than contact with nature. In our view, the Reasonable Person Model is a particularly useful framework for understanding why these experiences are supportive of veterans' well-being. As such, the study provides insights into other efforts that might help both veterans and non-veterans deal with life transition.

Recognizing the Present in the Past: The Technological and Cultural Forces of Contemporary Environmental Design Research

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Presentation #1: Recognizing the Future in the Past

From big data to developments in smartphones with environmental sensory features, a number of technological advancements create new possibilities and challenges for the study of the relationship between people and their environment. More information about the intersection of people and space is available to dissect and investigate. However, the vast supply of information also presents a danger of oversaturation that conceals the significant social, political, historical, and economic context. In this presentation, Teresa Whitney will discuss the importance of applying a research methodology that complements big data with rich sources of small and slow data. The strategic combination of these tools can inform and reinforce the design of higher performing buildings from a human perspective.

Presentation #2: Recognizing the Future in the Present

The contemporary moment can be defined by a combination of the resurgence of the social moment of the 1970s and the advancement of technological capacities. The alignment of these two elements of the equation have set the stage for countless opportunities to leverage human and environmental factors data to improve the designs of our physical spaces. In this presentation, Melissa Marsh will cite evidence of the cultural and technological forces that are transforming the intersection of social research and design.

Presentation #3: Recognizing the Past in the Present

The institutions that announced the founding of the field of environmental design research — the first journal (*Environment and Behavior*), the first Environmental Psychology Ph.D. program (CUNY) and the first meeting of an international research and practice organization (EDRA) — all came together between 1969-1970. Richard Wener's presentation aims to identify the historical and cultural events that were happening prior to that brief slice of time that set the context for the emergence of environmental design research as a field. These include important changes, and in some ways paradigm shifts, in demographics, culture, psychiatric practice, ecological consciousness, psychological research, and architectural practice, all of which contributed to the emergence of this field and its continued evolution. This presentation will culminate with an investigation of several historic examples of architectural projects that applied environmental psychology and social science research tools to the design of institutional spaces, such as schools, work environments, prisons, and hospitals.

Voices of Place – Indigenous Placemaking: Whose Stories Matter?

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Presentation #1: Indigenizing Government Housing

As a Navajo woman who was raised on the Navajo Nation and who lived in a government-provided home, many questions existed about its cultural appropriateness. “Navajo Ritual Spaces in Housing” is an architectural and design document created by a Navajo architectural student at the University of New Mexico, which seeks to provide proscriptive versus prescriptive design suggestions or criteria. Blackgoat will share her process and the outcomes. This includes obtaining approval from her hometown community and various Boards to conduct research on the Navajo Nation with community members and Navajo medicine men.

Medicine men from the southern region of the Navajo Nation were interviewed; each medicine man interviewed specialized in different types of Navajo rituals. Household interviews were also conducted with Navajo families who practice traditional Navajo rituals. Participants were asked open-ended questions about how they performed their rituals, the spatial aspects of their rituals, and where they prefer to host rituals. The questions related to their experience of hosting these rituals in their government-provided homes.

In addition to the interviews, information was also gained from published literature about the Navajo hogan, Navajo rituals and contemporary Native American architecture. Lastly, more knowledge was absorbed from discussions with architects, designers,

planners, professors, and colleagues about culturally appropriate design of homes and communities on the Navajo Nation.

“Navajo Ritual Spaces in Housing” is the physical translation and interpretation of the ‘stories’ (qualitative information) that was gathered, analyzed, transformed and presented.

Presentation #2: Sharing the Story, and Holding the Door Wide Open

Situated on indigenous lands, universities have great potentials to collaboratively address staggering inequities in access, sustainability, and impact of Indigenous people within the academy and in the communities at large. This presentation shares lessons from elders and young students, men and women, in three stories of place, people, and design working in a teaching, learning, community design, and mentoring capacity. Engaging in listening, experiential activities related to developing awareness of space and place in the context of diversity and social justice, and design both tribal members and non-tribal members gain greater understanding of possibilities. The stories bring forth design innovations and access lessons from the Coeur d’Alene; the Nez Perce, and the Shoshone Bannock tribes while engaging in mentoring within the Native American Student Center and COSMOS alliance.

This presentation will use the example of a ceremonial opening for a gathering of concerned educators and indigenous tribal members by Nez Perce elder and former Chairman Silas Whitman. He spoke imageably about a lived culture and worldview — an interdependent ecosystem where past, present, and future intertwine, and where human actions and interactions speak truths of enduring values, struggles, and impacts. He described a cultural land ethic as an act of decolonization, which allows for negotiating cultural realms of time and space connecting family, healing, cultural values, and self.

Listening with appreciative presence and authenticity to what is said and what is left unsaid, respecting ancestral knowledge, building trust that respects historical trauma, linked directly with establishing criteria for case study analysis and long-term project design goals and strategies, and afforded a safe space to engage which is necessary to hold a door open for access, sustainability, and impact.

Presentation #3: Valuing Our Own Stories

Placemaking and places that celebrate Indigenous core values and respect the cultures and environments are important to Indigenous peoples and nations. Recognizing the vested politics of both colonized and colonizers, or minority and majority stakeholders allows us to envision placemaking as a potential change-agent for Indigenous people. That is, using placemaking as resistance — a way to reclaim the definition, control, and sovereignty of culture through the making of their places.

How can placemaking be undertaken by Indigenous groups in the face of federal controls and policies and the impact those policies and practices have had even with Indigenous tribal politics and policies? How can EDRA design professionals and researchers help Indigenous peoples and communities re-value their placemaking traditions. How can we help expose in a critical way the process and how it is negotiated within the community? Between communities? Between community(s) and 'authorities'? Between community(s) and research and design professionals (Indigenous or not Indigenous)? What are the impacts or potential impacts for learning and knowing and for educational institutions and professional disciplines and practices on all the various stakeholders? What are some of the policy possibilities and implications for such work? How can the idea of Indigenous placemaking be changing processes and approaches for research, design, and the out-come of placemaking, and go beyond individual projects and activities to impact knowing, education, and pedagogy? Using several contemporary Indigenous placemaking examples and projects this presentation will look across various individual projects to examine these questions.

PARTICIPATION

Designer as Activist, as Educator, and Community Builder

Diana Copeland, diana@emeac.org (East Michigan Environmental Action Council); M'Lis Bartlett, mlis@umich.edu (University of Michigan); Joanna Lehrman, jlehrma@umich.edu (11th Hour Project)

Presentation #1: Building Gardens and Closing Schools: A Story of the Detroit Greener Schools Initiative

Working with four elementary schools in Detroit, East Michigan Environmental Action Council (EMEAC) and the University of Michigan organized participatory schoolyard design projects as a part of EMEAC's Greener School Initiative. The goals of the design projects were to empower students, teach environmental justice principles, and increase equity and inclusion in the schools and Detroit nonprofits. Participants reported gaining skills in design, increased knowledge on the local environment, increased math and science skills, and increased confidence and pride from completing an outdoor classroom project. They also reported an increased knowledge of native species, water conservation, green technology, and habitat restoration through workshops and discussions. Students learned how to measure, cut, and create models using professional architecture tools and materials. They constructed the outdoor classroom during their summer school, earning either stipends or school credit. Students removed trees, constructed stone planters, planted native species, and built raised beds. One of the most dynamic and fascinating aspects of this Detroit Greener Schools Initiative was the need for all participants to stay humble — as every expert (student, university, nonprofit, local resident) brought such fascinating skills to the process that each collaborator became an intricate part the way each outdoor classroom emerged (from food sovereignty gardens, to aquaponics, to meditation grounds, to

gardens of innovative technology). At the same time that the program was enjoying many successes, there were an equal number of real world threats to the Initiative. Over 100 public schools were closed during the time of the initiative and over 250,000 households in Detroit had their water shut off. These challenges were played out in the school system. The presenter will share on-going philosophies of change and processes of engagement used in the Green School Initiative and at EMEAC to ensure equitable participation practices.

Presentation #2: Beecher Schoolyard Design - Building Place and Pride

When working in communities facing a myriad of social, economic, and environmental challenges, landscape stewardship might seem low on a list of priorities. But recent studies of community resilience suggest that landscape stewardship efforts are an important component of supporting healthy and sustainable communities. In such contexts landscape architects have the opportunity to play an integral role in building resilience by supporting stewardship through design activities. To do so they can draw on best practices and theories from the fields of environmental education, critical pedagogy, and environmental justice. This presentation will discuss engaging middle- and high-school students in the Flint and nearby school systems in school-based restoration projects. For the past nine years, UM Flint's University Outreach has partnered with Genesee County schools to create place-based education projects that engage teachers, students, and community members in the shared process of learning about and acting on a local social or environmental concern. During that time this presenter, a designer, and place-based educator, has helped teachers and students to make a variety of schoolyard improvements including: designing and building an ADA accessible courtyard vegetable garden for students to learn about nutrition, re-designing and building a new outdoor courtyard and classroom, and the construction, planning and implementation of a large on-site rain garden to increase wildlife habitat. These projects have all

included an intensive in-school curricular component as well as after school activities. Through these processes she has had to critically reflect on the concept of student or youth voice in a school setting. In this presentation she will discuss the challenges of working within school systems, extraordinarily overburdened by a lack of financial and human resources, and the impact that has on student voice.

Presentation #3: Grand Rapids River Restoration: Thinking Across a Segregated City

Grand Rapids is the second largest city in Michigan. Historically, the city's industry was dominated by furniture manufacturing and export, facilitated by the use of the Grand River, which is the longest river running through the state, flowing through and out of Grand Rapids into Lake Michigan. The river was dammed and channelized as many urban rivers are, which fundamentally changed its ecological, social, and economic functions. As part of a city master planning process in 2012, one of the visions was to "restore the rapids" to the Grand River, a project aiming to restore the city's namesake in an effort to increase usability and function. One of the panelists will talk about her experience both from the design perspective and from the nonprofit philanthropy perspective as part of a fellowship program in developing relationships and investigating perceived impacts on the community in a racially segregated city. The panelists will also address challenges associated with the language around community engagement, transparency about planning process, and the relationship between designers and the public at large, particularly frontline communities of color. As a designer with marginalized identities, working in part as consultant to a foundation as well as liaison to community groups, the panelists approached the work by looking critically at power and ownership of the planning process around a public resource. Recommendations were made both to the foundation and the river project grantee about distributed power, honest communications with the public, and clarity around the role of feedback.

Creating Supportive Environments to Bring out the Best in People: Practical and Empirical Insights - Part II

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Presentation #1: Meaningful Action in a Prison

People gain deep satisfaction from taking actions that serve not only themselves, but others in important ways — actions that are personally enriching and that make the world a better place. In Stephen and Rachel Kaplan's Reasonable Person Model (2011), meaningful action is fostered through respect, participation, and the ability to make a difference. Some environments, such as prisons, inhibit or restrict opportunities to engage in meaningful action. These environments actively discourage collaboration and engagement, and are designed so that respect flows in one direction: from the incarcerated to the individuals in power. Such settings actively discourage individuals from engaging in meaningful action. And yet, for many humans, the need to contribute beyond themselves seems so strong that they might be motivated to take meaningful action if the context were the least bit supportive. We examined this possibility with participants from the University of Illinois' Education Justice Project (EJP) at the Danville Correctional Center, a medium-to high-security penitentiary in Illinois. EJP is a vibrant academic community that exists in the prison, on campus, and in various communities in Illinois. At the prison, EJP offers a variety of programs including for-credit courses, educational workshops, Language Partners, Chicago Anti-Violence Education (CAVE), and a research and writing center. We conducted interviews with EJP participants from inside and outside the prison. We found that treating people

with respect, encouraging people to share their skills and knowledge, and crafting opportunities that allow people to make a difference were powerful factors in creating supportive environments for meaningful action. The fact that these factors led to success in a medium to high-security prison suggests that they may be as or even more potent in other contexts.

Presentation #2: RPM as Institutional Backstop: Treading Lightly toward Conflict Resolution

This presentation highlights some important features of RPM in helping an academic institution navigate a grassroots approach to managing its own conflicts. Through a series of small experiments at one-on-one and departmental scales, and with choreographed efforts at building internal capacity, a university is fostering the safe environment for resolving a broad array of disputes. In turn, the development of tools and collegial expertise has the potential to retool the organizational culture without necessitating the imposition of external consultants or new top-down mandates for change. Accomplishing these goals requires careful attention to information sharing, supportive environments, and reinforcing patterns that are both sensitive and meaningful.

Presentation #3: Using the Reasonable Person Model to Build Supportive Environments in the Workplace

This presentation explores the use of RPM as a framework for creating a work environment that explicitly focuses on improving staff effectiveness and engagement. Six nonprofits have focused on intentionally applying RPM to implement strategies and systems that enhance their staffs' ability to do their best work.

Presentation #4: A Recipe for Success: Practical Insights for Fruitful Partnerships

Non-profit initiatives can thrive with the support of community-based corporate partnerships that bring valuable resources to bear. And while securing adequate funding and enthusiastic buy-in from senior

leadership is often given top priority, these alone are not predictors of program success. Rather, participation and meaningful engagement from stakeholders could make all the difference. The context for this example is a collaborative social enterprise that would support a leading edge meal program for low-income residents. Without adequate engagement of ground-level employees, the program launched and quickly fizzled. The Reasonable Person Model (RPM) provides useful insights about why things went awry and suggests lessons in other contexts that depend on collaboration.

POE/PROGRAMMING

Defining Project Success: How a Comparative Pre- and Post-Occupancy Evaluation of a PreK-8 School is Shaping Firmwide Protocols for Research while Improving Educational Performance, Occupant Well-Being, and Sustainable Design Practices

Emily Chmielewski, e.chmielewski@perkinseastman.com (Perkins Eastman); Sean O'Donnell, s.odonnell@perkinseastman.com (Perkins Eastman); Katie Herber, k.herber@perkinseastman.com (Perkins Eastman)

Presentation #1: Defining Project Success: How a Comparative Pre- and Post-Occupancy Evaluation of a PreK-8 School is Shaping Firmwide Protocols for Research while Improving Educational Performance, Occupant Well-Being, and Sustainable Design Practices (1)

How does one know whether the design of a building has achieved its goals? What metrics and processes are necessary to ascertain project success? How does a design firm develop a practice of evaluation to inform innovation? Join us for a discussion of how a new, comprehensive Pre- and Post-Occupancy Evaluation process is being developed for a design firm in order to collect and analyze qualitative and quantitative information that can demonstrate actual building performance. This process will be illustrated via a case study drawn from the on-going evaluation of the Dr. Martin Luther King, Jr. School, a new PreK-8 school located in Cambridge, MA. The presenters will discuss the development of a standardized Pre-OE/POE process and tools for their firm's K12 practice area, including the collection of archival data and actual indoor environmental quality

metrics that compare against occupant perceptions, as captured by occupant surveys and interviews. Project outcomes related to improved educational performance and occupant well-being will also be shared. The presenters will conclude the session by explaining how the process and lessons learned are informing, refining, and inspiring on-going design innovation in the K12 practice area and the firm's sustainable design practices, including the collection of alternative metrics based on project type. Conference attendees interested in practice-based research, Pre-OE/POE, school environments, and sustainable design are all encouraged to attend this multi-disciplinary presentation.

Presentation #2: Defining Project Success: How a Comparative Pre- and Post-Occupancy Evaluation of a PreK-8 School is Shaping Firmwide Protocols for Research while Improving Educational Performance, Occupant Well-Being, and Sustainable Design Practices (2)

Presentation #3: Defining Project Success: How a Comparative Pre- and Post-Occupancy Evaluation of a PreK-8 School is Shaping Firmwide Protocols for Research while Improving Educational Performance, Occupant Well-Being, and Sustainable Design Practices (3)

Design Thinking for Creative Problem Solving in Research & Design

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Presentation #1: Design Thinking and Research Methods

If we want to understand how and why people engage with objects and environments, we need to look beyond quantitative measures for true insight. Design thinking is a method of problem solving that uses research, observation, and empathy to both discover problems and generate novel solutions. Before problems can be solved, they must first be accurately identified. In this workshop, we will discuss how human-centered design methods draw on anthropological and ethnographic methods to learn how to see the seemingly invisible. Through the use of empathy modeling, observation, interviews and analogous experiences, designers and researchers can deconstruct their personal preconceptions to better understand and design for the end user. This process can develop more accurate problem statements, and therefore more potential for impactful human centered design. You will learn about the basic tenets of design thinking by quickly working through a problem that will challenge you to question the boundaries of your thinking while encouraging you to discover unexpected solutions. Be prepared to participate in rapid brainstorming, wild ideas, and even wilder prototyping. You will leave this workshop understanding the basic tenets of design thinking and how careful empathetic observation can transform your questions and answers in any field.

