Sustainable Futures: Architecture and Urbanism in the Global South
Kampala, Uganda, 27 – 30 June 2012

Hands, Eyes and Feet: Approaches to an Architectural Education

Garret Gantner

Head of Department, Architecture: Kigali Institute of Science and Technology, Kigali, Rwanda
MASS Design Group, Kigali, Rwanda

ABSTRACT: As the situations and opportunities facing architects in the developing world are specific to it's context, so too must an architectural education be delivered to shape that context. This paper examines methods of teaching architecture in the developing world, with specific cases from the Department of Architecture at the Kigali Institute of Science and Technology (KIST), in Rwanda. Core pedagogical methods are discussed, including a participatory design studio, a re-structuring of architectural history classes, and the role of appropriateness and technology in a design-based education.

Conference Theme: Education for Sustainability.
Keywords: Architectural education, teaching methodologies, architecture in the developing world,

INTRODUCTION: DEVELOPING AN EDUCATIONAL FRAMEWORK

At the core of an architectural education is the development of an ability to intelligently develop solutions to specific design problems in specific settings. Too often, educators hold a tacit assumption that an approach to such and education which works in one scenario can be applied in another and achieve the same results. As more and more of the world's design and building work moves to the developing world - a trend currently in process and likely to continue - it may be time to re-evaluate the way architects are educated in these contexts, and determine the real needs for their participation in the future of the architectural profession.

Generally, there is an overall dearth of publication about African architecture on the world stage, despite the fact that it's population is larger than any other continent aside from Asia. Partially this must be due to the low numbers of architects working in Africa, of course, but we must also pose the question - which is not intended to be answered here - as to whether the product of the education being delivered is partially responsible. Teaching practices need not, and should not, be raw emulations of practices elsewhere as these may not be relevant in the developing world; indeed educators should not be teaching mimetic practices at all. A university (not only in a program of architecture, but generally) ought to be about developing the ability to approach a problem intelligently more than developing an ability to reproduce what they see. For an architect (or student) in East Africa to see a work of architecture in a British magazine and apply it directly in Nairobi, for example, does not necessarily make any more sense than an architect in the UK seeing a mud brick and thatch roofed house in rural Uganda and building it in London. Quite obviously, the conditions which produced the two are different, yielding differing responses, and at it's essence, the pragmatic side of sustainability is, at least to some extent, about dealing with environmental conditions (be it ecological, social, economic, or otherwise) as they are and as they might be in years to come.

No institution could possibly have an answer for what *is* appropriate - nor should it, as appropriateness varies widely according to context and may evolve as rapidly as technology. Institutions can only develop the mindset of future professionals, teaching them how they might approach the problem and what the creative processes are that might lead them to an appropriate solution.

In the Architecture program at the Kigali Institute of Science and Technology (KIST), in Rwanda, which was founded only three and a half years ago and has yet to graduate any students, the curriculum has been developed not only to inculcate students with the fundamentals and critical processes of design, which is common to all architecture programs, but to deliver it in a way that may eliminate the competitive disadvantage that institutions such as KIST have: limited resources, miniscule budgets, and the absence of the plethora of historical buildings of architectural significance that might be found in cities elsewhere (including older cities in Sub-Saharan Africa). The methods, described here, are part of an ongoing evolution of the way architecture is taught - relevant not only to Kigali but to much of the developing world - to move the discipline of architecture towards it's potential future in the developing world, without compromising the ability to be involved in a global discourse. This is unlikely to be achieved by transplanting teaching methods from places in which the conditions we find in places like Rwanda do not exist. What is fundamentally at question here is to develop a way of teaching that is most relevant for the future of the architectural practice in the developing world. Some of the core issues to grapple with behind that are: dealing with what at first glance would appear to be a resource gap when compared

with better-funded universities, relating global architecture to the specific context of the developing world, and applying solutions appropriate to the task at hand.

