I, Emily A Roush, hereby submit this original work as part of the requirements for the degree of Master of Architecture in Architecture (Master of).

It is entitled:
Avoiding Imposition through Methods of Making

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Avoiding Imposition through Methods of Making

A thesis submitted to the Graduate School of the University of Cincinnati for partial fulfillment of the degree

Master of Architecture

In the School of Architecture and Interior Design of the College of Design, Architecture, Art and Planning
May 20, 2011

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Bachelor of Science in Design, Arizona State University 2007

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Abstract

In the years since the disappearance of the master builder, architects and their design processes have become increasingly estranged from the physical act of building. This detachment from the tangible realization of design disallows architects an understanding of the implications of their design decisions: availability of materials, complexity of connections, and financial feasibility. Consequently, this separation creates a second rift between contemporary architects and humanitarian design projects, as the priorities of the design process, non-profit organizations, and the underserved poor rarely intersect nor are readily understood by these disparate constituents. Though the trend toward socially responsible building continues to gain momentum, architects are at risk of being excluded from the financial and social benefits of this market sector based on their detachment from the real consequences of design decisions and inability to offer cost effective and culturally relevant solutions.

This thesis proposes that evaluating and restructuring the design process to respond specifically to the needs of humanitarian projects in a globalized setting could reposition architects to be considered essential contributors to this growing field. More specifically, it is proposed that by beginning the design process with a study of local culture, particularly methods of making, the culture of dwelling, and community aspirations, the architect becomes equipped to produce designs that reestablish the link between design and physical realization, are culturally responsible and rich, and are suited to the needs of non-profit sponsors.

Based on research and a recently completed project management experience in rural Tanzania, this project will result in a proposed framework for a design process tailored to the needs of architects working with unfamiliar communities. Simultaneously, implementing, evaluating, and informing this framework, an Entrepreneurial Center will be designed for the village of Roche, Tanzania. Local skills, existing technologies, and cultural norms will be analyzed to develop a building that provides examples and inspiration for the advancement of quality of construction, and life in general (through proliferation into areas such as cooking and transportation), applying the expertise of design thinking to achieve results that are tangential to existing cultural trajectories, rather than imposing the architect’s own cultural values.
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Acknowledgements

Anne, Glenn, and Cynthia Roush, Rebecca Pierson, and Richard Elliott for inspiration and support.

Aarati Kanekar, First Chair
Tom Bible, Second Chair
and Michael Zaretsky, Third Chair, for enriching my graduate education through great opportunity.
Preface

After completing an undergraduate degree in architecture and beginning to work in the field, I felt continually limited by my inability to design based on my lack of understanding of construction; both the what and the how of building. Consequently, my desire to build led me to the humanitarian sector, one of the few settings in which a construction crew seemed interested involving a female of small stature and no experience. As I struggled to connect my architectural education with the lessons I learned while rebuilding homes in the aftermath of Hurricane Katrina, I discovered an additional challenge in attempting to reconcile the methods of designing I had been taught, with the specific needs of humanitarian work. Not only has the field of architecture continually dispersed responsibility since the time of the master builder, relying increasingly heavily on engineers and consultants, architecture has narrowed its scope. I view the socially sustainable building sector as an opportunity for architects to expand the scope of their professional realm, and reclaim some of the responsibilities that have been parceled out since the time of the industrial revolution.

Continuing to work in socially responsible design, I once again found the design process and the needs of humanitarian projects at odds as I participated in the design and led the construction of a rural Tanzanian health center. Introduced to the project through a graduate studio led by architect and professor Michael Zaretsky, I first traveled to Roche, Tanzania in October of 2009 with the Cincinnati non-profit organization Village Life Outreach Project. The group has been traveling to the area biannually since 2004, and among many other successes, I was impressed at the pride and entrepreneurial spirit present in the sponsored villages. The Roche Health Center would be the organization’s largest venture yet, bringing medical care to an estimated 20,000 rural people for the first time. Throughout the autumn and winter quarters of that year, the design of the center progressed, as both students and professionals in a variety of fields contributed their time and effort. Though the goals were noble and the ideas inspired, we continued to struggle to connect the product of the studio to the reality of construction in a rural, unfamiliar, and economically depressed setting. We strove to design a building that was affordable
for the non-profit sponsor and reproducible by local people. We made strides toward these goals, but continue to evaluate the project in an effort to propose progressively more appropriate designs. This thesis and future phases of the health center will benefit from what we have learned, and in the mean time, rural Tanzanians are benefiting from the health care provided by Village Life and their Tanzanian partner Shirati Health, Education, and Development Foundation.

The ideas for this thesis coalesced over the course of my experience in Tanzania, and the paper begins by broadly addressing the causes and consequences of the architect’s separation from construction. It then narrows in on how this separation further creates a barrier to architects being viewed as integral participants in humanitarian projects. As the document moves toward the design of an Entrepreneurial Center for the same village in which I constructed the Health Center, a design process tailored to the realities of humanitarian work is proposed in which local culture, particularly methods of making, the culture of dwelling, and community aspirations, are analyzed and utilized as the primary design drivers for this and similar projects. Through this research I hope to broaden my knowledge and thinking on the ways in which architects can pursue socially responsible careers in a globalized setting without becoming resigned to a degree of poverty themselves. Further, I hope that this document may inspire other designers to consider the same issues, disseminate some of the lessons I learned during my time in Tanzanian, and provide a framework for those seeking guidance while working within culturally unfamiliar and economically depressed communities.
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Introduction

Physical poverty is not an abstraction, but we almost never think of impoverishment as evidence of a world that exists. Much less do we imagine that it is a condition from which we may draw enlightenment in a very practical way. Architecture has to address social values, as well as technical and aesthetic values. ¹

This thesis develops a modified design process tailored to the needs of architects working with unfamiliar, and typically underserved populations. Though the resultant process is overtly applicable to international, humanitarian projects, it could also be utilized domestically and within any setting in which the architect is working with a poorly understood community. Simultaneously, the thesis progresses the design of an Entrepreneurial Center in the rural Tanzanian village of Roche. The modified design process and the Entrepreneurial Center continually inform each other, allowing a deeper understanding of the feasibility and implications of each.

The need for a modified design process implies a problem with the application of current contemporary design processes to the humanitarian sector. Beginning broadly, the problem addressed is situated within the larger discussion of the rift between architecture and construction. Though the two aspects of built space are intrinsically intertwined, the schedules, priorities and purveyors of each are often in conflict. This rift began to develop previous even to the industrial revolution, but has progressively widened as technology and complexity have advanced within the field. Section one of this document explores the causes and consequences of this division, concluding with the proposal that the original disjunction presents a further challenge as it excludes architects from playing critical roles in projects focused on social sustainability, a market segment that continues to gain importance, attention, and funding in today’s globalized setting. Section two narrows the scope of the problem, examining practice today through the lens of the challenges described in section one. Typical contemporary processes are evaluated, and again barriers are identified that restrain the architect from making efficient and relevant contributions to socially sustainable projects.

Despite these challenges, a variety of projects provide guidance in developing a framework for a modified design process, better suited to the material, economic, and cultural requirements of humanitarian efforts. Through five precedents, section three examines the design processes of architects working within humanitarian settings and their relative successes and shortfalls. Interestingly, though architects working within their home countries almost always achieved cultural relevance, foreign architects were able to realize similar results when careful study of local conditions was undertaken. Anna Heringer’s work in Rudrapur, Bangladesh exemplifies this phenomenon. In Rudrapur, Heringer completed a three-month long “village study”, documenting and analyzing the local way of life, existing building practices, and cultural aspirations. Applying the lessons of these precedents to the thesis, it is proposed that by beginning the design process with an intensive study of local methods of making and dwelling, the architect becomes equipped to create a design solution that does not disrupt traditional ideas of craft or inhabitation. This study is not limited to the tangible, and an understanding of what the community hopes to become, in addition to the current situation, is an important component. Heringer explored this aspect of culture in Rudrapur
and discovered a yearning for more technologically advanced building practices. This same desire exists in Roche, as well as in many other economically depressed areas of the world, and whether or not the design of the Entrepreneurial Center is viewed as technologically progressive by local people will be one measure of its success. It is further proposed that rather than ending the design process, the architect and the community work in phases, continuing to share knowledge and modify future phases of the design.

The remainder of the document implements and evaluates the proposed design process. In section four, the site is discussed in terms of climate, culture, and craft, including a short discussion of the contrasts between craft knowledge and architectural knowledge. Clarification of the differences between the two allows an understanding of how craft knowledge can be modified without being lost. This section begins the community study, the first and most time intensive step in the design process that serves as the primary driver throughout the development of the Entrepreneurial Center. Section five then follows with analysis of the needs and opportunities presented by local culture. Proposals are made in response to the existing conditions, often through the modification of some form of technology currently existing in Roche, and analyzes how these modifications may impact building technology as well as day to day life in the village. Proposals take the form of models, diagrams, and drawings. They are evaluated through a series of questions aimed at determining their appropriateness, culturally, economically, socially, and from a feasibility standpoint, as well as their potential to proliferate and offer opportunities for long-term and subsequent growth. Section six of the document describes the program of the Entrepreneurial Center as a venue for education, microfinance, and community interaction. The final section of the thesis documents the design of the Entrepreneurial Center as a culmination of the research and analysis that make up sections one through six.
Section 1
The Separation of the Design Process and the Building Process

Construction is also not mere ratio- onstruction itself, which is not determined by purpose alone, but seems also to transcend rational values and is expressive. This also challenges the old prejudice that art [architecture] and construction may be neatly divided. \(^1\)

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Divergence of the Architect and the Master Builder

Historically, the processes of design and construction were not divided, but were indistinguishable, one from the other. The architect as master builder, a person who has gained almost mythical standing among architects today, carried the building through every stage of its realization. Designing, hiring laborers, hammering and chiseling, he was doomed to antiquity as technology advanced. Today, architects are sometimes categorized as specialists and at other times as generalists. In either case, the role of the architect has increasingly become one of coordination. Engineers, consultants, and contractors are relied upon, and often required, in contemporary projects. This change has created a chasm between the architect’s design process and the physical realization of the built structure. The evolution from master builder to executive coordinator can be traced to industrialization, specialization, and the digitization of drawings.

Discussing the evolutionary leaps in technology of the nineteenth century, Siegfried Gideon writes, "The architecture of today stands at the end of such a process." The implications of the industrial revolution and the technologies that inaugurated it are often evaluated with respect to the materials and innovative buildings that resulted, but the architect’s design process was also drastically altered by industrialization. The mechanization that occurred represents the beginning of the master builder’s demise. As early as the 1760s, inventions such as the spinning jenny and the water frame, both of which drastically increased productivity in the making of yarn, began placing a tool between the maker and his or her product. Later, much greater distance came between the architect (no longer builder) and the result of his designs in the form of machine-made building components. Joseph Paxton’s Crystal Palace exemplifies this change. First, machines, instead of handicraft, made the building’s structural components, and second, machines were necessary to assemble these components.

Paxton’s building was itself a miracle of manufacture; not the product of anything like construction in the traditional sense, dependent on masons, carpenters, or bricklayers, the Crystal Palace was instead a factory-made product, assembled on its site from thousands of pre-fabricated pieces. It was also itself a celebration of machinery. The building’s erection had required machinery at every turn; the iron pieces, columns, girders, arches—all were the products of relatively new types of tools that made the accurate forming of a multitude of identical parts not the product of skilled handiwork but the result of very carefully designed and crafted

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This move from man-made to machine-made is often considered the most significant catalyst to altering the role of the architect from master builder to a role of constantly diminishing responsibility. In the example of the Crystal Palace, Paxton's design process was significantly altered from the traditional steps an architect would have followed. Rather than producing a plan based on the module of the brick, Paxton's plan was based on the spanning abilities of the iron as reported to him by engineers. Rather than instructing laborers in the way to craft the joints he had designed, Paxton supervised the assembly of prefabricated parts. As technology advanced and the architect's design process evolved to meet new opportunities and requirements, the designer's tactile relationship with the building diminished. Today, in stark contrast to the master builder, architects rarely visit buildings under construction more than once a week.

Like industrialization, specialization pushes the architect further away from a role in which the design process is linked to physical outcomes. This is not to say that specialization has played a negative role in the evolution of the definition of the architect. It has often been an asset, allowing designers to focus their knowledge as the palette of materials, systems, and technologies available to them expands. The need for systems such as BIM (Building Information Management), indicate the degree to which responsibility has been decentralized today. Even simple projects will receive input from structural, civil, electrical, and mechanical engineers. Consultants may be brought in to design the building's lighting and acoustics, and environmentally conscious projects will include “green” and LEED accredited specialists. The construction phase of the process involves further facets of specialization based on structure, material, and training. Another benefit of specialization

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is a drastic increase in efficiency. Gideon recounts a mid-nineteenth century feat of naval food production made possible by specialization: A human assembly line was established in an English naval arsenal to speed up the production of biscuits. A work team of five bakers is to turn out seventy ships’ biscuits a minute: twelve ovens; ‘each will furnish daily bread to 2040 men.’ Despite notable advances, the increased number of both machines and people involved in the production of a biscuit or a building dilute the designer’s relationship to that product.

