Bricollage Research and Agile Development in Humanitarian Architecture

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Informal Settlements and Bricollage Research

Current efforts to measure, catalogue or otherwise document what are now known as informal settlements – a term that expresses more our lack of ability to measure than the inherent nature of the settlement itself – are limited by the mechanisms of research, a set of tools that are designed to assess conditions found within more formal sectors. As a result, architects, urban planners, policy-makers and others who are helping to frame the next generation cityscape are doing so with only a cursory understanding of the conditions faced by somewhere between 800 million and 1 billion people - a blindspot that will shortly balloon to somewhere between 1.3 billion and 2.5 billion citizens (Davis, 2007).

These paired conditions – the exponential growth in informal settlement and our almost complete inability to understand them - will only grow in importance over time. Unfortunately, to address the former is impossible unless we first address the latter and to address the latter requires that we adjust our techniques in light of the still-unknown realities of the former. This paradox forces our hand as researchers and designers of said environments, compelling us to adopt techniques of research, design and construction that permit a more gradual and systematic interrogation of current mechanisms based upon heretofore unknown conditions. Instead of entering into informal settlements as an engineer or scientist, with a preconstructed survey or premeditated mission (i.e. to tabulate numbers, design sustainable homes, or build a community center) we must enter into these situations as a bricolleur, using small acts of observation, data-collection, and construction in order to gain the knowledge necessary to craft more profound methods of working. In this way, the tools and measuring devices of the bricolleur-researcher function less like objects, designed to a fixed and singular purpose, and more like Claude-Levi-Strauss' objects of knowledge: artifacts designed provisionally, through which we might instigate the creation of new tools and objects (Strauss, 1968).

To illustrate these concepts, this paper will turn to a series of $5 architectures created in this spirit within informal settlements around the world. The measurements, insights, and methods unearthed through these small architectures will be presented, analyzed and discussed, in the hopes of, eventually, developing a more iterative research paradigm.

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Bricollage, Iterative Research Models

1. The Agile Manifesto

In February of 2001, 17 software developers met in Utah to discuss lightweight development methods. From this conversation, they authored the *Manifesto for Agile Software Development*, which established a rapid, adaptable and profoundly crowd-sourced method for software development. The *Manifesto* offered twelve key principles (Beck, 2001):

- Customer satisfaction by rapid delivery of useful software
- Welcome changing requirements, even late in development
- Working software is delivered frequently (weeks rather than months)
- Working software is the principal measure of progress
- Sustainable development, able to maintain a constant pace
- Close, daily co-operation between business people and developers
- Face-to-face conversation is the best form of communication (co-location)
- Projects are built around motivated individuals, who should be trusted
- Continuous attention to technical excellence and good design
- Simplicity- The art of maximizing the amount of work not done - is essential
- Self-organizing teams
- Regular adaptation to changing circumstances

Through these principles, the *Manifesto for Agile Software Development* took to task several long-standing parameters of software development, prioritizing self-organizing bodies over hierarchical orders, customer collaboration over contract negotiation and continuous development over realizing the goals of a predetermined plan.

1.1 Strategies of Agile Development

To realize these goals, proponents of agile development redesigned the project delivery process, replacing traditional methods with processes that would not only *permit*, but *promote* development, teamwork, collaboration, and process adaptability throughout the life-cycle of the project (Ambler, 2002). Several key strategies emerge from this base:

1.1.1 Continuous Integration

At its core, agile development requires the continuous integration of new or changed code into an existing code repository, with the smallest intervening window possible. This places great emphasis upon reducing or eliminating the gap between commit and build. It also places great importance on continually cultivating techniques of exchange that would allow contributors to rapidly find and address any errors that might emerge through this fluid process. Project delivery systems, as well as those dedicated to project documentation, assessment, and development, collapse into a single, iterative process without end. The build becomes automated – a process of overlapped research, design, testing and use that allows for the immediate testing of new work and the continuous integration of necessary corrections. A self-sustaining, regenerative information architecture thus emerges (Black, 2009).