CLOSING THE RESOURCE GAP: A PEDAGOGICAL METHOD

It can be universally accepted, I believe, that one important outcome of a university education is students' ability to research and, through critical engagement, gain a first-hand understanding of the subject matter being studied.

But the manner in which this research is conducted in the developing world cannot simply be replicated from an architectural pedagogy based in Europe or North America, to name a few examples. It will be decades (or longer) before institutions of higher learning in the developing world can rival the academic resources of similar schools in statistically wealthier nations. As a case in point, the KIST library currently has only 0.1% the number of books as my own alma mater in the United States; KIST has only about 200 books classified under the subject heading 'architecture' and zero subscriptions to architectural journals (of which there are very few published in and about Africa, anyway). Even if it is assumed that these sort of statistics will improve drastically within a generation or two, forming an architectural pedagogy which mirrors that of better endowed schools and relies heavily on access to such resources would be short-changing the students. Indeed, in the face of this scarcity of resources, it would be foolhardy to guide students towards what might be considered 'typical' academic research activities, relying on texts, journals, and literary sources. Nor would it makes sense to turn to digital fabrication equipment, high-tech machinery, or laboratories; such things do exist at many institutions, but they will not compare to the facilities found at universities in Europe, North America, Australia, or even much of South America and Asia, any time soon. Attempting to emulate the curricula and educational focuses of better-endowed schools in completely different contexts risks relegating schools to second-tier status.

Instead, the architectural curriculum must adapt, taking advantage of what the students *do* have, namely: hands, eyes, and feet. An architectural pedagogy based on student action and exploration (the *doing*), site or human-based research (*observing*), and application as advocacy (*going*) does not require the same abundance of resources as does one based on technology or more typical academic scholarship. A design pedagogy which looks to what are considered the world's leading institutions has it's limitations: the world's leading institutions have the world's best resources, and teach students to deal with architectural problems of a very different nature than is relevant in much of the developing world. Trying to train 'starchitects' to design 'icon' buildings with ungodly construction budgets risks teaching that extraordinary architecture is only meant for certain commissions in which the right client, the right budget, and the right program all converge, and where the possibilities are seemingly limitless. Many of the world's most recognized architects might make a living based on these sorts of projects, but the developing world by and large faces a different kind of architectural challenge. Here, the market for 'icon' buildings is not so lucrative: it is unlikely that students graduating from programs such as KIST's and seeking to practice architecture in East Africa would receive such a commission more than once in a lifetime, if at all. However, far from a limitation, this situation produces the developing world's biggest opportunity for architecture: it forces it to create solutions to very real issues in the places where the majority of the world's architectural work is likely to be done for quite some time.

Rapid urbanization has been underway in much of the developing world for decades, and is likely to continue for the foreseeable future. It is estimated that in the developing world, about 870 million people - almost half of the population of the entire urban population of the developing world - lives in what UN Habitat classifies as a slum. In Sub-Saharan Africa, the figure is over 70% of the urban population, and globally the number reaches close to a billion people (UN Habitat 2003). Counteracting this otherwise bleak statistic is the fact that economic growth in the developing world has surpassed growth in more developed countries - in some cases quite substantially. As much of the world economy plunged into recession in 2008 and 2009 (economic growth in high income countries became negative in 2009), the world's least developed countries maintained a steady 5.2% growth rate (UN 2012). Rwanda's economy grew by 11.2% in 2008, 7.5% in 2010, and continues at a similar pace today (UN Data 2012).

As educators in the field of architecture, there are two important points to draw from these statistics. One is that promising development indicators are likely to transform the built environment in the developing world's urban areas, and that it would be smart for architects to take a role in it. The other is that in order for architects to provide their services to the widest audience (and, by extension, ensure that the profession becomes increasingly relevant), the interface between the formal and informal cities, where the majority of the population lives, is an essential issue to be explored.