More recently, the digitization of drawings has further distanced the architect from the physical implications of his or her designs. Like specialization, this technological advance has positive connotations as well as dangerous side effects. Digitization in general has led to increased ease of communication and editing. This, in turn, can help architects respond to client’s goals, and to do so expeditiously. Despite these benefits, as in the case of mechanization, the architect is removed a further step from physical creation. Now, no longer is the architect not holding the hammer, but the pencil too has disappeared. The architect is physically realizing neither the building nor the drawing. The ease with which drawings are made with the aid of computers has generally increased the scope of what is included in construction documents. A minor change between one windowsill and another can be represented with two drawings created in little more than the time it takes to make the first one. Though a highly detailed drawing set is generally advantageous, it also reduces the need for the architect on the construction site.

**Implications of this Separation**

As the disparity between the knowledge of the master builder and the knowledge of the contemporary architect increases, the designer’s lack of understanding of materials, the time associated with making, and costs also grows.

In Biloxi, Mississippi, young architects designing homes for victims of Hurricane Katrina consistently produced drawings indicating nine-foot high ceilings. Construction managers were baffled at the wasted material and effort implicit in this decision. They were further perplexed when the architects said they had assumed ten-foot ceilings would add to costs. The architects were not aware of, or they had not considered, the standard lengths in which dimension lumber is sold in the United States. This example demonstrates how the different forms of progress described above have caused the construction knowledge previously held by the architect to disperse. The mechanization of milling lumber has resulted in a highly efficient process, but this process produces pieces in only specific lengths, widths, and depths. Specialization, in this case, means that

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contractors and carpenters are familiar with available lumber sizes and architects, at times, are not. Finally, the lack of time spent on building sites by architects, a by-product of digitized drawing methods, decreases the architect’s likelihood of gaining this knowledge empirically. In addition to lacking knowledge of standard material sizes, architects are also distanced from information, particularly tactile information, such as the flexibility, fragility, and texture of building materials.

The way in which materials are joined is also becoming increasingly mysterious to architects. Though architects produce details of material connections daily, these details often do not take into account the steps involved or the time required in their physical realization. For example, when designing concrete, some architects fail to consider the formwork their detail will require. The column at right, though imagined as a simple box, required sixteen pieces of formwork, almost none of standard width, to be cut and assembled to achieve the architectural intent. Another common misstep architects make due their distant relationship with the physical realization of building, is that the order in which the building must come together is not considered. This creates challenges for builders who must avoid damaging or dirtying the work of subcontractors who have come before them. Finally, architects inexperienced in building sometimes design in a way that leaves no tolerance for imperfection. AutoCAD users typically indicate the dimensions on drawings to 1/16 of precision, while contractors are often satisfied if the overall building length is within one inch of what is specified. Chassis are a common location for these differing levels of precision to conflict. While a six inch diameter duct may be suitable for ventilation needs, the contractor and subcontractors are likely to need significantly more than six inches within which to install the duct and any additional equipment, and to be able to maneuver their hands.

The final implication of the chasm that has developed between the design process and the construction process is a composite of the previous two implications. Due to a lack of understanding of materials available and the time required to make connections, architects are divorced from an understanding of the economic ramifications of their decisions. In the Biloxi example, the architects were not aware that specifying nine-foot stud walls meant the contractor would purchase ten-foot two by fours and then pay builders to cut one foot off of each stud. Similarly, in the example of the column, the architect did not take into account the time it would take carpenters to have each piece of lumber cut to the width required and then assemble the sixteen pieces of formwork. Though specialization has removed the responsibility of cost estimation from the architect in most cases, it is problematic if the architect does not realize when he or she is making a decision that adds cost to a building, particularly when working in humanitarian settings in which funds are often scarce. Each of these implications of the design process situate the architect to continue progressing toward a role that is distanced from the resultant building and its physical realization. As subsequent chapters will discuss, this divergence of the design process
and construction process, while problematic in its own right, has ramifications beyond those discussed in this chapter. The implications of the rift between the two fields leads to a subsequent disjunction between the priorities of contemporary design processes and those of humanitarian projects. The following graphic depicts the evolving responsibilities of the architect: in the time of the master builder, in contemporary times, and those proposed for architects working in humanitarian settings. The proposals for the humanitarian designer include a reconnection of the architect to the construction process and well as increased cultural awareness, two attributes that position the field to begin to be viewed as an integral part of socially sustainable projects.
responsibilities of contemporary architects (based on the AIA standard contract) shown in orange. Responsibilities of related professionals shown in grey.
Section 2
The Contemporary Design Process

“If some general pattern were to emerge both over time and between individuals, we might be somewhat nearer to at least a tentative explanation of the [design] process. ¹

Commonalities in Contemporary Practice

The divergence of architecture and construction, discussed throughout the previous chapter, is the history that has resulted in the design processes that are prevalent throughout practice today. In order to propose a modified process tailored to needs of architects working with unfamiliar communities, particularly in humanitarian settings, an identification of commonalities of contemporary practice is necessary.

Michael Brawne, in his extensive writings on the design process, continually returns to the topic of the difficulty in defining a theory, “that describes the way the design process operates.” He describes the steps the architect follows as individual, mysterious, and as not amenable to analysis. Despite the instinctual ideals often attached to design, processes of design share a common history that informs the work of architects today. In addition to a shared history, many contemporary design processes also share commonalities based on the architect’s relationship to the client and the priority given to certain aspects of design.

Historically, ideas concerning the design process and the issues that should guide the architect’s decisions evolved in Western Europe and the United States. More specifically, design processes evolved in the most affluent areas of Western society. Brawne touches on a few of the most prevalent design theories that have guided many design processes, both contemporary and

[Diagram showing common design drivers and the locations in which they were developed]

historical. These include the theory of applying particular ratios to architecture (Vitruvius, Italy), the primitive hut (Semper, Germany), typology (Quatremére, France), functionalism (Vitruvius, Pugin and Sullivan; Italy, England and The United States respectively), pattern language (Alexander, Austria), served and servant spaces (Kahn, Philadelphia) and universal space (Mies, Germany). Each of the processes from this abbreviated list can be traced to an individual or individuals living and working in Western Europe or the United States. Contemporary design processes today often contain aspects of many of these design theories, and rely on these ideas of organizational thinking, reflecting the shared Western history of the design process. Finally, each of these process drivers, with some exceptions in Alexander’s work, show little concern for culture. This is likely due to a dramatically less globalized setting during which the ideas were formed, when architects were less likely to design in an unfamiliar cultural setting. Today, the design process is still influenced by this history and avoiding cultural impositions in architecture is a relatively uncommon design driver.

In addition to a common history, design processes today often exhibit commonalities within the architect-client relationship. Foremost, is the assumption that the client is an entity or individual with whom the architect can communicate and discern goals and opinions specific to the project. This assumption, similar to the historical influences outlined above, is a Western cultural norm. In contemporary U.S. practice, clients typically approach the architect with a general idea of program and budget. Meetings are then held, and throughout the design process the architect can depend on what the client’s objectives are for guidance. Contemporary processes also often involve a monetary relationship between architect and client, a situation that has both positive and negative outcomes. Exceptions to this include many of the design-build university programs that have sprung up around the country. Hank Louis, organizing professor of DesignBuildBLUFF at the University of Utah explains, “Once we get to the Navajo reservation the whole social aspect of it becomes very strong and there’s a love affair that develops between the Navajo family and these students.” While architects may enjoy working with certain clients, Louis’ description of his students’ attitude toward the families they work with goes far beyond the typical architect-client interaction. Finally, the relationship between the architect and the client typically also involves a contractor. Within this triad each party performs responsibilities specific to his or her own profession, while interacting with and informing the other parties. This means that the client rarely participates in construction, the architect does not make decisions concerning who will maintain the building, and the contractor does not draw plans, a framework that can rarely be applied directly to

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3 ibid, 19-31
4 Reference based on responses by architects to a survey prepared by the author. Appendix A.
5 David Sokol, Teaching by Example, Architectural Record, October 1, 2010. 124.
humanitarian projects.

The last commonality among contemporary design processes to be discussed is the priority given to certain aspects of design. The three diagrams that follow are examples of the steps a present-day architect may follow while designing. Though these diagrams do not encompass all design processes today, they represent three common but different types of contemporary practices. In each example issues of site and program are identified as the aspects of a project initially undertaken by architects. These same issues are then often revisited until they have been satisfactorily addressed. It is not until much later in the design process that details are designed. This is not to say that architects do not spend a large amount of time designing the smaller scale portions of projects, but rather that decisions concerning details come only after decisions at the scale of the room and the site have already been made. Therefore the decisions made concerning material connections rarely affect aspects of the project that have already been developed. Similarly, the contractor or builder that realizes the architect’s design also often enters the design process in its later stages. This reflects the lack of builder involvement in many current design processes. While the architect may welcome input from the builder, the abilities of the builder to construct the project are not a primary concern. This too is indicative of the evolution of the design process in a Western environment in which a variety of construction materials and methods are readily available. The subsequent section will address these common aspects of contemporary design processes with respect to the challenges they present to architects involved in humanitarian projects.

6 Reference based on responses by architects to a survey prepared by the author. Appendix A
Example of a typical contemporary design process
Example of a typical contemporary design process
An Evaluation of Processes

Example of a typical contemporary design process
Disjunction Between Contemporary Process and Humanitarian Projects

Gideon writes, “Certainly there is no one who has escaped these effects, for the Industrial Revolution was not a political upheaval, necessarily limited in its consequences. Rather, it took possession of the whole man and of his whole world. The architecture of today stands at the end of such a process.” If Gideon were to have written, “Certainly there is no architect...” whose life was not dramatically altered by the Industrial Revolution he would have been more correct. As the previous discussion of process makes clear, contemporary design process is a product of the affluent Western world. It assumes that clients have funds available for the project, architects and clients can communicate (both through shared language and shared values), and a contractor can be utilized to secure materials and a labor force capable of realizing the design. Contrary to these assumptions, humanitarian building projects necessitate a careful avoidance of imposing Western ideals, a modified relationship between client and architect, and a rearrangement of the order in which aspects of design are addressed.

As architects enter communities that are underdeveloped, the decisions they make and the examples they set have a dramatic effect on the future development and architecture of the community. Adding to the challenges of designing in such a setting is the desire of many poor communities to emulate the construction of wealthier areas at the expense of a rich vernacular. Mud and thatch construction, for example, are undesirable to the people of rural East Africa despite their historical significance and excellent climatic response. In order to avoid imposing on local culture, Western trained architects must develop a design process that relies on a different set of values than those that led to systems such as typology or functionalism. The practices put in place by these ideals must be reevaluated within the current setting of globalization, particularly in humanitarian settings.

The relationship between architects and their clients in humanitarian projects is dramatically modified when compared to the relationships that exist in typical contemporary design processes. Clients within the humanitarian setting do not approach an architect with a defined program and budget. Often neither is present, and the program is the idea of the architect or a non-profit organization. Funding also commonly comes from a source other than the client. These differences define a relationship in which the client can easily be overlooked when decisions are being made, a stark contrast to the client described in the previous section. Further, architects and clients may not be able to relate to each other easily based on cultural differences. For example, architecturally, arrangements of spaces vary greatly between cultures. Socially, respect

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An Evaluation of Processes

manifests itself differently and may result in indirect responses from clients regarding the community’s satisfaction with the design. Finally, within humanitarian projects, the typical roles of client, architect, and contractor are often blurred. Clients may participate in construction, anthropologists may become primary consultants, and the architect may play the role of both designer and contractor or vice versa.

Lastly, the order in which aspects of design are addressed varies greatly between humanitarian projects and more typical projects. As described above, material connections and the project builder are normally chosen late in the design process. This is inappropriate in humanitarian projects in which both materials and skilled labor are often limited. While issues of site and program remain relevant, the technologies through which these aspects are realized are an inherent part of decision making. A study of projects such as Gando Primary School, described in the next section, explore this topic in depth. Each of the chosen projects addresses the challenge of the contemporary architect working within a humanitarian setting and modifying the design process in an attempt to bridge the gaps that have developed first between design and construction and later between design objectives and humanitarian priorities.
Section 3

Humanitarian Approaches to Process

“No architect normally designs for peasants in the villages. No peasant can ever dream of employing an architect, and no architect ever dreams of working with the miserable resources of the peasant.”  

Humanitarian Design Processes

Contemporary design processes, such as those explained in the previous section, commonly lead architects to conclusions that are not relevant in unfamiliar, often economically depressed settings. The alternative processes discussed in this section have been applied to, and sometimes conceived for, humanitarian projects. Many of these designs hinge upon the utilization of local practices and skills as they can be applied to construction, therefore simultaneously reconnecting design and building and forging an inroad for architects to begin to be viewed as necessary participants in socially conscious projects. Equally important, the culture of dwelling and the attitudes present within a community were studied by the majority of the designers evaluated in this section, indicating the additional goal of avoiding imperialistic designs. The results of these design processes are buildings that display awareness of the realities of construction and provide rich and appropriate responses to their respective cultural settings. This contradicts the Hassan Fathy quote above, asserting that the resources of the peasant are, in fact, not miserable. Though many beneficiaries of humanitarian projects are not skilled at construction practices, the abilities that they utilize for survival, in order to earn a living, and to create art are opportunities to which the architect can look in order to generate construction details. Beginning the design process with an evaluation of the local setting upsets more traditional architectural design processes in that the client-architect relationship is modified, feasibility issues are considered throughout, and the selection of the builder is moved from one of the last steps to one of the first.