Presentation #2: Design Thinking in Practice

Current research into neuroplasticity suggests that, just as humans form muscle memory for repeated physical actions, so too do our brains form paths of least resistance for the ways in which we most often think or make decisions. Like muscle memory, neural pathways and heuristics often save us time and energy — but they are far less likely to lead us to novel solutions. To prevent unconsciously falling into “the way we’ve always done it,” many researchers and practitioners are embracing iterative processes like design thinking. Without understanding the research behind methods like these, however, the risk of doing them by rote increases. This workshop will break down the reasoning and evidence behind each step of the design thinking process, teaching exercises that

engage new pathways for thinking and break through creative barriers. Participants will leave with materials and exercises they can use in their own work, as well as case study examples of applying design thinking to challenges other than “design problems,” including architecture, organizational behavior, and experiential services. Guests will walk away ready to face all problem statements, large or small, with solid design thinking methods ready for action.

Presentation #3: Ideation: Making Better Design Decisions

Design thinking is a problem solving method that helps designers rapidly generate ideas and then narrow down to those which might work best. It is used widely in product development along with human-centered design research, but ideation techniques can be used in any field that requires creativity! Ideation consists of thinking exercises which expand your normal range of solutions by asking you to consider alternative viewpoints and options. The benefits of ideation to decision making are supported by various judgement psychology principles such as narrow framing and confirmation bias. For instance, did you know that by changing the question “should I do this” to “what should I do,” you increase your chances of making a good decision? In this workshop we’ll teach you basic design thinking procedure, help expand your creativity through rapid ideation, and quickly point out studies that support these methods. You’ll leave with a cheat sheet that will help you master your brain’s psychology, even when it doesn’t want you to. Be prepared to play games, think crazy, and reframe like there is no tomorrow.

SUSTAINABILITY PLANNING, DESIGN & BEHAVIOR

Theories

Pro-environmental Behavior and Global Environmental Change

Ricardo Garcia Mira, ricardo.garcia.mira@udc.es (University of A Coruña, Spain); Jennifer Senick, jsenick@rci.rutgers.edu (Rutgers, The State University of New Jersey); Irina Feygina, irina.feygina@gmail.com (Climate Central, NYIT); Adina Claudia Dumitru, adina.dumitru@udc.es (University of A Coruña); Elizabeth L. Hewitt, Ph.D., elizabeth.hewitt@stonybrook.edu (Stony Brook University)

Narratives of Energy Efficiency in Urban Cooperative Buildings (case study of a Brooklyn co-op): Leadership in organizations can be both formal and informal. Cooperative buildings function as organizations, and members may embrace informal leadership strategies like the use of the narrative. Narratives from perceived leaders can have a strong influence on the collective perception among residents about energy efficiency in the building.

Presentation #1: Applications of Pro-environmental Behavior Models into Transdisciplinary Approaches for Explaining Human Behavior in Complex Contexts.

Presentation #2: Communicating About Flood Risks to Real Estate Market Segments in Coastal New Jersey

Presentation #3: Institutional and Psychological Factors Fostering Behavioral Change in Energy Use

Presentation #4: Social Simulation and Environmental Psychology: Contributions of Social Simulation to Confirmation/ Visualization of Pro-environmental Behavior

WORK ENVIRONMENTS

Integration of Factors that Affect the Engagement and Performance of Workers in Workplace: Worker-centered Approach

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Presentation #1: Does the Person-Place Relationship Impact Worker Engagement and Performance in Knowledge Work Organizations?

The latest Gallup poll (2014) shows that engagement level in the US workforce is only 32% despite the extensive resources invested by many organizations into environments for work. This is an enormous challenge for organizations and the design community. Does the physical work environment predict worker engagement? How is the work environment defined to best accommodate worker needs?

Understanding how the workers perceive themselves in the context of their physical work environment can provide insight into the type of workplace they would need in order to perform well on the job. The state of the individual worker's self-identity is affected by the perceptions and experiences they internalize from their workplace. The dimensions of the attitudinal states represent the contribution that the worker can make toward the problem definition of workplace design. Thus, these are not necessarily static descriptors, but rather, a dynamic result of the perceptions and experience of the worker population in a changing physical environment. The commonalities found to exist among a worker population are defined on the basis of worker attitudinal states and not their job categories, cultural norms, organizational strategies or workspace trends. Hence the foundational source of the problem

definition for workplace design becomes the worker. The interaction of these attitudinal and relational manifestations creates a person-place relationship that is perpetually evolving. This emergent state results in worker responsiveness to their job and affects performance. The ability of the workplace design team to obtain and interpret these manifestations in the worker population is critical in defining the problem of workplace design to be adaptable to the changing conditions of worker demographic and psychographic needs.

Presentation #2: Virtual and On-site Knowledge Workers' Engagement and Productivity

Information technology impacts the way people work (anytime, anywhere) as it creates new emerging forms of work involving an almost equal distribution of virtual (remote) and on-site (traditional office setting) knowledge workers. Organizations are presented with challenges on how to achieve productivity and engagement with this new blended workforce. There are three specific areas associated with this challenge. First, how do knowledge workers become engaged and how do mode and drivers of engagement differ between remote and on-site workers? Second, what factors influence productivity and engagement in knowledge workers (i.e., work location preference, leadership, ICT utilization) and the moderation and interaction effects of virtual intensity? Third, how do the socio-technical factors (ICT utilization, work location preference, leadership support, self-efficacy) impact the full-time on-site, full-time remote and blended workforce? We define the factors that influence productivity and engagement in knowledge workers. We find that work location enjoyment has a positive effect on productivity, and this has a more significant effect on remote workers. We also find that virtual intensity moderates the effect of work location enjoyment on productivity, where at higher levels of enjoyment of the location high virtual intensity workers (remote) are more productive than low virtual intensity (on-site) workers. Conversely, virtual intensity moderates the effect of work location tension and

engagement, where at a higher level of stress, high virtual intensity workers (remote) are less engaged than low virtual intensity workers (on-site). Lastly, we provide new insights on key differences among full-time on-site, full-time remote, and blended workforce. Overall, we present novel theoretical, methodological, and practical contributions to theories of workforce management.

Presentation #3: The Role of Technology in 21st Century Work Life

The research to be discussed through the technology lens is two-fold:

1. How can an organization dynamic influence relationship success in a multi-sourced environment?

Corporate Information Technology (IT) functions are under increasing pressure to succeed in their IT outsourcing (ITO) arrangements. Studies of ITO success have in the past mainly explored operational and financial aspects. At the same time there is limited research on broader organizational antecedents and outcomes of ITO. We examine the effect of organizational identity (OI) on outsourcing success. Building on a recent study which confirmed the positive role of OI strength on outsourcing success, we ask: Are there specific outsourcing and organizational conditions where IT organizational identity influences more outsourcing success? What impact does that have on the organization's workforce and their ability to engage and perform? Conducting an empirical examination of 312 IT leaders engaged in outsourcing, we find the effect of OI strength matters more under specific conditions: when IT organizations outsource core functions, maintain a utilitarian OI type of orientation, and have low cultural similarity between the client and the supplier. We thereby deepen our understanding in the role of identity strength as a potential determinant of ITO success and subsequently surmise that it's likely to have a material impact on the organization and its workforce.

2. What key technology considerations need to be addressed to support the human-centered organization?

Specifically, (a) how does ICT adoption thinking account for where the user/work leverages technology and (b) How can we further Collaboration thinking by measuring effectiveness in a human-centered work environment? Gaining answers to these questions will allow for the construction of Technology components for flexibility in what the worker sees, how they see it, where they see it, and when they see it.

Exploring the Value of a Green Prescription to Ameliorate the Impact of Workplace Stress for Correctional Facility Staff

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Presentation #1: Corrections Fatigue: The Stressors of Correctional Employment and Its Relationship to the Natural Landscape

More than a half million men and women work inside U.S. detention and correctional facilities. These facilities are stressful and dangerous places in which to work and employees often experience high levels of stress, trauma symptomology, and other mental health issues. Coupled with organizational and operational stressors, staff may experience corrections fatigue, the unhealthy psychological, emotional, behavioral, and physical manifestation of working within a correctional environment. The stress and fatigue associated with correctional work contributes to high absenteeism, minimal job commitment, and low job satisfaction. Unfortunately, concerns related to correctional staff well-being and job performance rarely garner public attention as the focus is typically on incarcerated

individuals. It is vital to understand staff experiences and find ways to mitigate the stress and facilitate well-being. Substantial literature exists demonstrating the ways in which the natural environment can achieve these goals, including among incarcerated individuals. Less is known about the relationship between the environment and health of corrections staff but the scant findings suggest that there is a connection. Understanding the impact of correctional work on staff mental health and job performance and its relationship to the physical and natural environment is an integral piece of improving organizational functioning and the success of correctional programs and rehabilitation efforts. The presenter will explore the impact of the correctional work on the mental health of staff in various positions (e.g., correctional officers, social work and education staff, medical personnel) and what is known about natural environmental factors that impact that health and their subsequent work performance. She will introduce a study under development in a women's prison in Washington that will explore corrections fatigue and its relationship to the physical and natural environment of the facility as well as her role in the Iowa study presented by colleagues in the symposia.

Presentation #2: Researching Organizational Commitment in Correctional Staff

Working toward a better understanding of how correctional staff experience their jobs is timely and prudent in today's society. Particular stressors in the correctional workplace have been shown to impact employees' organizational commitment (i.e., a level of attachment for the prison or correctional system for which they work). Corrections fatigue and low levels of organizational commitment seem to converge to decrease employees' investment in an institution, its mission, and those charged under their care, which may in turn have negative impacts on institutional functioning, collegial relationships, and staff-prisoner relationships. The recent focus on restorative justice in North America affords an opportunity to explore how correctional staff experience organizational

commitment in a unique type of workplace, as well as how prosocial behaviors are performed within a particular type of organization. This presentation will describe mixed-methods research strategies that may help to determine quantitative and qualitative levels of staff experiences with self-reported organizational commitment and organizational citizenship behaviors (i.e., voluntary actions that promote effective functioning of the organization but are not directly recognized with formal recognition). It will also explore how these variables may be used together in research along with attributes of a correction facility's physical and natural environment. The presentation will also discuss ideas for analysis to account for how interdisciplinary variables from the fields of criminal justice, environmental psychology, and industrial/organizational psychology associate with each other, and what the future of merging these variables may hold with respect to collaborative research projects.

Presentation #3: The Role of Occupational Therapy in Design of Environments for Correctional Staff

Occupational therapists understand the important and fluid relationship between people's interaction within their environment. Ecological theories central to their profession highlight the important influence of a transactional relationship of person and environment, on function, and performance of activities (occupation). These theories highlight a person's capacity to perform occupations as an outcome of a relationship among personal abilities, the demands of the environment, and requirements of activities (Iwarsson, 2005). Occupational therapists work with clients to optimize occupational performance by assisting them in achieving a goodness of fit among the person, environment, and occupation. The role of occupational therapy on the interdisciplinary prison research team is to contribute to developing programs and design guidelines to reduce staff stress and burn out and maximize performance through nature-based experiences, and to measure the effects of these site based and programmatic additions to correctional facilities. The presenter will discuss innovative ways

in which occupational therapy benefits design and program development of outdoor environments for correctional officers.

Presentation #4: Exploring and Implementing Green Interventions in Prisons Through Student Design-Build

Prisons need landscape architecture. This has become immensely clear through an intensive collaboration between the Iowa Department of Corrections (IDOC) and Iowa State University's (ISU) Department of Landscape Architecture. At the onset, the focus was on the well-being of incarcerated individuals but observations by faculty and students coupled with several suicides amongst correctional workers in Iowa led the IDOC and the ISU design and research team to evaluate the environment and generate design interventions to better support staff. Previous collaborative projects masterfully pooled together fiscal, intellectual, and material resources to build gardens, yet new questions surfaced about securing staff buy-in and creating environments they will use and maintain all within the limitations of the correctional environment.

The ISU design team has focused on staff at the Iowa Correctional Institution for Women (ICIW) by designing and building an outdoor "decompression" area. The popularity of this space led to a request from the IDOC Director to develop similar outdoor decompression spaces at all Iowa prisons. Two men's prisons were addressed in a design-research seminar (Fall 2016). In this seminar, students conducted a literature review concerning correctional staff health and people-environment relationships. They toured the facilities and surveyed the staff about the effects the physical environment has on their health. This feedback informed green design interventions. The IDOC intends to implement the student's designs in 2017, at which point evaluation will begin to track staff outcomes. The presenters, including representatives from the IDOC and ISU, will review findings from a study completed with ICIW staff and introduce the design-research seminar, including learning outcomes, design

proposals and student reflections. They will discuss the unique challenges of working within correctional institutions, staff concerns, next steps to using green interventions to improve the well-being of correctional staff, and the importance of an interdisciplinary research team.

EDRA48 MADISON

Group Presentations: Intensive Abstracts

CHILDREN, YOUTH & ENVIRONMENT

Fostering the Inclusion of Youth in the Public Realm: Design Processes, Practices, and Policies for the Creation of Youth-inclusive Public Outdoor Environments

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The ability of youth to freely enjoy public spaces, and to develop a sense of belonging and attachment to these environments, is critical for their physical, social, cognitive, and emotional development. Young people represent a vital citizen group with legitimate rights to occupy and shape their public environments, yet they are often driven out of public places by adult users, restrictive bylaws, or hostile designs. Youth also have the right to be consulted in decision-making processes related to the creation and use of public spaces. This Intensive follows a Call for Papers issued by the CYE Network in July 2016 soliciting contributions for an edited book, proposed as the second in a series following *Designing Cities with Children and Young People: Beyond Playgrounds and Skate Parks*, edited by Bishop and Corkery, being published by Routledge Spring 2017. This complementary book presents research and case studies that highlight both the need and strategies for creating inclusive, youth-friendly public outdoor environments. Papers are organized into three sections: Why we need to include youth in the creation and use of outdoor public environments; How can we create such public environments; and Case Studies promoting youth inclusion in the design and use of outdoor public spaces. The Intensive brings together authors of accepted papers with conference participants to discuss and refine key issues targeted in each section.

The Intensive will start with a presentation by Bishop and Corkery summarizing insights and lessons from their book. Paper authors will then present their proposed contributions in short lightning rounds organized by book section, with extended discussions to hone ideas, identify remaining gaps, and finalize the organization of papers. The Intensive will conclude with a planning session to consider priority topics and potential contributors from the group for the third and final book in the series.

CULTURAL ASPECTS OF DESIGN

Deaf Arts Museum Center: Repositioning Museum and Gallery Curatorial Service through Sensory Design, Culture and Community

Robert Alan Nichols, M.Arch., Assoc.AIA (robert@robertnicholsdesign.com) American Institute of Architects, Washington, DC; World Deaf Architecture, Inc., Washington, DC

This session explores the emerging concept of the Deaf Arts Museum Center as a profound example of how perception, culture, and community shape spatial organization while building positive change for traditionally underserved cultures, architectural and interior practice, and society at large. Through a case study on The Deaf Arts Center Museum, as a deaf architect, Robert Alan Nichols will unveil the unique relationship between deaf sensibilities and museum that has historically been overlooked by accessibility discourse. Attendees will learn about the museum design principles and processes that enhance visual language, spatial awareness, social connection, and cultural identity. This session introduces a community-based approach to sensory design museum, art gallery, and well-being.

Home as Authentic Shelter

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What is shelter? How is shelter different from home? And building off these questions, we derive the most important one, why do our homes today not feel like shelter?

It seems as mankind has evolved, we have somehow detached home from the authentic shelter and through this, we have lost something essential in our dwelling places. While dwelling places still provide protection from the elements, other essential aspects of shelter have been lost, creating a place to live that would seem, in any other age, to be alien to the human experience. This session will look at the "disconnect" between home and shelter, and examine what would make home an authentic shelter.

We will begin this exploration by defining the attributes essential to an authentic shelter, in two papers: "The Fundamentals of Home as Shelter" and "Shelter." With the problem defined, and the attributes delineated, we move onto "The Ghost in the Shelter" which examines the necessity of the spiritual in the act of creating home as authentic shelter. From this, we examine "The Impact of Colonization on the Colorized on Placemaking and Shelter;" a paper which delves into how the superimposition of European values on the indigenous peoples of the Americas disrupted the cultural aspect of their authentic architecture. Moving from indigenous people to the disadvantaged in America, we look at how the schoolyard can become shelter in "Loss of Habitat, Health, & Home: Schoolyards as Shelter in Philadelphia." Finally, we bring the discussion full circle in "Authentic Shelter as Access to Timelessness" which looks at the transformation of home into shelter, and shelter into home through the use of green infrastructures and ecological practice.

Presentation #1: The Fundamentals of Home as Shelter

While much architectural theory revolves around Laugeir's "Primitive Hut" as the most authentic form of shelter, this concept ignores the fundamental elements that create shelter.

Simon Unwin, in "Analysing Architecture," examines what he calls the fundamental elements of architecture: Bower; Hearth; Altar. These three elements form the core of what are the essential elements of an authentic shelter, elements that, if missing, remove the actuality of a living space being true shelter.

