
ARCHITECTURE AND WELL BEING IN INFORMAL SETTLEMENTS IN SURABAYA

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ABSTRACT

The aim of this paper is to "explore and to highlight the human dimensions in solving the problem of low income housing and settlement; not only from the political, economic or social as such but from the human and humane perspectives". And with this in mind this paper sets out to ascertain what aspects of architecture contribute to the well being (happiness) of people in informal settlements?

Keywords: *architecture, well-being, informal settlements*

ABSTRAK

Tujuan dari makalah ini adalah untuk "mengeksplorasi dan untuk menyoroti dimensi manusia untuk memecahkan masalah perumahan bagi masyarakat berpenghasilan rendah dan penyelesaiannya; tidak hanya dari aspek politik, ekonomi atau sosial tetapi juga dari perspektif manusia dan manusiawi". Dengan pemikiran tersebut, makalah ini menetapkan kepastian apakah aspek arsitektur berkontribusi terhadap kesejahteraan (kebahagiaan) orang pada permukiman informal?

Kata kunci: *arsitektur, kesejahteraan, permukiman informal*

INTRODUCTION

Architecture is defined in the Oxford dictionary as "the art or practice of designing and constructing buildings". Yet to practitioners of the art this definition seems to fall short of their experience. For example Khan has described architecture as "the thoughtful making of spaces; It is the creating of spaces that evoke a feeling of appropriate use." To which Hillier added that "firstly space is about vacancy rather than any physically measurable quantity. Secondly, appreciation of space requires movement between different spaces for it to be experienced and consequently space

has “relationality” (Hillier, 2007). Consequently, architecture according to Khan and Hillier is more to be experienced rather than practiced.

Prior to both (Alexander, 1979) suggested that architecture was about “patterns” or rules of thumb used by practitioners and that “the more living patterns there are in a place – a room, a building, or a town the more it comes to life as an entirety, the more it glows, the more it has that self maintaining fire which is the quality without a name. And when a building has this fire, then it becomes a part of nature. Like ocean waves, or blades of grass, its parts are governed by the endless play of repetition and variety in the presence of the fact that all things shall pass. This is the quality itself.” At that time he and his associates suggested 253 such patterns which encompassed the ideas of space and transition later proposed by Kahn and Hillier. This was later reduced to 10 essential patterns and they commented that “while it seems to us that the original notion that good houses are made of deep, traditional patterns, grounded in human experience is still valid, practice has made us realize that the really crucial patterns are far fewer in number than we had previously thought; and that this smaller group of patterns is more powerful than we had previously imagined”. They go on to state that “While there may be many dozens, even hundreds of patterns that go into the making of homes, there is only a handful that we now say are essential...” (Jacobson, 2002). These 10 patterns have been used to form the first “tool” used in this research.

But how or even is this architecture described above connected to our well being? Alain de Botton (2006) believes there is a connection and his work analyses how one’s well being is connected and manifest in their surrounding architecture. He concentrated more on the built environment side of such a relationship but suggested that “architecture isn’t medicine. You can disagree with medicine and it will still work. Architecture is different. It is an invitation to a mood, not an order that will force you into a mood. I would compare the effect of architecture to the weather. The weather means a lot to our mood and people move to countries for the weather. But if something terrible has happened, it doesn’t matter that it’s a beautiful day, you’ll be upset whatever happens. Or the other way around. However, most of the time, we’re in a middle kind of mood. That’s when we can be pulled in one direction or the other by the weather” (Thyssen, 2010). How then does one measure such “ubiquitous” well being or in de Botton’s terms “happiness”?

The approach adopted in this and previous research was to use a Quality of Life (QoL) tool called the DASS42 (the case for this selection will be discussed later). There are apparently 38 QoL tools (Sharpe, 2005) and the usefulness of such tools according to Malcolm is to provide “an approximate measure of the right things [as being] more meaningful than an exact measure of the wrong things” (Malcolm, 2006). Polletti perhaps puts it best with the comment that such approaches “aims for better (as opposed to perfect) information with which to make a case for plausible (as opposed to proven) associations” (Polletti, 2004). Thus, the role of the DASS42 is not to show absolute quantitative differences in a research sense but rather to suggest reasonable and credible cause and effect linkages. And hence the second tool for this research. Their linking should then throw light on aspects of architecture that contribute to the well being (happiness) of people in informal settlements.