The following examples are a carefully chosen assortment of projects of similar building scales, in varied geographic settings, architects working within their own cultures or finding their way within a new place, and high, low, and hybrid technologies.

Hassan Fathy, New Gourna Project

In Architecture for the Poor, Fathy documents definitive years of his career as a socially active architect in Egypt in the 1950s. He expands upon his views on culture and tradition, and through his retelling of projects, communicates the evolution his own design process. He begins his book with mud bricks, and writing on this material and its assembly dominates the text, but in order to understand Fathy’s interest in the mud brick, his attitude toward architecture must first be clarified. This is most clearly accomplished by looking at the gouaches that were his preferred method of architectural
representation. Working in contrast to the style of architectural drawings of the time, Fathy did not draw three dimensionally or illustrate the buildings’ surroundings in a false way. Rather, he juxtaposes plans and elevations with the proposed building’s actual surroundings, illustrating that his primary concern is that the building be appropriate to both the cultural and physical setting of the place. He writes that his renderings were created, carefully avoiding the professional slickness of many architects’ plans, which often distort natural forms in order to make the setting match the buildings, I did not try to produce effects of depth, nor bring in convenient oak trees to balance massing, 2 clarifying that Fathy’s primary goal was not aesthetic.

Fathy’s design development begins with an idealistic view of the country life that he believes Egyptians once enjoyed. As he matures, Fathy writes of his first exposure to the reality of country life as dark, dirty, and cramped, but sees the mud brick as an opportunity to improve the houses of both the poor and the middle classes. Despite producing many designs based on these discoveries, Fathy’s houses were still not economical due to the high cost of roofing materials, and an unsatisfied Fathy begins to look to historical buildings in Egypt for precedent. Eventually he discovers the Nubian tradition of utilizing mud bricks for domes and vaults and hires masons practiced in this style of building to construct roofs for him. Through descriptions of these discoveries in Architecture for the Poor, Fathy slowly reveals a process that prioritizes the goal of housing for the Egyptian poor. This leads Fathy first to research and second to experimentation. He does not begin with plan drawings or models, but allows these traditional design exercises to enter the process only after appropriate materials and methods have been established.

This reversal of the order in which issues are approached has two distinct implications on the design process; in Fathy’s work details are predetermined and design by the architect takes place primarily at the room scale. First, in terms of details, Fathy writes, “the working drawings lost much of the importance they usually have. The masons were master craftsmen to whom every detail of the work had become familiar over many years, for it was their own technique…In fact, they could even watch me while I was drawing and tell me not to bother with these dimensions.” 3 By utilizing a traditional building system, Fathy circumvents the ever-increasing need to clarify design intentions through construction documents. In this case, the joint is a proscribed size and shape based on the room the architect has set forth, and this is communicated to the builder through handed down experience rather than drawings or specifications. Converse to typical practice, the masons demonstrate to Fathy the method and the parabola that allow the arch he is pursuing, rather than Fathy specifying

2 Hassan Fathy, Architecture for the Poor (Chicago: The University of Chicago Press, 1973), 44.
3 ibid, 38.
an aesthetic goal and the masons attempting to realize his objective. It is inherent in Fathy’s design that the details be those of the craftsman, allowing him to achieve his agenda of architecture that is universally affordable through the utilization of local labor.

Second, Fathy’s process results in predetermined building forms. The precedent that Fathy looks to provides him with set sizes and wall and roof forms, based on the tolerances ingrained in the construction technique. He explains the most common arrangement that includes two parallel walls with a higher wall at one end. The vault is laid against this end wall, and its shape is the specific parabola that conforms to “the shape of the bending and moment diagrams, thus eliminating all bending and allowing the material to work only under compression.” This demonstrates the proscribed nature of the building forms Fathy worked with. Combining these forms with the predetermined details discussed above, the architect is left to mold the individual rooms to the needs of their users. Fathy often employs nooks for sleeping, built-in furniture, and carefully attended to windows and doors in his designs. Though the desirability of design taking place primarily at the room scale is debatable, it is certainly a result of Fathy’s design process and is therefore linked to his desire to create architecture for the poor.

Despite this desire, Fathy’s designs were only marginally accepted by the Egyptian poor, and the New Gourna project specifically was largely rejected by the people it had aspired to house. Though Fathy’s process was attuned to the humanitarian setting, resulting in structures that are highly economic and simple to construct, Fathy ignored the desires of local people. The people of Gourna wanted neither to relocate, nor to live in mud homes. Though Fathy was Egyptian himself, his process did not fit the humanitarian setting in terms of careful response to local aspirations.

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An Evaluation of Processes

- **Problem Identified**
  - lack of affordable housing

- **Solution Proposed**
  - utilize a universally available material

- **Solution Refined**
  - experimentation
  - historical study
  - builder chosen
  - details defined

- **Project Definition**
  - affordable housing in new Gourna
  - site identified

- **Program Clarified**
  - users studied
  - drawings clarify room requirements

- **Construction Preparation**
  - bricks made
  - builders arrive, training not necessary

- **Construction**
  - architect present on site

Hassan Fathy's design process
Completed in 2001, Gando Primary School is the result of architect Diolo Francis Kôô's desire to ensure that education be available to the children of his home village in Burkina Faso. This small school has received more media attention than the most aid projects, surely in part due to its graceful roofline, interesting...
roof structure, and the play of light along the surface of the bricks. Yet, these aspects and the media interest all result from a virtually undocumented source, Kéré’s design process. Like Fathy, Kéré did not begin with a Google map or bubble diagrams, but with a goal. In Kéré’s case, this goal led him to link the decisions he made during the design process to the viability of their realization, ultimately resulting in a building admired for its appropriateness as much as its beauty. This appropriateness pervades the building; aesthetically, environmentally, and throughout the construction process.

By evaluating the skills of local builders and situating this knowledge as the primary design driver, Kéré proceeded through the design process in an unorthodox yet highly successful way. One of Kéré’s first decisions in the design of the school was to use clay as the primary building material. This was a bold decision, as Kéré understands the stigma that exists toward earth construction in this area. The villagers, equate clay with backwardness Kéré states, but persevered with the decision in order for the school to be able to be constructed, and hopefully replicated, by local people.5 Men and women of the village created bricks for the walls and the ceiling by adding a small amount of cement to soil and then utilizing a hand-operated press. Though this process is a modification on the traditional way of making bricks in Gando, villagers could be quickly trained in using the press, and then needed no training in laying bricks as this practice already exists in the area. Kéré then utilized these bricks throughout the building. They make up the walls, columns, buttresses, and ceiling.

The buttresses are an excellent example of how Kéré’s choice to use earthen blocks based on local building skills, led to a number of architectural opportunities later. He writes, The buttresses, which serve to brace the walls, stage a play of light and shadow which communicates plasticity as well as structure. At the same time they are cooling elements which both provide shade and reduce the acoustic interference between the classrooms. 6 Additional proof of Kéré’s commitment to designing with local builders in mind can be found in the project’s introduction page from Design Like You Give a Damn.

Pictured at right, project information typical throughout the book such as location, designer, and engineer are included, but the page also makes an appearance in this project’s description.

The school’s roof is a further example of a design process based on local building skills resulting in a building both aesthetically pleasing and functionally beneficial to the community. One of the building’s most captivating elements, the truss, was designed specifically with local builders in mind. Metal roofing materials from Europe have become available in this region, but are often inappropriate due to their efficient transmission of heat and the loud noise they produce during heavy rainfalls. Kéré addressed both of these issues by implementing a metal roof separated from the building by a brick

ceiling (mitigating noise) and an exposed truss (allowing air movement to dissipate the roof’s heat). These trusses, made up of metal reinforcing bars, were welded together in relatively small sections and were able to be lifted into place without the use of cranes or other tools. Ronald Rael writes, ‘Welding was already a well-establish local skill in the community and took advantage of the fact when designing the ingenious truss system that supports the lofty metal roof.’ Utilizing a design process that considers spatial requirements and site adjacencies after available building technologies have been studied, was able to realize a design that vibrantly reconnects architecture and building, and does so in a culturally and economically relevant manner.

An Evaluation of Processes

- Problem and program defined
  - The architect's societal obligation
  - Education needed in Gando
  - Site selected

- Availability assessed
  - Budget
  - Local materials
  - Local skills
  - Details determined

- Climate analyzed
  - Building form and layout designed

- Design development
  - Drawings finalized

- Construction preparation
  - Bricks made
  - Minimal training

- Construction
  - Architect present on site
  - Local welders create trusses

- Occupancy and consequences
  - Maintained by builders/users
  - New skills result in employment opportunities

- Diébédo Francis Kéré's design process
  - Kéré's home and project location
Marianne Cusato, The Katrina Cottage

In each of the previous examples, African architects designed earth based buildings for groups of people with clearly defined skills sets. In the United States, it is difficult to establish a specific set of skills as being local to a particular place, but in the aftermath of Hurricane Katrina volunteers who flocked to the Gulf Coast to help rebuild could often be defined as unskilled. To address the urgent need for housing in this setting, architects such as Marianne Cusato looked to pre-fabrication to design buildings that could be constructed by the builders available. Cusato designed and developed the Katrina Cottage in a charrette just days after the 2006 hurricane. The expediency with which design began is a characteristic that remained with the Katrina Cottage throughout Cusato's design process, which in turn had implications on the decisions Cusato made as well as the resultant physical product.

Like Fathy and Kéré, Cusato did not begin her design process in a typical manner. Based on the urgent need for a suitable design and the rigorous economic requirements of the situation, Cusato choose a construction type before addressing site or programmatic issues. In fact, the nature of the problem would not allow Cusato to incorporate any traditional site analysis into her process. Rather, an effort was made by the attendants of the charrette to clarify the vernacular style of the region and aesthetically base the design on this in hopes of achieving cultural relevance. In Cusato’s case, the design process was reversed from the typical method of moving from large-scale solutions to small-scale solutions, and, atypically, she worked in plan only after both a construction type and an initial rendering of the building were already complete.

This change in process has implications on the way in which the architect addresses issues of design. First, by choosing a construction type that takes minimal time and requires minimal levels of skill, the Katrina Cottage's details were largely predetermined. Architectural drawings of the Cottage typically do not include drawings of the details, reflecting that in this design process the responsibility for detailing is shifted from the architect to manufacturers. Further, contractors have no need to know of or understand details that would be completed and imbedded in building components before being shipped to the site, a surprising similarity to Fathy's lack of need for drawn details. Second, the charrette setting for Cusato's design process meant that little time could be spent studying how the building could aesthetically achieve cultural relevance. Early in the charrette, Cusato sketched a “little yellow cottage” reminiscent of a New Orleans shot gun style home. This sketch is strikingly similar to the final product.8 Without a specific site from which to draw inspiration and cues, Cusato

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relied on an image of a New Orleans home to impart cultural appropriateness to the Katrina cottage.

As well as affecting the order in which the architect addresses issues, a change in design process inevitably has implications on the building produced as well. First, in order for construction of the building to be feasibly completed by an unskilled labor force, it has to be able to be produced as largely prefabricated kits or modular construction. Though the Cottage can reputedly be built in both of these ways as well as with panelized systems or traditional site-built methods, the modular system was widely implemented by FEMA and Lowe’s stores along the Gulf Coast are currently marketing the kit system. Both of the later systems require simple assembly through bolting together segments of the building, followed by finish work that can be completed by contractors or homeowners. HVAC installation is the only exception to the rule of unskilled labor in the Cottage. The second implication of Cusato’s altered design process on the building is that rooms are often undersized and tightly packed. This may be a result of designing the building plan late in the process, rather than as one of the first steps, as is often the case. Ranging in size from 480 to 936 square feet, the cottages are available in one to three bedrooms models. Architect Eric Moser’s plan, pictured above, is an example of a two-bedroom version that has taken space maximization to an extreme. He writes, “Putting two bedrooms in less than 500 sq. ft. is hard to accomplish, but this plan does so with craft.”