This is because these elements, much like Campbell's theory of myth, conform society. According to Campbell, myth has three aspects; it teaches our relationship with the gods, with our fellow people, and with ourselves. Translated to architectural form, the Altar teaches us our relationship with the Divine, the Hearth forms our interaction with our group, and the Bower creates our understanding of ourselves.

While we believe home is shelter, in actuality the modern home offers little in the way of shelter, because we have lost or warped beyond recognition the fundamental elements of architecture. The Hearth, which through time became the dining table, is now more often the television room, and all of the human interaction that the table brought is lost in the "hush, I'm trying to pay attention" involvement with the television. The Altar, which became books, be they scripture or philosophy, become ignored, and the spaces they inhabited filled with knick-knacks, or worse, "decorative books." The Bower, the ultimate refuge of the soul, becomes cluttered with smart phones and laptops, so that no personal reflection or even private thoughts can occur.

In the last 20 years, we effectively banished the concept of shelter from our spaces, much to our detriment as a society. Humankind needs respite, actual shelter from the world around them, and re-incorporation of these fundamental elements of architecture is the key.

Presentation #2: Shelter

After being expelled from paradise, from the womb, from the nest, from our mother country, we now seek a return to home. We are all refugees.

Shelter: one of the more timely uses of architecture given today's crises, shelter arises out of a need to protect, to become invisible, and to become private. In the contemporary landscape of surveillance and military technology absorbed by consumers, we need shelter in a weaponized world. In this realm, when it functions as a covert shelter, home becomes subversive and dangerous.

Home is in its essential the best shelter for an individual or a group. It is not anywhere nor everywhere. It emerges from the very place and time in which you are and is built from the places and times where you once were and shall be. Therefore, in its nature, in its heart, the shelter is sustainable. Shelters both grow out of the site or engage the site in constructive dialog, or both, thus absorbing and transferring the existing conditions into its structure, and into the site, changing the ground's composition as they take form. Unlike the Nescafé (instant, just add water) housing going up all around us, shelters are not gizmos and imply a close, organic relationship to the site.

Shelter, while often sanctifying a space from a perceived threat of outsiders, does not have to be made or inhabited alone. In fact, the walls of architecture can be solidified by the social connection to others, be they strangers, kin, or alternative selves.

Presentation #3: The Ghost in the Shelter

Over millennia, mankind has recognized the spiritual nature of architecture, of building, and of place. Where spiritual beliefs abound, the eternal nature of salvation decodes from the harmonic universe, and it is embedded, or subsumed, by the transformation of profane into consecrated form — its architectural essence deriving from another realm, "removing it from the malign influence of Satan," (Council of Trent, 1563). In the case of secular necessity of the home, the community, and country, there is a recognition of similar yet less fully transformed infusions of spiritual meaning.

Over millennia, mankind recognized a spiritual nature in the secular origins of architecture, particularly the home. Home as shelter is not enough, its spiritual meaning is infused through form, space, and artistic derivative. Perhaps people don't believe in ghosts, at least not literally, but most people seem to find meaning in everyday spaces, where they live, where they sleep, where they are born, and where they die. The shelter we find in death, in our memorial, whether we are embalmed or cremated, holds spiritual significance across most cultures since the beginning of time.

It seems at present that an eerie trance has humanity rushing headlong into a world where technology imbues otherwise meaningless forms and spaces with a super-overlay of augmented reality. We are entering the realm where the ghost-in-the-machine is infusing life's meaning into otherwise meaningless spaces. This is not a place where picture frames show images of the grandkids, but a place with the living and the dead, and where fantasy and reality exist is one. If the technology existed in Pompeii, the tiled floors and walls of the villas would be alive today, telling holistic stories of family, culture, and dreams. This is a discussion of immateriality, technology, hubris, pride, and of ghosts and shelter.

Preseation #4: Authentic Shelter – The Impact of Colonization on the Colonized on Placemaking and Shelter

For thousands of years the Indigenous people of North America made place and shelters well adapted to both environment and cultural and social needs. This placemaking was not static but developed and evolved with the changing needs of the Peoples. The colonization of the 'New World' changed this. It changed the places of most of the Peoples, and limited their choices and means to create their own places. "The Nations Within" is how some people have described the Indigenous people of the US. On paper they may be granted to government status and sovereign independence and self-determination;

however, the reality has been for the colonizers to control the placemaking of the Indigenous Nations and to use it as a continuing drive to assimilation and adoption or adaptation. How can control of Native placemaking support Indigenous people through resistance to colonization, civilization, and assimilation. How can voices of Indigenous people be heard in designing everyday places or everyday placemaking to achieve authentic shelter. That is placemaking and places that celebrate Indigenous core values and respect the cultures and environments they are part of. These topics will be explored using various contemporary Indigenous projects and examples.

Presentation #5: Loss of Habitat, Health, & Home: Schoolyards as Shelter in Philadelphia

Millions of American elementary school children play on barren plots of cracked asphalt that resemble parking lots rather than schoolyards, and in Philadelphia, these underfunded public schoolyards can be particularly bleak. If you're attending a public school with an asphalt playground, while the private school down the street has a green athletic field, gardens, and every piece of play equipment imaginable, it's not equitable — you know your social status just walking down the street. You are told that you are not valued enough to get that schoolyard. And what's worse, you are fully aware of the fact that this place is not meant for you or your family because the site is fenced off and locked after school hours. Schoolyards in South Philadelphia offer one of the few open spaces in an otherwise highly urbanized environment with virtually no street trees or green space. Despite the educational and health benefits of green landscapes, only two major cities in the United States — Denver and Boston — have renovated all of their public schoolyards. In this session we will discuss the importance of schools and schoolyards as safe havens and shelters for youth at three schools in South Philadelphia.

Presentation #6: Authentic Shelter as Access to Timelessness

Shelters provide not only safety and privacy, but can become a home — for a moment or lifetime — but temporarily nonetheless. The ability to be or feel at home by connecting the inhabitant to the fabric of life in, around, above, below, and through a place, might be best achieved through authentic shelter.

Feeling privacy, safety, and a sense of being home is increasingly important in a world with relentless monitoring, messaging, and demand of instant digital response. When feeling at home with ourselves, when connecting and being in the moment, we can render out a more authentic version of ourselves by accessing mindfulness and timelessness.

Although that sometimes can be a challenge as we have many selves, so how do we identify the real one? Escaping from Kronos (chronological) time and entering into Kairos (timeless) time can help bring out a more authentic 'self' and thereby facilitate creative thinking for continued survival.

Using 'things that are there' when creating authentic shelters for disaster relief or (temporary) living can be responsible, sustainable, and efficient responses to practical problems, yet more importantly, might facilitate personal connecting and (re)rooting into a digital detoxed place. Place stores memory for the individual to access when 'being' and 're-being' in a place across time. Authentic shelter made by living, porous and permeable local materials, can facilitate not only rooting and re-rooting, but bring forth a more authentic self through native connecting to place.

Using 'things of the place' additionally involves materials already grounded in local ecological process and typically result in textured and tactile experiences. Architect Kengo Kuma similarly talks about the importance of respecting the 'spirit of the material' to achieve a deeper degree of sustainability. Authentic shelters can help open the door(s) into timelessness and our authentic self so we can get 'home'.

ENVIRONMENTAL DESIGN RESEARCH EDUCATION

Student Architectural Ethnographic Photo-elicitation; Listening to Places Through Inhabitant Voices

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Two practicing architects will introduce the problem by presenting the NYC Committee On The Environment, (COTE) monthly meeting deliberations on the need for social science for architectural practice. These views of practicing design professionals will frame presentations that follow.

Two architectural educators will discuss the research component of their Environmental Design Research (EDR) courses. Each will show assignments they used to have students create research useful for practicing designers. Students access the inhabitant's point of view through photo-elicitation interviews, and summarize findings with slides and relevant social science and architecture literature. The professional designer's evaluation of the usefulness of the student work demonstrates one way to address the unmet need for social science research in architectural practice. A Neonatal Intensive Care Unit Medical Intern, who also has architectural training, will present an example

of photo-elicitation research conducted with help of architecture students. Students carried out data collection and analysis and involved the architect who designed the building to help interpret interview comments by providing building code restriction, client requirements, and technical and budgetary limitations. A historic preservation educator will present an example of employing students using photo-elicitation methods to identify the variety of phenomenological experience of the historical visual landscape. An urbanist who has contacted ethnographic fieldwork, will address how to incorporate photo-elicitation in future ethnographic work of the urban environment, as part of teaching design students. If this research through teaching is widely adopted by professional design schools, it can contribute to a national database supporting environmental design practice and education. The challenge of creating a repository of inhabitants' voices on the built environment, will be presented by the director of a center that currently maintains national database on Green Buildings.

The intensive will conclude with an interactive workshop on how to promote such EDR courses in Architectural curricula.

Presentation #1: Student Architectural Ethnographic Photo-elicitation; Listening to Places Through Inhabitant Voices

The architect, seen as responsible for the construction of, as well as various modifications that define our environment space, has a clear influence on our relations through the proposed constructions. It is therefore important to know the physical and social needs of the community to which these interventions are directed. This situation is even more evident in heritage cases, since it assumes a role of identity and other associated cultural values in other areas of knowledge. Many authors conducted an analysis of the types of values that are associated with the architectural heritage. Their differences lie mainly in their terminology and classification instead of the content itself. This presentation will follow the

classification established by Feilden (2004), because it is suitably adapted to architectural heritage. The purpose of this article is to highlight through the analysis of those involved in architectural heritage that ethnography is an effective tool, which can assist the architect. It is proposed to apply ethnography as a method of microcosm research the architect should know before intervening in any type of architectural heritage. Ethnography gives the architect a methodological tool that will help identify the most important emotional variables associated to heritage and social use values. Ethnography will focus on analyzing the semiotic keys that allow it to decipher the diverse experiences obtained from a place and thus develop a more conscious analytical perspective. By valuing the integral use of the perceptive, the sensorial, and the emotional, as fundamental chains expression, the architect can take into account the information during the design phase.

Presentation #2: Voices from the Design Professions Demanding a New Kind of Social Science Research

This presentation by two practicing architects interested in research translation will help set the stage for the rest of the presentations. It will bring the point of view of the architectural practitioners on the purpose and execution of post-occupancy evaluation/ assessment and the corresponding perceived need for new and different methods and tools with which to engage occupants. This presentation will summarize varied perspectives on POEs of a group of 30 architectural practitioners in New York City who participate in the AIA Knowledge Network, Committee On The Environment (COTE) which meets once a month to share research information on sustainability issues. Recently, however, the group engaged in a series of critical discussions of current and shifting conceptions of post-occupancy evaluations.

Architectural practitioners who were always concerned with the human element in architecture, were expressing interest in new perspectives on what

post-occupancy evaluation is, how it might be done, and what it would take to make it more productive for architectural practice. Ultimately, after a period of speculative discussions practitioners arrived at the conclusion that new methods and processes are needed. The desire was expressed for collaboration with social scientists in order to effectively shift the practice toward more meaningful and consequential applications obtained from engaging with occupants' experiences and perceptions.

The characteristics of an ideal relationship with social science, as envisioned and proposed by this group of practitioners, will be offered as introduction to the Architectural Photo-elicitation Ethnography for critical discussion and consideration.

Presentation #3: Inhabitant Photo-Elicitation Interviews through Teaching I

This is the first of two presentations on environmental design research (EDR) courses creating research useful to practicing architects. We review the assignments that structure the research that architects have reported as influencing new designs. The assignments are performed by teams, where different teammates provide leadership in architectural fieldwork, social science fieldwork, architectural literature, social science literature. We will also review how each of these assignments fulfills NAAB Student Performance Criteria making similar EDR courses attractive for architectural curricula.

Assignment 1. Evaluate functionality of the building under investigation using photographs, diagrams, and scale drawings using criteria taught in architectural studio. It provides material for designing the photo-elicitation instrument but also creates a baseline of understand how the building serves human needs.

Assignment 2. Evaluate the functionality of the building through behavior observation and mapping to select areas to focus on with photo-elicitation.

Assignment 3. Review the architectural literature by selecting exemplary precedents of the particular building type to examine how their design supports various social functions. Each student focuses on one issue and examines how multiple designs address it.

Assignment 4. Leverage teamwork to locate social science research articles on a particular building type to create a master-PDF. Use keywords to locate articles on an issue and create PowerPoints for architects to reference social science research in their practice.

Assignment 5. Use knowledge of the building, inhabitants, social/architectural literatures to design photo-elicitation: photos, recording-form, recruiting-material/strategy, interview locations/formats, analysis-matrix, schedule.

Assignment 6. Conduct interviews, enter comments by photo, and group similar comments.

Assignment 7. Derive actionable findings with architect's input considering

- building code
- client's intentions
- budget and technical constraints

Assignment 8. Present each finding with:

- Place: photos and scale drawings
- Interviewees' comments and social attributes
- Architects' interpretation of design significance
- Precedents addressing finding
- Citing related social science

Presentation #4: Inhabitant Photo-Elicitation Interviews through Teaching II

This is the second of two presentations on an environmental design research course, this one piloted at another University with a much smaller class size. This course involves the design evaluation of a residential care home for persons with dementia. The presentation will focus on the assignments that

prepared students to design a photo-elicitation instrument and familiarize them with the building, the inhabitants, and related literature.

Assignment 1. Ethics Submission orients the student to ethical research practices involving human subjects and the particular challenge of seeking informed consent of substitute decision-makers for vulnerable populations.

Assignment 2. Architectural Analysis requires the student to evaluate the functionality of the building through a walkthrough with a building design informant (designer, facility manager, or staff), architectural analysis using photographs and scaled design drawings, and a targeted literature review of design needs of the resident population.

Assignment 3. Photo-elicitation Instrument asks students to design the research instrument components including:

- selection of photographs for interviews
- material for recruiting interviewees
- recruitment strategies
- interview locations
- interview questions
- matrix to enter and analyze data
- schedule for activity, participants, date, and place

Assignment 4. Field Work is using the research instrument created in assignment 3 for interviews with inhabitants, entering data in the matrix by interviewee.

Assignment 5. Analysis of the collected data through grouping comments by each eliciting photograph and gathering similar comments together to examine if common social variables of the interviewee help explain the response. If possible, the building design informant assists in the analysis of findings.

Assignment 6. Reporting requires students to prepare a final presentation, including relevant literature presented in PowerPoint slides.

This course provided students a unique opportunity to actively engage with and give persons with dementia a voice in explaining to designers how they perceive and feel about spaces they inhabit.

Presentation #5: A NICU Building through Inhabitant Voices, an Example of Student Photo-Elicitation Interviews

Photo-elicitation interviews were conducted over two semesters with the help of architecture students at a radically innovative Neonatal Intensive Care Units building redesign.

Single cramped open bay NICUs have been designed in the past to facilitate monitoring vital signs. However, such space is stressful as crying triggers cascades, sleeping and feeding cannot be customized, and lack of privacy discourages breast feeding. In a complete inversion the new design placed infants in single rooms that afforded privacy for breast feeding and an individual schedule of care. An elaborate remote electronic monitoring system replaced direct monitoring and improved response time. The intensive care nature of the building, however, required internalizing reaction and committing responses to body memory. This necessitated six weeks of training the staff-simulating reactions to emergencies in the new setting.

The new building resulting through a highly participatory design process enabled architects to comprehend the complexities of this relationship between the design of physical space and the influence it has on the outcome of patient care, as it affects the neonates, their families, and caregivers. Photo-elicitation validated through unsolicited comments several explicit design objectives, such as stress relief for kids and families in the form of waiting areas with large fish tanks and diverting light from infant's eyes. Both of these were identified as important in the medical and social science literatures for NICU.

The interviews also produced unexpected findings, such as while single rooms afforded improved privacy compared with the single open bay arrangement there

was still need for even more privacy for breastfeeding. According to the literature shy mothers do not produce milk, and this raises the health risk for NICU babies, particularly low-weight and premature newborns. In addition, the front main entrance is used for emergency deliveries despite the fact that it was never intended for this use, indicating the need for improved signage.

Presentation #6: Photo-elicitation: Listening to the Historical Landscape through Inhabitant Voices

There is a growing body of literature establishing the importance of place attachment in how people perceive, understand, and value the historic environment. An existential phenomenological perspective can also be quite useful to guide the overall research methodology used in understanding place attachment, by helping the researcher explore aspects of the emotional experience of being in certain places. Photo-elicitation techniques offer a useful way to understand this attachment to the historic environment, especially when research participants are given the ability to take their own photos. This process allows the participants to identify specific aspects of environments that are particularly meaningful. Data can be collected by allowing participants to tell their own stories about the photographs they have taken. During this interview process, the researcher's role is minimal as the participants tend to stay self-focused and directed on topics related to their emotional experience of being embedded in an environment. In this way, the introduction of the researcher's own meanings into the collected data is minimized, improving the internal validity of the research design.

Presentation #7: Photo-elicitation: Listening to Urban Places Through Inhabitant Voices

This presentation will address ethnographic fieldwork using photo-elicitation within the urban environment as part of teaching design and planning students. It will discuss the significance of ethnographic methods to benefit design and planning professionals and will provide an overview of its usefulness for design and planning pedagogy.