There are underlying assumptions in this work. Firstly, that “architectural” space is important because it can enhance (if not promote) well being and secondly that those who are “happier” are more likely to enjoy such spaces. With these two in mind, the selection of an informal housing settlement in part is to show these “patterns” (assuming that they can be identified) in a fundamental context and that there skillfully application can reach those with perhaps less than others.

Literature Background

The measurement of architecture’s impact on well being within a household can be addressed by a variety of methods such as interviewing the building occupants (in either a structured or unstructured way), talking to locally based experts in practice and at Universities, studying demographical trends and plans, or some combination of these approaches (Birkman, 2006). However, the approach adopted in this study was to “talk to the buildings”; an unusual approach grounded in the work of Cooper but based upon the patterns as suggested by Alexander (and particularly by Jacobson et al.) and in the work of Brand (Cooper, 1974) (Cooper, 1995), (Alexander et al, 1977), (Jacobson, 2002), (Brand, 1995).

Cooper’s seminal work first published in 1974 (and then later in 1995) established the existence of a relationship between the house and its occupants. Her work was based around a role playing exercise. She describes it as “...after the person had described what they had put down [as a sketch or picture], I would place the picture on a cushion or chair about four feet away and would ask them to speak to the drawing as if it were their house, starting with the words, “House – the way I feel about you is . . .” At an appropriate moment, I would ask them to switch places with the house, to move to the other chair and speak back to themselves as if they were the house. In this way, I facilitated a dialogue between person and house, which often became quite emotional, sometimes generated laughter, and occasionally brought forth statements beginning, “Oh, my God . . .,” as some profound insight came into consciousness.” And her conclusion based on 60 in-depth interviews over 20 years was that “...the key seems to be in the personalization of space: More and more, I found in the stories I heard that it is the movable objects in the home, rather than the physical fabric itself that are the symbols of self.” And for Cooper it is this alignment with self that is the key to a house’s architecture and the well being of it’s occupants.

Brand seemed to agree with Cooper but extended beyond solely the movable objects by introducing time scales “...age plus adaptivity, is what makes a building come to be loved. The building learns from its occupants, and they learn from it...” He proposed a “Six S” Hierarchy with interaction at all levels as follows (Brand, 1994, pp 23 pg13):

- Site such as the geographical setting, it’s urban location and legal description is eternal and does not interact.
- Structure with interaction once every 30 to 300 years (Brand comments that few buildings make it past 60 years of age)
- Skin changes due to technology and fashion interaction once every 20 years

- Services (wiring, plumbing, kitchen appliances, heating and cooling) interaction once every 7 to 15 years
- Space Planning which includes the interior partitioning and pedestrian flow, interaction once every 2 to 3 years in offices and perhaps 30 years in some homes
- Stuff (furnishings) interaction continually.

This time dependant interaction does seem to support Cooper's earlier position and moreover Brand also believed that what made a house/building (in his terms) "learn" was its 'physical connection to the people within' and that such "learning" was ultimately essential in trying to find this identity and presumably well being.

For Jacobson the language of this relationship was in the "patterns" that existed in the house. The "Language of Patterns" was developed by Alexander and "in a general sense these patterns are a designer's rules of thumb or intuitive principles that guide them just like it does with our grammatical rules [that] allows us to speak fluently and create well formed sentences". (Alexander et al, 1977). Alexander's position was that "this language [of patterns], like English, can be a medium for prose, or a medium for poetry. The difference between prose and poetry is not that different languages are used, but that the same language is used, differently. ... The same is true for pattern languages." He goes on that "it is essential that when you have learned to use the language, that you pay attention to the possibility of compressing the many patterns that you put together into the smallest possible space. You may think of this process of compressing patterns as a way to make the cheapest building which has the necessary patterns in it. It is, also, the only way of using a pattern language to make buildings which are poems". He was later to refer to this as the "Timeless Way of Building" (Alexander, 1979). And as outlined earlier Jacobson et al 25 years later stated that "While there may be many dozens, even hundreds of patterns that go into the making of homes, there is only a handful that we now say are essential..." (Jacobson et al, 2002). The selected 10 Essential Patterns were as follows (Table 1).