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Though Moser’s plan does indeed fit two bedrooms into the small space, the viability of living in such a space is questionable. Contrasting this, both Fathy and Kāẓūr also addressed building plan after a majority of other design decisions were complete, and with generally successful and spacious results. Though Cusato’s process achieves some of its humanitarian goals through tailoring design to locally available skills sets, cultural relevance could not be attained based on the expediency required and the lack of site specificity inherent in the project.
An Evaluation of Processes

**Project Defined**
- Disaster relief housing
- Construction type defined (prefabricated and modular)

**Region Addressed**
- No specific site
- New Orleans shotgun style home emulated

**Design Development**
- Space layout
- Construction documents completed

**Marketing**
- Manufacturers contracted to create building modules and kits

**Sales**
- Plans sold to homeowners, contractors, and Lowe's stores

**Shipment**
- Kits or modules arrive at site

**Construction**
- Home owners and volunteers complete majority of construction
- Architect not present

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The Katrina Cottage Design Process
Anna Heringer, Modern Education and Training Institute (METI)

This project differs from the first two examples in that the architect is not native to the project location. Anna Heringer was born and educated in Austria, but traveled to Rudrapur, a rural area of Bangladesh during her architectural education. The time she spent there, before designing what has come to be known as the Handmade School, was an in depth study of local culture and building practices. She then worked with the Bangladeshi non-profit organization Dipshika and mud construction

experts to propose and then build the school. Heringer’s process presents an acute contrast to the commonalities of contemporary design processes explored earlier in the paper, while her attitude toward local building technology differs from both Fathy’s and Cusato’s. While Fathy lauds traditional building practices and utilizes them throughout his work, he does not take into account the desire of villagers to technologically progress construction techniques. Cusato also allows her design to be limited by available skill sets, yet Heringer’s design both utilizes and expands upon existing building technologies.

Both the roles of those involved in this project and the order of operations are indicative of a humanitarian project, as opposed to a more typical contemporary project. As described earlier in this paper, a traditional relationship in which the client employs the architect and the roles of client, architect, and builder are clearly defined, is an ill fit for this type of project. In this example, living and working with local people shifted the client-architect relationship from hierarchical to interdependent. Heringer relied on the people of Rudrapur for cultural and climatic information, while they relied on her to employ design thinking and imagine a feasible building that is both structurally sound and comfortable to inhabit. The time Heringer spent in the area also extended her responsibilities beyond those of building, structure, and systems to include social and anthropological understandings. In addition to attempting to meet the needs of a community with limited resources, architects such as Heringer are challenged with avoiding imposing the ideals of their own culture. Within this context, Heringer operated as designer, researcher and interpreter and the local people, her clients, functioned as consultants, teachers, and builders.

In the design of METI, Heringer strove to utilize the skills and materials available in Rudrapur, but also responded to the desire of local people for a more technologically progressive building. In an Aga Khan Awards article, Ali Kriscenski explains, “The school is based on regional construction and local materials but implemented with modifications that add efficiency and structural integrity.” In this way Heringer differs from both Fathy and Cusato. Fathy concentrated wholly on the use of local materials and methods, but his buildings utilized ancient technology. Cusato, on the other hand, designed relying on recent technology to ensure that untrained builders could participate in construction. Heringer’s approach introduces modifications to existing building materials and techniques, advancing local building technology in a culturally relevant manner. For example, preparation of the loam used in traditional buildings in this area is time consuming and difficult. After studying earth structures, Heringer proposed that cattle be used to prepare the loam, easing the process and allowing a larger structure to be designed. She explains, “To use cows and water buffaloes for mixing is the first step of industrialization.

12 ibid
In general the mud is mixed by people only which takes a much longer time.” Designers also modified traditional bamboo structure and lashing techniques by adding members and prefabricating trusses on the ground before lifting them onto the second story. Making an additional level possible was extremely important on this site where space for growing food is in high demand. Finally, Heringer introduced a damp-proof course into the brick foundation to prevent moisture from rising into the walls in this flood prone area. In these ways, Heringer’s process is similar to Kéré’s, with the notable exception that what Kéré inherently understood as a native, Heringer learned and responded to carefully. The process Heringer utilized accomplishes the ideal of recombining architecture and building through a rich understanding of a specific culture and it’s methods of making and ideals of dwelling. A cultural study similar to Heringer’s is an invaluable addition to the design process for architects working in humanitarian settings.

14 ibid
An Evaluation of Processes

**Village Study**
- Immersed experience of rural Bangladesh culture
- Study of urban and built environments
- Builder selected

**Material Study**
- Conference on Earth construction
- Material connections determined

**Project Proposed**
- Client identified
- Site selected
- Program clarified

**Drawings Prepared**
- Earth construction consultants
- Structural consultants

**Training**
- Villagers trained in modifications to traditional building methods
- Loam prepared by cows

**Construction**
- Training implemented
- Sustainable handmade techniques utilized throughout

**Occupancy and Consequences**
- Maintained by builders/users
- Sustainable building requires negligible financial maintenance

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Anna Heringer’s design process

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Heringer’s home

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Project location
Roche Health Center Design Team, Roche Health Center

This final example of a humanitarian design process is specifically applicable to this project in that the experience of designing and constructing the Roche Health Center, and asking ourselves how we could improve our process in future projects, inspired this thesis. Further, the health center site is in close proximity to the site of the proposed Entrepreneurial Center.

As in each of the humanitarian examples, the roles of designer, builder, client, employer, and employee were blurred throughout this project. Westernized ideals such as the assumption of communication between users and designers, and the absence of the designer from the construction site were impossible to maintain in this project due to challenges of distance, language, and culture. From March to November of 2010, a representative of the Roche Health Center Design Team was present on site almost every day. The existence of a designer as on-site manager creates a link between what has been imagined and what is built, but this connection of the design and construction processes was also present early in the design phases. By identifying locally available materials and tools, decisions made during studios taught by Professor Michael Zaretsky, the project’s lead architect, in 2008 and 2009 were based on an awareness of the realities of materials and skills. The graphics at right show a study in which design alternatives were visualized based on where the materials they required could be purchased. The upper graphic is constructed with the materials most closely available to Roche, while each of the following designs includes additional elements that require materials from farther away. The bottom image, with its prevalent dark green, indicates the materials required would need to be transported to the site from the city of Mwanza, approximately 180 kilometers away. Though the understanding of local construction options and challenges in Roche was not as complete as Heringer’s, certain aspects of the design such as the interlocking soil stabilized blocks (ISSB) build upon existing methods of construction, and the technology may proliferate and even inspire improved quality of life in areas beyond construction. Further, the success of the ISSB indicates that reconnecting design and building does not necessarily imply the architect participate in construction, but rather that early consideration of materials and processes available may bridge this rift. Kīrē’s understanding of local conditions demonstrated this well in the previously discussed example of Gando Primary School.

In addition to reassessing the traditional roles of architect, builder, and client, the Roche Health Center was also educational in terms of defining roles within the local culture. First, gender roles in Roche are dissimilar from those found in the United States. A female architecture student served as on site project manager from March through September, a
situation local men adapted to slowly. Interactions between local men and women also clarified some of these differences. Women seemed comfortable to participate in unskilled manual labor such as digging or carrying materials, but were excluded from activities such as mixing and pouring concrete and cutting and nailing formwork. In addition to excluding women from certain activities, local culture made it difficult to bring in Tanzanians from surrounding areas to assist in construction. Tribalism dictated that carpenters from thirty kilometers from Roche were unwelcome. Only in very limited cases was a specialist, such as an electrician, welcomed by the men of Roche to assist in construction of the health center. In contrast to this, the people of Roche were very accepting of foreign visitors who wanted to participate in construction. Americans, in
particular, were welcomed as President Barrack Obama’s father was a member of the tribe native to this area, the Luo.

The Roche Health Center design team strove to produce a building that would be both structurally sound and culturally appropriate. This required research into a variety of fields, some of which include Tanzanian history, the local economic setting, vernacular building practices, and seismic conditions. This research led designers to interlocking soil stabilized blocks. Employed in a confined masonry system, this type of brick can result in a seismically sound structure. Further, they can be created locally at low cost. Utilizing soil for 90% of the material and cement for only 10%, the bricks are economically feasible for the villagers, and the manually operated press does not require the expense or inconvenience of a generator. Though the bricks are largely mud, the introduction of technology in the form of the block press, similar the Heringer’s innovations in METI, allows villagers to view the building as progressive. The insight and ability to introduce change without imposing on local culture was gained, in both Roche and Rudrapur, through time spent with local people. Despite many successes in the health center, time spent in Roche during construction has led to further insights that will result in modified materials and technologies proposed for the Entrepreneurial Center. These conclusions have led to two additions, a first and last step that will be incorporated into the modified design process proposed at the conclusion of this section.

Though the health center has many similarities to the humanitarian precedents previously discussed, one difference is that in this case the details, or joints, were determined late in project. For Fathy, builders who were familiar with the techniques he desired provided traditional details. For Cusato, joints were determined by manufacturers who pre-fabricated sections of the buildings. In the case of Roche, aspects of design such as site, program, and climate were carefully analyzed before details were determined. This contradicts the goals of the project (such as reproducibility and minimal cost), as the results of late-stage decisions were typically expensive and less locally appropriate than had been desired. For example, a means of connecting wood trusses to a concrete beam was not decided until a moment when time was a limiting factor. Therefore a welded bracket was utilized. Though this bracket is attractive and functional, it could not be produced, or reproduced, by the people of Roche. This way of thinking about connection is unfamiliar in Roche where lashing is the most common form of wood connection. Though local materials had been carefully considered in the Roche Health Center, the designers were not native to the site, like Fathy or KŒ and the time was not available to study local skills and building methods to the extent that Heringer did, resulting in a building only partially attuned to the local culture and aspirations.
An Evaluation of Processes

- project defined
  - client identifies need
  - builder selected

- cultural familiarization
  - political and economic setting
  - local building practices
  - goal set to avoid imperialist attitudes

- climate analyzed
  - site conditions
  - sun, wind and temperature
  - seismic conditions

- initial design
  - program proposed
  - continued research
  - schematic plans, elevations, and renderings

- design development
  - construction system finalized
  - program and plans finalized

- construction preparation
  - bricks made
  - local building committee formed

- construction
  - architect representative present on site
  - training throughout
  - details determined in design-build setting

roche health center committee’s design process
Process Conclusions from Precedent Studies

By contrasting typical contemporary design processes with humanitarian processes, it is clear that engaging communities throughout each step is integral in the later if imperialist attitudes are to be avoided and valuable knowledge is to be gained by both the designer and the community. Though humanitarian efforts are not new developments, the real ramifications of such projects have only recently begun to be understood. Many examples exist of well-intentioned aid projects rendered ineffectual or even damaging by unexpected side effects. One such instance was discovered in Kenya when doctors found that the HIV/AIDS patients they were treating with anti-retroviral drugs were not stabilizing. Further investigation showed that HIV/AIDS patients require significantly more calories that healthy individuals, and without ensuring patients would receive increased quantities of food, the drugs had little to no effect.15 Another example comes from a large donation of malaria nets sent to East Africa through the United States President’s Malaria Initiative instated by the George W.

An Evaluation of Processes

Bush administration. Though this 1.2 billion dollar influx of nets was initially beneficial, small manufacturers and retailers were unable to remain in business in the wake of the donation. Malaria nets are treated with a chemical that repels mosquitoes and when that chemical wore off, or nets were torn, replacements were no longer locally available. The design processes described in this section provide examples of successes and failures that can help guide architects to avoid such unanticipated consequences in future humanitarian design projects.

Concluding this portion of the document, first, contemporary design processes (from section 2) and humanitarian design processes are summarized in the diagrams below, and trends are identified that differentiate the two methods of designing. Second, the summarized humanitarian design processes are also critiqued and modifications are proposed and expanded upon, resulting in a third diagram of the author's proposed design process for working with unfamiliar, and typically

underserved communities.

Overt differences between the summarized contemporary design processes and humanitarian processes are the parties included, their degrees of involvement, and the priority placed upon particular aspects of design. Though both the architect and consultants play a role in both types of processes, the owner within more traditional projects is substituted for a sponsoring organization such as a non-profit or governmental organization in socially driven projects. The contractor may or may not appear in humanitarian design processes, just as end users are optional contributors to more conventional design processes. Notably, within humanitarian design processes, the community not only plays a large role from the beginning to end of the process, their involvement is essential to the progression of the design. This is represented by the continuation of the community line joining the architect line in the diagram; rather than provide the architect with information or opinions, the community takes an active role in designing within humanitarian settings. The degree to which the role of the client is modified from one of reaction to one of participation can be linked to opportunities for the architect to continue to work in the community. In both Gando and Rudrapur, villagers donated their labor to the construction of Kéré’s and Heringer’s designs, and in both cases additional buildings have been added to form complexes. This flexibility in the roles played by participants demonstrates a shift from typical contemporary processes toward a modified process through which architects utilize their expertise in design thinking to creatively address local challenges while avoiding imposing their own ideals.

The stages within the design processes on the previous page also differ. Primary steps within a conventional design process may appear as secondary components or may not appear at all within a humanitarian design process, and vice versa. Contract documents illustrates this. While this stage in the contemporary design process is one of the largest, indicating the great deal of time dedicated to it by practitioners, the finalization of drawings is a sub-category under one of the smaller stages of the humanitarian design process. Similarly, village study is the largest aspect of humanitarian design, and makes no appearance within typical contemporary processes. Finally, the design of details is shifted from the later stages to the forefront of the process within humanitarian projects. The limited materials and skill sets often encountered when designing for underserved populations necessitate this change. This reconnection to the realities of construction is achieved in each of the projects not through the architect usurping the role of the contractor, but through early consideration of who will construct the building and the construction methods and materials available. Additionally, this understanding of how the building will be physically realized allows an accurate understanding of budget; a facet of humanitarian building that is often tightly constrained.

