Urban Instrumentality: Pedagogy in an Era of Ecological Design Challenges

JOSE L.S. GAMEZ
University of North Carolina Charlotte

In 2014, NASA projected higher than previously predicted irreversible climate changes that will result in sea levels rising 1 to 2 meters worldwide by 2100. Along the way, according to the London School of Economics’ Urban Age Project, the global population will become 75% urbanized by 2050; much of this urbanization is occurring in developing countries, which will account for approximately 4 out of every 5 city dwellers—often in coastal locations. This combination of rapid urbanization and environmental change requires a reinterpretation of development, architecture, and ecology in which an integration of urban components is essential if the management of the environment and resources is to result in resilient and livable cities. With this in mind, this paper reflects upon two three-year collaborations between our Master of Urban Design program and universities in parts of the world that are undergoing the brunt of this global urbanization: China and Brazil. Through a discussion of a series of summer workshops, fundamental challenges to the integration of ecological strategies into design pedagogies are illustrated through the experiences of students.

INTRODUCTION
In 2014, NASA projected higher than previously predicted irreversible climate changes that will result in sea levels rising 1 to 2 meters worldwide by 2100.1 Along the way, according to the London School of Economics’ Urban Age Project, the global population will become 75% urbanized by 2050; much of this urbanization is occurring in developing countries, which will account for approximately 4 out of every 5 city dwellers—often in coastal locations.2 These transformations influenced the planning and implementation of our Master of Urban Design Program in the School of Architecture (SoA) at UNC Charlotte in 2008 and, later, its required international experience—the summer capstone studio abroad, which enabled our program to located itself in places in which urbanization and sustainable development questions could be examined first hand.

This combination of rapid urbanization and environmental change requires a reinterpretation of development, architecture, and ecology in which an integration of urban components is essential if the management of the environment and resources is to result in resilient and livable cities. This translated into our pedagogical approach that attempts to bring questions of urbanization and climate change into the curriculum. In a sense, impending global crises demand a global pedagogy. With this in mind, this paper reflects upon two collaborations between our Master of Urban Design program and universities in parts of the world that are undergoing the brunt of this global urbanization: China and Brazil.3 We began our quest to explore global sustainable development strategies 2013 in China with a 3-year research cycle; this was followed by a 3-year partnership in Brazil that began in 2015.4 In many ways, these programs were designed to provide opportunities for our students to engage a range of topics not often studied in western design programs precisely because the most rapidly transforming urban contexts facing the profession often lie outside the United States. Framed by themes of verticality and compactness, complexity and density, and sustainable development, the program focused upon emerging patterns of Chinese centralized planning and urbanization as our first set of case studies. These studies were followed by a series set in Brazil where urbanization is often poorly controlled and often informally driven.

Our international urban studies were also a part of a larger initiative in the SoA aimed at integrating global studies and to help our students understand their roles in an increasingly urbanized and resource challenged environment.5 I mention this because it sets the stage for the challenges that we faced as students participated in intensive workshops with partnering institutions in which city-building skills and sustainable development strategies were tested and, thus, expanded our academic and professional discourses. Our view, like that of many others, was (and still is) that our curriculum must integrate environmental and sustainable development strategies into a holistic approach to education.6 What follows, is a discussion of our summer workshops that illustrate fundamental challenges that emerged as we attempted to integrate ecological issues into design pedagogies. Using cities like Suzhou and Rio de Janeiro as laboratories, students explored the design, ecological, and socio-cultural dimensions of building resilient cities and their experiences in attempting to address the relationships between density, social vitality and cultural perceptions suggest a that a combinatorial approach to urban forms may provide a way forward.