To date, much of the study and research of this urban condition is still housed at universities in the old colonial powers, rather than in the cities being studied. In many schools, the architectural projects issued in design studios are often generated by application of aesthetic preferences alone, in which formal geometries dominate the discussions. While this is, of course, one part of an architectural education, it is (unintentionally, I believe) something of a superficial application, drawing inspiration from architectural magazines and schools in countries with the financing and capacity to seemingly erase technological limitations. It ignores the extraordinarily important point that architecture is a social service as well as an artistic one; it forgets that architects are not just curators of architectural objects, but designers of solutions to very real problems of habitation and urban conditions; it misses the core principle that great architecture is developed from generative processes which may have myriad influences. Thus, it risks reducing architecture to a game of show-and-tell.

It is important for educators to step back and evaluate where the of the next generation of architects' biggest contribution may be. Given the situation in Sub-Saharan Africa, and the likelihood that it's cities will be the recipients of much architectural work in years to come, a thorough understanding of the uniqueness of this situation and an ability to analyze, discuss, and teach within it becomes essential.

How is that the most widely distributed study of urban Africa is Rem Koolhaas's work on Lagos, in which Koolhaas (backed by ample funding, for sure), of his own admission, first comes to understand parts of the city only after renting the President's helicopter and viewing it from the air? While there may be some substantive evaluation of Lagos in this work, on the whole it takes urban conditions generated from the desperate attempt to eke out a living and glorifies it as fascinating urban phenomenon (Packer 2006). Fascinating it may be, but without any attempt to address the issues that pertain to it, without any strategy for designing within it, and without any proposal for designing to support the fascinating conditions but eliminating the depravity, the architect's role in this urban phenomenon is reduced to a casual observer, not too unlike a passing tourist. Considering that the majority of Africa's urban population lives in places like these, and economic growth is likely to increase land values and transform their spatial conditions, our institutions must strive to be more than casual observers.

Students at KIST don't need a helicopter to study their city. In some respects, they don't even need a classroom (especially considering the fact that their classrooms are currently housed in a former military building with rather uninspiring spaces, poor daylighting, and poor ventilation). The city is right in front of them, and as many of them are residents within neighborhoods not unlike the ones that Koolhaas marvels at, they are already well-equipped to understand them. Of neighborhoods organized according to traditional settlement patterns, students at KIST have an innate understanding; they have lived with it all their lives. Of neighborhoods organized through legislation and city planning, students can actively seek public documents to investigate them. They simply need to be made aware that such conditions, to other parts of the world, might be considered abnormal, and be informed of alternatives and strategies. Herein lies the role of the educators.

Kigali is not the mega-city that Lagos is, and is decidedly more orderly, but development pressures on informal neighborhoods are at least equally as strong (if not greater), and this interaction between formal and informal is precisely one of roles that architects will need to take on for the foreseeable future.

Since it would only take about a month or two for a student to peruse every architecture book in the KIST library, other means of research need to be employed. To this end, several of the architectural design studios at KIST are designed to facilitate interaction of students with the city outside of the classroom. Starting from the second year, students are given very public projects, often with unfamiliar programs, in unfamiliar locations, or with very specific goals to be met. Design appropriateness is emphasized as much as raw architectural power; this appropriateness, whether ecological, cultural, economical, programmatic or otherwise, produces the core tenets of sustainability. The students become more than just artistic designers: they become participants in an active process of researching and, in the end, *doing*, not merely being lectured about doing, or reading about doing. The city, and in particular, it's residents, become a library with a million sources.

Paramount in this pedagogy at KIST is the final design studio before the students enter the thesis year. Comprising a scope of a neighborhood masterplan and individual building resolution, the studio uses a participatory design approach to address the issues in an informal settlement near Kigali's city center. This year, the inaugural running of the class at KIST, the project dealt with densification and urban growth at the interface between the formal and informal city. Students left the studio to become researchers in the field, documenting the physical issues to be addressed, interviewing residents, obtaining information from the city government, and holding a series of meetings with members of the community to share and discuss their research and proposals.

