THE OROWA HOUSE: A TYPOLOGY OF TRADITIONAL YORUBA ARCHITECTURE IN ILE-IFE, NIGERIA.

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Beyond generic descriptions of Nigerian traditional architecture as 'adobe walls, domes, courtyards and overhanging hipped roofs', or in response to the oft-posed question: *What exactly is Indigenous Nigerian Architecture*? This paper presents a spatial typology from Ile-Ife town core area. The study identified the distinctive features of the traditional Ile-Ife Orowa House; key function spaces e.g. the Orowa (central hall), a comprehensive pattern of space use in the dwelling, the organizational (spatial) criteria, and morphological characteristics using Hillier and Hanson (1984) Space Syntax methods.
Key spatial relationships between the core functional spaces in the Orowa house that define its morphology were identified, which extend beyond the descriptive studies of Yoruba traditional domestic architecture more regularly found in existing literature. The use of space syntax allowed for measurable analyses of the twenty-four houses surveyed, and contributes to the documentation of traditional dwellings in Nigeria.
While differences in space use pattern exist between the Orowa house and contemporary houses found in the larger sample from which this paper is derived, some space use patterns persist in both; indicative of a 'Nigerian' or at least a Yoruba way of living that survives in newer architectural forms.

Keywords: Traditional Yoruba architecture, Domestic space, Space Syntax, Orowa House.

1 THE IDEA OF INDIGENOUS ARCHITECTURE

Several researchers have studied what many consider 'indigenous' architecture in many African cultures, but most of these have been from a socio-ethnographic position, in which architectural perspectives are often oblique to the focus of such studies, and are often by non-Africans. Osasona (2007) asserts that the process of documenting the architecture, meaning and the use of space in Africa is far from being well established by African architects, and queries the existence of an 'African' or a national type as a result of the myriad of cultures, and influences on the continent. Consequently, this study adopts the position that exploring the idea of traditional Nigerian architecture is best achieved by identifying typologies within each ethnic context due to the existence of over 400 different ethno-linguistic groups in Nigeria. This paper presents a traditional dwelling type from Ile-Ife town in South Western Nigeria, and it adds to a small but growing body of work focussed on in-depth analyses of traditional (Nigerian) domestic architecture from a specifically morphological perspective similar to (Isaac-Sodeye, 2012; Ekhaese, 2011; and Muhammad-Oumar, 1997).
Traditional or post-traditional architecture according to Amole (2000) is the 'brand' of architecture that results from the traditional form, morphology and material technology evolving via a process of selective borrowing from external sources, and the 'core' of the original traditional dwelling is likely to endure, as the process of modification is gradual and community generated. Bearing in mind the subtle differences between the traditional and the vernacular (post-traditional), this research has identified the Orowa house as a traditional Ile-Ife 'type', for a number of reasons. The Orowa house presented distinct differences in morphology and space use in comparison with contemporary and more recent vernacular examples in Ile-Ife, and is

essentially one of its earliest surviving models of domestic architecture despite some changes in material technologies. It is argued that these 'innovations' to material technology and evidence of external architectural influences have not resulted in major changes to the morphology. To analyse morphology and space use, this research adopted the use of Space Syntax theories and methodologies developed by Hillier and Hanson (1984). It also includes an inventory of the domestic activities in each functional space as found in the twenty-four traditional Orowa dwellings.
The space 'label' refers to spaces where distinct functions identified by the respondents coincide with fully or partial enclosure by walls, as well as spaces that are only articulated spatially by furniture arrangements, although the function label often did not adequately describe the diversity of activities in the room.