In the classroom, the first objective will be to perform an assessment of multiple neighborhoods within the city of Providence using direct observation, photographs, diagrams, cognitive maps, behavior mapping, and sketches. This immersive field work exercise provides students with a foundational understanding of a neighborhood's social, physical, and economic conditions and will support the development of a photo-elicitation instrument.

The second objective will be to craft open-ended interview prompts, select photographs, identify key interview locations, and develop recruitment materials that will be used during interviews with neighborhood residents, visitors, and merchants. After conducting interviews with a variety of neighborhood actors, students will identify common social variables using interview coding techniques and photo-elicitation.

The final phase includes identifying key neighborhood assets and challenges using the data with the help of an urban designer or planner. An asset-based approach will provide evidence of opportunity areas to strengthen the community's social capital and increase neighborhood participation in improving its existing conditions.

Presentation #8: Workshop on Some of the Challenges in Implementing such EDR Courses

The intensive will conclude with a workshop on how to promote such EDR courses in architecture curricula and will address three questions:

- 1) How to recruit professional designers to help students taking an environmental design research class conduct photo-elicitation interviews to access inhabitant experiences of their building?
- 2) How to engage the client who hired the professional designer and administrators of a building, to facilitate the semester long research?

- 3) What are some challenges in recruiting interviewees for the photo-elicitation interviews?

HEALTH

The Built Environment as a Factor in the Engagement Process in Health Care

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In order to improve outcomes in healthcare processes, it is critical to engage patients in managing their own health, as well as family members in their caregiving role. This is important for supporting the patient's health after hospital discharge and reduce chances of early readmissions. Through the Affordable Care Act's Hospital Readmissions Reduction Program (HRRP – 2012), American healthcare policies have intensified the demand for improved patient-family engagement strategies, as these have been associated with improved outcomes in terms of patients' health maintenance, patient-family experiences during hospitalization, and cost efficiency. However, little is known about the nature of the engagement process and the mechanisms necessary to achieve effective engagement during hospital stay, and even less is known about the role of the built environment affecting this process in healthcare facilities. A literature review was conducted to establish a relationship between the built environment and the components of the engagement process in healthcare. A descriptive framework was elaborated from what was found in previous studies, exposing the environmental variables affecting the ability of individuals to engage (activation) and the patient-family-staff partnership in

decision making. As a platform to share knowledge pertaining to this framework, this half-day pre-conference intensive session will explore environment-behavior research linking the built environment to concepts in healthcare influencing activation, like privacy, control, social support and patient-family satisfaction; and influencing the care-partnership, like work performance, social contact, communication and collaboration. Experts in evidence-based-design research working with healthcare settings will interact and share their knowledge about this topic, looking at the potential application of environment and behavior concepts and research to the development of a framework around patient and family engagement. The discussion plans to identify future methodologies that may contribute to environmental design studies and help building a stronger body of knowledge in this particular topic.

Presentation #1: Designing Partnerships: Engaging Patient and Family Advisors and Health care Staff in Designing Therapeutic Health care Environments

The engaged patient has been heralded as "the blockbuster drug of the century." Enlightened health care systems are implementing a wide variety of strategies to engage patient and family advisors to achieve the ambitious "quadruple aim" of enhancing the health care experience, improving population health, reducing the costs of health care, and improving the work life of clinicians and staff. Yet many health care systems are not aware of the growing body of rigorous evidence demonstrating that the environment of care may be thwarting their efforts to achieve the quadruple aim. Unfortunately, health care executives and their design teams often fail to recognize the important role of patients, family members, and frontline staff in the planning and design of health care facilities. Some argue that involving more people will "take more time, involve more people, and result in more political wrangling within the organization" (Carpman and Grant, 2016). Given that stakeholders may be disappointed if all of their demands are not met, many claim the benefits do

not outweigh the costs of engaging them. The result, oftentimes, is the construction of health care facilities that inadequately meet the needs of patients, families, and staff; diminish their experiences in these facilities; and lead to dissatisfaction, burnout, and higher health care costs. This session will explore recent evidence regarding patient, family, and staff engagement in planning and design.

Presentation #2: Lessons from Patient and Family Experience to Inform New Design Strategies

Modern health care design has made tremendous strides to improve health care spaces, facilitating infection prevention, operational improvements and throughput, and reducing medical error. To ensure that credible sources are used to develop strong solutions, many practitioners follow evidence-based design recommendations. They rely on literature reviews as a basis for design intervention, and they collect information through survey tools and post occupancy evaluations. This information has been shared throughout health care design education forums and widely accepted as a standard for improving such facilities.

This growing repository of evidence enables health facility design education networks to share lessons learned from previous projects in hopes of improving future health care accommodations. In response to a movement that has humanized health facilities, addressing patient safety and satisfaction have become top priorities. However, many designers are unable to engage patients and families due to project limitations and privacy concerns.

This session explores patient engagement ideas that would enable designers to glean valuable information from observations and experiences shared by patient and family volunteer groups. Physical and virtual mock-ups of health spaces have been created to enable users to envision facility improvements for the purpose of providing feedback on design ideas. These models also enable designers to visualize the challenges that

users face, by allowing them to simulate activities and educate designers on the function of the space. A case study of the Patient Experience Simulation Lab, a program created by the Institute for Patient-Centered Design, will review the strategies used to collect patient and family feedback on design projects.

Presentation #3: Honoring the Voice, Understanding the Journey: Tapping into Health care's Most Valuable Resource

With the increased complexity of health care systems today and the rising costs of medical treatment, health care organizations across the world are looking to their patients to become active participants in managing their own health. To ensure this dynamic change in health care practices has a lasting impact on desired health outcomes, it is imperative that the patient voice be central to creating environments that empower patients and their families to engage in preventative health measures, while honoring patients as an integral part of the care team. As each patient's social determinants of health bring a unique perspective to the health care experience, it is essential to understand their journey throughout the continuum of care to ensure health care environments afford equitable, high-quality care for all. This session will share methods for garnering and understanding the patient experience through journey modeling, experience mapping, and ideation sessions, and demonstrate the application of these methods for designing health care facilities to support emerging models of care for medically underserved and vulnerable populations.

Presentation #4: Designing Empathy through Narrative Inquiry: The Case of Integrated Care

Narrative inquiry offers a springboard to design empathically for patients and their families. To illustrate this approach, we will share our student processes for creating award-winning models of integrated care. The challenge involved designing an integrated care clinic as part of a 49,000 square-foot facility to be (1) supportive by encouraging patient and staff

interaction, (2) comprehensive by meeting acute and chronic physical and behavioral health needs, (3) connected by allowing extended services from shorter waiting times to longer after hours availability. With the overarching goal of marrying exceptional patient-focused care with positive clinical outcomes, the design teams studied patient experiences from physical, emotional, intellectual, and spiritual perspectives that would result in deeper patient connections to their clinicians and a great recognition of the supportive role of family members.

To develop new and meaningful insights on environments for integrated care, we drew on narrative inquiry as a tool to heighten design empathy. Narrative inquiry enriched a research process involving site visits to medical and integrated care facilities, analysis of related peer reviewed literature, and interviews with stakeholder groups to inform the development of patient and caregiver stories. This process helped shape the clinic spaces and offered a powerful way of presenting and communicating design intent, and led to fresh interpretations of integrated care. For example, one team developed interesting ideas of proactive empowerment while another emphasized mindfulness and restoration. By crafting stories of the health care experience with multiple voices, students seemed better able to frame truly patient-centered design solutions. This narrative journey involved reading and discussing first person patient and physician accounts; crafting patient-caregiver stories with dialogue that captured emotional breadth, points of tension, resolution, and unchanging realities. In the end, this narrative immersion refocused the designer beyond the visual to support the whole person experience.

Presentation #5: ICU: Why Family is Critical to Critical Care

Health care reform has created a new paradigm for health care: one where health care outcomes are paramount, where hospital readmissions are unwanted, and where patients have to be ever more engaged in their own care. In critical care units, patients are often so critically ill, that the family

becomes the conduit between provider and patient for care management, especially discharge instructions and care protocols to be followed at home which are essential to reducing readmissions. Additionally many critical care units are taking on patient mobility goals — ensuring that patients are mobile in the critical care units before being transferred to step down or med surg. This also requires family involvement. Unfortunately, critical care units are highly clinical-care-focused, medical equipment heavy environments, meaning family support within the room, and even on the unit, can be a challenge. But family support may well be the key to engaging patients in their care. In this presentation we will share insights about family spaces on different ICU units, via results from a series of design diagnostics (surveys + field research + parametric analysis), conducted in ICU units in the United States.

Presentation #6: Environmental Dimensions of End-of-Life Care to Support Family Members After a Patient's Death

The importance of 'family presence' during the experience of death is well established, and often considered as an encompassing element of a good death in this contemporary society. End-of-life care or hospice care philosophy identifies family engagement as a significant feature. Hospice care dominantly believes that family members are rational in helping providers make decisions and also support them with openness to make a difference in the quality of patient's life. Hospice care is also guided by a philosophy that family members need help caring for dying patients, as well as support for their own personal well-being during this time of crisis. The bereavement support for family begins before death and continues for some time after death (over 13 months in the United States). A good number of studies have addressed design issues related to accommodating family members in health care facilities, but very few have focused on caring for family members after death in end-of-life settings — until now.

This presentation will reveal results generated from a study focused on meeting family needs after death, and will provide design considerations for hospice environments. The study considered qualitative research design with the mixed method of data collection: literature review, expert opinions, and case study surveys. The following environmental dimensions had been identified from the analysis:

- provide privacy for grieving, accommodate a large number of visitors, ensure security from vandalism,
- provide spaces for spiritual care, storage for patients' belongings after death, scope for remembrance,
- and bereavement services.

This presentation will also provide the design checklist. The design considerations to address these dimensions will also be discussed with some examples.

Presentation #7: Family-Centered Care as a Double-Edged Sword: Why Context and Population Matter when Designing for Vulnerable Populations

The built environment has a key role in supporting or hindering patient safety and experience in psychiatric units. Although the existing literature on psychiatric facilities design is very limited, it offers evidence that the built environment can influence safety and patient experience. Further research is needed to expand the body of work of this overlooked area, evidence-based design in psychiatric facilities. One of the areas of deficiency in the existing psychiatric design guidelines is family engagement. In effective health care systems, patient and family engagement is an essential factor that improves patient, family, and staff satisfaction and outcomes, and reduces costs. Understanding the feasibility of the family engagement concept in the context of psychiatric facilities along with their benefits and limitations is essential to develop a better family-centered care environment. The study utilized an online questionnaire and focus groups with nurses and mental-health technicians of a major psychiatric

hospital whose broad depth of knowledge on patients and family interaction enables them to see family engagement from a critical perspective. A total of 70 participants completed the questionnaire, and a total of nine participants attended the focus groups. The results revealed that while family support benefits the patient, lack of designated visiting areas in the psychiatric units results in four main concerns: patients' privacy and confidentiality, physical safety of patients, psychological safety of patients, and patient stress. This study will inform designers and administrative decision makers of the design considerations for effective family engagement strategies.

NONE/NOT TIED TO ANY NETWORK

Help Madison Engage! Participate in Multi-Disciplinary Collaborative Planning in our Evolving Host City.

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Madison has been named one of “top five livable cities” in the U.S. However, Madison is not equally “livable” for all members of the community, and suffers from dramatic outcome disparities between different community groups. Madison is also undergoing an evolution in development and economic dynamics. Just two illustrations are a recent influx of high-density housing, and the loss of a key manufacturing facility within its city limits; both deeply intertwined with the designed environment and human ecology of the community.

In this context, meaningful community engagement around neighborhood needs and city design and planning is greatly needed. Madison has various assets that can be leveraged for new era of community-engaged planning – including: the University of Wisconsin-Madison; new City planning initiatives focused on community engagement; and a robust local network of formal and informal organizations. The EDRA Annual Conference in Madison in 2017 is

an invaluable opportunity to engage a global network of design and planning scholars to exchange ideas about Madison’s next phase of planning and design, including all voices, taking into consideration the complexities and interdependence of notions of basic needs, “livability”, human thriving, culture, shared resources, common spaces, and basic infrastructure. Through a one-day intensive workshop (transportation provided), attendees will hear from community members, local officials, and scholars about an array of contextual elements that impact Madison’s design future and “livability” for all. Attendees will conduct site visits in one of two (2) selected Madison sites which demonstrate assets and challenges to livability and new opportunities for design. The latter part of the day will include multidisciplinary round-table workshops that will leverage EDRA participants’ professional skills in combination with community-engaged planning principals to develop proposals for sites visited. Participants will also identify suggested priorities and constituencies to engage for next phases of planning and design in the evolving community of Madison.

From Grounded Theory to Certified Outcomes: The SEED Methodology

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This intensive will overview the research that informed the development of the SEED [Social, Economic, Environmental Design] project development and certification methodology, review case studies of its application in the US and abroad, and demonstrate the usefulness of this methodology in pedagogy and in practice. The overview will include the results of research funded by the 2011 AIA Latrobe Prize, which identified the heuristics of “Public Interest Design” and laid the groundwork for the development of

the SEED methodology and certification protocols. The case studies offer examples of how the SEED methodology can be efficiently integrated into practice and effectively communicate social, economic, and environmental results to a broad range of stakeholders (the USGBC is now recommending the SEED Evaluator to applicants interested in the two points allowed for "Social Equity" in the LEED certification). The Co-Founder of the SEED Network will introduce the SEED Evaluator, an online tool that practitioners are using to document the process and outcomes of their work and apply for third-party SEED certification. This intensive will include small group discussion and live online interaction with the SEED Evaluator.

POE/PROGRAMMING

Facility Programming: New Approaches and Methods for Unique Cases

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Facility programming is highly variable in its scope, reach, and depth. Because of the diversity of facility development situations, it is very rare that any two programming projects will proceed in the same way. In this respect, we will look at the predesign phases of the facility development process as a territory that is negotiated by several different types of consultants, in different ways, and with different emphasis. Our goal is to inform about practices in programming with a focus on a programming project in which panelists used an approach that was unique to them or different from their usual practice because of the special demands of the project. These projects differ greatly from the rest of programming commissions because of the amount of work, complexity of information collection, and the professional sophistication of clients. Clients search for consultants that can operate in all these realms or who can organize a consortium that can deliver the entire programming project. Clients clearly prefer providers with expertise in organizational processes and operations. These perceptions and beliefs guide clients to invest more resources and time for facility programming and to hire the best program providers. The session will consist of four case studies that exemplify unique programming approaches and practices. The presentations will be followed by a question and answer session and a discussion. The session will take one half day. It is intended for programmers and other EDRA members and guests who are interested in programming.

Because of the interactive and hands-on character of the presentation, we prefer about 30 participants.

Presentation #1: Collaborative Programming for Collaborative Services and Operations

Public libraries and community centers provide complementary services; however, joint library-community center facilities are often programmed and designed around a discrete service and operational model. This case study will look at the process of working with a San Francisco Bay Area city to program a new joint library and community center facility to support collaborative operations and seamless service delivery. The process created a new framework to facilitate discussion and decision-making about services, operations, and facility program needs with the city's library and recreation services leadership and staff — most of whom had little to no experience with facility programming prior to this effort.

Presentation #2: Focus on Jobs to be Done

This presentation will focus on a "jobs to be done" approach to strategic visioning and programming for university student unions. The intellectual work of creating a shared vision for student unions requires collaborative exchange and intellectual curiosity about what makes campus places beloved. The approach discussed here assists universities in finding their collective voice to articulate the "jobs to be done" by the building. Clarifying the "jobs to be done" involves more than identifying specific spaces and features to be included in the building. It is a form of contextual inquiry, advanced by leading business strategists, that focuses on the problems that people seek to solve by uncovering the assumptions and values that underlie people's decisions to "hire" a product, procure a service, or in this case, spend their time in a particular place. Through carefully orchestrated workshops, this "jobs to be done" approach seeks to identify what people seek to accomplish by spending their time in a student union. This is especially important for a highly diverse and purpose-driven place like a university

where students not only have many demands on their attention, but many opportunities on and off campus to study, relax and entertain themselves. The goal of these workshops is to understand what students, faculty, and staff intend to accomplish when they might invest ten minutes, an hour, or an evening at a student union. Identifying the essential jobs to be done by a student union requires immersion in the university's culture and understanding the campus as a social ecology. Holding meetings and workshops with stakeholders throughout the university is an essential part of the process. In addition, intercept interviews on campus and nearby hangouts actively engage students and others who hold important perspectives, yet are unlikely to attend any focus groups.

Presentation #3: Multi-Disciplinary Opportunities for Use of Existing Design Processes and Methods

Design is inherently a multi-disciplinary construct. Design process, while similar in nature across disciplines, takes on nuanced variations within each discipline due to the demands and constraints of that discipline. Similarly, design methods have evolved to fit the needs and limitations within each discipline.