In this way, a design studio which emphasizes participatory design in an informal settlement is not only a pedagogical attempt to pay attention to the idea of participation in urban design (the merits of that can be debated, though might be more necessary in Kigali - a city where the master planning is only presented publicly at poorly publicized meetings). It also correlates the need to develop relevant research techniques with one of the biggest design needs facing the developing world: the ability for architects, urban designers, planners, politicians and citizens to work intelligently within informal areas and work with and in response to those who, though they often comprise a majority or at least plurality of cities' population, are *most* affected by urban development and growing population density but are traditionally *least* represented during design, planning, and policy-making. It places students at the center of the development and debate over the city's master plan, and the way it deals with urban growth, densification, and the future of a plurality of Kigali's population. It allows students to gain an understanding of the city, and of organic growth patterns prevalent throughout history in all cities. It gives students an opportunity to design in an environment which is as close as possible to the actual running of an architectural job: a project that is self-organized, dealing with multiple stakeholders and clients, working with (or around) the city's regulations, and delivering a solution to a very palpable urban problem. It integrates the urban design, urban planning, and research methodologies lecture classes into the design studio. And, of course, as does any design studio, it develops architectural space-making skills.

CONVEYING RELEVANCE: GLOBAL ARCHITECTURE IN A LOCAL ENCLAVE

After several years of delivering architectural history classes, the staff in the Department of Architecture at KIST noticed that the students' mastery of the subject was lacking, and performance in the history classes was mediocre. When we asked the students what the issue was, we were informed that many of them did not

understand why the subject matter was relevant to them: there was nothing they could relate to Rwanda. Of course, due largely to a scarcity of widely-circulated sources to the contrary, architectural history is still taught from a quasi-colonial perspective, introducing students mostly to the history of Western architecture. Even if one teaches a more globally-oriented history of architecture (which is a goal in and of itself), it still will not contain more than a few slides on East Africa, and probably none on Rwanda. The students were unable to take what they saw in history classes and use it to understand their own city, or their own history.

This poses an important question: how does one make history relevant in a place where one does not witness his/her own history simply by being out on the streets, or where one does not have access to wealth of literature about it? A century ago, Kigali was only a small fortress with a few hundred residents, it only became the capital in 1962, and only reached 100,000 residents in the mid 1970s. The oldest buildings in Kigali date only to the 1930s, and they are, to put it mildly, less than ideal examples to demonstrate global architectural history. At the risk of over-generalizing, it is also true that many, even most of the major movements in architectural history originated outside of Sub-Saharan Africa, so what is observable in many cities such as Kigali is a second-hand knock-off, at best. In short, there are few living examples of architectural history (and sometimes, as in Rwanda, an effort to erase the physical relics of colonialism).

For a student of architecture in Rome, or Paris, or London, or Kyoto, or Cairo, or any number of major cities worldwide, the purpose of studying architectural history is evident: one is surrounded by it. The tracings of time, and the buildings' and spaces' roles in the city, are palpable; the cities are living museums of building. In most Sub-Saharan African cities, no such direct relationship between history and present exists, at least not in the building stock. Students, then, may be right to question the traditional teaching of history as a timeline of important structures built in some other time, some other place, by some other people, with little direct connection to, for example, the city of Kigali today. Further complicating the matter is the lack of exposure most students have had to the rest of the world before they enter the program. Most students at KIST have never left their home country (until the 3rd year travelling studio organized by the Department of Architecture). This may not seem like such a conundrum in many other places, in which there is a greater mix of ethnicities, cultures, and influence, but let's take a moment to put this in perspective. Rwanda is smaller in area than 45 of the 48 countries in Africa, smaller than 44 of the 50 US States, smaller even than half of the *provinces* in Kenya, and, having been one of the few African countries whose borders roughly followed pre-colonial boundaries, is without the diversity of language and culture that is found in most other African countries. To immerse students from such a limited background into a global architectural history course and expect them to immediately understand how it affects them may be misguided.