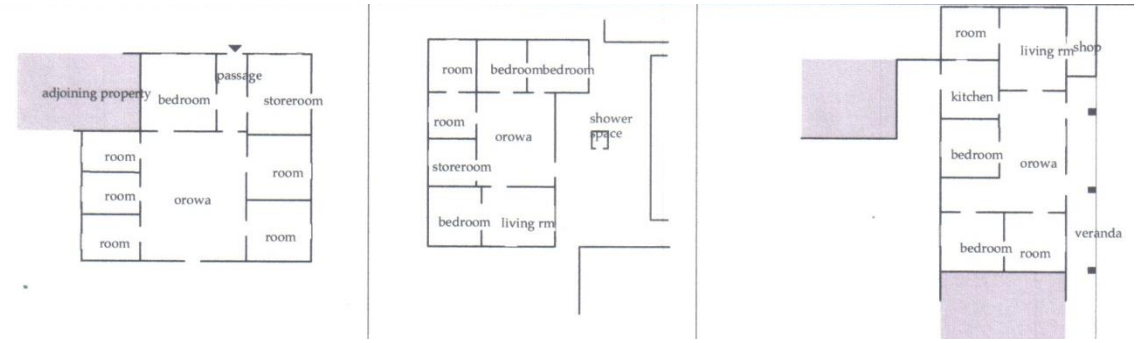
2 ILE-IFE: YORUBA TRADITIONAL ARCHITECTURE

Gugler and Flanagan (1978) identified that the compounds were the most important elements in the traditional Yoruba town. These traditional domestic buildings have thick mud walls (cob structures between 6-12 inches), bamboo rafters or other termite-resistant timber with thatched roof construction, and room sizes based on a standard module of 10 feet (ese bata mewa) (Osasona, 2007). Some modifications were found in most of the traditional houses sampled; mainly in the use of corrugated roofing sheets instead of thatch, and occasionally, cement: sand plaster to mud walls. The traditional multi-generational family compound (*agbo'le*) comprises of a group of *Courtyard-type* or *Orowa-type* houses or both. The courtyard house with its inward focus of small rooms around a large courtyard/impluvium or a series of interconnected small courtyards/impluvia was more common among the chiefly ranks and often developed in an agglomerative way, while the Orowa house is usually without courtyards. The case study town; Ile-Ife is in a hot and humid forest region, and the effect of the weather is that open shaded spaces are more comfortable, particularly in the daytime. As such, thick adobe walls, coupled with small windows, the sloping roofs with eave overhangs, are commonly found in response to the weather. This architectural form of small rooms around a communal space is common in West Africa, as seen in Bini architecture (South-West Nigeria) and further afield in Ashante architecture (Ghana).

2.1 The Orowa House Introduced

The key distinguishing feature of the Orowa house is that spaces are linked to each other through other spaces or through the Orowa - a central large hall that serves as the main connective and activity space for each dwelling. The main entrance into the house is usually directly into the Orowa or into a small lobby connected to the Orowa or through a front veranda, which then leads into the Orowa (see figure 1). Typical activities that take place in the courtyard (e.g. cooking, laundry, livestock rearing, and storage) are often found in the orowa, in the Orowa-house.
The toilet and shower areas are always separate from the main building within the compound or family land. Each bedroom, or suite of two/three rooms, belongs to an individual and their nuclear family, but in a polygamous set-up- each wife and her offspring has a room or suite of rooms, while the husband has a separate bedroom. The bedroom is the only real 'personal' space available to the nuclear family, or to each wife and her offspring, and contains personal belongings. Bedrooms tend to be small (about 2.8m x 3m), and are frequently without windows, and until recently without door locks, and is used mainly for sleeping and for storage. The combination

of small cell-like spaces/rooms around a large communal space has the effect of drawing members of the extended family into prolonged daily contact in the courtyard or veranda where the bulk of family life and household tasks take place. Consequently, many of the communal domestic activities are 'pushed' into the orowa/outdoor spaces, and items for regular use are often stored in the Orowa.