Table 1. Pattern Definition

No	Pattern	Definition
1	Inhabiting the site	If the form of the house doesn't begin by responding to the site, house and site may well end up in conflict with each other
2	Creating rooms, outside and in	a lively balance of indoor and outdoor rooms
3	Places in between	Places that allow you to inhabit the edge, that offer enough exposure to make you aware of your surroundings, and that provide just enough protection to make that awareness comfortable
4	Refuge and outlook	At its simplest we are inside looking out
5	Private edges, common core	A good home balances private and communal space throughout
6	The flow through rooms	Movement through a room affects the room itself

No	Pattern	Definition
7	Composing with materials	Choosing its materials to support, frame, fill, cover, colour and texture space is the act of composing the home
8	Sheltering roof	More than any other single element, the form of the roof as experienced both outside and in carries the look and meaning of shelter, of home
9	Parts in proportion	A home is a hierarchy of parts in proportion
10	Capturing light	Good homes capture light filter it, reflect it in ways that, no matter the season or time of day, delight their inhabitants

These 10 patterns has been beneficially used in several situations and one example has been the mapping of these patterns against the spatial areas of 109 houses provided for those affected by the 2004 Asian Tsunami in Tamil Nadu, India (Russell et al, 2008). That produced the matrix shown in Table 2 below and lead to the development of future alteration plans for housing beneficiaries as resources and funding became available to them.

Table 2. Mapping Matrix of 109 Houses in 9 Different Villages in Tamil Nadu, India

Pattern	Location									Total
	1	2	3	4	5	6	7	8	9	
Inhabiting the site	54	46	42	78	42	28	3	23	13	329
Creating rooms	33	30	32	68	15	13	2	14	7	214
Sheltering roof	29	17	10	51	1	2	0	1	5	116
Capturing light	10	5	5	12	8	13	5	2	1	61
Part in proportion	25	19	13	29	2	5	1	3	1	98
The flow through rooms	25	28	12	40	18	3	2	3	2	133
Private edges, common core	26	8	21	37	27	4	1	11	4	139
Refuge and outlook	28	44	24	26	21	2	0	2	9	156
Places in between	38	32	32	59	5	3	2	15	4	190
Composing with materials	31	15	20	43	3	3	1	3	3	122
Total	299	244	211	443	142	76	17	77	49	

Note: Number of Houses: 109, Total Mods. For House: 1547, Average per House: 14.2

- | | | | | |
|------------------|-----------------|------------|------------|------------|
| 1. Outside Front | 3. Alleyway | 5. Lounge | 7. Toilet | 9. Rooftop |
| 2. Porch | 4. Outside back | 6. Kitchen | 8. Bedroom | |

The "Talk to the Buildings" approach has several advantages over other more main stream methods because of the following:

- Buildings don't by necessity tell "lies".
- Such tools could be transcultural and therefore usable in other geographic areas.

- There is no direct need for language translators in the field
- It has a certain appeal and seems reasonable to those in the architectural stream
- It fills a gap and allows validation and potential triangulation of research findings
- It enhances discussion within the teams
- Can rapidly produce base conclusions for critical reflection

And hence (as mentioned earlier) the first tool of this work. QoL is defined by Wikipedia as "...an important concern in economics and political science. There are many components to well-being. A large part is standard of living, the amount of money and access to goods and services that a person has; these numbers are fairly easily measured. Others like freedom, happiness, art, environmental health, and innovation are far harder to measure. This has created an inevitable imbalance as programs and policies are created to fit the easily available economic numbers while ignoring the other measures that are very difficult to plan for or assess." (Wikipedia, 2011).

There are 38 such QoL models (Sharpe, 2005); but earlier field work has confirmed the particular usefulness of one of these models called the DASS42 (Potangaroa, 2006). These were as follows:

- The DASS42 does not need a before and after survey to draw relative comparisons. Most/all of the other QoL models have this requirement which means that any results, trends or tendencies are not known till after the "intervention". This is a crucial aspect for operational settings where identifying vulnerability, targeting assistance, informing programmes, comparison across programmes and early metrics for aid, and development situations are desired. The WHO QoL is a good example.
- It has been designed for use by non psycho-social professionals (such as architects and engineers). This is also crucial particularly where there is other psycho-social work underway. Moreover, it allows a more direct connection between the potential outcomes of the work rather than the outputs as identified as an issue earlier by Wikipedia.
- It deals with the ubiquitous non clinical context of QoL which is where de Botton was suggesting that "architectural happiness" exists.
- The questions are phenomena-logically based and are largely trans cultural. The questions are almost mundane and feel like the sort of questions friends might ask of each other. Some QoL tools are not so accessible.
- But more importantly do not generate expectations amongst the surveyed population. This particularly important in operational programmes where surveys can generate other unintended problems. For example questions aimed to identify whether vulnerabilities can convey the idea that if one were "vulnerable" that they could get more and potentially get it quicker.