What was missing, it became evident, was an essential component of any aspect of education: the ability to relate the content to the students' own environment. Thus, at KIST, we have decided to restructure the way the same content is delivered, deviating from a more 'normal' course towards one tailored to the objective of the education. Rather than a straight chronology of important movements and examples of architectural objects, the history classes will (this has not yet been implemented, so is still something of an experiment) be re-organized to trace thematic influences which have led to, generated, or solicited a reaction creating major paradigm shifts in architecture. Thus, instead of only moving from the old to the new, the classes trace three major threads relevant to all points in history and explore how they have created the architecture being studied. The first of these looks at how advancements in technology have created new, previously unattainable forms of architecture. The second looks at the social and political influences on architecture, i.e. architecture as a proposition for, reaction to, or a critique of society. The third, more theoretical theme looks at evolving ideas of beauty throughout history, and how it has become the foundation of major movements.

All of these threads are still prevalent today, whether consciously or not. By emphasizing the influence rather than the object, the pedagogy is able to tackle two important points. First, and perhaps most importantly, it focuses the attention of the course content on the *why* and *how* more than the *what*. Teaching students *what* we feel they should know about architectural history is little more than the memorization of images, names, and dates. Since it places little emphasis on the situational causes or generation of architectural expression, it reduces the subject matter to isolated objects which, again, are from some other time, some other place, built by some other people. It implies that architecture is inhabitable sculpture and nothing more. By tracing generative themes, students are able not only to understand *why* certain historical movements came about, it also helps to generate thought about what current influences might be, thereby promoting the critical thinking behind their own design work. Second, it relates historical trends very directly to what they see going on around them today. If a gothic cathedral, for example, is studied merely as an object, it might be difficult for a student in Rwanda to understand it's relevance. However if it is seen as a major breakthrough in technology which then produced a new architectural form, this progression can be followed straight through to contemporary building in a country (Rwanda) which is rapidly adopting new technology. It allows students to see not only how technology has been *applied* (which is not so useful; blind application rarely produces great architecture), it allows them to see how it has *influenced* design thinking, thus encouraging them to explore what the next form of architecture in their own environment might be. Similarly, if Modernism is seen only as a minimalist aesthetic, it reduces the study of history to mere visual studies. But if it is studied as a social and political agenda to take the mechanization of society that was so destructive during the first World War and use it for more constructive results, it then encourages students to analyze their own situation and produce what is most necessary for them, in their time, their place, amongst their people. This sort of analysis is exactly the sort of architectural thinking and problem-solving today's institutions need to engender, and the most likely to produce a truly sustainable long-term result.

EMPHASIZING APPROPRIATENESS: TEACHING TECHNOLOGY AND DESIGN

In East Africa, and in Rwanda in particular, there seems to be an underlying fascination with technological advancement. Rwanda's own *Vision 2020* development plan outlines a path towards becoming a technology and finance-based economy - perhaps a smart objective for a country with fewer natural resources than it's neighbors and limited agricultural land but abundant human resources. This fixation on technology has crept into Kigali's contemporary architecture, with new construction featuring loads of expensive, imported materials and an entire aesthetic obsession justified only because it is deemed 'modern.'

Just two months ago, at a conference sponsored by the East Africa Institute of Architects working towards the harmonization of educational standards in architecture, a discussion of the evaluation criteria for an East Africa student design prize included speeches about how students were 'incorporating technology into their designs.' In the end, one of the criteria was left as a single, rather ambiguous word: "futurism." Apparently, even architects are dizzied with supposed the technological panacea.