CHASING CHINA (2012-15) & READING RIO (2015-17)
Our program in China focused upon emerging patterns in urbanization by addressing questions of scale, density, centralized planning, and sustainable development through exposure to the complexity of cities like Suzhou and through work with students from Suzhou University of Science and Technology, Xiamen University, and Wuhan University.7 By the time of our
first visit, the country had undergone intensive urbanization for nearly two decades and it seemed as if the city building theories that we were discussing in Charlotte were being built in China. Our overall program was framed through the lens of “Vertical Urbanism” and addressed visions of sustainable development in the form of highly compact urban places. Urbanism in China at the time was marked by high density, high rise living and included complex commercial, recreational and social programming uncommon in the west. Verticality, in this sense, provided a paradigm that shaped new urban centers, distinguished them from traditional downtowns, and blurred distinctions between the local and the global while maintaining Chinese imprints. What our students witnessed what the political economist Bob Jessop has called “glurbanization”—global processes that impact cities differently while simultaneously creating many similar attributes rooted in competitive place-based dynamics. This high density urbanization had clear consequences; for example, hazardous air quality plagues many mega-cities in China and contributes to acid rain in many villages on their outskirts.

As a coastal metropolis, Rio is characterized by natural water systems that, due to poorly managed development, contribute to flooding and mudslides. Yet, growth continues in ecologically sensitive areas and this situation has been exacerbated by recent mega-event driven development coupled with inter-dependent informal urbanization. In Zona Oeste and Barra da Tijuca, or the western zone of Rio de Janeiro, these came in the form of the 2016 Summer Olympics, the 2014 World Cup, and the 2007 Pan American Games. These large scale planned initiatives drew workers who built adjacent favelas alongside the construction sites of these global events. This contrast between the highly formalized alongside an equally impactful local informalization is related to the glurbanization we saw in China and it framed student questions about the fragile ecology of Zona Oeste. These forces made Zona Oeste a compelling area for design investigation tied to climate change and, in particular, sea level rise precisely due to its coastal location. Working alongside students from the Pontifical Catholic University at Rio de Janeiro’s Urbanism Laboratory within the Graduate Program of Architecture of the Architecture and Urbanism Department, our students explored the existing fabrics of the city (built and ecological) in order to identify unique characteristics to drive design integration later.

THE WORKSHOPS
Each MUD international program was framed as a 3-year research cycle and within a specific region of investigation. This format enabled an evolving yet structured teaching environment and it also allowed faculty and students to investigate urban design questions in an iterative fashion. The continuity of exploration also allowed our faculty to sustain collaborations with local faculty and contacts over time. For our MUD program, this has led to studio publications that feature the work of the students and scholarly monographs that feature the work of faculty from collaborating institutions.

Design teams for the workshops were composed of students and faculty from each participating university and each also engaged from local professionals from a range of industries and organizations. Typically, teams would consist of 4 or 5 students—2 or 3 from Charlotte and 2 or more from our Chinese or Brazilian hosts. In China, the teams were made up of architecture and urban design students. In Brazil, the disciplines were more diverse; in order to enrich the experience of the UNC Charlotte students, we cross-listed our coursework with Latin American Studies. Additionally, our collaborating partners at PUC-Rio opened the workshops to their sustainable urbanism program broadly so the mix of local students ranged from architecture to urbanism to environmental sciences and biology. Given the topic of sea level rise that helped frame the program in Rio, these provided both drive and design students proved to be particularly valuable. While the results of each three year cycle produced substantial design and pedagogical research, each individual workshop contributed significant insights. The outcomes typically came in the form of four or five group projects presented at a final review with jurors from local universities, client/developers, and municipal organizations as well as local design firms.

CULTURE, CLIMATE & PEDAGOGICAL CHALLENGES
In China and Brazil, development itself is a significant ecological challenge and its sheer scale often overwhelmed our students. Scale and verticality in Chinese cities became traits that our students attempted to address while more complex ecological challenges remained symbolically important but typically poorly resolved. In Brazil, the landscape (both cultural and geographic) challenged the abilities of students to see beyond impending climatic changes. In many cases, our students could not comprehend why development had been allowed to continue in areas that will be severely impacted by sea level rise. In both cases, our pedagogical challenges were tied to differing cultural understandings of density, scale, development pressures, or of the role of the public sector in protecting environmentally sensitive areas.