OROWA HOUSE 1 OROWA HOUSE 2 OROWA HOUSE 3

Figure 1: Examples of Orowa House

Source: Researcher's Fieldwork

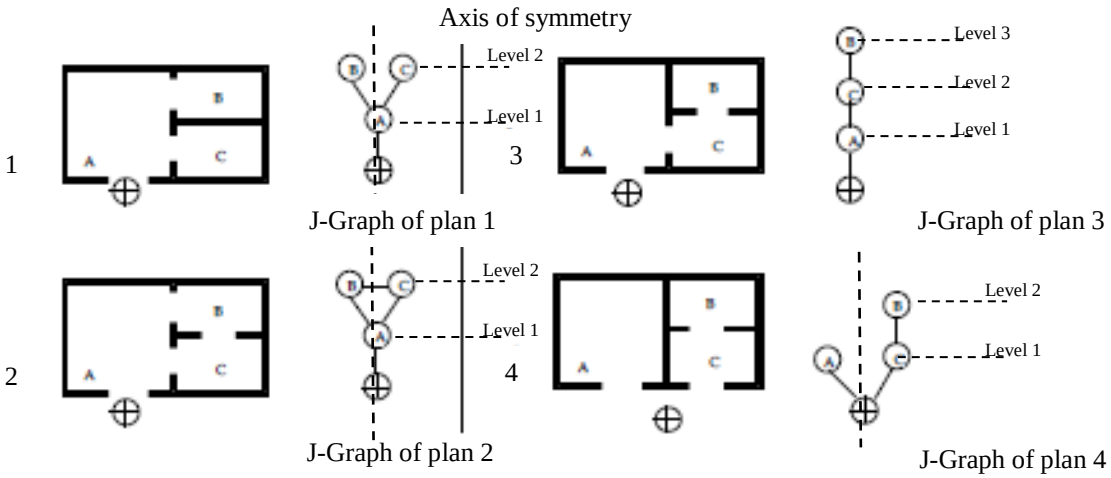
3 LITERATURE REVIEW

The decision to analyse physical spaces, and the objects and activities together, was supported by the challenges of understanding the nature of physical space. Giddens (1984) (in his critique of Foucault on timing and spacing in educational space) describes space as a 'complex' "*whereby its most important aspect is not any particular part of a building but its* ***relational*** *form".* The complexity attributed to educational space portrayed above, is even truer of the domestic space, hence its study is likely to benefit from a combined approach. Therefore, to understand physical space it is necessary adopt methods *'that analyse not things in space, but space itself with a view to uncovering the social relationships embedded in it' (*Lefebvre, 1974,1991; *p 89).* The process of explaining physical (domestic) space, and space use required spatial theories/methodologies that recognise space as possessing built-in social and contextual meaning, and measures its fundamental connectivity patterns. Space syntax theory and methodologies developed by Hillier and Hanson (1984) specifically addresses these issues and also provided a means of objectively comparing a set of buildings.

3.1 Space Syntax Theory Introduced

In Hillier (1996) and Hillier and Hanson (1984), space is a primary element of buildings and their work draws the above ideas together; that the configuration of (internal) space is a direct expression of social relations, and its key focus being the ability to move from one space to another (permeability), as well as the co-presence of people within a space. By analysing configurational relationships between specific functional spaces, apparently disparate plans can be compared. Hillier and Hanson (1984) have developed analytical tools for predicting consequences of design interventions in the built environment, and these techniques have gained wider use by archaeologists to interpret configurations of ancient ruins; by law enforcement agencies for crime prevention; and by academicians in the study of society and space

(Isaacs-Sodeye 2012). The discussion on the configuration of space in space syntax focuses on the basic nature of connections between two spaces/rooms considered via the existence of a third space in a building. A space is one step away when spaces are directly accessible from each other, and each intervening number of spaces that separates one space from another increases the number of steps/depth between these spaces. Figure 2 shows four visually similar floor plans, but, when the connection between each space is mapped out, by representing each space/room as a circle, we see that internal spaces in the plans have different connectivity patterns, described in space syntax theory as the Justified Accessibility Graph (J-Graph). In each J- graph, the doorways, or points of accessibility where a person can walk through from one space to another are represented as lines/links connecting the circles. The circles are arranged showing the increasing depth/steps from the outside world, which is represented by a circle circumscribing a cross. The J-graph reveals the number of steps required to reach all other rooms in the building from a specific room/space.