For a design pedagogy devoted to critical thinking, creative processes, and sustainability, however, this raises some major challenges. To varying degrees, but generally universally, an over-emphasis of technology breeds a reliance (currently, at least) on imported materials, systems and technologies (with their decidedly *un*sustainable life-cycle properties including high shipping costs, long transport routes [and therefore fuel consumption], perhaps questionable labor practices in the country of origin, and often a lack of familiarity amongst local contractors in their construction or installation - requiring either external assistance or exorbitant costs). Yet somehow this is approach is still revered (perhaps a product of cultural desires to modernize and embrace anything and everything perceived as modern) over an education which investigates how we might design buildings, spaces, and urban conditions which spring from, and are made of, the place. This is not only a theoretical question of a 'sense of place,' as it is often described in architecture, but is an approach to sustainability which emphasizes ecological, social, and especially economic considerations. Rwanda has high import taxes, and as a mountainous, land-locked country, overland shipping is arduous, making construction material quite expensive relative to labor. Thus, in the process of building, vast sums of Rwandan money (often public money, as the central government is one of the largest commissioners of new construction) are funneled out of Rwanda, to suppliers abroad.

Furthermore, in a climate such as Rwanda, which can accurately be described as nearly perfect for human habitation, performative technologies (heating, air conditioning, high-performance material applications, etc) are largely unnecessary unless a building design is so flawed as to create the problem where it does not exist naturally. (In some cases, it may actually be beneficial for students to be mostly *un*familiar with technological solutions to problems that could be solved through design; it will make them less likely to use them unnecessarily and more likely to search for more sustainable design solutions). Much of the purpose of technological advancements in building, from a functional standpoint, allows us to compensate for our inability to design using natural systems. The goal of a design education, then, ought to focus on eliminating that inability in order to foster more sustainable design practices.

Thus, this fixation with technology needs to be looked at with a critical eye, as it can easily become a distraction for what a program of architecture is best left to teach: design fundamentals, creative processes, analytical skills and, more didactically, skills for avoiding unnecessary technologies, after having come to an informed conclusion as to what is or is not necessary. Technology, after all, will change with time, so teaching specific technologies will end up to be an education with a short life-span; strategies and fundamentals, however, will contribute to a lifetime of research, analysis and design. The embracing of technology may, of course, enhance design, but it is not a substitute for intelligence.

To address this at KIST, students are faced with design problems of all aspects: small projects in rural areas with inconsistent electrical supplies; projects with highly specific environmental criteria; pragmatic urban issues (such as the one described in "Closing the Resource Gap" above), among others. Technology lecture courses are, to the extent possible, integrated with design studios, so that the students may immediately apply what they learn in lecture to their own projects, thus again emphasizing the *doing* over the simple retention of information. Theory classes offer students the opportunity to participate in discussions not only of design, but also of current urban policies in development in Kigali, thereby teaching the ability for architects to become advocates of design. In the end, it is this combination of observation, implementation, and advocacy, which fuels the curriculum.

CONCLUSION: FORMING THE NEXT GENERATION OF DESIGNERS

It is easy for the delivery of an architectural education to become stagnant, stuck in a framework that may have produced successful graduates in years past but never re-calibrated for the issues facing the next generation of designers. In the developing world, especially, architects and educators need to take a good look at how the profession is being continually re-shaped, and how the role of it's professionals might be evolving. The educational methods described here are not intended to be permanent solutions; they, too, will need to be adapted and tweaked continuously in order to maintain relevance. But at their core is an underlying ability to address the design challenges specific to students in the developing world, and in particular, Rwanda, by

ensuring that each piece of their education is directly related to the current situation students find themselves in, and is carefully constructed to prepare them for the unique architectural opportunities outside their studios.

REFERENCES

Packer, George. (2006) The Megacity: Decoding the Chaos of Lagos*, New Yorker,* Nov. 13, 2006.

United Nations Human Settlements Programme. (2003) *The Challenge of Slums: Global Report on Human Settlements 2003.* United Nations Human Settlements Programme (UN Habitat): Nairobi, Kenya.

United Nations. (2012) *World Economic Situation and Prospects.* United Nations: New York, USA.

UN Data / GDP Growth (Annual %) (2012).

Retrieved from http://data.un.org/Data.aspx?d=WDI&f=Indicator_Code%3ANY.GDP.MKTP.KD.ZG#WD