Process and methods for planning and design in built environment disciplines have evolved from millennia old practices. The longstanding disciplines inherited design principles from classical architecture and iterative design methods from renaissance engineers. Methods that have emerged from these fields — subsequently borrowed across disciplines — include model building, pattern language, and user group work-sessions.

Process and methods for product design continue to evolve from an engineering and human factors heritage of the mid-twentieth century. Methods that have emerged from these fields — subsequently borrowed across disciplines — includes simulation, and prototyping.

Process and methods for the design of virtual

artifacts — such as computer user interface, website, and mobile application design — are currently experiencing a growth spurt as those domains are maturing. They, too, stem from a human factors design heritage, but have quickly evolved new processes and methods due to the particular requirements and constraints these designs experience. Methods that have emerged from these fields — subsequently borrowed across disciplines — include rapid application design (RAD), use cases/user stories, personas, and rich meta-data application.

This presentation reports on recent interview research exploring current design methods practice across multiple physical and virtual disciplines toward surfacing methods that may have as yet unexplored multi-disciplinary value for planning and design practice.

Presentation #4: Programming a Large Project

A case study will be presented for the largest and most complex programming project undertaken by the presenter. The project, still in the pre-design phase, is a 3,885-bed jail emphasizing specialty housing for acute mental health, two levels of step-down mental health, medical detoxification, medical outpatient housing, and high security housing. The project has the requirements of two of the four most complex facility types to program and design: correctional and in-patient medical. The program has 1.9 million gross square feet with a budget of slightly over \$2 billion. Additional complexities for the project included taking over programming from another consultant who set the initial scope, project management shifting from the county administrative office to the public works department, coordination of programming with a requirements document for a design-build solicitation, and the interjection of an independent health care consultant by the county board half way through programming. The basic work plan divided programming into separate correctional and health care tracks, with coordination as necessary between separate teams dedicated to each track, but other efforts were required to coordinate such a large and complex project.

RESIDENTIAL ENVIRONMENTS

Voices of Place: Empowerment and Well-being in Urban Residential Environments

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Increasing urbanism offers myriad opportunities to examine well-being outcomes in diverse contexts for groups with distinctive needs. Well-being is intimately entangled with quality of life giving residential settings a central role in the achievement of well-being. Acknowledged as the primary setting for human habitation, residential environments should enable us to relax, be ourselves, and have the highest degree of control on our interactions with the outside world. Employing five presentations across a range of different demographics, this session examines core research concerns at the intersection of empowerment and well-being in urban residential environments. Within this broader theme, this intensive explores questions of mixed-use and multi-cultural environmental interaction, lifespan housing alternatives (aging in place), strategies to improve well-being for teenagers in urban residential environments, and policy considerations to encourage residential environments that are more supportive of human well-being broadly.

The five presentations in this intensive will be organized around two sub-themes: 1) socio-cultural

well-being in contemporary urban density, and 2) environments that support well-being across the lifespan. Following individual presentations, we will move into breakout working sessions organized around these topics. Each breakout group will outline a white paper on its topic. The intensive will conclude with a wrap up presentation of white paper outlines and creation of a strategy for development and dissemination of these white papers.

Presentation #1: Exclusion, Invitation, Entitlement: A Case Study of Territorial Hermeneutics in Urban Design

In the field of urban design and planning, a popular current approach to urban re-development is to revive key aspects of cities that flourished prior to widespread automobile dependence. Such efforts are aimed at fostering greater pedestrian activity and thus include elements such as ample housing, density of built form, and zoning laws that allow mixed uses on one parcel of land.

When such a new development joins the civic stage, it enters the awareness of all who search the internet for “restaurants” or “retail” in the area, and the destination point is likely to lie in close proximity to a high-volume place of residence. As a result of this juxtaposition of retail (public) and residential (private) spaces, some specific types of confusion may ensue.

This study examines a mixed-use development south of downtown Denver which boasts “luxury living” within walking distance to everyday needs such as mass transit, retail, grocery, and restaurants. The fact that such of a place of residence allows easy access to desirable amenities, while facilitating visits from outsiders, is laudable. The obvious problem for residents, of course, stems from unwanted noise and possible criminal activity in their midst — and the question arises: How effectively does built form mark lines of territory between public and private realms?

This observational case study draws upon the theory of proxemics and territoriality as advanced by Edward

Hall, as well as research by Oscar Newman, who built upon Hall's work to develop his theory of defensible space. Approached from a symbolic interactionist perspective, this case study will offer insights into the legibility of everyday built form that impacts visitors and residents alike.

Presentation #2: The Environment's Potential to Improve Quality of Life for Aging Populations

The baby boomer generation is about to create an increasing wave of older adult population, and this marks only the beginning of a critical era in American history. This period necessitates an increasing demand for senior housing and amenities that help older adults age in place. The exceptional growth in the number and proportion of senior Americans signals an immediate need for rigorous applied research. Researchers must particularly assess this vulnerable population's behavior, needs, and preferences in order to propose new housing options and prototypes that offer living options for healthy aging. Architects, city planners, and policy makers have not comprehensively assessed older adults' needs and dynamic capacities as the main drivers for creating residential environments that promote quality of life.

This paper intends to offer a review of the U.S. and international literature on housing, and identifies it as the heart of healthy aging, and a facilitator for better quality of life. Key points include the role of built environment on healthy aging, the existing theoretical frameworks that represent context of studies on home environments for the elderly, the importance of social and physical resiliency in senior housing environments, and relocation later in life. Methods that have utilized GIS and meta-analysis of existing data are specifically investigated in an effort to shed light on patterns of relocation later in life in context of urban and rural areas across the United States.

This review is a step towards clear understanding of important factors that seniors will take into account when they choose a place to live in, and the level of

effectiveness of these factors in promoting their quality of life. The findings of this research can be further utilized by built-environment planners and designers towards creation of spaces that promote healthy aging.

Presentation #3: Supportive Community-Based System

Neighborhoods that experience high perceptions of crime, high levels of transience, and major health inequities do not offer the chance for a healthy lifestyle. How can the built environment add upon the existing urban fabric inhabited by vulnerable populations to strengthen sense of place and social ties?

The south side of Peoria, IL, is currently lacking diverse housing typologies and pedestrian-friendly environments that foster social networks. Through evidence-based design research methods we establish a 'Supportive Community Based System' to increase the health and well-being of the Southside residents. A 'Supportive Community-Based System' is an environment that encourages a diversity of social interaction and an overall cooperative way of life. This is comprised of housing typologies specifically designed to support multigenerational families, older adult populations, and single-parent households. All of these housing types are linked together through exterior environments enhancing the pedestrian experience.

By evaluating the southside neighborhood through qualitative research methods, the built environment begins to sculpt a healthy neighborhood by creating a sense of place and enhancing residential experiences.

Presentation #4: Lost in the Shuffle: Teenage Urban Health and Design

Teenagers experience a broad range of physical and mental health problems which are systematically associated with increased risks for chronic conditions that will manifest later in life. For example, half of all diagnosed mental health disorders occur in teenagers (Kessler et al., 2005). Some of these issues are influenced by the environments they experience every

day, such as urban nature (Park, 2004) or high density urban environment (Park et. al., 2007). However, we don't know how to create design interventions that allow teenagers to thrive in a high density urban environment. By neglecting these issues, environmental designers risk creating environments that are bad for adolescent health, which may lead to poor development and unfulfilled adults.

To assess such issues, we conduct a multidisciplinary literature review to investigate what design interventions in different scales can reduce negative behavioral and poor health risks in dense urban environments. We searched literature in urban planning and design, geography, public health, etc., and integrated the results. We found that teenagers' health and well-being risks include physical well-being, such as cardiovascular condition, obesity, and malnutrition, and mental health risks such as depression, anxiety disorder, and ADD. Behavioral issues are discussed, including crime, delinquency, and substance abuse.

We found some examples of design interventions that can improve health and well-being for teenagers in the neighborhood scale, building scale, and single unit scale. Some issues may not be accomplished via design interventions alone — governmental policies, educators, parents, and adult role models are also necessary to help bring teens to their full potentials.

This literature review provides design suggestions for urban designers, landscape architects, and architects to develop design strategies that help reduce health risks for teenagers. However, teenagers have diverse needs and preferences, and many cultural factors should be considered when applying these suggestions into design.

EDRA48 MADISON

EDRA Shorts Presentations

CHILDREN, YOUTH, & ENVIRONMENT

An Intensive Approach to Photovoice in Collaboration with Tribal Youth in India

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Photovoice is a research tool used to facilitate marginalized communities in reflecting critically on their experiences and to promote dialogue, encourage action, and inform policy-making (Wang & Burris, 1997). Although the use of Photovoice has been growing rapidly in a variety of fields (Singhal et al., 2007), few studies have discussed how to mediate between the wish to have high levels of youth participation, and time and resources restrictions due to the practical challenges of conducting participatory action research with marginalized communities in developing countries (Hussain et al., 2012).

To address these issues, the main objective of this pilot study is to demonstrate how to modify the activities and process of Photovoice appropriately for the local context. Also, this study examined the impact and challenges of applying the Photovoice method with tribal students in a rural part of India. The first author of this paper led a 17-day intensive Photovoice session with a group of tribal middle school students (12 to 15 years old) in rural West Bengal, India, to explore students' experiences in the learning center where use of multiple technologies aims to improve teaching and learning processes.

This study revealed that even youth from a marginalized community, who lack access to digital devices at home and are at risk of dropping out of school, are capable of understanding and implementing Photovoice to communicate their perspectives on the surrounding environment.

Regarding the adapting of Photovoice into a local context, working with the local NGO, Suchana, was effective as their staff have a strong partnership with the community and thus they could identify when and how students can engage in activities and set up an environment to turn students' voices into action.

Voices from the Margins: Children with Autism Spectrum Disorder (ASD) Relate their Experiences in a Wayfinding Experiment

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Among the challenges facing some children with Autism Spectrum Disorder (ASD) is difficulty wayfinding. This exploratory research study aimed to find out whether the addition of wayfinding aids could help children with ASD navigate the corridors of an elementary school. Wayfinding aids included colored doors, colored shapes on the floor, and signage. Nine participants were randomly assigned to control or treatment groups. Participants in the control group were led individually from a start point to a destination point by the researcher who provided instruction in existing wayfinding cues along the route. Participants were then instructed to lead the way to the destination indicating anything they remembered along the way. Participants in the treatment group carried out the same task but the researcher provided instruction in wayfinding aids that had been applied along the route. After the wayfinding activity participants were interviewed to find out how they felt and what they remembered about the route. The voices of children with ASD are often overlooked so this was an important aspect of the research. Other data collected included observations, behavioral mapping, and video and audio recordings. The study was grounded in the principles of Person-Environment Fit Theory which posits that if a human is well-matched to the interior they will find it easier to use.

In this presentation, visuals will show the wayfinding route to demonstrate how aids could be applied in a school to benefit children with ASD and how a similar field experiment could be set up. The experience of participants will be told in poetic transcription, defined by Glesne (1997) as “the creation of poemlike compositions from the words of interviewees” (p.202). The poems do not rhyme but they are rhythmic. As Glesne (1997) puts it, the result moves “in the direction of poetry but is not necessarily poetry” (p.213).

Engaging the Voices of Pre-teenage Boys to Compare Qualities of ‘Insideness’ of their Significant Places

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This presentation will outline the process in which 30 pre-teenage boys described their relationships and senses of belonging with two significant places: their school and one other special outdoor place. The boys’ writing and drawings were interpreted through the analytical lens of ‘insideness’ of place to discover the impact of each place’s affordances. ‘Insideness’ is the degree to which a person identifies with a place, and the extent to which they feel as though they belong to it.

Preliminary findings indicate that the ‘insideness’ experienced by the boys at their 125 year old Catholic school is limited due to the limited affordances. The research aspires to discover how the affordances of the boys’ ‘other’ places (usually more complex and often featuring nature) might inform how school outdoor learning environments could be designed to provide a more diverse range of affordances and richer learning environments.

Working together in the classroom, critical dialogue between teacher-researcher and student-participant took place, centering the boys’ voices and co-constructing an indication of their sense of

identification with the school and with another place of significance in their lives.

Being a teacher at the school, the researcher, as bricoleur, actively structured the research methods from his tools at hand. He developed a series of lessons guiding the boys in the development of their environmental autobiographies (drawings, maps, self-portraits, and a recount of a memorable experience) in which each boy provided a detailed description of himself in both places. Both ‘languages’ of written text and drawings were considered together by the boys and the researcher. Fifteen boys were interviewed to gain a deeper understanding.

This presentation will outline the process used to engage the voices of 30 boys and summarise visually their ‘insideness’ of place. It will also translate these insights into strategies for improving all school outdoor environments.

CITIES & GLOBALIZATION

Rereading Urban Vacancy in Baltimore, Maryland

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Vacancy is an issue facing many American metropolitan areas and post-industrial cities. Cities with high rates of vacancy struggle with planning and designing to reactivate vacant land. The City of Baltimore, Maryland, categorizes vacancy as either a lot (11% of the City’s land area) or a building (14%) (Baltimore Open Data, 2015). A strong gap in literature and in practice exists as to how vacancy is defined and assessed, and its interspatial relationships on a city scale.

This presentation demonstrates a new framework for investigating, characterizing, and defining urban vacancy in the case study of Baltimore, Maryland. Data from the United States Census Bureau, the Baltimore Neighborhood Indicators Alliance, and the Baltimore Housing Authority were utilized to conduct three analyses: distribution, density, and interspatial. Geospatial statistical analysis was performed to assess the interspatial relationships of vacant buildings and lots within the city on three scales: watershed, neighborhood, and census block group. This study found 10.9% of the city's vacant land included cemeteries, parks, natural areas, and other urban spaces. From this emerged "utilized landscapes," a new classification of vacancy representing land void of traditional ownership, activities, and conditions. A distribution analysis revealed a conglomeration of vacant buildings and lots located at the intersection of the Jones Falls, Gwynns Falls, and Baltimore Harbor watersheds. Layering the density analysis determined the Gwynns Falls has the highest percentage of vacant building and lot quantities. A statistically significant concentration is specifically found in the Middle Branch sub-watershed. This statistical spatial analysis led to the development of "transitional zones," areas with a high presence of vacant land existing with social capital within close-proximity. From this study a new understanding of urban vacant land in post-industrial cities can be developed, reflecting on the utility, ownership, activity, and value of our urban landscapes.

CULTURAL ASPECTS OF DESIGN

A Case Study of Campus, Community, and the Edge Between

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Many municipalities struggle in their relationship with their contiguous colleges or universities. In the American college town, this tension can be particularly prevalent since the higher education institution often has a predominant role in shaping both town and gown to suit the needs of the institution. In 2008 geographer and researcher Blake Gumprecht undertook one of the only comprehensive studies on the American college town that exists, describing it as "any city where a college or university and the cultures it creates exert a dominant influence over the character of the town." While he unfolds further criteria, towns which meet this benchmark often innately follow suit to the predominant order of the college or university.

The purpose of this study is to present initial findings from a multi-case study examining the social and physical structures of the American college town as it relates to primary stakeholders in the built environment design and planning process. Additional methods include the use of interviews, archival records, surveys, and observation. The study proposes that higher levels of collaboration between campus and community positively affect perceptions of social ties between groups and perceptions of the built environment at shared campus-community edges, lessening the perceived dominance of the institution. This study also contends that high levels of collaboration between town and gown result in improved landscape character where the campus meets the downtown.

Understanding the effects of collaborative efforts between town and gown in the built environment

design process might result in a revised municipal architectural review process, revised standards for campus planning and design processes to include all primary stakeholders, and an improved place experience for local and academic communities alike.

ENVIRONMENT-GERONTOLOGY

Emergency Rooms under Demographic Change: Design of a Dementia-sensitive Waiting Pod

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The individual number of hospital admissions per year increases with age. Many older adults are in recurrent need of acute care. Often, the beginning of the hospital stay is marked by admission to the emergency room. There, long hours of waiting are common. This is very stressful for every patient, but especially for older adults with dementia. If a diagnosis of dementia is known to the triage nurses, they may implement specific policies to avoid waiting time. However, those policies are rarely in place in emergency rooms and many older adults may show symptoms of dementia but have no known diagnosis. Therefore, they may spend many hours waiting, which is an adverse event for them. Their disorientation to time, place, and situation may worsen significantly. As a result, patients with dementia often may become restless, wander away, and put a burden on family members, caregivers, nurses, and doctors alike.

An acute care hospital in Berlin, Germany, addressed the challenge of caring for people with dementia in the emergency room. Thirty-four interviews with caregivers and family members (n= 10), nurses (n=8), paramedics (n=7), and doctors (n= 9) were conducted. They were asked to describe their experience with people with dementia in the emergency room. All interviews were transcribed and analyzed for spatial and architectural

relevance. The resulting information was transformed into design criteria. Based on these requirements, a design for a waiting pod which can be introduced into the hallway of emergency departments was developed. The prototype of this waiting pod will be presented. Evaluation criteria for its effectiveness will be introduced: evaluation results are forthcoming.