Given China’s centrally controlled planning, our students assumed a level of accountability that was not manifested most places. Air quality alone was an indicator that growth and sustainability were not equally balanced in the country’s plans to urbanize. For example, our collaborations with the College of Architecture and Planning at Suzhou University of Science & Technology focused on a former industrial site in the Suzhou Industrial Park (SIP), which had been redeveloped in 1994 as a joint venture between the Chinese and the Singaporean governments. The SIP served as a high-profile demonstration project featuring Singapore’s economic development models translated to mainland China. Envisioned as
Suzhou’s business center complementing its historic downtown, SIP developed into a city of over 700,000 residents. Nevertheless, after many years of rapid growth, the widely lauded model faced challenges as the city underwent economic and social transformations in which high-end service industries rose to importance. By the time of our visits, SIP was a post-industrial landscape in which poorly constructed buildings showed signs of deterioration (despite having been constructed between 2002 and 2004) and the streetscape was in poor condition, canals were overgrown and littered with waste, and the local air and water quality were poor. In addition, the site’s land use planning did not match the proposed vision of a high density, mixed use and transit-oriented development.

In Rio, the country’s inability to control growth gave rise to different issues and environmental consequences. Unfortunately, Barra da Tijuca itself is not well suited to development. Due to a high-water table, the soft coastal basin soils, and sensitive ecological systems, it is easy to understand why the larger area is a poor candidate for development. The ground is so unstable, for example, that contractors must raise the level of sites by 2 meters; soils are imported and compacted to prevent future sinking. Then, each site sits vacant for two years so soils settle before construction can occur. Additionally, Barra da Tijuca lies within the larger Jacarepaquá Basin, a “double barrier system” watershed bounded by the Atlantic Ocean, lagoons, marshes, and mountains. This kind of geographical area is particularly susceptible to sea level rise given its geological formation and coastal location. Interestingly, the shadow of Brazilian Modernism can still be felt here. By the 1960s, Zona Oeste became a focus for national interests and, with the introduction of the Lagoa-Barra Highway, the area became a more accessible from Rio’s famous Zona Sul (where Copacabana can be found). Zona Oeste was imagined as a new regional center for the city; economic development and a new regional metropolitan center in Barra da Tijuca were so important that the country’s most prominent architect and planner, Lucio Costa, was commissioned to create a vision for the area in 1969—one that would result in the world’s most beautiful “cidade oceanica,” or ocean-side city. However, development and governmental pressures allowed growth to all but erase Costa’s framework. Development has resulted in residential towers serving as vertical cul de sacs complete with active security personnel, gates, and fences.

DENSITY AND DISBELIEF

In both Brazil and China, our students struggled to address environmental challenges while also coming to terms with the seemingly unprecedented density that they encountered. Given the rate of Suzhou’s expansion, our design teams sought to address high-density urbanism through ecological repair and verticality. They realized quickly that perceptions of density, complexity, mixes of uses, and of spatial organizations (such as commercial or semi-public uses below and above the ground plane) were conditioned by local cultures and practices. Mixed use, for example, in much of the United States is often not nearly as mixed as what we experienced in Chinese metropolitan centers. Similarly, the idea that a new development may house 100,000 people or more surprised our students but is common practice China. This is fostered by a national “urban administrative hierarchy” that often concentrates development in specific cities that includes combinations of infrastructure, intensive mixed use developments, housing for hundreds of thousands, and commercial, cultural and entertainment facilities. In Rio, our design teams contended with a set of environmental conditions that raised questions rooted in disbelief (“why would anyone build there?”). These questions stemmed from the premise underpinning our Brazilian partnership; we set a planning horizon of the year 2100 by which time sea levels are expected to rise by 1 to 2 meters worldwide. Climate change has already contributed to the growing frequency of torrential rainfall in Latin America and, as cities like Rio have matured, impermeable surfaces have also increased and water management issues became more challenging. The intersection of human-made and natural systems were common to both Suzhou and Rio but they were manifested in different ways. One aspect of growth that our students experienced was an “expanded urban scale” that has been “stretched... and upgraded as an integral part of the strategy of place-marketing and place-promotion in order to capture and fix global mobile capital.” This combination of place-based development and expanded urban scale presented significant challenges for our students in China:

Student 1 (2012 in China): The most challenging aspect was to reconcile our desire to apply western design principles to China’s auto-oriented mega-block development. Another challenge was conceptualizing how vertical mixed use buildings would accommodate the current and predicted population density in China. Ultimately, we decided to hold firm and to design smaller more pedestrian-friendly blocks. We learned quickly to think at much larger densities than we were used to designing for in the west.

Student 2 (2014 in China): Scale was a bit overwhelming and we were shown two polemics in China: the mega block and the small winding, organic town structure. So, even though we have an arsenak if Western design techniques, I think that all went out the window when we were introduced to the site.

In Rio, scale remained a challenge but students also fell prey to a fear of the impending sea level rise:
Interestingly, in their efforts to reconcile the contrasts
returned to basic skills that they had learned before travel -
ments in question. Some ideas, such as flooded
ours in China and Brazil, are crucial resources that can anchor
strategies so often seen in academia was quickly disappeared;
New Urbanism no longer sat apart from Landscape Urbanism,
for example. Students borrowed strategies from one camp
to augment those in another: pedestrian scaled increments
were layered over mega-blocks and infused with ecological
forms; compact development models were infused by verti-
cal high-rise mixed-use; ecological systems stitched together
buildings, landform and public spaces in three-dimensional
and multi-programmed frameworks.

THOUGHTS ON THE NEED FOR A COMBINED URBAN ETHOS
Upon reflection on 6 years of internationally programming,
it is clear that unique opportunities exist to prepare students
for success in a global profession. These opportunities high-
light global issues and their impacts upon local conditions; in
this sense, the need to redefine the roles of infrastructure,
design and ecology, for example, can be placed in stark relief
through first hand explorations. Given the complexity of
the issues that face cities in the 21st century, workshops such as
ours in China and Brazil, are crucial resources that can anchor
international networks of experts, place global research part-
nerships in positions to influence local actions, and support
international outreach projects.

As is often the case with university/community collabora-
tions, clients and city representatives in both Suzhou and
Rio were impressed with the insights offered by students
and with the applicability of many of their ideas to the devel-
opment projects in question. Some ideas, such as flooded
landscapes or large scale water-related infrastructure invest-
ments, may have seemed beyond the realm of financial or
political feasibility, but the rich urban analyses embodied in
the projects was often convincing and thought-provoking
particularly with regard to a wider urban context. By engaging
our student teams as “outsiders” in the conversation, voices
could be raised that underscored important issues facing not
only the long-term development of each specific site but also
issues shaping the urban futures of each host city. This kind
of global engagement with sustainable development issues
represents a necessary role for urban designers in particu-
lar: that they must become managers who can translate and
direct (if not deploy) the cultural, scientific, and often techni-
cal expertise of other disciplines in the service of cities far
removed from but none the less interconnected with their
home institutions.19