The DASS42 questions are in appendix 1. It was developed at the University of New South Wales, in Sydney Australia (Lovibond, 1995). And is a "set of three self-report scales designed to measure the negative emotional states of depression, anxiety and stress" and was "constructed not merely as another set of scales to measure conventionally defined emotional states, but to further the process of defining, understanding, and measuring the ubiquitous and clinically significant emotional states

usually described as depression, anxiety and stress" (DASS, 2006). The characteristics of high scorers on each DASS scale are as follows:

- Depression scale: self-disparaging, dispirited, gloomy, blue, convinced that life has no meaning or value, pessimistic about the future, unable to experience enjoyment or satisfaction, unable to become interested or involved, slow, lacking in initiative.
- Anxiety scale: apprehensive, panicky, trembly, shaky, aware of dryness of the mouth, breathing difficulties, pounding of the heart, sweatiness of the palms, worried about performance and possible loss of control.
- Stress scale: over-aroused, tense, unable to relax, touchy, easily upset, irritable, easily startled, nervy, jumpy, fidgety, and intolerant of interruption or delay.

The ability to characterize results and therefore not need a before and after study is because of the "severity" table feature of the DASS42 (refer to Table 3 below). Consequently, results can be classified as normal, mild, moderate, severe and extremely severe that then allows both an individual and an aggregated classification. This aggregation means that comparison between different types of programmes such as health, housing and employment and also between different geographical zones is possible. This was not required for this study. This provided the second tool for this work.

Table 3. The DASS 42 Severity Index Table

Classifications	Depression	Anxiety	Stress
Normal	0 – 9	0 – 7	0 – 14
Mild	10 – 13	8 – 9	15 – 18
Moderate	14 – 20	10 – 14	19 – 25
Severe	21 – 27	15 – 19	26 – 33
Extremely Severe	28+	20+	34 +

Source: Devilly, 2005

Site

The site selected for this study was Kampung Tunjungan (Figure 1). It is an informal settlement located in the CBD of Surabaya, Indonesia and is bounded by major roads and buildings. Its location means that residents have been able to find employment in these offices or by operating small businesses (often home based) such as readymade food, barbers or tailors. The site was selected because of the previous contacts and work that ITS had completed in the Kampung.

There are no parks or open public areas within the Kampung though residents often grow potted plants and flowers; lanes are narrow (typically 2.5 metres overall); and children by necessity play in the lanes. Houses built in the 1930's seem to be better quality than those built later in the 1970's and the pressure to build has resulted in some houses not actually facing a lane. Some houses have a city supply water system, most do not and hence water purchase from shops or cartage from nearby wells is a constant requirement. Drainage is by gutters built in response to

annual flooding of the Kampung and is usually maintained by each resident. Waste water is via these drains. House plots vary from 2.5x5 to 10x20 metres and some residents have constructed 2 storey homes. It is made up of 4 separate areas as shown in Figure 1 below.