1.1.2 Incremental Improvement

To realize continuous integration, proponents of agile development had to first break large tasks into smaller increments, offering the actors engaged in the continuous integration process small, self-contained nuggets of insight in real time. Wisdom thus becomes a matter of many insights piled up, not a carefully choreographed and predestined process authored by a predetermined body of experts. New iterations of work are a product of weeks, not years. The goals of project delivery thereby shifted from offering iterations with sufficient functional improvement to warrant a full market release to offering iterations with a manageable amount of bugs capable of offering incremental improvement to the previous model (Beck, 1999). As every commit is built, many small ideas naturally trump the large. As the tools and processes behind the work become more refined, the speed and accessibility of the build improves dramatically. Correspondingly, new iterations of work are now a product of weeks, but minutes.

1.1.3 Self-organizing Teams

As the processes behind continuous integration advanced and the acceptable increment of project delivery shrunk, proponents of agile development were able to radically expand the nature of the teams behind the build. Instead of assembling a predetermined group of experts or placing the task before a large team of professionals, all stakeholders can now be involved in every aspect of the project delivery process. The indeterminate nature of the term stakeholder brought about cross-functional and self-organizing teams of contributors, without any consideration for existing corporate hierarchy or the corporate roles of team members.

1.1.4 Constant Communication

However, to realize any of these strategies requires rapid communication. In the early days of agile development, this placed a priority upon quick, face-to-face communication techniques that would expose problems as they arose. The script, not written communication became the prior means of offering updates and progress reports. Daily

meetings, often referred to as stand-ups or scrum meetings due to the habit of participants standing to keep the conversation short, were ritualized. The fifteen-minute office meeting became the norm. As internet-based communication technologies advanced, these meetings fractured, allowing anyone with access to the script and the knowledge, skills and toolsets necessary to evolve it well could contribute. The wisdom of crowds could be harnessed to an extent never before thought possible (Surowiecki, 2005).

1.2 Essential Conditions for Agile Development

To realize agile development strategies requires that those framing the work ensure that three core conditions are in place:

1.2.1 Shared Language

First, those framing the work must offer the focus of the work in a language understandable to all who are expected to contribute to the work. Within the world of information technologies, this shared language finds its root in the nature of the program itself. Traditional language definitions – as offered by spoken tongues or written conventions – are of secondary importance. Thus, although it might be helpful in some instances if the contributors all spoke the same language, it is not required; the language of programming is the core mode of exchange. This casts a wide net, permitting experts from around the world to contribute their wisdom to the work. For the architect operating as a socially-responsive creative actor, this approach offers a potential address to a common hurdle to collaborative work and, with it, a challenge. If the architect can couch the creative process in terms common to a wide body of potential contributors, he/she could potentially overcome the difficulties in creating collaborative work with people who speak many different languages and hold many different conventions of information exchange, as is often the case in fringe settlements. Images thus trump words; executed work, discussion.

1.2.2 Shared Tools

Secondly, the team farming the work must ensure that the tools necessary to engage the design action are accessible to all parties who will contribute to the work. Obviously, for the information architect, this tool set is found within the various computing technologies required to understand the context for the design action, analyze the various conditions that will inform the address, and disseminate the resulting position to all potential future contributors. Provided that this requisite tool set, including the computer, peripherals and all requisite tangible and intangible infrastructures, is available to all parties, the potential for engagement exists. For the architect engaged in socially-responsive design work, this tool set is based upon the material and practice conventions found within the work's immediate context. Indigenous materials and practices are a natural cornerstone of the design response, with a particular emphasis upon those materials and practices that are common, accessible and replicable. Considerations of cost (less expensive materials are more easily purchased), workability (resources more easily worked will permit a wider body of contributors), and assumed expertise (if the talents required to use the materials are easily mastered, more people will be able to engage the work), become quite important. Although

less inclusive tools sets, including those found within more expensive physical supports (laptops, 3d printers, etc.) and more exclusive methods (environmental modelling, scripting, etc.), are valid modes of pursuing the initial design response, any insight found using said mechanisms must be quickly translated into more universal means. The laptop may be used to model iterations and the CNC router, produce studies, provided that the final disseminated result of these investigations are based upon tool sets of the place.