Finally, after analysis of each of the humanitarian processes (and while designing an Entrepreneurial Center in rural
Tanzania as an additional research method), the modified design process shown here is proposed. It mimics the summary of humanitarian processes with two primary exceptions. The “community study”, exemplified by Heringer’s “village study” and given a great deal of emphasis in the diagram on the previous page, is given additional prominence. This step in the design process is not only the first, but it is also the most important and holds sway over subsequent decisions. Second, the

The proposed modified design process
importance of design and implementation in phases is represented by the cyclical nature of the design process, in contrast to the linear models shown previously. This step is linked back to the community study, clarifying that a successful study of local culture is based on continual sharing of knowledge and ideas between the architect and the community. These two steps, discussed below, are later implemented in the design of the Entrepreneurial Center in sections five and six.

**Step 1**

Evaluation of humanitarian design process precedents, particularly Anna Heringer’s METI, exposed a period of cultural familiarization as an imperative early step. Prioritizing analysis of existing methods of making, modes of dwelling, and cultural aspirations is proposed as the first step toward developing an appropriate design within the unique situation of the socially conscious architect working within an unfamiliar setting. Methods of making include both construction and non-construction related activities, allowing the architect a holistic understanding of culture that would not be gained from studying vernacular buildings alone. In the design of the Entrepreneurial Center, the *ugi* making process was highly influential. The steps that women follow daily to make this staple food informed the appropriateness of including concrete in a design for Roche. Not only were local women excellent judges of accurate consistency, the size of a batch of *ugi* corresponded well to the amount of concrete that could be mixed at one time and tamped into a block formwork. As discussed previously, Kőrő’s Gando Primary School also responds to local methods of making through the use of earthen blocks and welded rebar truss.

While the local culture of making informs technical aspects of designing and building, analysis of the local culture of dwelling defines appropriate spatial and experiential design responses. This component of culture can manifest itself through areas such as space layout, social, economic, and environmental opportunities and challenges, and decoration. Cusato’s Katrina Cottage appealed to the local culture of dwelling, albeit with limited success, through the use of bright colors and the inclusion of a front porch. Though overall square footage of the cottages was extremely limited, the importance of the semi-public front porch was understood as a necessary cultural element and maintained throughout multiple iterations of the design. In Roche, tribalism, gender roles, and water cleanliness challenges are examples of the local culture of dwelling that impact the design of the Entrepreneurial Center. These are discussed at length in section five.

Both the culture of making and the culture of dwelling are based on the reality of the community as it currently exists, and the history that has led to that reality. Including an attempt to understand cultural aspirations in the community study allows the architect to develop design ideas that not only build upon the community’s historical identity but also respond to the local vision for what the community may become. Both Kőrő and Heringer responded to this additional characteristic
of the future hopes of local people. In both cases, villagers viewed mud construction as primitive and had hoped for higher technology to be employed in their community buildings. Despite this, both architects were able to introduce technologies that only slightly modified existing methods of making, yet appealed to local people based on the increased strength and longevity of the resultant buildings. In contrast to this, Fathy did not address the aspirations of the people of Gourna. Not only did the people not want to relocate to the village of New Gourna, they were also uninterested in adopting the Nubian vault, viewed as an ancient building technique, as the construction style for their new homes. Because of Fathy’s inability to respond to this aspect of the local culture, much of the work he accomplished in New Gourna was never completed nor inhabited. In Roche, local people have made it clear that a seismically stable and long-lasting building would be a great source of community pride. It is the goal of the Entrepreneurial Center to respond to this desire, respecting the existing community, including future goals and visions.

The Next Step

Though in many cases design processes are represented linearly, the design process proposed by this thesis is cyclical on a variety of levels. As a basic premise of this thesis it is understood that there are many drawbacks to designing within unfamiliar cultures, and more often than not such endeavors fail to avoid imperialistic attitudes. Despite this, there is also an understanding that a return to the time of cultural isolation is highly unlikely. Within this framework, the proposed design process should be viewed not only as cyclical in terms of continually informing itself, but also as a tool through which the architect and the community engage in a cyclical sharing of knowledge. In this way, it is clarified that communities such as Gando, Rudrapur, and Roche are not beneficiaries, but collaborators in design innovation. The non-profit organization Village Life Outreach Project provides one such example. Though the group has positively impacted villages in Tanzania through biannual medical brigades since 2004, the city of Cincinnati has also benefited from the knowledge and experiences gained by participants in the brigades. Lessons learned are being applied by doctors and nurses in local hospitals, engineers working on sustainable water purification technology, and architects designing both domestic and international projects.

As the proposed design process is applied, step one, the community study described above, will inevitably be incomplete and imperfect regardless of the number of iterations completed. Aspects of the design and technologies introduced will have unexpected impacts. By implementing projects in phases, the designer has the opportunity to work cyclically, making modifications to subsequent phases based on new knowledge gained in each step, rather than viewing any step as the last. This approach also works well programmatically for microfinance, one of the major functions of the Entrepreneurial Center.
Section 4  
Roche, Tanzania

*Having come into contact with a civilization which has over-emphasized the freedom of the individual, we are in fact faced with one of the big problems of Africa in the modern world. Our problem is just this: how to get the benefits of European society, benefits that have been brought about by an organization based upon the individual, and yet retain African’s own structure of society in which the individual is a member of a kind of fellowship.*¹

- Julius K. Nyerere, First President of Tanzania

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Proposed site for an Entrepreneurial Center in Roche, Tanzania
Site Conditions

The goal of this thesis, to create a framework through which appropriate design responses can be generated by architects working within unfamiliar cultures, is inherently achieved through a highly localized response. Therefore the village of Roche must be carefully analyzed. The location of the site, climatic conditions, vernacular buildings, and local crafts have been studied as a beginning of the Roche community study.

Location

The United Republic of Tanzania, formerly known as Tanganyika, is one of the largest countries in East Africa. It is also one of the poorest countries and most dependent on foreign aid. Loosely controlled by the German East Africa Company from approximately 1885 until England took hold of the country in 1916, and led by British indirect rule until 1961, Tanzania is notable for its peaceful history. The gaining of independence was diplomatically achieved and is largely attributed to the country’s first president Julius K. Nyerere. Nyerere was opposed to the individualistic capitalist system the British had imposed and instated a socialist system called ujamaa, characterized by a communal state of mind and living. The system was largely a failure (though villagisation, the optional physical relocation of people as a step toward ujamaa, is typically considered successful in improving quality of life), sometimes attributed to the bonds of tribalism that disallowed the success of large scale communal living as well as the general lack of production of communes. Today, tribalism and clannishness (smaller scale than tribalism) are still strong aspects of Tanzanian culture. Notably, the Luo tribe, primarily situated in Kenya, extends only a few miles into Tanzania in the Roche area. This is the tribe from which US President Barack Obama descended, resulting in strong positive American sentiments in this area. Today, Tanzania ranks 148th out of 182 countries according to the UN’s Human Development Index, a measure of social and economic development based on health, education, and income. Important proximities to Roche include the Kenya-Tanzania border, 1.2 miles from the

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2 Gregory Maddox and James Leonard Giblin, In Search of a Nation: Histories of Authority & Dissidence in Tanzania (Oxford: James Currey, 2005), 76.
proposed site of the Entrepreneurial Center, and Lake Victoria, 7.5 miles from the site. Proximities within the village of Roche include the town center (1.6 miles from the site), local government offices (0.6 miles), the main road (also 0.6 miles), the Roche Health Center (0.8 miles) and the Roche Primary School (0.1 miles).

Topographic data for this area indicates that though the proposed site for the Entrepreneurial Center is not a particularly low point, the area will receive some drainage from surrounding hills. Based on observations, the site does not appear to flood or become marshy during the monsoon seasons, though a raised foundation may be an appropriate response to the topography.

Pathways in this area are primarily informal routes followed by pedestrians. Many of the smaller plants in this region
have shallow roots, allowing a path to be formed after only a few days of regular use. Similarly, the road shown in blue is the product of repeated use, not planned infrastructure. This route leads from the main road to the health center, as well as the Kenyan border. Other common routes shown on the map include the pedestrian paths from the town of Roche to the primary school, from a nearby primary school to the church, and from the church toward the Kenyan border.
This particular site and program have been chosen because of the entrepreneuring spirit that has bred in Roche since the Cincinnati based non-profit Village Life Outreach Project has been working in the area. Village Life has been visiting Roche twice a year since 2004. Until the opening of the Roche Health Center in April 2010, medical care was available only during these visits, but Village Life also taught villagers about ways in which they can improve their health and education year round. Three locally run committees have resulted from Village Life’s efforts, and during the construction of the Roche Health Center in 2010, many proposals were brought to Village Life’s representatives requesting funds or information to assist in entrepreneurial projects. The existence of a group of economically active individuals, regardless of the scale of their economic activity, is an important cultural indication of an appropriate setting in which to introduce microfinance opportunities. This aspect of culture will be further addressed in the programming section of this document.
Climate:

Sun

Roche is located approximately seventy miles south of the equator. This creates a markedly different relationship to the angle of the sun than that to which U.S. educated architects are accustomed. North and south faces of buildings can be treated almost identically since the sun path, pictured to the right, is almost perfectly centered over the site. Similarly, the east and west faces of a building also receive an almost equal amount of sun from a similar angle, though the intensity of evening sun in this area must be taken into account. With these angles in mind, orienting openings primarily along the north and south sides of the building, and providing minimal overhangs at these locations will help keep the building cool and well lit. The east and west walls, and any openings in these walls, should be protected from morning and evening sun. This could be addressed through the use of vertical louvers. While both of these recommendations do not indicate the need for a large roof overhang, the intensity of the equatorial sun places a premium on shade. Excess of shade around a building would likely become a gathering space, particularly in the afternoon hours.

Temperature and Humidity

As described above, Roche's proximity to the equator suggests scorching temperatures. This is not entirely true as low humidity, moderately high altitude, and regular breezes mitigate the heat, though this is not to say that care should not be taken to cool the building. Climate Consultant, an environmental evaluation software, recommends operable walls, shaded outdoor spaces, ceiling fans, indoor air motion, carefully oriented natural ventilation, the facilitation of cross ventilation, and earth sheltering as possible strategies to maintain a comfortable temperature within the building. Natural means of mitigating temperature extremes are particularly important, as there are currently no

Recorded temperatures (in F) according to Climate Consultant
sources of power in Roche.

Interestingly, despite high temperatures, the charts below indicate that temperatures often drop below anticipated comfort levels. Further research by UC Professor Michael Zaretsky also indicates that the comfort zone of native inhabitants may be three to five degrees Fahrenheit warmer than those of people not residing near the equator (shifting the gray area in the chart above from 68-78 degrees to 72-82 degrees). In these diagrams, the left diagram shows that Roche is “uncomfortable” 63% of the time. The right diagram depicts improved comfort through the addition of natural ventilation cooling (outlined in green) and internal heat gain (outlined in beige). By cooling the building at certain times, and retaining heat at others, Roche can be considered comfortable according to Climate Consultant 97% of the time.

Psychometric charts according to Climate Consultant
Precipitation

There are two rainy seasons in this area of Tanzania. The first, which takes place from late March through May, is the more intense of the two. The second takes place during October and the early part of November. During both rainy seasons, storms typically take place in the late afternoon or very early morning hours. Storms are extremely intense, and though data has not been compiled concerning the rate of rainfall, the degradation of roads and paths following rainstorms is evidence of their intensity. The moisture in both the ground and the air during these periods is contrasted by extreme dry periods during the rest of the year. A design solution for this site must accommodate both seasons in which the ground may become saturated, and seasons during which dust rises from roads and pathways.

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Local precipitation data

Wind

A strong local understanding of wind patterns is exhibited in the primary schools adjacent to the site of the proposed Entrepreneurial Center. Morning winds from the northwest come in from Lake Victoria, while evening breezes move the opposite direction. The classrooms are arranged to take advantage of this daily ventilation. This consistent air movement provides design direction in terms of orientation, openings, and roof slope. The Entrepreneurial Center (shown in orange) will mimic both the orientation and spacing of the elementary school buildings (shown in the aerial photo to the right) in order to gain similar natural ventilation benefits.
Seismic

The Great Rift Valley, one of the oldest active faults in the world, extends into Tanzania in this area. Though data on seismic activity in Roche is limited, this graphic represents the consistent moderate seismic activity that occurs on a regular basis. Local residents report that minor earthquakes are common, and four such events occurred between March and October of 2010. Little to no damage is sustained from earthquakes in this area, partly due to the typically low magnitude, but also because the vast majority of construction consists of single story earthen structures. The Roche Health Center was designed to specifically address this challenge, incorporating a large concrete frame to support the building as well as confine bricks during seismic activity. As technology is introduced, it is important that construction techniques do not encourage building practices that may result in dangerous structures.
Local Building Practices

There are two primary types of buildings in Roche. The first is the vernacular mud hut with a thatch roof. The second is the square or rectangular brick building with metal roof, introduced during English colonization of Tanzania. Though both have benefits and drawbacks, most local people view the later as a desirable status symbol.