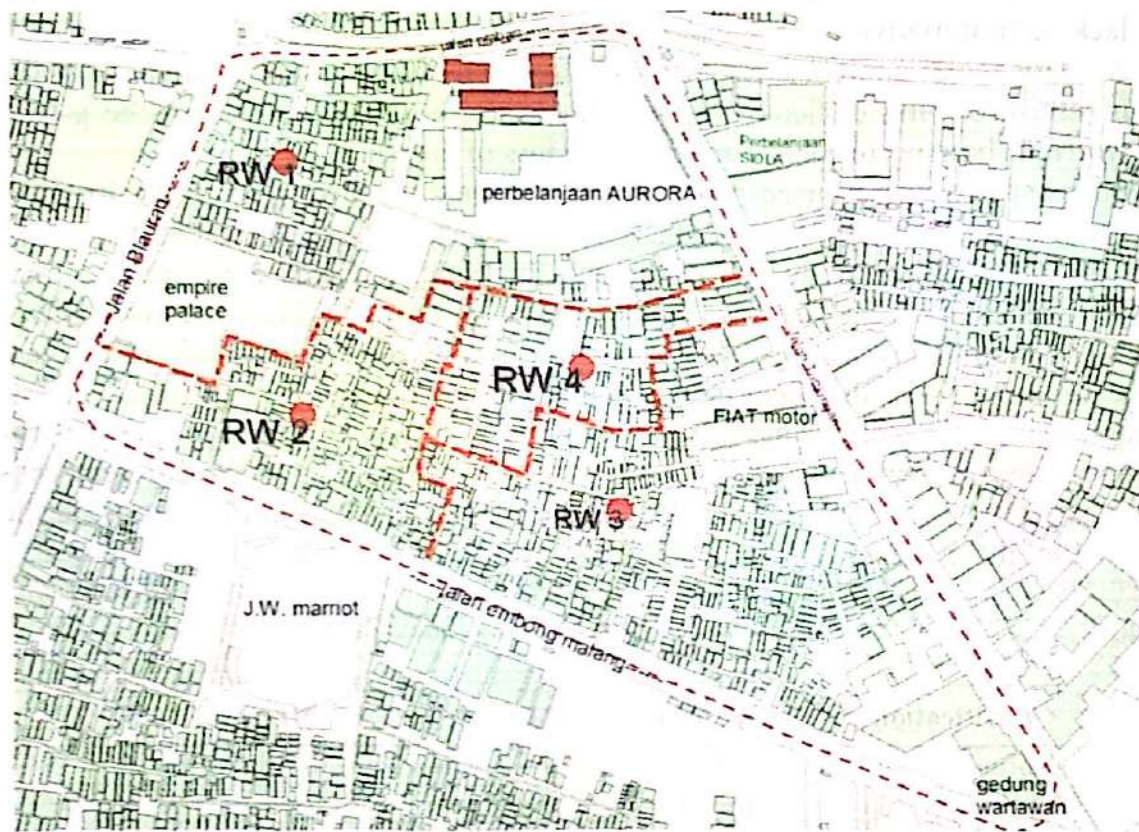


Figure 1. The Map of Kampung Tunjungan
Source: Sigit, 2010

Methodology

Training with both tools was given to the members of the 4 survey teams prior to their work in the field (one team for RW1 through 4). It consisted of PowerPoint presentations covering examples of the “10 Essential Patterns” taken from a visit 2 days prior to the training (and hence current). This was followed up by a walk through the Kampung where the Patterns procedure was used and discussed. Spatial areas associated with the houses were identified to standardize the survey approach and data collection. For example, the area immediately outside the house would need to be the start point for all teams. That is then connected to the porch or entry (where we were expecting a higher density of patterns), the lounge corridor and rooms and rear kitchen/bathroom areas which would be subsequently examined. It was emphasized that several patterns could exist in one spatial area and in one architectural feature; and as expected in the example in Figure 2 below of a porch contains patterns 2, 3, 4, 5, 6, 7, 8, 9 and 10.



Figure 2. A High Density of Patterns in this Porch

The other DASS42 survey tool had previously been translated into Bahasa by the Legal Department of Sykat Kuala University in Banda Aceh and checked by the Jesuit Brothers in Yojarkarta and used in over 10 different locations in Indonesia. Nonetheless, the version was review by the ITS team and some minor modifications made. The teams were then taken through the survey to ensure there was an agreement on what the questions meant and the process to be used.

Approximately 20 families were survey from each of the 4 districts (17 from RW1, 20 from RW2, 25 from RW3, 23 from RW4 hence 85 in total) during May 2011 and the results for the Patterns and the DASS42 were compiled using EXCEL spreadsheets. Those that had the higher QoL and the lower QoL were separated out and their patterns reviewed as the basis for the following results.

RESULTS AND DISCUSSION

The DASS42 QoL results showed the following (Table 4):

- RW1: 4 reduced QoL factors involving 2 households
- RW2: 13 reduced QoL factors involving 7 households
- RW3: 0 reduced QoL factors
- RW4: 24 reduced QoL factors involving 16 households
- 25 households in all.

Hence, RW3 would seem to have the best QoL followed by RW1, RW2 and finally RW4. The least QoL ranking for RW4 was consistent with the feeling within the survey teams and while it was not unexpected it was somehow still surprising. The overall results from the Pattern Tool are shown below in table 2. The top half of those results suggest that the most commonly seen patterns were Pattern 1: Inhabiting site, Pattern 7: Composing with materials and Pattern 8: Sheltering roof. All areas, except RW3 (which had Pattern 5: Private edges common core and Pattern 6: The flow through rooms instead of 7 and 8) were essentially in agreement.