Source: adapted from Hillier and Hanson (1984)

Figure 2: Basic Spatial Configurations of floor plans with Justified Graphs

The J-graph of Plan 1 reveals a 'tree-like' arrangement of spaces and plan 2 has a ring-like structure allowing more than a single option of movement between the internal spaces. Plan 3 shows a single sequencing of spaces and only a single option to the movement pattern within the plan. Minor changes in the four plans above seem to have resulted in real differences in the movement patterns of each plan; repercussions which may result in what Hillier and Hanson (1984) describe as either symmetry (along a vertical axis as shown in the j-graphs for plans 1 and 2), or asymmetry along the vertical axis as indicated in plan 4; unique characteristics inherent in the configuration of any plan. A second characteristic of the relationship between interior spaces identified in space syntax is the existence of one or more locus of control. Empirical research based on space syntax has shown in some situations, that a few spaces exert strong control over other spaces in the plan which results in *non-distributedness* defined as the existence of fewer routes or a tree-like choice as seen in the j-graphs of plans 1 and 3, while other plans manifest greater choice of independent routes resulting in what is described in space syntax terms as *distributedness.* Distributedness also refers to the existence of 'rings', which describes the option of moving through a series of spaces/rooms, commencing from a room and ultimately ending in the same room. The j-graph of plan 2 shows an example of a ring that is formed by moving from room A to room B to room C and back to room A.

Another space syntax technique developed to express the connections/permeability patterns of a 2-dimensional plan as an abstraction is shown in Figure 4. The process involves identifying the fewest and widest distinct convex spaces on the floor plan, and establishing doorways, and other openings that allow thro-movement between spaces. This form of representation is called a *convex break-up map* in space syntax theory. Each room/space is represented with a convex shape (usually rectilinear) and the doorways or points of movement between each convex space are represented by a thin box connecting the two convex spaces (compare Figure 3 and Figure 4). According to Hillier and Hanson (1984), a convex space is any cell/space label that is fully bounded by walls and encloses all the surface area that may be connected by any two points within the cell, but this was further expanded in this research, to include the coincidence of geometric distinction with functional differentiation. The connectivity pattern between all spaces in a system is analysed mathematically to provide a measure- the *Integration value*- that captures non-local properties of spaces critical to the movement dynamics and potential of a system (Hillier, 1999). Each space has a specific set of connections to a number of spaces in each plan, and each space is compared in terms of its degree of connectivity to all other spaces in the plan to develop an integration value for each space in a building, reflecting its relative connectivity within the whole building. The integration value as such, is a calculation of how close each space is to all other spaces in the building. Each space has an integration value based on its relationship to the whole, and integration values reported in this paper were generated by transcribing the number of connections that each space has in a specific floor plan using NetBox software. This was then imported into software (NewWave) that analyses the connections of each space in comparison to all the spaces in a building, to calculate the integration value of each space; a process that is now easier using more recent software such as DepthMapX. The integration value can be seen as a measure of relative asymmetry or relative depth (Hillier and Hanson, 1984; pp108-109). The higher the integration value of a space, the fewer steps required to traverse each room in the building from such a space.

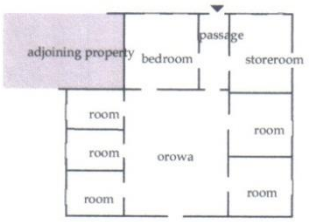


Figure 3: Floor plan of Orowa house 1

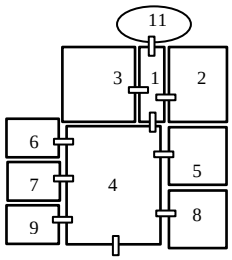


Figure 4: Convex break-up map of Orowa House 1

Figure 5: Convex integration map of Orowa houses 1, 2, & 3

Source: Researcher's fieldwork

The convex integration map (see Figure 5) is an extension of the convex break-up map, and is a visual representation of the range of integration values using an 8-interval scale (based on the lowest and highest integration value derived for an individual plan). The spaces with high levels of connectivity are those with the highest Integration value, which are defined as the most *integrated* spaces, and are indicated in red in the convex integration map. The spaces with the least numbers of connections, will have lower integration values, and are described as *segregated* spaces (indicated in violet in Figure 5).