The mud and thatch building mitigates the climatic challenges discussed earlier. Thick mud walls keep afternoon heat at bay, releasing warmth into the building during the coolest parts of the night. The round plan of huts does not allow the sun’s rays to hit the building directly, further decreasing afternoon heat. Thatch roofing responds ingeniously to climatic conditions allowing warm air to rise out of the hut during dry periods, yet grasses expand when moist, preventing rain from entering the building. Colonial style buildings are similar to the vernacular huts in that brick walls offer similar benefits of heat lag, yet beyond this the similarities cease. One benefit of the more recent building is that windows and other openings are often larger and more frequent, allowing breezes to pass through the structure, while openings in vernacular buildings are typically small due to poor spanning abilities of the materials. The roof is a primarily negative aspect of the Colonial building type. Wood trusses are typically used, though safe spanning and nailing practices are uncommon. Corrugated metal roofing tops these trusses, increasing indoor temperatures during the hottest parts of the day and releasing valuable heat during the night. Further,
during rainstorms the metal reverberates so loudly that conversations cannot be had indoors, and all meetings and classes are cancelled.

Benefits and drawbacks, climatic or otherwise, found in both types of buildings are primarily based on the materials used. These materials span a spectrum that is populated by locally available materials at one end and materials with long life spans at the other. The mud hut is constructed entirely of materials easily attainable in the Roche area. The *Atlas of Vernacular Architecture of the World* identifies wattle and daub construction, mud plaster finishes, and grass and/or palm thatch roofing as building techniques local to this area throughout history. The disadvantage of these materials is their short life spans. Mud walls are often plastered once each year. Thatch roofs may last from four to seven years according to the Roche people. Individuals then struggle to save funds and coerce neighbors into assisting in periodically reconstructing their homes. Contrasting this, the corrugated metal roof and kiln-fired bricks are difficult to obtain but have increased longevity. Villagers travel approximately thirty kilometers for manufactured materials such as lumber, corrugated iron sheets, and nails, often collecting as much as they can carry on a bicycle to slowly accumulate the materials they need. The return on this investment is a highly respected home that may remain in good condition for ten to twenty years.

In addition to understanding the climatic characteristics of these building types and the cultural attitudes toward them, the processes involved in building them are studied in the next section. As building materials and techniques are proposed for the Entrepreneurial Center, this information and the experience gained while building in Roche will help determine which aspects of vernacular construction to emulate and which to avoid.

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The Dilemma of Local

Though buildings sometimes achieve cultural relevance through the use of local materials and skills, a dilemma is presented in villages such as Roche where a rich cultural heritage is paralleled with the desire to emulate more affluent countries, particularly in community buildings. In Roche, cultural sensitivity does not mean lauding the vernacular, but rather understanding existing conditions to the extent that the materials or procedures that are introduced are well suited to traditional methods of making. Designing to conform solely with locally available products would limit the architect to organics such as mud, sisal poles, and grasses, and local people view the use of these materials as backward. As Antoni Folkers explained in his lecture “Beyond the Western Paradigm”, when his firm proposed to construct homes in Africa with mud as the primary building material they were asked whether people in New York are building with mud. Through research in surrounding towns and cities, an understanding of what could be brought to Roche has been gained. Available materials and skills run the gamut from low to high technology with earth systems prevalent in the Roche area, lumber available in Tarime, solar panels in Mwanza, and pre-fabricated structures in Nairobi. This variety of technologies presents additional challenges as low-tech solutions are sometimes more difficult to construct than those that are higher technology, though the later are less likely to impact local building culture significantly. In addition to the challenges associated with importing materials, utilizing unfamiliar skills must also be managed with an eye to cultural appropriateness as tribalism makes it undesirable to bring a craftsperson from a nearby city to Roche. It is therefore the goal that through an understanding of crafts and skills that currently exist in Roche, innovative materials, tools, and procedures can be combined with existing technology in a culturally appropriate manner.

6 Antoni Folkers, Beyond the Western Paradigm lecture at the University of Cincinnati, October 2010.
Situating the Project
Craft Knowledge in Roche

Design is what, for practical purposes, can be conveyed in words and by drawing: workmanship is what, for practical purposed, can not.  

The dilemma of local, demonstrated through the graphic on the previous page as it applies to materials, carries over into the realm of construction skills though the conditions are quite different. While locally available building materials are limited, locally available skill sets are diverse. These skill sets do not necessarily align with construction, especially construction in which earth is not the primarily building material, but comprise a collection of craft knowledge that can be translated into material connections as architectural details. Identification and analysis of this knowledge and the opportunities presented are central to this study. By placing the skill sets of those who will be involved in constructing a project at the forefront of the design process, the architect positions him or herself to reconnect the processes of design and construction, and achieve a product that inherently integrates with its specific setting through a variety of facets. The achievement of these goals is dependant first on the architect’s selection and understanding of local skills that qualify as evidence of craft knowledge, rather than simple processes of making, and second, on the ability of the architect to bridge between his or her own architectural knowledge of building and local craft knowledge. These two requirements necessitate delineation and definition of the two types of knowledge.

Architectural knowledge: Involved in a broad understanding of materials, spaces, aesthetics and theories, this type of knowledge is gained both academically and practically and requires “abstract conceptualizing”, lacks clearly defined rules, and typically results in representations rather than physical realizations.

Craft knowledge: Acquired through experience and practice, craft knowledge embodies both a mental understanding of steps and rules inherent in either a material or making process, and a corporeal or motor memory of physical realization of an object resulting in both abstract understanding and technical manual skill.

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In Howard Risatti’s “A Theory of Craft”, the products and processes of the craftsperson and designer are discussed at length. Primarily, the two realms are in contrast, though overlaps are also identified. Commonalities include a functional aspect required of the products of each type of knowledge and some degree of abstract conceptualization. This shared link to function is set within Risatti’s definition of craft, a definition that well suits the products of Roche villagers, stating that practical physical function has been common to craft objects for millennia. Architecture also requires some level of functionality, regardless of discourse concerning the role of function within building programming and design. Abstract conceptualization as it applies to craft knowledge is also set within Risatti’s definition as well as David Pye’s understanding of craftsmanship. Both writers distinguish the craftsman from the workman or laborer in that while the workman carries out the plans of a designer, the craftsman is involved, or at least able, to imagine the product he or she is creating. This ability to visualize something that is not yet existent is common ground between craft knowledge and architectural knowledge in that both rely on the conceived idea to guide the respective processes, whether through the motions of fingers within clay or decisions in an office.

The role of conceptualization also represents one of the largest rifts between architectural knowledge and craft knowledge. While the architect rarely moves beyond representation of conceptualizations, the ability to realize the conceptualized form is the core of craft knowledge. This results in a direct connection between craftsmen and their mediums that architects typically lack. Risatti writes that Craft making is centered in material and its transformation through the hand as sensing agent. This quote not only underlines the importance of physical knowing within craft knowledge but also points to the significance of material within craftsmanship. Because craft knowledge is evolved with regard to specific materials and the tolerances, opportunities and challenges of that material, the craftsperson develops conventions and regulations remarkably similar to those developed historically by crafts people working with the same material. For example, the thinness of a glass blown object has a limit past which the material will fail. The glass blower understands this guideline and does not exceed the material’s capacity. Similarly, the print maker knows that intricate patterns are not feasible with certain inks or paints that will fill small gaps. The tool used to carve the stamp also delineates particular limits to the size, shape, and depth of cuts such as those shown in the stamp and print shown here. Contemporary architectural knowledge is not defined by such conventions with relation to materials. Finally, craft knowledge and architectural knowledge diverge in the degrees of precision understood. Compare the drawing of a welded

9 ibid, 17.
10 ibid, 103.
bracket (far right) with its seamless lack of joints to the realization of the design (lower right). The real bracket displays both
the thickness and the messiness of joining the material. Pye writes, “Now a design is in effect a statement of the ideal form of
the thing to be made, to which the workman will approximate in a greater or less degree. In a designer’s drawing all joints fit
perfectly! 11 This difference is linked to the notions of conceptualization versus execution described previously in that while
both forms of knowledge require conceptualization, execution plays a primary role in craft knowledge but is often divorced
from architectural knowledge. This begins to suggest a means by which the architect can mediate the knowledge inherent to
his or her profession when designing with local skill sets as the primary design driver.

The next section explores the skills currently prevalent in Roche, viewed as examples of craft knowledge in practice.
It is important that these skills be evaluated from a craft perspective rather than the viewpoint of repetitive tasks commonly
carried out or simple procedural steps in that facets of craft knowledge -- the relationship to materials, inherent rules (including
opportunities for flexibility), and definition of precision -- will allow these abilities to be evaluated in-depth and result in an
exploration of the architectural details they imply are appropriate.

Drawing of welded bracket differs from the real bracket in terms of precision.
Section 5
Designing through the Community Study

Appropriate construction techniques and design strategies need to be introduced to respond to the needs and dreams of the people in an economically reasonable, ecological, social and aesthetic way. ¹

Through pursuing an understanding of the methods of making, the culture of dwelling, and the aspirations inherent in local communities, architects gain the knowledge necessary to develop a design that is simultaneously culturally rich and appropriate, reconnects design and construction, and meets the needs of non-traditional clients. In regard to cultural aspirations, a topic discussed in section three, E.F. Schumacher clarifies the importance of an appropriate response. In his watershed text on appropriate technology Schumacher expounds, ‘For it is not a question of choosing between ‘modern growth’ and ‘traditional stagnation.’ It is a question of finding the right path of development, the Middle Way between material heedlessness and traditionalist immobility.’ As this thesis explores methods of designing that enhance quality of life while respecting existing cultural values, a variety of aspects of life in Roche are taken into account. These studies include observations of construction techniques throughout the building of the Roche Health Center, research on the history and culture of the Luo tribe, and documentation of everyday activities.

The Roche Health Center

The community study applied to the Entrepreneurial Center began with the construction of the Roche Health Center. From March through September of 2010 the process of completing drawings, obtaining a building permit, hiring (and firing) builders, and constructing the center provided many of the lessons that inform this thesis, particularly the subsequent pages concerning existing conditions and evaluation of potential impacts. On-site, construction techniques were easily observed. Local men were experienced brick-layers, and quickly became skilled at mixing and pouring concrete as well. Carpenters made beautiful louvers, notched tightly together, but struggled to nail together formwork for concrete columns. Women also participated in construction. The tasks that it was deemed culturally appropriate for women to complete, such as digging trenches and hauling water, were indicative of less tangible aspects of the culture of Roche. Finally, conversations that took place during construction communicated aspirations of local people. Many praised the strength and durability of the building. The fact that it would not need to be rebuilt within the lifetime of those present was a great source of pride. The materials used also imparted prestige to both the building and the village. Cultural lessons such as these, gained through time spent within the local community, begin the community study, step one of the design process.

Applying the Process

Construction of the Roche Health Center involved cyclical sharing of knowledge.
Material preparation and early construction of the Roche Health Center
Applying the Process

Construction of the Roche Health Center
Local Building Methods Analysis

Careful study and evaluation of local building practices makes up another aspect of the community study. Understanding the construction methods prevalent in Roche gives insight into opportunities for technological growth without disregarding traditional building practices. As the architect works within an unfamiliar setting, developing guidelines may help determine if a technology is in fact suitable to the specific community and project. Texts such as Schumacher’s *Small is Beautiful* and Marilyn Carr’s *The AT Reader*, give general principles for what makes technology appropriate. These commonly include low capital costs, the use of local materials to the greatest extent possible, and the capacity for local repair and maintenance. In addition to these general guidelines, specific characteristics may also generate guiding principles. For example, the local means of transportation may inform the average size of building materials utilized. Whether people walk, bike, or utilize livestock to transport materials each suggests a different level of difficulty in transporting bags of cement or 40’ lengths of rebar. In Roche, though concrete is a common building material, the amount of formwork generated by the health

center's large concrete structure represented a confusing amount of waste to local people. Therefore, a guideline appropriate to Roche that will be applied to the Entrepreneurial Center is that the amount of material waste generated by a technology must be minimal, or the waste must be able to be reused in another capacity.

Documentation of local building practices, such as those shown here, assist in understanding the culture of making. The steps involved in construction the two types of local buildings appear on subsequent pages, as well as studies concerning non-construction methods of making such as cooking techniques, fabric tying, and bicycle repair.
Applying the Community Study

Applying the community study described in section three to a design project is an ongoing process of analysis and evaluation. In addition, the intuitive aspects of the design process discussed in section two must take place at this stage, making the risk for imposing unfamiliar cultural ideals the greatest. Despite this, just as Heringer likely did in the design of METI, as ideas are generated regarding the introduction of materials, tools, or procedures, these ideas should be examined to hypothesize what impacts they may have on the community, as well as to verify that the design is indeed tangential to the local methods of making, culture of dwelling, and community aspirations. While technology is often viewed as having a positive influence, according to Barrett Hazeltine and Christopher Bull, authors on appropriate technology, “Rapid technological changes almost always weaken an existing culture.” This can be avoided by choosing technologies that are build upon ideas already present within the culture, as well as avoiding dramatic leaps in technology. Through the lens of economics, Schumacher explains the challenge.