1.2.3 Shared Knowledge

Third, any team attempting to execute agile development strategies must make sure that all knowledge required to engage the work is universally accessible. The complexity of this mandate is found within the paired needs for speed and accuracy. If the knowledge base is not up-to-date or is not verified, the contributed wisdom of every step of the process from that point forward will be sacrificed. Google works because it is consistently updated and verified, Wikipedia fails, at times, because the system of updating and correcting is not as robust. Similarly, Linux contributors wield great wisdom because they have access to the latest updates and all the facts that went into these decisions. The speed with which these paired concerns are met will greatly impact the speed of development: instantaneous, accurate updates will pave the way for a very fast development; slow, inaccurate updates will stop it altogether. For the socially-responsive architect, these concerns for speed and accuracy are not easily met, as the tool sets used to transfer information within fringe settlements – conversation, word-of-mouth truisms and, eventually, traditions - are not designed to exchange new wisdom with great speed or provide for consistent verification. In fact, most of these mechanisms are prone to encourage behavioral patterns, such as information cascade, social comparison, and polarization, that lead to rumors, gossip, and other oft-erroneous reports (Surowiecki, 2005).

1.3 From Agile Development to Humanitarian Design

To cultivate a shared base of exchange – in terms of language, tools and knowledge – that can keep pace with the rapid development of fringe settlements, the socially-responsive architect must break down the offered insight into more manageable units of transference. Instead of elaborate arguments or complex propositions, the architect must cultivate wisdom gradually, through a series of concise addresses couched in a language easily understood and transferred using tools and means easily engaged. To operate well in fringe settlements, the architect must pursue the work through meme-tectonics.

2. Meme-Tectonics

The utility of the meme - a bit-sized morsel of information easily shared and virally propagated - is well-known to the advertising agent, TV executive and counter culture warrior (Lasn, 2000). To those dwelling within informal settlements, this idea, although generally couched using different terminology (if at all) is of vital importance. Without it, critical messages – where to hijack free electricity, how to find clean water and what materials are best suited to keep the rain off your head – can be misunderstood, mistranslated or misjudged, missteps that could greatly impact one’s odds of survival.

From this foundation, emerges meme-tectonics – bite-sized construction morsels based upon the methods of the bricolleur and the potentials found within undervalued resources (Frampton, 2001). For the activist artist and socially-responsive designer, meme-tectonics offers a method of project delivery that sidesteps the limits of top-down project dissemination, which are too slow to keep pace with the rapid growth of edge settlements and assume a hierarchy of knowledge transference, without sacrificing the knowledge base of the external expert.

For the activist artist and socially-responsive designer, meme-tectonics trades the creation of objects for the creation of objects of knowledge – material constructs that collect the wisdom of many and propagate virally (Levi-Strauss, 1968).

2.1 Three Studies

Each of the projects shown here represent the promise of meme-tectonics within distinct fringe settlements: the site of the first work, affectionately titled streetURCHIN by its original makers, is based upon economic situation, the site of the second work, fencePOCKET, is based upon a perceptual situation, and the site of the third work, projectionMAIL, is based upon a situation of custom. To address these diverse concerns, all three works collect around the promise of simple, easily transferred tectonic knowledge, as offered by the following descriptions:

2.1.1 Meme-Tectonics 01 _ streetURCHIN (total cost: $0.50)

streetURCHIN is borne of an invitation to exhibit previously realized work and the designers' strict refusal to engage in such a limited, object-centric action. Instead, those responsible for this work requested to use the exhibition as an opportunity to engage a set of architectural systems present within the context of the gallery space. Specifically, the designers requested to engage the systems that defined the distinct lifestyles of the transient peoples who inhabited the sidewalks around the gallery. The resulting work presents itself not as a solution to homelessness, but as a minor tectonic address to the issue of sleep faced by said populace: the construction of an urban tent that is safer, drier, warmer and more portable than the cardboard tenements currently deployed, using only discarded materials and simple methods of construction. The eventual product of the designer's effort uses simple, repetitive techniques to produce a completely watertight and easily transported shelter from nothing more than discarded plastic shopping bags, rubber bands, and used water bottles.