The unequal relations in the connectivity of spaces also results in a tendency for different weightings in the way activities are disposed around the building and each floor plan expresses a specific pattern of connection, symmetry/asymmetry, choice of movement between the spaces and ranking of key domestic activities that Hillier and Hanson (1984) describe as a *phenotype*. For example, the relationship of key domestic spaces in Orowa house 1, shows that the Orowa is the most integrated (connected) space, and the shower room is the least connected (segregated).

The rank order of integration pattern of key spaces in Orowa house 1is as follows: - (Most integrated) Orowa > bedroom > shower room (segregated)

Patterns of ranking of integration values for key space functions (Orowa, parlour, kitchen, bedroom and shower room) in individual dwellings have been found to be a culturally potent template that is often recreated regardless of variations in floor plans (e.g. Taher and Brown, 2003; Bafna, 2001; Amorim, 2001; Hanson, 1998; Bustard, 1999; Monteiro and Hillier, 1987). It is this template that Hillier and Hanson (1984); Hillier and Graham (1987) refer to as the *inequality genotype*, and it is in its relatively stable nature, that cultural knowledge resides. It is the genotype template that is adjusted when creating individual (floor plan) phenotypes, and as such, a substantial amount of social information can be retrieved from the genotype. The existence of such a genotype or template can only be established by analysing a sample of floor plans to see if the pattern of the ranking of integration values of the key spaces remains consistent, despite variations in floor plan layouts.

Some of the criticisms raised previously about space syntax - its lack of focus on the geometry (Ratti, 2004), its use of 2-dimensional abstraction (Allison, 1999), and the need to incorporate more phenomenological aspects (Seamon, 2003), - are not as critical as may initially seem. Space syntax measures relational elements of a system rather than properties (e.g. size, distance) because configuration of space is considered a fundamental, but not the sole role of bounded space, and seems to account for spatial and functional relationships without direct reference to geometry with high predictability rates [Bafna (2003), Amorim (2001a)]. This Hillier (1999) claims, is not to say that geometry is not significant; only that the justified graph (and other space syntax methodologies) seems to account for certain aspects of geometry (e.g. distance) without expressly measuring it. In any case, some level of abstraction is always required in most methodologies to make discussion and comparison feasible. Qualitative analyses can certainly be incorporated into space syntax analyses, which this study does by combining it with the analysis of object and activity locations.

4 METHODOLOGY AND SURVEY DESIGN

The results presented here constitute part of a larger study of both traditional and contemporary houses in Ile-Ife (160 plans). The twenty-four Orowa houses presented here were almost restricted to the Enuwa sample area which is in the oldest existing quarter in Ile-Ife and is mostly occupied by extended families with many dwellings

dating to the 1890s. The majority of these dwellings are owner occupied by traditional titled chiefs whose lifestyles are more focussed on traditional customs and religion. A structured interview and the preparation of a floor plan were done by 2 bilingual interviewers.

The Depth measure utilised here is based on the J-Graph described in the preceding section that summarizes the overall isomorphic distance away from a root cell, (usually the outside world) as well as the total number of links or steps that separates each space/room in the domestic plan from the outside world defined as *step depth*. Each of the plans was analysed in this manner to see how 'deep' or 'shallow' each plan is from the outside world. For example, the j-graphs of the four floor plans in Figure 3 show that plan 1, 2 and 4 have all their spaces/room at a maximum of 2 steps away from the outside world, while floor plan 3 is deeper with the spaces at a maximum of 3steps away from the outside. The J-graph makes the syntax of the plan clearer, because the number of steps between cells, and the way the dwelling performs in terms of circulation options are easier to identify.