If aid is given to introduce certain new economic activities, these will be beneficial and viable only if they can be sustained by the already existing education level of fairly broad groups of people, and they will be truly valuable only if they promote and spread advances in education, organization, and discipline. There can be a process of stretching ever a process of jumping. If new economic activities are introduced which depend on special education, special organization, and special discipline, such as are in no way inherent in the recipient society, the activity will not promote healthy development but will be more likely to hinder it. It will remain a foreign body that cannot be integrated and will further exacerbate the problems of the dual economy.

Therefore, as ideas for the Entrepreneurial Center in Roche develop, they are modeled and evaluated through diagrams and a series of questions clarifying the relationship of the design to existing methods of making and hypothesizing potential impacts on construction as well as other aspects of life. The remainder of this section documents the move from analysis to application.


Existing conditions are documented, and often linked to a series of photographs or sketches that helped clarify a current need or opportunity in Roche. A design response is then proposed. This response often takes the form of a model, allowing the architect to gain insight into how the design could be constructed. The evaluation that follows each design response is a summary of the answers to a series of questions concerning the appropriateness of the innovation. Design ideas build upon each other as the chapter progresses, beginning with phase one and continuing through phase three. Despite this, it is understood that evaluation should take place between each phase, and the subsequent phases may be drastically different from what is originally proposed.
Phase One Existing Condition: Culture of Dwelling
There is little economic opportunity or community space in Roche.

Response:
Phase 1 of this design creates an armature for informal market stalls using sisal poles.
Evaluation:
Though markets are common in this area, Roche currently does not have a market venue. Women often travel to sell goods to supplement the supplies and income of their primarily agrarian households. Creating local economic opportunity through adding some formality to selling, and increasing the number of participants, is likely to increase household incomes and potentially lead to further entrepreneurial ideas. A market would be viewed as highly desirable progress for the village of Roche.
Phase One Existing Condition: Methods of Making
Sisal structures have short life spans and limited strength.

Response:
Sisal poles will be reinforced by filling them with cement, creating footings and protecting them with paint.

Modified sisal construction technology: cement fill, protective coating
Evaluation:
Increasing the longevity and strength of this local building method with little added cost could proliferate easily from both an economic and a transportation standpoint. Economically, sand and sisal poles are available for little to no cost in Roche. The mixture used to fill the poles would contain a high percentage of sand, decreasing the quantity of costly cement required. Similarly, sand and sisal poles are available in Roche itself, and because cement must be brought from the next town, limiting the quantity required makes this technology feasible. Both men and women could construct durable frameworks for homes and other small buildings by reinforcing sisal in this way. Finally, though the building methods are only marginally modified, the increased strength and longevity of resultant buildings would serve as a sign of technological progress.
Phase One Existing Condition: Culture of Dwelling

The fabric *kanga* plays a significant role in the daily life of women in Roche. It serves as a tool for carrying loads such as firewood. Children are also carried in *kangas*. *Kangas* are often worn over clothing, protecting it from dirt and damage.

Response:

The sisal poles that make up the market structure are arranged based on the dimensions of the *kanga*, allowing women to create an impromptu shaded market stall with no economic investment.
Evaluation:
This design element requires no economic investment or material transportation for its implementation. By creating a space in which women can take part in economic activities without investing materials or other capital, families are likely to benefit from increased income. The impermanence of this market structure also speaks to the tribe’s nomadic history. This aspect of phase one focuses primarily on social and economic conditions within Roche, rather than construction or technological conditions.
Phase Two Existing Condition: Methods of Making
Locally fired bricks deteriorate quickly, crumble easily, and contribute to deforestation.

Response:
Through an alternative brick making process, the interlocking soil stabilized brick (ISSB), shown at right, is formed by a manually operated press.

Evaluation:
The ISSB is formed with 90% local soil and 10% cement, making cost and transportation of materials feasible for the local people. The press compacts the bricks so that they do not need to be fired, eliminating the need to gather and burn precious firewood. The press itself is manually operated, capitalizing on readily available labor rather requiring a generator and fossil fuels. Though ISSB suggest great economic and building possibilities, the press is expensive and extremely heavy posing difficulties in the proliferation of this technology.
Colonial style construction study

One of many ISSB made on the Roche Health Center site by community members
Phase Two Existing Condition: Culture of Dwelling

In Luo culture, gendered spaces are indicative of male and female roles within society. This is exemplified by cooking spaces such as the *ugi* making space shown above. Men, and even boys, do not take part in this activity or typically enter this space.

Response:

Male, female, and shared spaces exist in the design of the Entrepreneurial Center, though they do not denote social hierarchy.

Evaluation:

Maintaining the cultural norm of gendered spaces increases the likelihood that the people of Roche will feel comfortable within the Entrepreneurial Center, while removing hierarchy from the spaces indicates that men and women are equal participants in education and economic activity. The market is divided into primarily female spaces (phase one stalls) and primarily male spaces (phase two shops). The classrooms and offices, symbolic of the most technological and economic progress, will be shared by men and women (phase three).
Applying the Process

Ugi making process study

Gendered spaces plan

male

female

shared
Phase Two Existing Condition: Methods of Making
Roche experiences frequent, small-scale earthquakes, but brick and block construction techniques are not seismically stable.

Response:
Modifying local block making technology to create blocks with holes allows walls and columns to be structurally tied to each other and the foundation.
Evaluation:
Block making technology in Roche sometimes involves a hinged wooden box in which a cement and sand mixture is tamped to form hundreds of concrete blocks in a day. By modifying this box slightly to include two metal rods that create holes in the block, blocks can be structurally linked to each other and the foundation. This technology results in almost no waste, formwork is easy to transport, and results in stronger, safer buildings. Additionally, the small batches of concrete required are more likely to be mixed accurately and evenly. Women may participate in this activity as it is very similar to the process of making ugi, the staple food.
Phase Two Existing Condition: Culture of Dwelling

Most buildings in Roche are arranged based on loosely defined family units in which layers of sub-groups exist within larger groups.

Response:
A similar pattern is emulated in the Entrepreneurial Center.

Evaluation:
Arranging the center into a series of groups is metaphoric of the community as a larger version of the family unit. Smaller groups may materialize based on goods sold or days on which the center is visited. The more formal market structure created in phase two particularly emphasizes this spatial arrangement. A small number of stores are clustered within an open area and then covered by one large roof structure, delineating multiple layers of boundaries. Finally, the layout results in many opportunities for outdoor shaded areas, another important aspect of community interaction in Roche.
Phase Two Existing Condition: Methods of Making
Many examples exist in Roche in which spanning members are inadequately sized and poorly secured.

Response:
Clearly delineating hierarchy among structural members within the roof clarifies structural forces and the appropriate sizes of components.
Evaluation:
This design element does not propose the introduction of unfamiliar materials or construction practices. Rather, a single sisal pole denotes a light load, while combining three or more poles suggests an area where additional strength is needed. Clarifying structural hierarchy in this way utilizes local, affordable materials and techniques to result in safer structures that may proliferate through observation alone. This structural understanding could also be applied to areas such as farming equipment. Further, larger buildings could be constructed in this way, increasing the number of community buildings in the area.
Phase Two Existing Condition: Community Aspirations
Thatch roofs are climatically efficient and historically important, but have short life spans and are viewed as primitive by local people. In opposition, corrugated metal roofs are viewed as a symbol of prestige though they function poorly from a climatic standpoint.

Response:
The sisal roof structure becomes a base for the application of a variety of tiling systems, thatch or otherwise.
Evaluation:
Though the form, material, and technology utilized for this roof structure is very similar to what currently exists in Roche, this framework allows a variety of responses. Thatch tiles could be applied, gaining the climatic benefits of the material, while simplifying maintenance issues as individual tiles or rows of tiles could be replaced as needed. This could potentially remove some of the stigma currently attached to this culturally rich roofing method. Other tiling options could also be applied accommodating a variety of desired material costs, appearances, and life spans.
Phase Three Existing Condition: Community Aspirations

Economically, the majority of the people in Roche are classified as “extremely poor”. Through the economic opportunities gained in phases one and two, many may become classified as “economically active poor”.

Response:
Microfinance is introduced in phase three through education, savings, and micro-loan opportunities.
Evaluation:
As a result of the previous phases of the project, this aspect of the design focuses on further addressing local aspirations. Neither ingenuity nor an entrepreneurial attitude are lacking in Roche, therefore it is hypothesized that through a reliable system of banking, development can occur from within the community.
Phase Three Existing Condition: Methods of Making
Built up rubble strip footings have limited life spans
and durability during seismic events. They are also
suited to residential scale construction.

Response:
A plinth foundation is utilized in which existing strip
footing materials are used as infill while a concrete
block perimeter adds stability.
Evaluation:
This modified construction method results in a more stable and longer lasting foundation that is suited to larger structures such as community buildings. Economically, it is also beneficial. After the initial investment, it will require minimal maintenance. Environmentally, buildings are protected from rising damp and high water during monsoon seasons. The plinth also supplements the rain-water catchment system described on the next page.
Phase Three Existing Condition: Methods of Making

The modified block making technology introduced in phase two suggests a strong likelihood of proliferation. It also offers increased stability.

Response:
In phase three significantly more concrete blocks are used. Tall water cisterns are created, taking advantage of the improved structural stability provided by the blocks.
Evaluation:
This application of the concrete block demonstrates potential to address a variety of challenges that exist in Roche; social, environmental, and economic. While construction technology is directly impacted, the ability to construct larger, safer, and longer lasting structures also appeals to cultural aspirations for buildings as a source of community pride.
Phase Three Existing Condition: Culture of Dwelling
Sources and storage options for clean water are extremely limited in Roche. Significant time and effort is spent transporting water. Sickness and death result from unsanitary water.

Response:
The phase three building incorporates a rainwater catchment system into the structure.
Evaluation:
Utilizing the seismically stable concrete block introduced in phase two, cisterns are created within the Entrepreneurial Center. Similar cisterns exist in Roche though they are very rare. While economic and construction technology questions have been addressed in previous phases, architecture that supports improved infrastructure is proposed as the next step because poor health is a social challenge that deters all forms of progress.
Phase Three Existing Condition: Community Aspirations

Though maintenance and climate issues were addressed by the tiling systems in phase two, the tiles have limited longevity and are ill suited for water catchment.

Response:

Combining the tiling framework and the concrete block proposed in phase two, a site-made concrete roof tile is proposed.
Evaluation:
Using a method of making concrete blocks already existing in Roche, this technology modifies the form and the mixture to create a tile that is light yet durable and likely to be viewed as a symbol of prestige by local people. The resultant roof will be long-lasting and easy to clean, maintaining the quality of the rainwater being harvested. Additionally, builders trained in making and installing the tiles could benefit economically.
Phase Three Existing Condition: Culture of Dwelling

Many community groups exist within Roche, though spaces for meeting and opportunities for continuation and growth are limited.

Response:
Microfinance is likely to benefit and encourage community organizations. The water cisterns also could promote **ujamaa**, an African socialist way of life, as organizations could construct and maintain them, deciding how the water collected is to be used.
Evaluation:
Stemming directly from the local culture of dwelling, this support for local groups promotes a social way of living. Further, formalized community organizations would begin to fill the role currently occupied by humanitarian groups, indicating progress away from Tanzania’s history of dependency.
Continuation through Phases

The application of the community study to the design of the Entrepreneurial Center is represented in this section as a three-phase implementation. Despite this, it is expected that modifications will be made throughout the project. The cyclical process described in section three implies continual revision. For example, through the community study it could be discovered that phase one should be preceded by additional education, research or design activities. Subsequent phases may be broken into multiple sub-categories, and phase three should not be considered an end product. As each phase is completed, systems of evaluation should be prepared to clarify the outcomes of projects. These metrics should be wide enough in scope to assess the impacts technologies and design decisions have over time, within surrounding communities, and upon diverse aspects of local life. They should also attempt to discern unexpected consequences of each phase in addition to those that were planned.