However, this incarnation only represents a small piece of the value held by the work. As is the case with any work of meme-tectonics, the impact of the address is proportional not to the final object crafted by the originators, but the extent that this object instigates others to use the approach to realize more profound versions of it. To facilitate this process, the originators of the first *streetURCHIN* sought to disseminate the findings to the widest audience possible using a small, pocket-sized manual that uses simple graphics and photos to describe our twelve-step construction process. The team then sent hundreds of these booklets to galleries, agencies and other activist organizations in cities around the US. The

manual thus became an invitation for others to enter into the conversation, build alternative versions of the work, enter into the issues faced by the homeless, and get involved in finding a more permanent solution.

2.1.2 Meme-Tectonics 02 _ fencePOCKET (total cost: $0.00)

Like *streetURCHIN, fencePOCKET* does not attempt to solve anything, for the problem-solving dynamic has little value in fringe situations, serving only to understate the complexity of the conditions engaged or overstate the potential of external interlopers to do so. Rather, *fencePOCKET* is a meme-tectonic based upon a two observations: (a) that our nation's urban areas contain miles of chainlink fencing, guarding our property lines and defining a perceptual edge between public and private lands and (b) that chainlink fencing, although very resistant to vertical forces, often falls victim to horizontal forces, resulting in bulges, creases and other deviations. When brought together, these observations offer hidden potential within fencescape deformations: a blurring of the perceptual edge offered by the fence and thickening of the assumed line between public and private lands. The meme-tectonic offered by *fencePOCKET* is designed to instigate the creation of new public space within these fencescape deviations.

To work well within this context, *fencePOCKET*'s meme-tectonic is designed to be:

* SUSTAINABLE: *fencePOCKET* is constructed entirely of reclaimed tarp, becoming a consumer of waste, not a generator of it. The resiliency of this tarp, a deficit if placed within a landfill, becomes a huge asset when used to create *fencePOCKET*, adding durability and longevity to the construction.

* LEGAL: *fencePOCKET* can be tailored to any deformation, eliminating any legal issues associated with trespassing into either public or private lands.

* EFFICIENT: *fencePOCKET* uses a simple weave construction – a process that allows even the smallest sections of reclaimed tarp to tap into the strength of existing fences.

* ELASTIC: *fencePOCKET* can be built anywhere a fencescape deviation exists: any city, any country, any place.

* USEFUL: *fencePOCKET* can accommodate a wide range of uses: *fencePOCKET_PARK* [public lands are vanishing], *fencePOCKET_GARDEN* [the average American meal travels about 1500 miles], *fencePOCKET_FREE STORE* [Americans deposit 56 tons of trash into landfills every year, around one-third of which is related to new purchases], *fencePOCKET_BENCH* [US cities are quickly removing benches to combat public sleeping], *fencePOCKET_COT* [there are currently over 650,000 people in the US without shelter]

Once again, the incarnations shown here only represents a small piece of the value held by the work. *fencePOCKET* is completely open source: created wherever a fencescape deviation exists (open-site) by anyone who would like to take possession of wasted space (open-architect/contractor), programmed by whoever has the desire to realize its utility (open-developer) and occupied by whoever desires to do so (open-user).

2.1.3 Meme-Tectonics 03 _ projectionMAIL (total cost: $2.00)

The final work, *projectionMAIL*, is borne of the tension found within the exhibition of design work in a location completely foreign to the context of the work itself. Specifically, this work stems from an invitation to exhibit work created when a forty-person team representing two countries, eight universities and six disciplines travelled to Mumbai, India to help develop new architectural strategies with an Indian non-profit that provides education and health programs for children living on the construction sites of Mumbai. During this five-week project, this team of students, artists, architects and designers would forge a collaborative effort with a people who spoke a different language, had different customs, and carried different values to address the complex and fluid set of programs, sites, and communities offered by a migratory client existing on borrowed land. The resulting effort produced not a single project, but an infrastructure through which many projects might be realized over time by a myriad of publics over a long period of time.