In addition to the assessment of step depth, the J-graph also reveals that each cell/space has four topological possibilities identified by Hillier (1996) as: -

1) A-spaces; that is, cells/rooms with a single connection, that are terminal/dead-end in nature,
2) B-spaces; cells/rooms with two or more connections that lie in a sequence that allows a complete linear procession through a series of cells to terminate at the starting point/cell,
3) C-spaces; that is, cells/rooms that have two or more connections, and lie on a ring,
4) D-spaces- Cells with more than two connections and lie on at least two rings.

A higher proportion of ringy spaces (C and D-spaces) usually correspond to reduced step depth, and a higher proportion of terminal (A-space) or thoroughfare spaces (B-space) to higher step depth (Hillier, 1998). As such, a space label can also be compared across separate plans because of the measure of relative depth, which is the mean depth of a cell in a given plan in relation to all other spaces in the plan from the outside world, and this helps overcome stylistic or geometrical differences in the plans. The actual depth of a space from the outside world was used in comparing the location of various domestic activities, objects, similar to (Dursun and Saglamer, 2003; Seo, 2003; Amorim, 2001; Monteiro, 1997).

The pattern of integration is the second syntactic measure of connectivity that was of interest. As discussed earlier, it assigns a numeric value for each space label based on algorithms in the software calculating the connection of each cell in relation to all other cells in the domestic space. Integration values can be expressed in a table form (with the integration values of all the spaces/rooms in a building listed), or as an 8-interval colour-coded range expressed as a convex integration map as utilised in this research. Different plans were assessed by checking the rank order of the integration values of key spaces/rooms arranged from the most segregated to the most segregated, to identify the inequality genotype- the consistent pattern of the ranking of the integration values of the key spaces across the plans.

In addition, the mean integration of each space for the genotype was derived from the integration value of each space from the 24 floor plans surveyed. A similar mean step depth value for each key space/room was calculated from the 24 plans to arrive at a mean value of each space for the genotype. This mean integration and step depth allowed for comparisons of different genotypes as well as comparison across house plans.

5 The Orowa House- Space Syntax and Space Use Analyses

The Orowa house was almost totally restricted to Enuwa, with all but one of the examples in the total sample found there. The integration values of key spaces - Parlour, Kitchen, the Orowa (or corridor), Bedroom, and Toilet (or shower room) - for each plan were ranked in order form integrated to segregated, and those sharing a similar sequence of integration of spaces were identified as belonging to the same genotype. Of the twenty four Orowa house in the sample, two main patterns of the ranking of integration values for the key spaces were identified; that is, two genotypes. The Orowa genotype accounted for 70% (17 nos) of the houses, and the Double-loaded (DL)- Corridor (with segregated kitchen) Genotype, accounted for five of the other seven Orowa houses. The two genotypes are described below.

5.1 The Orowa Genotype

The Orowa genotype was assessed based on the availability of either a shower or toilet, since not all the floor plans sampled had both. Also, only nine of the Orowa houses had principal corridors/lobbies, so the corridor was not a key feature in the morphological assessment of the Orowa Genotype. The Orowa was the most integrated space in the dwelling followed by the living room, which sometimes had the same integration value as the bedroom, or was slightly less segregated (see Figure 6). The kitchen and the shower/toilet were the most segregated spaces (see Figure 7 for Mean Integration of the key spaces in the Orowa genotype).