When faced with these challenges, students quickly
returned to basic skills that they had learned before travel-
and attempted to stretch them to fit new circumstances.
Interestingly, in their efforts to reconcile the contrasts
between their design experiences and the contexts that China
and Brazil presented, students explored design frameworks
rooted in combinatory and ecological urbanisms.18 Given
the need to act, the ideological divide between city building
strategies so often seen in academia was quickly disappeared;
New Urbanism no longer sat apart from Landscape Urbanism,
for example. Students borrowed strategies from one camp
to augment those in another: pedestrian scaled increments
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The composition and format of each team both reflected this
approach while also challenging us (faculty and students) to
think beyond the “rules of thumb” that we have come to rely
upon in the U.S. The interconnection between students from
several parts of the world working collaboratively quickly
helped highlight cultural dimensions and limitations of design
strategies rooted in the differing educational and lived experi-
ences of each student.20 For example, our program enrolls
both domestic and international students who, in the case
of PUC-Rio for example, meet with not only Brazilian but also
French, African, and other Latin American students. In this
sense, each team represented a set of global cultures who
often negotiated working definitions of basic design terms
such as density and scale. Additionally, our workshops fos-
tered collaborative investigation and design exploration,
which often differs from many architectural design studio for-
mats. For many students involved, this format necessitated
a departure from a design culture that privileges individual
competition in favor of sharing of expertise, local and global
knowledges, and it opened interesting opportunities for
interpretation and speculation. Diversity, in this setting, was
an asset that enabled cooperation as well as cultural and pro-
fessional growth: “in this context, it is precisely how morally
appropriate knowledge is constituted and the relations of
power at stake in doing so” become integral to the overall
learning environment.21

The interactions between our students and those in China
and Brazil led to an expanded sense of the compact city,
one that builds upon differing cultural perceptions of scale,
complexity, density, and sustainability. For both our Brazilian
and Charlotte-based students, for example, this points to
a need to examine what Viniece Jennings, Jessica Yun and
Lincoln Larson have described as “values and valuation,” or
cultural perceptions tied to professional “duties and obliga-
tions within the human-nature relationship.”22 While their
work focuses upon environmental ethics with respect to
health and wellness, the basic argument that Jennings et al
make is generalizable to urban design education. In other
words, urban design education can reinforce both cultural
awareness as well as environmental ethics as we “continuously confront decisions about what we value and what others value, how we are required to act, and how we feel about ourselves when we do.”

Despite the challenges that our students faced while abroad, our basic pedagogical interest in complex and sustainable forms of development remain important aspects of our program. In fact, the global contexts that we study shed light upon how our practices in the U.S. and urban circumstances found elsewhere can interact. Urban design, like its allied design disciplines, requires ecological sensitivity and critical cultural thinking. In the case of our work, we find that our cultural perceptions, as well as those of our students, have shaped our notions of good urban design in productive but limited ways. While this does not negate their value, it certainly points out that our values are not universal. This is not earth-shattering news but it suggests the need for urban designers to deploy their imaginations as critical cultural practice.

ENDNOTES


3. In China, students were led by Dr. Zhongjie Lin who introduced them to a context in which contemporary urban design theories were being tested in real time and at enormous scales. In Brazil, Dr. José Gámez led students through sites that were being urbanized often through informal forces that followed major event-driven infrastructural investments.

4. One result of these research partnerships has been the publication of academic and student work; an edited monograph is under way documenting our work in Rio while the work from China has already been published [see: Zhongjie Lin and José L.S. Gámez, editors, 2018 Vertical Urbanism: Designing Compact Cities in China (London: Routledge)].


7. For example, students were asked to read Thom Mayne’s book Combinatory Urbanism: The Complex Behavior of Collective Form (Los Angeles: Stray Dog Cafe, 2011). Students were also encouraged to examine the work of leading “landscape urbanists” such as Stan Allen and James Corner as well as innovative interdisciplinary design teams such as Dusan C. Drake’s DLANDstudio that integrate (among other things) ecological strategies into their work.

8. For example, our urban design program regularly enrolls students from China, the Middle East, and India who come to the U.S. to study abroad; our program then takes these international students to yet another country in which, in the case of PUC-Rio for example, they meet with not only Brazilian but also French, African, and other Latin American students. In this sense, each team represented a set of global cultures who often negotiated working definitions of basic design terms such as density and scale.


16. Interestingly, each student team represented multiple countries and cultures: our urban design program regularly enrolls students from China, the Middle East, and India who come to the U.S. to study abroad; our program then takes these international students to yet another country in which, in the case of PUC-Rio for example, they meet with not only Brazilian but also French, African, and other Latin American students. In this sense, each team represented a set of global cultures who often negotiated working definitions of basic design terms such as density and scale.