A Study on the Impact of Biophilic Design on Noise Perception: How to Approach a Reduction in Noise Annoyance through Design

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This study explores the influence of biophilic design elements in interior environments on the human perception of sound, such as perceived loudness and annoyance. The objective is to understand the correlation of the subjective loudness and annoyance of noise from interior environments, and noise perception which is influenced by the visual characteristics of biophilic design. A case study method is used to examine the perception of sound including perceived loudness and annoyance for older adults in nursing facilities. Virtual scenarios were created and presented to the participants by computer visualization of three-dimensional models on the screen and sound from audio speakers. A controlled simulation was developed to provide interior dining spaces with auditory and biophilic design features. A total of 32 residents ranging from 65 to 90 years old, representing both genders, participated the study. The data included demographic information, interview transcripts, and the evaluation scores on attractiveness (ugly-beautiful), perceived loudness (not noisy-extremely noisy), and annoyance (not annoying-extremely annoying). The evaluations used rating scores on ten-point Likert scales. The data were analyzed using content analysis, ANOVA and correlation techniques.

The results of the study indicated there was no statistical significance in the influence of visual setting on sound judgments in the given audiovisual indoor environment. However, data suggests that positively-rated interior spaces can lead to a lower perceived loudness and annoyance. In particular biophilic design attributes of window views to nature and indoor plants showed stronger effects on modifying the feeling of annoyance. In conclusion, design guidelines were provided to inform decisions of designers and administrators responsible for designing environments for older adults in long-term care settings. Based on the proposed design guidelines, redesigning an existing dining space was suggested with design visualizations. Further study will continue to explore the effects of biophilic design attributes on noise annoyance reduction.

An Overview of Design Styles of Multi-sensory Environments for People with Dementia

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One in nine Americans over 65 have Alzheimer's disease and approximately 5.4 million Americans of all ages have the disease (Alzheimer's Association, 2016). Sensorial deprivation or overload can result in behavior problems known as behavioral and psychological symptoms of dementia (BPSD), including agitation and aggression, and tend to occur during personal care assistance (Cipriani, Vedovello, Nuti, & Di Fiorino, 2011; Sloane et al., 2004; Teri, Larson, & Reifler, 1988). Per findings in neuroscience literature, the built environment, defined as the architectural environment people inhabit, can modify the role of human genes and impact cognition (Academy of Neuroscience for Architecture, 2015; Zeisel, 2006). In fact, an enriched environment contributes up to a 25% increase in brain connections (Peterson, O'Donnell, Wicklund, Pigozzi, & Mau, 2010), which supports the concept of environment as a non-pharmacological intervention in dementia-care. Researchers have

demonstrated non-pharmacological advantages of the built environment for people living with dementia (Calkins, 1988; Elliot, 2013; Gesine Marquardt et al., 2014; Tilly & Reed, 2008; Zeisel et al., 2003; Zeisel, Hyde, & Levkoff, 1994). Multisensory environments (MSE), also known as Snoezelen®, are an emerging environmental intervention for people with dementia to help them reach sensory equilibrium based on the theory that behavior problems including agitation and aggression occur due to either over- or under-stimulation (Kovach, 2000). Typical elements of MSE include visual, auditory, tactile, and olfactory stimuli; ergonomic vibro-acoustic furniture; bubble tubes; color-changing LED lighting solutions; music; fiber optics; and aromatherapy. These environments are known to have positive impact on behavior for people with dementia (Yao & Algase, 2006; Baker et al., 2001; Collier, McPherson, Ellis-Hill, Staal, & Bucks, 2010; Brennan, Su, & Horowitz, 2006). The purpose of this EDRA Short will be to help the audience understand MSE, identify benefits of MSE, analyze design elements through photo methods, and understand various applications of MSE.

ENVIRONMENTAL & ARCHITECTURAL PHENOMENOLOGY

European Contemporary Urban Farming: Building between Urban Space and Natural Space for the 21st Century Post-Industrial City

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Urban farming has always been practiced in the past until it was removed during the industrial era. However, this phenomenon has recently reappeared in urban settings of Europe. Rooftop gardens, as well as community gardens, have become amenities for a lot of inhabitants of cities. This study investigates the architectural facets of this new phenomenon.

According to French sociologist Henri Lefebvre, the city is a “second nature,” defining it as a social product at the expense of nature. However, while he felt that society was the main creator of cities, he also believed that architects could translate new societal trends into spatial forms. Within this intrinsic characteristic of architecture hides the capability to design space for the community, a space that compromises between opposites like individuality and plurality, built and open, private and public. A fundamental question arises from this analysis: Is urban farming fundamental in healing the fracture between the opposites of urban space and natural space, creating a new “second nature”?

The study relies on a mixed methodology that involves Interpretive-Historical Research and multiple case study, (1) describing how urban farming has disappeared from European architectural theory in the past and (2) picturing the contemporary return of urban farming design in the European architectural discourse. The first objective focuses on the analysis of the masterplans of Le Corbusier, while the second objective investigates the works of three architectural firms — Studiomobile, Conceptual Devices, and GravalosDiMonte arquitectos — through published sources, photographs, drawings, and interviews conducted at the ‘15th International Architecture Exhibition’ in Venice (Italy) in May 2016.

The research expects to obtain two conclusions: understanding why urban farming disappeared from the architectural discourse, and how the new design approach to urban farming compromise between urban and nature.

Geographies of Space-Induced Anxiety

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This study begins with the question of disablement of persons by the built environment, and hones in on the particular case of space-induced fear and anxiety.

Based on previous research, the study adopts a geographic approach that characterizes this condition as the subjective experience of boundary crisis. This boundary crisis has significant implications on the subject’s patterns of mobility. Previous research shows that phobic experiences are exacerbated in crowded social spaces owing to greater perceptual sensitivity to the “other’s gaze,” while the home is often viewed as an aid to help reconstruct their self identity and maintain a sense of control. It is known that people’s cognitive maps of places determine their ability to plan and execute movement. These mental representations may include markers and cues that bolster their awareness of environmental affordances, and according to their respective degrees of comprehensibility and meaningfulness gain favor or otherwise.

The study will employ qualitative research methods. In its first phase participants photograph visual markers and cues in their neighborhoods and identify whether they promote or deter mobility, while their walkthrough is being tracked by GPS. Interactive story maps will be created from these geotagged photos and GPS trace logs. The second phase of the study involves using this map as a tool in semi-structured interviews with the participant to expand on the relational nature of these attributes and their correlation with the experience of loss of control, and if and how they cope with or overcome these limitations.

It is important to note that this is a work-in-progress in its very nascent stage, and is expected to grow and develop over the next year to culminate in a master’s thesis. It is expected that this research will aid architects, designers, planners, policy-makers, and community stakeholders in creating empathic and inclusive environments.

ENVIRONMENTAL DESIGN RESEARCH EDUCATION

A Splash and a Crowd: Do Water Fountains and Active Street Improve Plaza Visitability?

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Building on William Whyte's work on livable places (1980, 1988), the present study uses a four-item scale of visitability to test whether two design attributes identified by Whyte — the presence of water fountains within the plaza and access to active streets — increase visitability. Using Photoshop, the study manipulates 2 scenarios for street access (presence of street with retail fronts, no visible street), and 4 scenarios for fountains (accessible fountain where people can touch the water, floor fountain that children can play with, elevated fountain that people cannot reach, no fountain). To study the interaction between the two design attributes (fountains and access to active street), the study uses color slides of three plazas each altered for the 8 different scenarios (4 for fountains x 2 for street access):

1. Accessible fountain / street with retail fronts
2. Accessible fountain / no street
3. Floor fountain / street with retail fronts
4. Floor fountain / no street
5. Elevated fountain / street with retail fronts
6. Elevated fountain / no street
7. No fountain / street with retail fronts
8. No fountain / no street

Sixty participants rated slides of the plazas on the Perceived Visitability Scale (PVS). The four items of the scale had high inter-item reliability. The visitability ratings show preference to the presence of a particular water feature and its interaction with street access. Despite their long-standing tradition, Whyte's recommendations have not been examined through

experimental research. This study attempts to do so. The implications for design decisions of water features (their functionality, as well as location) and the plaza's access to the street are discussed in terms of plaza's livability. The study is part of a larger research project that attempts to facilitate community interaction through accessible and universal design.

Neuroscience, Architecture and Allied Disciplines: What Kind of Conceptual Framework?

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In the last few decades, in architecture as in allied disciplines — arts, interior design, landscape architecture, and environment behavior studies — a growing interest has developed towards neuroscience that informs and evidences future built environment prospects. The development of the Academy of Neuroscience for Architecture conference (ANFA); EDRA's 2015 conference theme: "BRAINstorm: Dynamic Interactions of Environment Behavior and Neuroscience"; and the emergence of seminal architecture and neuroscience publications signal the emergence of new design paradigm that deserves attention.

Associated with the emergence of new paradigms, the necessity of a framework that describes the conceptual organization or structure of the emerging paradigm is a necessity. The purpose of the framework is to help establish discipline's possible framework of interventions, to provide for people in the field to relate to each other in a consistent way, and to help those outside the field to understand it (Moore, 1987).

Architects have ventured into establishing a nucleus of research that finds impetus in behavioral sciences: Eberhart's *Architecture and the Brain: A New*

Knowledge Base (Greenway Communications, 2007); Mallgrave's *The Architect's Brain: Neuroscience, Creativity and Architecture* (Wiley and Blackwell, 2011); and Zeisel's *Inquiry by Design: Environment, Behavior, and Neuroscience in Architecture* (W.W. Norton 2006). Likewise, neuroscientists, driven by the interest of other disciplines, have written accessible books on the subject: Chatterjee's *The Aesthetic Brain* (Oxford University Press, 2015); Kandel's *The Age of Insight* (Random House, 2012); Starr's *Feeling Beauty* (MIT Press, 2013); and Shimamura's *Experiencing Art* (Oxford University Press, 2015).

The purpose of this EDRA Short is to (1) explore the existing connections (research precedents) between architecture and neuroscience underscoring dimensions of aesthetics, perception, and cognition; (2) address the impact(s) on applied research; (3) highlight areas of deficiencies for future research endeavors; and (4) suggest a tentative conceptual framework for possible attendees' feedback.

Voices from Our Brain: Sensory Design for a Non-Visual Experience

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One key fact of environment-behavior research based design is that it takes deliberate efforts to deviate from the 'mainstream' approaches of design to focus on people's experiences in places and physical, social, cultural, and psychological aspects related to such experiences. Environmental design research (EDR) has taken a strong lead on connecting multiple disciplines together to understand human experiences in depth and to facilitate creating the most inclusive environments. Despite such efforts, EDR scholarship still can do even more towards equitable design. EDR can widen the horizon for inclusivity and equity by reshaping universal design concepts and principles. When considering inclusivity, current

universal design codes are notably limited. A glaring gap exists in guidelines for visually-impaired users: they only describe the incorporation of Braille signage (in select areas) and sound alarms for egress, thus leaving out many other spatial considerations critical to a truly inclusive user experience. While safety is an essential component in design, creating a wholesome, intuitive — and more importantly — an equitable experience for all users should be central to universal design. This EDRA Shorts presentation will illustrate how an empirical study analyzed a range of spatial experiences of visually-impaired people. It focuses on the importance of not only navigational spatial requirements of such users but also on the importance of simultaneous uses of multiple senses. It emphasizes why design must soon redirect its focus on multi-sensory design processes. In doing so, the presentation will briefly summarize what neuroscientific evidence reveals about the role of human senses in spatial experiences and how such knowledge can be used towards a philosophy that readily adopts equity through sensory design.

An Architectural Studio Designing at the Intersection of Culture, Nature and Technology for the Benefit of an At-Risk Community

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The studio explored possibilities of inventing meaningful architectural formal/tectonic languages specific to the products of a local urban musical culture reaching back two generations, resonant of the origin of the natural material required in the design proposals, and designed in context with the local urban vernacular architecture, in service of a local population of persons at risk.

The urban neighborhood was SoHo in New York, with its historic cast iron legacy. The musical culture was that promulgated through the venue The Kitchen,

having as its muse John Cage, and musicians who followed him as diverse as Phillip Glass, Steve Reich, Arthur Russell, Laurie Anderson, Deborah Harry, David Byrne, John Lurie. The client body providing the program was HousingWorks, a health care and housing provider to the local population afflicted by the dual problems of homelessness and HIV. HousingWorks operates clinics and a popular music performance venue to raise money for their health and housing mission. The new construction technology — modern mass timber systems — made of softwood forests, anchored the urban investigation materially in nature.

Students analyzed a personally selected musical composition from a musician and parsed their interpretation of the music in time with a syntax of points, lines, planes, volumes, into invented two and three dimensional languages. The syntax is conducive to the formal assemblage possibilities of modern mass timber. Students then analyzed multi-scalar aspects of softwood tree species harvested to manufacture mass-timber components. Groups drew site analyses of the ordering systems of cast iron buildings.

Buildings for Housing Works were proposed in timber employing orders and geometries discovered. Over three semesters of work it was apparent that a rich and diverse locally-specific design language had emerged, knitting together understandings across generations of musicians and a neighborhood community healing itself from the ravages of the AIDS crisis.

Using Wearable Cameras as Teaching Tools

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Wearable technologies have considerable potential as data collection tools though they have been marginally investigated in educational settings and not at all in design studios. With increasing class sizes and the need for faculty efficiencies, pedagogical methods that

improve educational quality must be found, especially when students work both independently and still require significant one-on-one instruction. This project sought to understand the potential effect of wearable technology on design studio pedagogical techniques.

The learning preferences of today's traditional college student includes collaboration and, in the day of the "selfie," this technology was imagined as a natural extension of their habits. The primary investigator used her own studio course for this study; a research assistant managed all equipment and data collection to protect student interests. The students were randomly selected to wear the cameras on days when a variety of activities were planned (model construction, desk reviews, work days, etc.) and they wore the cameras for the full four hour studio. The cameras used for data collection are unobtrusive, hands-free, automatic and clip to clothing. The cameras record six images per minute and provide the user's unique perspective.

Wearable technologies provided a method to record activities between faculty and student, between students, and in a variety of educational settings. Time on task, decision making, and interactions between students and faculty was documented though the cameras and the associated data are not without challenges. Because the cameras were used in dynamic settings, image quality was inconsistent. Despite the almost continual use of phones for selfies and groupies, students were reluctant to participate. This presentation will prepare participants for the use of wearable technologies in learning settings with best practices identified. Video, images, and audio will provide specific examples.

Two Case Studies on Implementing the Parametric Design Method in Landscape Architecture

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The capability of automating and customizing tasks has made coding one of the most critical core skills of the 21st Century, and has proven to be an effective approach for engaging critical thinking and problem solving (Jonassen, 1996). In the architectural field, coding known as parametric design is well integrated into both modern design as well as into research on architecture and urbanism (Schumacher, 2009). Previous case studies (Ivanka et al., 2009) have found integrating parametric design into architectural studios stimulates an increase in ideas, provides technological flexibility, and encourages a higher level of technological engagement for designers. Grasshopper, a visual programming language on the Rhino program platform, has the capability to create generative forms without tech substantial skills or knowledge of computer scripting. Therefore, Grasshopper makes parametric design easily accessible to a wide range of users.

Landscape architecture design works with phenomena that include interrelationships between culture, society, and ecology. Much like those found in the architectural field, these concepts require a high level of critical thinking and problem-solving. However, the parametric design approach is rarely integrated within education and practices in landscape architecture, and few studies have examined the effects of applying computer programming tools like Grasshopper within the industry. This study presents two exploratory case studies that implement the use of Grasshopper. The main data collection methods include observations and questionnaires. The first case study consists of the application of these technologies within the context of a landscape architecture graduate studio course at Clemson University, and the second is at the data collection and analysis phases of a research project.

All participants have no previous experience on parametric design. The result of this study may provide an in-depth understanding on the future implementation of the parametric approach, and an expanded understanding of design and analysis in landscape architecture.

HEALTH & PLACE

Aging in Place in America – User’s Needs and Related Perceptions

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As the elderly population in the United States increases, the nation’s housing needs are expected to be significantly impacted. Because disability rates increase as a population ages, a growing need for inclusive homes is anticipated. Unfortunately, a perception exists amongst those designing and promoting homes that consumers do not like to envision themselves as aging and therefore reject the presence of accessible features in the homes they build or remodel. The scope of this research was to investigate feelings of the population regarding amenities specific to showers. A quantitative approach was used to survey a random sample of people living in six regions of the United States. Participants were provided photographs of a variety of showers with differing levels of accessibility. The respondents were then queried using a six point Likert-type scale regarding their feelings about the comfort, safety, and attractiveness of the photographed spaces.