Table 4. Overall Results from the Patterns Tool

Location				Pattern						
	1	2	3	4	5	6	7	8	9	10
RW1	45	40	36	38	37	42	45	43	37	34
RW2	52	50	47	48	46	46	56	54	46	42
RW3	66	63	62	65	69	68	65	60	64	61
RW4	65	61	54	65	65	54	72	73	57	58
TOTAL	228	214	199	216	217	210	238	230	204	195
Result Finding										
Highest	RW1	38	Lowest	RW1	13	Average	RW1	25.4		
	RW2	44		RW2	11		RW2	26.4		
	RW3	44		RW3	17		RW3	28.4		
	RW4	41		RW4	19		RW4	29.1		
	Overall	44		Overall	11					

Note:

- | | |
|-----------------------------------|-----------------------------|
| 1. Inhabiting the Site | 6. The Flow Through Rooms |
| 2. Creating Rooms, outside and in | 7. Composing with Materials |
| 3. Places in Between | 8. Sheltering Roof |
| 4. Refuge and Outlook | 9. Parts in pProportion |
| 5. Private Edges, Common Core | 10. Capturing Light |

What is perhaps interesting is that RW3 had the highest QoL and that perhaps this shift in the pattern mix somehow reflects this difference? Patterns 1-3 seem to be more about the relation of the space to its neighbours (what Hillier referred to as “relationality”) while patterns 4-7 deal with what is in a space and patterns 8-10 with its relationship to the “whole”. Thus, this shift in patterns for RW3 while still being “within the space” of Patterns 4-7 could be part of the identity alignment referred to by both Cooper and Bland? If that was so then a higher QoL could/would seem to be connected as suggested by them? However what is clear is that the role of architecture in this context is subtle. It is also interesting to note the least seen which were Patterns 3, 9 and 10. This subtlety seems to continue into an analysis of the pattern density where density of patterns has been taken as the total number of patterns mapped in a household. Alexander’s position is that the higher the density the greater the architectural richness and hence one could/would anticipate some connection? The range of values is from a maximum “density” of 44 (in RW 2 and RW3) to a meager 11 (in RW2) and hence the while there is a suggestion for the higher values there is not for the lowest values.

What then happens when these two tools are connected? The results for this are contained in Appendix 2. Those with a “normal” classification for all 3 scales based on the Severity Table of the DASS42 were counted as “Happy” (following de Botton’s terminology); those that anything else were treated as “Unhappy”. For the

4 areas of RW1 to 4 there were 25 “Unhappy” households and 60 “Happy” ones. It should be again noted that all of RW3 were “Happy” and that RW4 had the lowest QoL and the most “Unhappy” households. The patterns data for these two groups were separated, analyzed and any differences noted. An 11th pattern of natural ventilation was added to this data because in preliminary discussions it was felt that such a pattern (though it was not readily defined at this stage) would be important in the tropics. It was based on a subjective sense of the survey person as to whether an area was well ventilated or not.

Firstly, it should be noted that the differences were numerically small. Nonetheless, it seems that more patterns are associated with a higher QoL (by 1.1 pattern differences based on average counts). This increases to 1.8 when the “Unhappy” data is compared to RW3 (where all households are “Happy”). Moreover, when one looks closely it seems that the ratio of Happy/Unhappy households equals the pattern difference. Consequently, an increasing ratio results in an increasing QoL which is notable firstly because it is not seemingly mentioned in the literature and secondly it has operational implications in that the addressing the next persons QoL greatly enhances the community response because of the non linear nature of the relationship (see Table 5 and resulting graph Figure 3). Hence, “Happiness” seemingly breeds “Happiness”.

Table 5. Scale Effects

Location	Ratio of Happy to Unhappy	Difference in Patterns
RW4	0.4	0.2
RW2	1.9	4.5
RW1	7.5	6.7
RW3	25.0	28.4
	(series 1)	(series 2)