The invitation to exhibit this work created *Publics Stimulus Packages*: an open-ended series of exhibitions (*ACTS*) and conversations (*TALKS)* intended to use the potential of meme-tectonics to question and expand the relevance of this infrastructure to other sites, publics and spheres. ACT I of this series, *Projection Mail: Uniting Systems in the Public Sphere*, employs hundreds of *PROJECTION MAILboxes [SMALL],* a $3 projection system with a range of over 10'-0", to offer patrons a myriad of perspectives on the aforementioned work. The size and weight of these projectors, as well as the nature of the projected image, allows patrons to cultivate new overlaps between these perspectives and their own, convergences which both reflect and rearticulate the relationship between the work, those viewing it, and, invariably, those responsible for re-creating it. So that this movement might expand to include publics, spaces and time periods not offered by any single exhibition, patrons to both the physical space of the gallery and a parallel online event are invited to propose alternative venues for the work by "stealing" one or more of the boxes and taking it to (what they believe to be) a more suitable location.

Once repositioned on a new site, the *PROJECTION MAILbox [SMALL]* uses simple graphic mechanisms to clearly communicate its intent to the now-expanded body of contributors, stimulating them to [re]position the work into unknown contexts, [re]project the image onto unanticipated surfaces, [re]purpose the box (through graffiti or the substitution of images) to new ends and [re]present their movements, insights and photos to a growing body of online contributors. The trans-personal experience thereby created brings together acts of transition and alienation, fantasy and translation, compelling those engaging the work to trade the position of voyeur (gawking at another, exotic experience) for one that is more personal (building one's awareness of 'projecting' onto a foreign culture offering), interactive (interaction between the given image and the creative potential of the spectator) and expressive (specifically related to their own experience as it relates to the Indian experience). The translation of the work thus becomes both relational to the original context and self-relational, creating a critical awareness of one's own position vis-à-vis the site of the observed. In so doing, *Projection Mail*, like the work that proceeded it, offers not a project, but an infrastructure through which others might stimulate a new set of negotiations between the structures offered by our work in India and those inherent within new sites, programs, and publics.

3. Language > Object | Architecture > Design

In software engineering, two patterns of replicable solutions exist. A design pattern refers to a reusable solution to a common problem within a given context. An architectural pattern refers to a reusable solution that engages a system-wide pattern (Buschmann, 1996)). Both design patterns and architectural patterns are templates: a series of best practices that can be used in many different situations. Over time, these practices become formalized, creating a pattern. Patterns that are object-oriented – showing relationships between classes or objects – are generally more mutable. Thus, object-oriented patterns are not as applicable in functional programming, regardless of whether the scale of the address is a given context – design pattern – or a given system – architectural pattern.

These differentiations provide a great deal of insight into why some acts of the humanitarian architect have far greater resonance than others (Lasky, 2010). First, works that are object-oriented will generally have far less range and yield than those that are language-oriented. The range of object-oriented humanitarian architecture will be proportional to the range found within the objects engaged. Conversely, the range of language-oriented humanitarian architecture will be proportional to the range offered by the language that furnishes its base. This returns us to the core methods, continuous integration, incremental improvement, self-organizing teams, and constant communication, and concerns, shared languages, shared tool sets, shared knowledge, of agile development. If the architectural proposition engages these methods well, the range of the work, like that of the information architect, will extend dramatically. Secondly, works that find their base in architectural patterns will generally outperform works that find their base in design patterns. Architectural patterns describe a higher-level system of organization: the parameters and infrastructures engaged will, by definition, impact a larger frame than will design patterns. Thus, although architectural patterns can be more difficult to discern, their proper engagement must remain of core concern to the socially-responsive designer.

The exponential growth found within fringe settlements demands it.

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