Visualizing Positive and Negative Affordances in the Home Environments from the View of Infants Using Mobile Augmented Reality

Miho Nishizaki, mnishiza@tmu.ac.jp (Tokyo Metropolitan University)

Accidental injuries among young children in their home are one of the major health problems throughout the world. Accidents in the home are the leading causes of injuries and even deaths in children under five years old. Several studies indicated that those accidental injuries among children in their home were preventable. In order to prevent accidents and decrease the risk of injury in the home, collecting data on accidents and conducting analysis are necessary. This study presents a prototype Augmented Reality (AR) application aimed at visualizing infants' affordances in their natural settings for prevention of accidents and promoting development. We focus on affordances, which are possibilities for behavior that depend on the fit between action capabilities and action-relevant properties of the environment. Environmental affordances include both positive and negative aspects. To visualize how infants perceive and act in their everyday environment, we conducted longitudinal observations of 15 infants from 4 to 12 months of age at their homes in Japan and Portugal. The observations revealed that there were more than 300 kinds of everyday objects which infants directly encountered in home. Based on the observations, we developed a mobile prototype AR application for iPhone and iPad. All AR contents were converted to line drawings based on the actual recording video data, to protect personal information. We also conducted user interviews of the prototype with engineers, researchers, and parents. The results showed that the prototype would be viable for widespread everyday use.

Physical Activity in Latinas' Daily Routines: The Role of Cultural and Gender Identity and Neighborhood Characteristics

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This research is an attempt to understand Latinas' experiences in relation to physical activity. Research shows that Latinas engage in leisure time physical activity substantially less than non-Latino white women (29.2% compared to 47.8%). Research focusing on Latinas and physical activity also shows that cultural elements might explain the difference. The emphasis on family in Latino culture has been reported as a potential point of intervention to improve physical activity among Latinas.

The purpose of this study is to explore Latinas' gender identities, cultural identities, and daily routines in relation to physical activity and neighborhood characteristics.

Ten Latinas who have children younger than five were interviewed. In-depth interviews included questions about their gender and cultural identities. Time diaries were used to record their daily routines with reference to neighborhood characteristics. They were also asked to assess their neighborhood's characteristics in relation to physical activity with an audit tool.

The results suggest that gender and cultural identities of Latinas shape their daily routines, which effect their level of physical activity. A pattern of family-centered outdoor activities, which can accommodate moderate to vigorous physical activity, has been noted. Neighborhood characteristics were mentioned positively by all respondents in their descriptions of outdoors activities.

Since approximations of requirements for physical activity are based on data from caucasian men, this research might help understand how cultural variations can be addressed in physical activity recommendations in relation to neighborhood characteristics.

HEALTH CARE ENVIRONMENT

Health Care Facility Intelligibility under Growth Conditions

Mahshad Kazem Zadeh, mahshad.kazem-zadeh@ttu.edu (Texas Tech University); Erick Carrasco, erick.m.carrasco@ttu.edu (Texas Tech University); Julie Zook, M.Arch; Ph.D., julie.zook@ttu.edu (Texas Tech University)

Health care facilities undergo expansions over time. One of the big challenges for hospital managers is that adding new buildings to the existing ones can affect overall legibility. Spatial legibility refers to the capacity of a setting to be organized and understood as a coherent and usable pattern of space. Lack of legibility in health care facilities is problematic because it can increase anxiety for already-stressed patients and visitors, result in lost time for staff who supply directions to patients and visitors, and pose threats to patient safety when illegibility complicates intra-hospital patient transfers.

The present study aims to identify principles for legibility in health care facility growth based on the analysis of eight cases, four of which appear to preserve or enhance legibility and four of which appear to increase problems with legibility. Each of eight floorplans is analyzed using space syntax analysis measures that provide estimates of intelligibility based on visual and accessibility relationships within each plan before and after expansion. Additionally, the design of corridor systems is discussed in terms of the extant literature on environmental cognition, wayfinding, and navigation.

HISTORIC PRESERVATION

Sustainable Conservation Practices for Heritage Buildings

Ayooluwa Coker, coker.ayo@gmail.com (University of Manitoba)

Heritage conservation in past years has been influenced by aesthetics, culture, and history. This practice needs to be reconsidered in terms of users. For this reason, there is urgent need for sustainable conservation practices that put into consideration unlimited accessibility for both present and future generation with all types of disabilities, making heritage buildings more inclusive in their design. These days, heritage conservation seem to take more priority than universal design and accessibility. In other words, aesthetics, culture, and history speak louder than certain human needs, and have developed a voice of place in our present world.

There are no limits to what can be achieved through universal design if only we as designers set our priorities towards the understanding of the issues involved within heritage building conservation and accessibility. There is a need to consider accessibility issues around heritage building sites, the advantageous use of building elements for sustainable accessibility and the need to understanding accessibility design and how it works. Such practices would require better tactile system for the blind, improved emergency systems for the deaf, the dumb, people with mental disabilities, crippled and many more to be considered when retrofitting these buildings. Once these has been put in place, equity in the experience of culture and history becomes pronounced because only poor design disable people.

Alterations in the Religious Landscape of Edisto Island Before and After the American Civil War

Christina Pokwatka, pokwatka@gmail.com (Roger Williams University)

Edisto Island, located about one hour south of Charleston, South Carolina, has a strong connection to its religious landscape. While traveling throughout the island, many churches representing various religious denominations line the two-lane roads of the small community. This report examines churches in the built environment of Edisto Island before and after the American Civil War. The churches studied were Edisto Island Presbyterian Church, Edisto Island Baptist Church; Trinity Episcopal Church, Edisto Presbyterian Church, USA; and Zion Reformed Episcopal Church. Their design, membership demographics, and histories were all taken into account while writing this report. When comparing the antebellum versus postbellum landscape, it is apparent that the war proved to be a pivotal changing point for the religious landscape of Edisto Island. While this report illustrates that shifts in the religious landscape of Edisto Island began before the Civil War, it proves that it was not until after the war had ended that the biggest changes were seen with the establishment of new congregations.

PARTICIPATION

Participatory Interior Design for Informal Science Learning in Small Community Science Centers

Barbara Lynne Young, young256@purdue.edu (Purdue University)

Falk and Dierking (1992) developed a model for understanding museum visitor experiences which merges a visitor's personal context, social context, and

physical environment. The model asserts that a visitor's experience is shaped by the integration of all three contexts and relies on gathering user perceptions. In order to assist a small community science center in the process of expanding its reach, a series of community participatory events were held to gain feedback about their current perceptions and what kinds of changes might be desired. These community driven ideas helped shape the future direction of the space and educational programming, and serve to create a specific vision to drive fundraising efforts. The events served as strategic development for the organization, assessed the effectiveness of the current building, and generated design criteria for construction or renovations.

It is said that participation "reduces the feeling of anonymity and communicates to the user a greater degree of concern on the part of the management" of the organization (Sanoff, 2000). The mission of Imagination Station is to provide hands-on experiences which strengthen scientific literacy in children and families in the Greater Lafayette community. Drawing from literature on learning in informal settings, the National Research Council describes informal learning as "learner-motivated, guided by learner interests, voluntary, personal, ongoing, contextually relevant, collaborative, nonlinear, and open ended" (2009). As such, it is critical that community voices are incorporated into decision making processes to ensure the success of the organization.

A series of community events were held at Imagination Station to build awareness of current conditions, discuss the organization mission, reach, future development and assess the building, and collaboratively plan adjacencies for exhibit areas, special programming, and ancillary spaces. The outcome of these events shaped a creative interior design project as well as fostered collaboration with other disciplines.

Planning with People in Smart Cities: Exploring the Use of Smart City Technologies in Efforts to Engage the Public in Planning Efforts in the Proctor Creek Watershed

Emma French, emfrench@gatech.edu (School of City and Regional Planning, Georgia Institute of Technology)

Last year the American Planning Association published a report in which they argued that planners play a critical role in the advancement of “smart cities.” One of the benefits of smart cities, the report claims, is that they create more avenues for community participation in policy and planning processes. Participatory planning theory emphasizes the need to involve the citizens in a way that empowers them to influence the design of their communities. Unlike the more conventional rational planning model, which positions the planner as a technocratic expert, participatory planning takes a non-hierarchical, bottom-up approach in which the planner’s job is to bring together all possible stakeholders and facilitate consensus-building. This study explores the role of smart city technologies (SCTs) in efforts to involve the public in planning efforts in Atlanta, Georgia. Planners and stakeholders involved in three specific planning efforts in the Proctor Creek Watershed are interviewed in order to determine the types of SCTs currently being used by planners to support public participation, the perceived impacts of the use of these technologies on public participation, and the barriers related to technology-aided participation in these planning efforts. This study hopes to expand our current understanding of the role of SCTs in efforts to involve the public in urban planning and policy making.

Democratization of Design Processes and Outcomes

Melissa Marsh, melissa@plastarc.com (PLASTARC, Inc.)

The social research and design zeitgeist is defined by an unprecedented opportunity to democratize spatial design processes and outcomes. Historically, commentary and feedback about the built environment has been a professionalized discipline reserved for architects and architectural critics — as well as the patrons with the capital to pay for the architect. However now with social media platforms like Twitter, Instagram, and Foursquare, any user of a space can comment on the way that a space feels, looks, and performs. Social data is a powerful source of participatory feedback information about physical space that should be leveraged during the design process. This presentation will touch upon the ways that the prevalence of social data is currently transforming the building industry as well as examples of work environments that have leveraged participatory feedback throughout the design process.

In addition to the democratization of the design process, trends in the consumer marketplace and the emergence of an on-demand economy have created new occupant expectations about how physical spaces should perform. People desire spaces that are customizable — flexible enough to be shaped around diverse and constantly evolving individual needs and goals. This EDRA Short will highlight evidence and examples of shifting occupant demands, as well as the ways that exemplary architectural projects are accommodating them.

Getting Community Engagement Right: Older and Younger Scholars Co-Creating With Community

Melissa Marsh, melissa@plastarc.com (PLASTARC, Inc.)

Architects have a critical role to play as enablers of successful community engagement. As the late Ernest Boyer states in *Building Community: A New Future for Architecture Education*, "The academy must become a more vigorous partner in the search for answers to our most pressing social, civic, economic and moral problems, and must reaffirm its historic commitment to the scholarship of engagement."

Applying Boyer's model to higher education in design, architectural research and creative endeavors must seek to frame community engagement, collaborative design techniques, and co-creative processes of design and building as a critical part of the design process. Working with students as scholars, we seek to produce places and experiences that meet and exceed the needs and future potential of end users.

Additionally, we wish to make a difference in the lives of the community that typically are left unaddressed and underserved by architects, the demographic that is often referred to as "the other 90%". The belief that architecture must serve the citizens, communities, and neighborhoods in which it resides must permeate our entire design culture. Being an architect is to better the health and well-being of all, and architecture must reach forgotten programs such as homeless shelters, supportive housing and addiction recovery centers, and nature-based learning environments for underserved children.

This broader conceptualization of scholarship is accompanied by stronger integration of faculty research and creative endeavors and student learning into the life of communities outside the walls of academia. Therefore, the question for this EDRA Short

posed is, how do you bring research and creative endeavors to the classroom and how do research and creative endeavors inform teaching? The answer is through community engaged scholarship working with students as scholars and engaging an authenticity of real needs, real problems, real clients, and real users in co-creation with the community!

PLACES OF WORK & HIGHER EDUCATION

Which Came First, the Maker or the Makerspace?

Wendy Hynes, whynes@purdue.edu (Purdue University)

As the maker movement continues to transform our relationship with craft, makerspaces are increasingly popping up in libraries, garages, museums, warehouses, and every place in between. The increasing interest in making has not been lost on educational entities who embrace the benefits of a project-based curriculum and want to promote interdisciplinary collaboration and entrepreneurial innovation. However, contrary to the formal design process used to build many educational facilities, grassroots makerspaces are most often created when those with like-minded interests come together and adapt the building around them to fit their needs. Excitement to outfit educational makerspaces with cutting-edge technology in hopes of emulating the grassroots maker movement has preceded research on the effectiveness of such setups potentially leaving new state of the art facilities grossly underused.

The comparative case study presented here documents two contrasting approaches towards environmental design and the maker community. Specific avenues of inquiry included focus groups, interviews, and observations. Two makerspaces catering to the same academic campus in a large Midwestern city were investigated. The first space is very grassroots,

formed by self-proclaimed hackers. The space is old, a “hodgepodge of donations” as one user described it, yet when they were prompted with “what does your ideal makerspace look like?” the overwhelming response of all users was “just like this.” The other makerspace was built by a corporation in hopes of attracting innovative thinkers to generate intellectual property. Designed by a professional design team it provides a shiny, clean and sterile atmosphere, spacious circulation, tool organization, and state of the art equipment.

The research presented explores the impact of the user driven vs. designer driven making environments, while investigating cultural differences in the making communities themselves along with their perceptions of a supportive makerspace. Lastly, the study identifies equipment and activities most valued by these communities.

Physical Contexts for Informal Science Learning: Interior Design for Community Science Centers

Barbara Lynne Young, young256@purdue.edu (Purdue University); Hyun Joo Kwon, hyunjookwon@purdue.edu (Purdue University)

Falk and Dierking (1992) developed a model for understanding museum visitor experiences which merges a visitor’s personal context with the social context and physical context of the museum. Given this understanding of integrated experience, literature pertaining to informal science learning, interactive exhibit design, museum wayfinding, and museum visitor experience and identity was reviewed. Many articles reference the importance of the physical environment and even impress ideal practices but few center on the role of the physical environment. Six factors for the design of interior space were identified as having relevance to informal science learning based on the review of literature. These are (1) organization

and wayfinding, (2) visibility, (3) accessibility, (4) affordances, (5) light levels, and (6) acoustics.

An observation instrument was developed to track users as they navigated a community science center dedicated to providing experiences in informal science learning. Exhibit layout and groupings were noted on plans. The movement and location of visitor groups entering the space were recorded on a floor plan in two two-minute intervals which corresponded to a time-based chart. The chart is designed to measure or comment on the six identified categories. For instance, navigational questions directed toward staff are recorded under “wayfinding” and light levels measured in each space are recorded with the help of light meters. Informal interviews with visitors and staff provide data about acoustics and accessibility features including ease of access, sight-lines, and effective use of signs. Using a space syntax approach, the building was analyzed using depthmapX software developed by The Space Syntax Laboratory at University College London. Isovist data was compared with space utilization through observations. Navigational routes will be compared with isovist data to see if there is a correlation of visitors to highly visible areas.

POE/PROGRAMMING/BUILDING PROCESS & ALLIANCE

Evaluation of Place Through the Lens of User-generated Content

Babak Soleimani, babaks@Umich.edu (University of Michigan)

In recent years, Web 2.0 has provided a platform for active participation of people in generating data on the world wide web. User-generated content refers to the data created and modified by users of such platforms. People use these applications and websites to share their thoughts, actions, experiences, and feelings. On the other hand, location-based services

allow users to assign a location to their online postings via GPS technologies. Through their online activities, users generate a large amount of geo-located text and multimedia material every day. In this paper, I examine the potential of harnessing user-generated data from location-based services for extracting place evaluations. Using reviews from Tripadvisor, a travel review website, I am addressing the challenges of analyzing unstructured review content. Also, a framework for analyzing place-related textual data from user-generated platforms is introduced. Quantitative content analysis of reviews shows that user-generated data provides a multifaceted insight into the users' evaluations of the place. A comparison of reviews between different building types reveals the significant evaluation factors.

RESIDENTIAL ENVIRONMENTS

The Impact of New Urbanism on Designing and Planning Efforts to Rebuild Detroit

Joongsub Kim, jkim@ltu.edu (Lawrence Technological University)

New Urbanism has been regarded as one of the most influential movements in the recent history of architecture and urban planning in the United States. New Urbanist principles have been applied to various design and planning efforts in suburbs and cities across the country, regardless of whether those efforts are made by New Urbanists or not. This paper investigates the impact of New Urbanism on the practice of designing and planning in the city of Detroit. It reviews the applications and implications of New Urbanism principles at various scales. The paper examines several key planning or development projects undertaken in Detroit and determines whether there are any notable similarities and differences between those projects and New Urbanist principles, and also what impact New Urbanism has had on

those projects. The paper concludes that New Urbanist design principles play an important role in shaping key policies, strategies, and approaches to rebuilding Detroit, and asserts that New Urbanist principles can improve living conditions and opportunities for disadvantaged inner-city residents. The paper also concludes that New Urbanist design principles are supportive of broader policies aimed at revitalizing Detroit in general. However, the paper cautions that New Urbanism should be regarded as one strategy among many and that it should be integrated into the broader range of social, cultural, economic, and community development programs initiated by various entities in the city, as they attempt to enhance the quality of life in underserved neighborhoods in Detroit. The paper also suggests that thoughtful integration of New Urbanist approaches and those of other contemporary urbanisms such as Landscape Urbanism, Tactical Urbanism, and Insurgent Urbanism can promote collaboration among officials, designers, planners, community development organizations, and residents, and help them reach consensus on sensible and socially responsible approaches to revitalizing distressed neighborhoods and rebuilding Detroit.