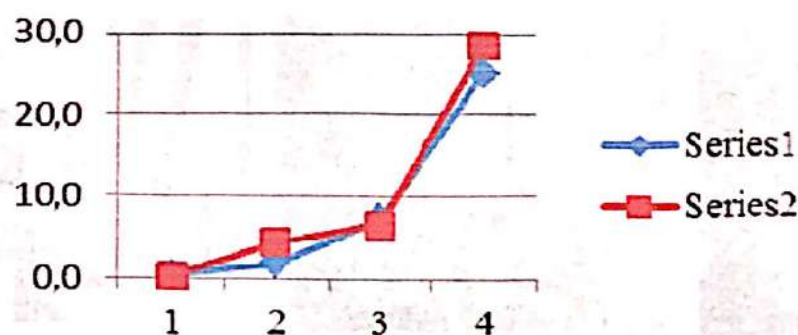


Figure 3. Series 1 and 2 of Table 5

The linking of the two tools also points out the Patterns that appeared to be associated with a higher QoL. These were Pattern 3: Places in between; Pattern 6: the Flow through rooms and the added Pattern 11: Airflow. On the other hand, the two that weren't, were Pattern 4: Refuge and Outlook and Pattern 8: Sheltering Roof. A similar result is found when the “Unhappy” data are compared with RW3.

This represents a shift from the earlier results that suggested 1, 7 and 8 as major and 3, 9 and 10 as minor Patterns and perhaps underlines the need for managing community engagement and its associated metrics. And while there would have been some increase in the QoL if the design and its implementation had been on Patterns 1, 7 and 8 (rather than 3, 6 and 11) any increase in QoL may be more attributed to the “Happiness breeds Happiness” (HbH) effect and perhaps to the incorporation of other Patterns by default (rather than design). That aside the usual issue on the ground is how to achieve the best outcome using available (usually scarce) resources, which is an issue now seemingly mitigated by the HbH effect?

So coming back to the original objective of this paper, what aspects of architecture contribute to the well being (QoL or happiness) of people in informal settlements? The application of the two tools to the community at Kampung Tunjungan suggests 3 major areas namely: Pattern 3: places in between. This deals with the transition between spaces and the incorporation of places in that transition that allow people to stop, sit, occupy, talk, observe but not be in the way (Figure 4).



Figure 4. Footpaths in Front of the Houses

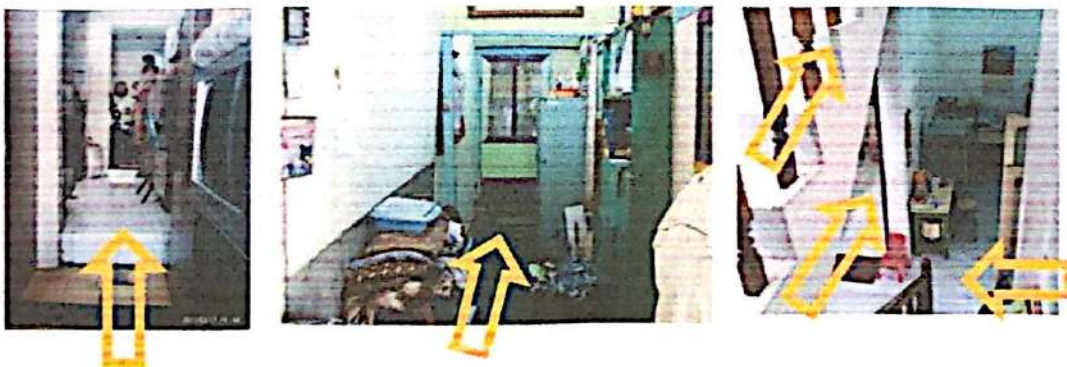


Figure 5. The Interior of Houses, Showing the Flow Through Rooms

Pattern 6: The flow through rooms. This deals with how you move through the house (Figure 5).

Pattern 11: Airflow was an added pattern and now needs to be developed further to produce its “pattern” in a similar way to the other 10 rather than revert to solely an engineering “definition”.

The incorporation of such patterns should be straightforward but perhaps should be given more attention than what they may have previously.

CONCLUSIONS

There was something of the “Holy Grail” feel about this research when it was first proposed. That has come through the work in the subtle ways that architecture impacts on the outcomes (or QoL) of those living in Kampung Tunjungan. De Botton’s comments that architecture is not like medicine seem to have been supported by this work. However, beyond that there exists a “space” in which architecture operates at differing scales that seem to be dependent on the ratio of “Happy” to “Unhappy”, the higher that ratio the potentially higher the impact of architectural patterns. And in here the work of Alexander, Jacobson, Brand and Cooper seem to comfortably fit. Architecture certainly does have a role but it is not as straightforward or technically based as is current projected.

Certainly further research is needed and a study of the physical attributes of the households involved would extend the reach of the work so far. Further work is needed to identify what is an “Airflow” Pattern and to better understand the HbH effect

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