As a result of this extended project delivery, the architect progressively gains an in-depth understanding of a culture that was once unfamiliar. Implied by this argument for continual, phased involvement is a significant investment of time and effort within a specific community. While many critics of humanitarian projects disparage such efforts as imperialistic, citing culturally inappropriate projects in seemingly exotic areas of the world, this thesis poses that through a long-term commitment within a specific setting, architects can work within foreign cultures yet avoid these negative consequences. This long-term involvement also perpetuates an understanding of the community and the architect as equal partners, rather than beneficiary and benefactor. While the architect brings specific expertise and experiences, the community offers a multitude of lessons as well.
Applying the Process

Roche community member
Section 6
Programming the Entrepreneurial Center

“About 90 percent of the people in developing countries lack access to financial services from institutions.”¹

Microfinance in Roche

Dr. Chris Lewis, founder of Village Life Outreach Project, has often been quoted, “It is our goal to give a hand up, not a hand out.” Village Life has succeeded in improving the lives of countless Tanzanians through mobile health clinics, education outreach programs, scholarships for Tanzanians attending primary and secondary schools, a nutrition program, and, most recently, the Roche Health Center. Though the value of each of these endeavors remains unquestioned, some have been “hand outs”. In proposing an Entrepreneurial Center in Roche village, the adults of the village will be exposed to a resource that offer economic opportunities, yet requires commitment and effort on their parts if change is to be affected in their lives. The proposed center includes informal market stalls, formal market stalls, and store structures for fledgling entrepreneurs, as well as spaces for adult education, group meetings, private meetings for microfinance opportunities, and outdoor gathering spaces. Each of these spaces create a setting in which members of the Roche community can come together or meet with visiting organizations to take part in activities aimed at enhancing the economic situation and quality of life in this area of Tanzania. The Entrepreneurial Center is differentiated from a community or education center primarily through the inclusion and importance of microfinance opportunities at the center. The presence that Village Life has had in this region in recent years, particularly the organization of committees within each of the sponsored villages, seems to have catalyzed local groups to form and entrepreneurial efforts to be proposed. Evidence of this entrepreneurial spirit can be found in multiple plans that were brought to the health center between March and September of 2010 in search of funding. These included a dam for irrigating farmland, funds to construct a chicken farming cooperative, and a sewing machine to help a woman support her family. Though microfinance opportunities have burgeoned in East Africa in recent years, these opportunities have not reached this remote area of Tanzania, resulting in this project’s focus on a place from which microfinance lenders could base their operations. Finally, children also will benefit from the center as classrooms can be utilized by the primary school as needed, and parents may be more likely to become involved in their children’s educations when meetings, adult education, and business opportunities take place in close proximity to the school.  

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2 Yolande Miller-Grandvaux, “USAID and Community Schools in Africa: The Vision, the Strategy, the Commitment” in Literature Review of community Schools in Africa (Washington DC: USAID Africa Bureau, 2002).
According to Marguerite Robinson, anthropologist and author of *The Microfinance Revolution*, “Microfinance refers to small-scale financial services – primarily credit and savings – provided to...individuals and groups at the local levels of developing countries, both rural and urban.\(^3\) The basic principle of microfinance is simple, by providing finance opportunities in areas in which they are not available, economic activity will result and the number of individuals and families living in poverty will decrease. While this principle is widely understood there are two common misconceptions concerning microfinance that Robinson clarifies. First, microfinance is often thought of only as lending, yet she claims the need for savings is equally if not more important in developing countries. Robinson ascribes to the “financial systems approach”, which seeks to reach the economically active poor borrowers who can repay microloans from household and enterprise income streams, and savers, as opposed to the poverty lending approach, which supplies credit only.\(^4\) In economically depressed settings savings may easily be lost or stolen, or more likely, family members may lay claim to a relative’s excess funds. This facet of microfinance underlines the need for information privacy within the Entrepreneurial Center. Second, Robinson makes a distinction between two groups that she classifies as the “economically active poor” and the “extremely poor”. Though the distinction is not precise, the former group, have some form of employment and are not severely food-deficit or destitute.” She does not recommend extending microfinance efforts to include the extremely poor, as the credit extended to them cannot be expected to be invested at the expense of providing food for family members, and therefore cannot be expected to be repaid. Rather, Robinson recommends outreach and education programs to benefit this group, and points out that if financial opportunities are available to the economically active poor they may be able to hire extremely poor individuals, improving the situations of both.\(^5\)

Both of the lessons from Robinson suggest that the Entrepreneurial Center be conceived of in phases. During initial steps, a microfinance institution could offer savings opportunities and educational programs in Roche. This phase targets the extremely poor and introduces the microfinance institution to the community. In the later phases, microfinance options will begin to include microlending, and small business venues will be constructed as a part of the Entrepreneurial Center. Loan recipients may locate shops and other businesses in the Entrepreneurial Center, increasing the likelihood of loan repayment

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4 ibid, 22.
5 ibid, 20.
through proximity to the microfinance institution. Additionally, distinct phases of construction may allow technology introduced during the first phase to proliferate throughout the community before subsequent phases commence. The designer could then assess the daily uses of the center, and modify or expand upon the initial space allocations.

**Space Requirements**

The spaces required in the Entrepreneurial Center can be divided into four categories. Microfinance operations spaces, though essential, make up a relatively small percentage of the center, and their location should suggest privacy and security. The classrooms make up the largest built component. Effective natural ventilation is particularly important in these spaces. Storage and built-in seating are also desirable in the classrooms. Business venues must be flexible to accommodate a variety of shops and activities. Venues may vary in the degree of permanence required by the business from a market day stall to a workshop for a craftsman. Gathering spaces are the fourth primary component of the Entrepreneurial Center. Informal gathering is common in Roche, and typically only requires shade. The Entrepreneurial Center will facilitate gathering through shaded courtyards, outdoor seating, and one or more community message boards. Parking, both car and bicycle, and pit latrines are also essential programmatic elements. Projected space requirements are listed on the following page.
<table>
<thead>
<tr>
<th>Space Name</th>
<th>#</th>
<th>Initial Proposed Dimensions</th>
<th>Required Equipment</th>
<th>Space Needs</th>
<th>Other Notes</th>
<th>Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>outdoor gathering area</td>
<td>1</td>
<td>undetermined</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>temporary market stall</td>
<td>30</td>
<td>4' x 8'</td>
<td></td>
<td>shaded area to transact business, adaptable to changing needs</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>entry area</td>
<td>2</td>
<td>undetermined</td>
<td>message board</td>
<td>clear point of entry, separates classrooms and offices from shops</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>restroom</td>
<td>4</td>
<td>9' x 4.5'</td>
<td>bucket for water</td>
<td>good ventilation</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>permanent market stall</td>
<td>8</td>
<td>8' x 12'</td>
<td>shelving</td>
<td>shaded area to transact business, storage for goods</td>
<td>requires lock</td>
<td>2</td>
</tr>
<tr>
<td>permanent shop</td>
<td>6</td>
<td>12' x 16'</td>
<td>counter, shelving, and additional storage</td>
<td>security for goods and/or tools, adaptable to changing needs</td>
<td>requires lock</td>
<td>2</td>
</tr>
<tr>
<td>parking</td>
<td>1</td>
<td>20' x 36'</td>
<td>none</td>
<td>good drainage</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>bicycle parking</td>
<td>1</td>
<td>10' x 30'</td>
<td>dividers to lean bikes against</td>
<td>highly visible</td>
<td>bike locks are not present</td>
<td>2</td>
</tr>
<tr>
<td>microfinance office</td>
<td>2</td>
<td>12' x 12'</td>
<td>desk, chairs, filing cabinets, book shelf</td>
<td>acoustical and visual privacy</td>
<td>requires lock</td>
<td>3</td>
</tr>
<tr>
<td>lockable storage</td>
<td>2</td>
<td>4' x 12'</td>
<td>shelving</td>
<td></td>
<td>requires lock</td>
<td>3</td>
</tr>
<tr>
<td>veranda/waiting area</td>
<td>2</td>
<td>8' x 80'</td>
<td>benches</td>
<td>requires shade</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>classrooms</td>
<td>4</td>
<td>20' x 24'</td>
<td>tables and chairs, marker or chalk board</td>
<td>clear orientation of space, natural ventilation</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>storage</td>
<td>4</td>
<td>4' x 8'</td>
<td>shelving</td>
<td></td>
<td>requires lock</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Estimated SF</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>31,000</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*note: all spaces should receive natural light and ventilation, electricity and other forms of power are neither nor reliable in Roche
Section 7
Design

When designing for change, the part that is unseen makes the part that is seen work. ¹

¹ Sergio Palleroni, “Learning from Communities,” Speech, Structures for Inclusion 10+1 from Design Corp, Chicago.
Phase one design collage
Phase two rendering
Phase three rendering
Works Cited


Antoni Folkers, Beyond the Western Paradigm lecture at the University of Cincinnati, October 2010.


Palleroni, Sergio. “Learning from Communities.” Speech, Structures for Inclusion 10+1 from Design Corp, Chicago, March 26, 2011.


“Schulbausteine fur Gando e.V.” Schulbausteine fur Gando e.V. http://www.fuergando.de (accessed October 11, 2010).


Contemporary Process Questionnaire

The following questionnaire was developed by the author in an attempt to better understand commonalities among contemporary processes today. Questions are italicized, while the three respective responses received from practitioners are in red, bold typeface, and all capitalization.

1. What is your first step when beginning to design a project?

Understanding what the driving force(s) are behind the project, i.e.: cost, design, program, etc.

Meet with the client to review site, program, existing conditions (if addition/renovation), scope of work, budget and in general get to know the clients/build a relationship in order to serve them better throughout the design process

IDENTIFY CHARACTER AND CONSTRAINTS.

2. Though architects revisit issues of site, program, and details throughout the design process, please number the following elements in the order in which you typically initially address them.

1. site physical
2. site contextual
3. site climatic
4. program building form
5. program required spaces and sizes
6. program adjacencies
7. details related to construction type
8. details specific to the project

Hard to say any issues are addressed simultaneously. Design is a constantly spinning circular process. Typically we will look at all the site stuff first, next the program and then work into the details. As we design we are constantly aware of all three and how every decision affects all three.
3. Which of the following is the closest to what you consider your primary design driver? secondary? tertiary?

- icon/form
- program
- budget
- environmental sustainability
- social sustainability
- materiality
- builder abilities
- building maintenance
- other (please specify)

It really depends on what the client’s objectives are.

2 icon/form
1 program
3 budget

TERTIARY icon/form
PRIMARY program
SECONDARY budget

4. Do you prepare your own cost estimates? If not, who does?

I only prepare cost/SF estimates in-house, otherwise I hire a cost consultant or a Contractor to budget for me.

We have a good feel for general square footage pricing and use that at the beginning to guide our design. However, we request the client bring a contractor on board early in the process to provide preliminary costs estimates and in general give valuable feedback on the design/constructability.

DESIGN/BUILD CONTRACTOR

5. When you begin a project, is funding typically:

- Previously secured before your involvement
- Potentially forthcoming
- Raised by yourself or your organization
- Other (please specify)

Previously secured before your involvement
X Potentially forthcoming
Raised by yourself or your organization
Other (please specify)
6. Do you consider standard building material dimensions (such as lengths, widths, and heights of lumber, or the length and width of a sheet of drywall) while designing?

Yes, I use it as an organizing tool, but will consider breaking the rule if it makes sense.

- Always
- Often
- Sometimes
- Rarely
- Never

With the use of engineered lumber, standard lengths are not applicable. Each piece is cut to proper length at the factory. With regard to sheet goods (drywall, decking, sheathing, etc.) only on budget jobs (i.e. duplexes where the design will be repeated multiple times) will we focus on designing on a 2x2 or 4x4 grid.

- Always
- Often
- Sometimes
- Rarely
- Never

7. How many times in a week do you typically visit a construction site while your design is being built? Is this the number of times you would like? If not, why can’t you visit the site as often as you would like, and would you visit it more or less frequently?

It depends on how the Owner is paying me for construction observation. I will usually visit a site one a month, unless there are issues in the field.

Typically only about 20% of our clients are interested in paying for construction phase services. Of the clients that are willing to pay we average about 1.5 site visits per month. I would love to be there more often so many critical decisions that have major impact on the design and budget are made without my knowledge.

TWO TO FOUR TIMES. MORE FREQUENTLY SO IT WOULD BE POSSIBLE TO HELP PROBLEM-SOLVE BEFORE THINGS GET TOO FAR ALONG.
8. Either typically, or based on a specific recent project, were the majority of laborers involved in the construction of your design(s), residents of the city or town in which it was constructed? If not, how far do these laborers often travel from their homes to the site?

For residential work most subcontractors and laborers are within an hour’s drive; on commercial work they may travel from another state and live near the site Monday thru Friday and only go home on the weekend.

From what I know, most are from the middle Tennessee area. I don’t have any idea how far they travel.

I WAS WONDERING THIS MYSELF, & DON’T KNOW THE ANSWER, BUT AM TRYING TO FIND OUT.

9. Do you live in, or are you native to, the country in which the majority of your projects are built? the state?

I have only done two projects outside the US, (Honduras and Dominican Republic). However, I travel all over the US doing Commercial and Industrial work. I think I have done a project in 46 of the continental US

I live in the middle Tennessee area and most of my projects are within a 50 mile radius of my office.

YES, NO

10. When young architects/interns come to work with you, what do you feel most draws them to you/your firm?

I think there are three factors that draw people to your firm:
   Project Type, Construction Type, Outside influenced (region of the country, mountains, etc.)

Small firm = exposure to all aspects of architecture – design, construction and the business side.

OPPORTUNITY TO WORK IN A LARGE OFFICE ON LARGE PROJECTS WITH (LARGE) ENGINEERS.