SUSTAINABLE PLANNING, DESIGN, & BEHAVIOR

Taxonomy of Recycle Architecture

Thelma Flores, Ph.D., tlflores_phd@yahoo.com.sg (EDRA, IDEC, SECAC, Euroacademia)

Recycle architecture can be interpreted in manifold design taxonomies. Interdisciplinary fields of research provided systematic methods of identification and classification such as trans-material components altered by innovation and upcycle processes, re-use of waste for architectural purposes, and completely rehabilitated architecture. Through a critical examination of various materials, the practice of taxonomy in recycle architecture reveals four design facets:

1. The creation of new meanings in the context of placemaking manifest the taxonomy of form vs. function.
2. The value of sustainability embraces the taxonomy of appearance vs. reality.
3. The experimentation of materials driven by social responsibility, the intentions are classified into the taxonomy of motivation and invention.
4. The adaptation of practice in holistic awareness, the taxonomy of purpose and pleasure significantly converges.

The research pursues this inquiry in recycle architecture within the context of design for sustainability (DfS) method, evidence-based practices of architectural repurposing, and the directions in non-traditional design efforts. As we qualify and quantify various global practices on building construction and standards, we track the taxonomy of form and function within the premise of renovation and renewal of spatial purposes. Oftentimes, we find old train stations converted into learning environments, previous churches turned into entertainment destinations, or previous commercial buildings transcending volumetric restrictions converted into residential lofts among many others.

The identification of earth-friendly materials and processes, and the application of sustainable strategies indicate the wiser strategy to create the taxonomy of lifecycle extension and cutting-edge forms. Products are developed from waste materials and processed for a second functional use, and recombinant or hybrid materials are combined to define new performance qualities. Designers constantly seek and apply ecological strategies towards material innovation, and critically evaluate the value of retro-fitting past architectures and effectively introducing preservation, rehabilitation, restoration, and reconstruction within the taxonomy of adaptive re-use.

Communicating Sustainability Initiatives Virtually: Taking Stock of the Real Estate Management Service Industry

Erin Hopkins, erinz1@vt.edu (Virginia Tech)

Implementation of green building practices throughout the real estate industry illustrates social responsibility for the planet as well as a marketing opportunity to showcase this responsibility. In the multifamily property management industry, firms are beginning to take hold of sustainability by introducing green real estate management services. This is encouraging news as the majority of a building lifecycle is during the management phase.

The aim of this paper is to uncover the extent to which firms in the multifamily property management industry in the United States are promoting green property management services on their websites. This is accomplished by studying the presence of sustainability initiatives on the websites of the 50 largest multifamily property management companies in the United States. Using sustainability as the criteria, content analysis is employed to uncover certain words and themes. Measurement and coding transform content variables into numbers. This research technique helps to uncover trends in this large amount of material which may otherwise go unnoticed. Quantitative techniques such as charts and tables are also created to further display the results. This research is important as green real estate management services can significantly help to combat the negative environmental impacts of the built environment. Following are the four learning objectives: (1) Recognize the extent to which firms in the multifamily property management industry in the United States are promoting green property management services on their websites, (2) Understand the types of green property management services being offered by these firms, (3) Distinguish the gaps in green real estate management services which may

exist, and (4) Realize the potential environmental and economic effects of green real estate management services.

Maximizing Solar Energy in Hydroponics

Schuyler Duffy, swd43@cornell.edu (Cornell University)

The primary goal of this research is the optimization of solar efficiency of a hydroponic system housed in a greenhouse. Northeastern farmers face myriad challenges resulting from the environmental pressures presented by climate change. Rising temperatures significantly threaten dairy production as well as economic staple crops with winter chilling requirements (apples, blueberries, grapes, cranberries, maple syrup), decreased snowpack increases risk of seasonal drought, and a warmer climate introduces new invasive species (Frumhoff et al., 2007). There is a demonstrated need for innovations that are profitable for farmers, and that increase farmers' adaptation to a changing climate while reducing their environmental impact. Depending on the availability of solar resource at a given latitude, supplemental lighting can be the primary energetic cost of greenhouse production (Albright et al., 2008). Dynamically affecting greenhouse environmental parameters can be accomplished at high temporal and spatial resolution through computational control mechanisms. When coupled with carbon dioxide enrichment, rotation of hydroponic equipment between levels and digital lighting control are two strategies that may increase yield while minimizing energy consumption. Pulse width modulation (PWM) is a lighting control program that dynamically modulates the power supplied to lights in response to ambient light sensors. PWM increases temporal resolution of the control program, allowing for granular power adjustments occurring within microseconds. Furthermore, rotation of an entire crop across the topmost layer may serve to redistribute solar radiation across an entire crop. While previous research has focused on binary

(on/off) controls and the economic impacts of supplemental lighting decisions (Heuvelink, et al., 1989), the proposed project emphasizes the dynamic balancing of ambient conditions against artificial inputs towards increasing efficiency of greenhouse crop production.

Urban Migration as a Water Issue – Case Studies from India

Sukruti Gupta, sg2247@cornell.edu (Cornell University)

Internal displacement and forced migration due to climate factors is a pressing issue that remains undocumented. Communities inhabiting fringe areas of urban India suffer from social and environmental setbacks that can be attributed to lack of effective water management. Being in close proximity to urban areas makes these regions susceptible to degraded watersheds, high pressure on agricultural land, contamination by waste streams, and contamination by toxic chemicals. Prolonged drought causes crop failure, leading to poverty, indebtedness, and subsequent migration to the city in search of unskilled work. The internally displaced are thus, in essence, climate refugees.

City planners struggle to improve living conditions in slums inhabited by migrant populations. Cities and their peripheral rural areas require planning and management as interdependent entities, and need a remedy that addresses this migration at its source.

This non-experimental research focuses on two case studies from India that exemplify remedial actions to internal displacement through effective water management. The subject of the first case study is the MVF Foundation works in fringe areas of Hyderabad, Telangana, to improve the watershed and provides skill-building workshops. They upgrade catchment areas, employ villagers, educate women, and help to grow crops. The second case study looks at farmer communities in Dewas, Madhya Pradesh

collectively dig retention ponds in fields to enhance agricultural yields in the drought-prone region. It has encouraged return of migratory birds and local wildlife in the area. Based on interviews, field visits, and literature review, it can be concluded that in both cases, the water table has risen, family incomes have increased, and the trend towards urban migration has been reversed. Both establishments have helped communities become stronger and resilient by their participatory approach.

These case studies give voice to grass-root movements which demonstrate that empowering communities through participation is a more effective solution than laying heavy infrastructure to ensure water resource availability.

Struggle and Success Stories: Voices from Chicago's Vacant Lot Owners

Douglas Williams, Ph.D., dwillia8@illinois.edu
(University of Illinois)

For over half a century, neighborhoods at the urban core of U.S. cities have contended with an array of destabilizing conditions: from the economic blight of 'community burn' (Fulilove, 2004) to gentrification in concentrated areas of poverty, within the majority of communities of people who are 'truly disadvantaged' (Wilson, 1990, 2010). While well intended, municipal policies and practices can burden members of marginalized communities with myopic strategies for improving complex inimical vacancy conditions in neighborhoods. With recent purchases of hundreds of vacant lots for one dollar, Chicago's Large Lot Program is showing promise for residential property owners to reestablish their once stable dwelling grounds. What voice does social capital have when downtown policy meets local citizens on Chicago's South and West Sides?

This ethnographic case study is a part of a longitudinal evaluation of Chicago's Large Lot Program, sharing

local people's place-keeping stories in the inner-city. A mostly African-American population, the twelve participants included residents from the first three program selected neighborhoods: Englewood, Garfield Park, and Woodlawn, where thousands of vacant lots are continuing to be purchased, starting in 2014 through 2017. Our preliminary findings from part two, of a three-part evaluation includes data from in-depth interviews that illustrate social values were fostered from the program's inception, implementation, and future envisioning among the residents. Challenges of neighborhoods sharing an awareness, trusting in the validity of the program, and accessing information and resources among new owners are being overcome through their collective agency.

These findings support social capital theory: when socioeconomic crisis persist, communities come together (Putnam, 2000), using open space to foster a more sustainable and healthy community (Hou, Johnson, and Lawson, 2009) and social-cultural relationships of claiming open space (Allen, 2001; Finney, 2014; Glave, 2010) are values expressed by new owners.

EDRA48 MADISON

Posters

Display Poster Presentations

(alphabetical by presenter's last name)

Study on Environmental Maintenance of the Waterside in Forest with Using Thinned Wood

Presenter: Shigeyuki Ajisaka, ajisaka@mac.com
 Authors/Institutions: S. Ajisaka (Osaka Prefecture University College of Technology); T. Ikeda (Setsunan University)

Restorative Environments Utilized Among College Students

Presenter: Yara Altaher, yaltaher@uci.edu
 Authors/Institutions: Y. Altaher (UC Irvine, Program in Public Health); M. G. Runnerstrom (UC Irvine, Program in Public Health)

Gentrification: The New Urban Renewal – Cherry, Charlotte, NC

Presenter: Nadia M. Anderson, nander35@uncc.edu
 Author/Institution: N. M. Anderson (University of North Carolina at Charlotte)

From Crystal Cathedral to Christ Cathedral: A Transforming Place of Worship

Presenter: Sarah Marie Angne Alfaro, angnesm@miamioh.edu
 Author/Institution: S. M. Angne Alfaro (University of Missouri-Columbia)

Microclimatic Design of Outdoor Places for Seniors

Presenter: Eric Karsten Bardenhagen, bardenhagen@tamu.edu
 Authors/Institutions: E. K. Bardenhagen (Texas A&M University); R. D. Brown (Texas A&M University)

Social Dimensions of Residential Water Reuse

Presenter: Laura Bell, lmb377@cornell.edu
 Author/Institution: L. Bell (Cornell University)

Teaching and Learning the City: Assessing Outcomes of a Design Service-Learning Course in Detroit

Presenter: Claudia Bernasconi, bernascl@udmercy.edu
 Authors/Institutions: C. Bernasconi (University of Detroit Mercy); N. Fricke (University of Detroit Mercy); R. Pisano (University of Detroit Mercy)

Urban Forests and Social Justice: Issues and Considerations in the Production and Distribution of a Green Amenity

Presenter: Nicholas Boyd, nboyd7@gatech.edu
 Author/Institution: N. Boyd (Georgia Institute of Technology)

Residents' Expectations for New Rail Stops: Optimistic Neighborhood Perceptions Relate to Subsequent Transit Ridership

Presenter: Barbara Brown, barbara.brown@fcs.utah.edu
 Authors/Institutions: D. Tharp (University of Utah); B. Brown (University of Utah); W. Jensen (University of Utah); C. Werner (University of Utah)

Can Virtual Reality be Used to Mimic the Health Benefits of Nature and Systematically Environmental Psychological Theory?

Presenter: Matthew Browning, browning@illinois.edu
 Authors/Institutions: M. Browning (University of Illinois at Urbana-Champaign); K. Mimnaugh (University of Illinois at Urbana-Champaign)

Empathic Design for Precision Agriculture: A Graphic Designer Stepping Into and Out of the Farmer's Life

Presenter: Phil Choo, phil.choo@okstate.edu
 Author/Institution: P. Choo (Oklahoma State University)

Identification of Outdoor Attributes as Influential Factors of Therapeutic Environments on Quality of Life of Residents in Assisted Living Facilities

Presenter: Eva Clauss, claussed@appstate.edu
Authors/Institutions: C. Sullivan (Appalachian State University); H. Ghamari (Appalachian State University); E. Clauss (Appalachian State University);

Linking the Urban Fabric: Street Edge as a Barrier or Bonding Element

Presenter: Shailee Ketan Dave, skdave2@illinois.edu
Author/Institution: S. K. Dave (University of Illinois)

Building Information Modeling: Challenges in Implementation for Academia and Industry

Presenter: Haithem A. El-Hammali, haelhammali@vcu.edu
Authors/Institutions: H. A. El-Hammali (Ph.D.); C. M. Amor (VCU-Q); D. Pati (Texas Tech University)

A Case Study Exploring the Daily Learning Environment Experiences of a High School Student with Attention-Deficit/Hyperactivity Disorder (ADHD)

Presenter: Julie Emminger, jcemminger@ufl.edu
Author/Institution: J. Emminger (University of Florida)

Narratives of Light Enveloping the Urban Night: A Critical Examination of Safety in Public Spaces

Presenter: Thelma Lazo Flores, tlflores_phd@yahoo.com.sg
Authors/Institutions: T. L. Flores, Ph.D. (Design+Research Atelier); S. Bhattacharjee (University of Oklahoma)

University Art Museum Case Study: Framing Ecomuseological and Inclusive Approaches

Presenter: Thelma Lazo Flores, tlflores_phd@yahoo.com.sg
Authors/Institutions: T. L. Flores, Ph.D. (EDRA, IDEC, SECAC, Euroacademia); D. Potts (Ball State University)

Layers of Engagement in Five Modest Modern Church Ministries

Presenter: Kimberley Furlong, kfurlong@uark.edu
Author/Institution: K. Furlong (Fay Jones School of Architecture + Design, University of Arkansas)

Engagement and the Impact of Contrasting Active Learning Environments in Higher Education

Presenter: Wendy Hynes, whynes@purdue.edu
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Natural Remedy: A Presentation of Current Healing Garden Projects and Trends

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Brazilian Older Adults Perceptions on Bed Design Features

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Considering the Quality and Quantity of Lighting in an Older Adult Congregate Facility Chapel in Northeastern Thailand: An In Situ Study

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Place Attachment through Nature Bonding in a Senior Cohousing Community

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The Effect of Birdsong on Preschool Executive Functioning: A Pilot Study

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Hospital Expansions and Intelligibility: A Space Syntax Analysis

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Stroke Patients' Mobility and the Architecture of Rehabilitation Clinics

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A Study on the Improvement of Passageway Signage in Hospital Extensions

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Uncovering Differences in Environmental Hazards from Objective and Subjective Assessment Approaches

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Human Spirituality and the Convergence of Architectural Theory and Empirical Science Understanding

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Impact on the Feeling of Being Covered in Outdoor Spaces with Eaves in the City

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Space Image Preference of General Hospital in Korea

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Investigating Multi-sensory Environments on Behavior for People with Dementia: A Systematic Literature Review

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Examining Relationships Between Visual Complexity and Cognitive Performance in Interiors Using Virtual Reality

Presenter: Laura Healey Malinin, Laura.Malinin@colostate.edu
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Development of the Nature Language: Documenting Nature Interaction in a Healthcare Setting

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At the Intersection of Community and Collaboration: Empowering South Side Peoria Residents through Evidence-Based and Participatory Design Methods

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A Study on the Arrangement Type and Characteristics of Community Facilities of Newtown Apartments in Korea

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Evaluation of Design Improvements in Assisted-Living Spaces for Dementia Patients

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Art Therapy and Syrian Refugee Children: Using a Design Thinking Framework

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Transition and Values of Urban Agricultural Spaces in Metropolitan Areas of Japan

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Role of the Support Center for the Elderly in Temporary Housing Units of Ofunato City, Japan: A Study on the Prevention of Social Isolation of the Elderly in Temporary Housing Units, Part 3

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A Case Study of Remodeling Design Characteristics of Exhibition Space as Idle Industrial Facilities

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Patient Room Design Preference of Hospitalized Adolescent Patients in Korea

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Case Study About "Quality of Rest" in Expressway Rest Areas: Comparison between Denmark Rest Areas and Japanese Rest Areas

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Avoiding Planning For Atlantis: What Does Resiliency Planning Mean to Small Historic Coastal Neighborhoods?

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Analysis on the Physical Housing Environments of the Potential Naturally Occurring Retirement Communities of Condominium Apartment House in Seoul city of S. Korea

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Attitudes and Preferences for Residential Stormwater BMPs: A Comparative Case Study

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Expressions of Puerto Rican Cultural Heritage in Plaza Betances (Southend Boston, MA)

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Sustainable Preservation and Habitability of Traditional Villages in China-Lingquan Village, Shaanxi Province

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Information Effects Upon Perceptions of Wind Energy Projects: Associations Between Attitudes and Changes in Aesthetic Quality Versus Acceptability Ratings in a Laboratory Test Using Video-Acoustic Simulations

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Post-Occupancy Evaluation and Redesign Recommendations for Standing Desks in Elementary Classrooms

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Survey on Distracted Walking in Railway Stations: What Makes People Use Their Mobile Devices in Hazardous Situations?

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Motivations for Contribution to OpenStreetMap

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Identifying Psychological Effects as Presented in Introductory Interior Design College Texts

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Conceptualization of Legibility in the Urban Space

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De-Stressing through the Placement of Healing Gardens: Voices of African American Women Living in Low-Income Housing

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Voices of Millennials in the Garden

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Green Community Renovation in Suburban Residential Rokku Town

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How to Teach Lighting Design for More Inclusive and Responsive Environments: Elumtools and 3D Printing as Potential Teaching Aids

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How Responsiveness of Interior Design Students Toward Feedback Impacts Their Creativity

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Therapeutic Spaces for Correctional Officers

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Pop-Up Retailing: Defined and Designed

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Building Engineering Identity: Supporting Social Construction of Knowledge and Collaboration in the Interior Environment

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