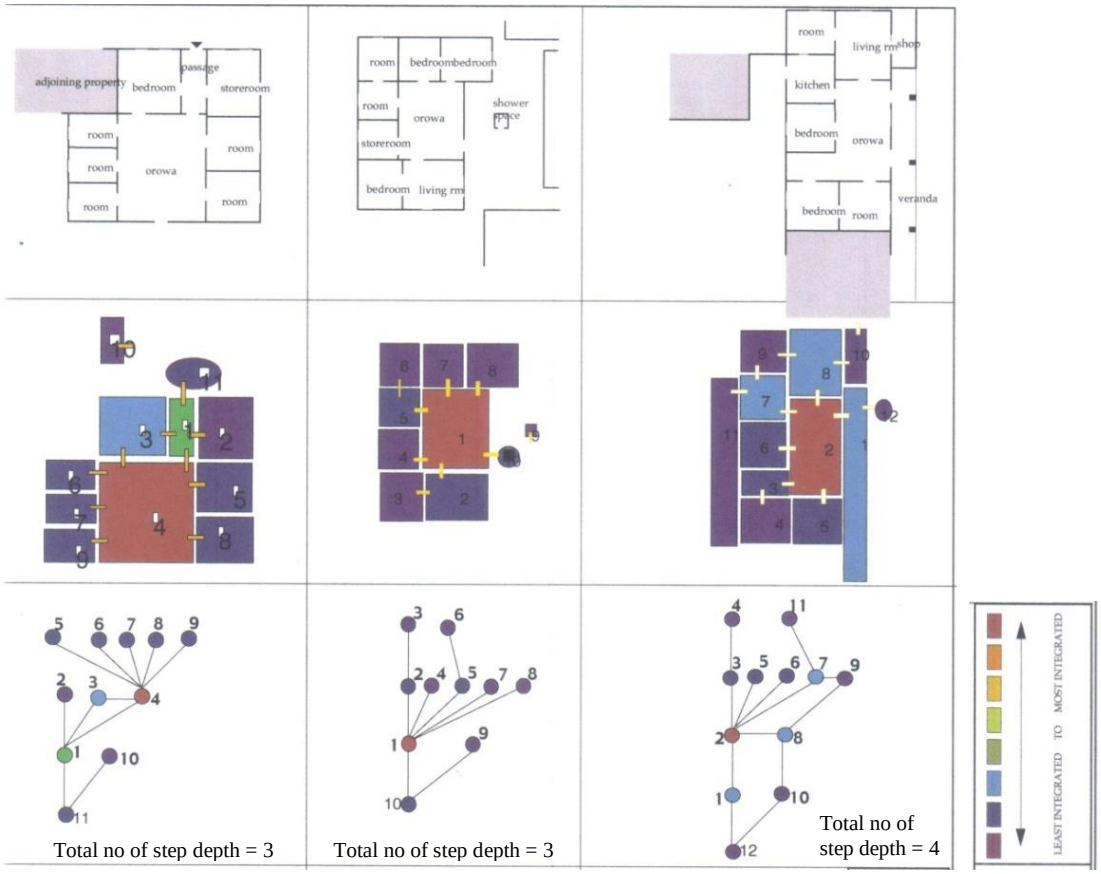


Figure 6: floor plans, convex integration maps and J-graphs of examples of the Orowa Genotype

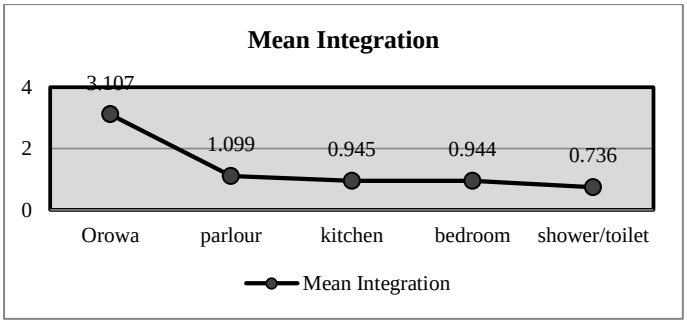


Figure 7: Line Chart of Mean Integration of Key spaces in Orowa Genotype

The mean depth for the key space labels was based on the step depth of each space label in each dwelling, that is, the number of intervening spaces between each space label and the outside world, and based on this, the shower was the shallowest from the outside world since it is almost always connected directly to the outside, and the Orowa is the shallowest interior space (see Figure 8). Overall the Orowa genotype had a mean step depth of 3.588 making it the shallowest in the total sample and the exterior was also quite integrated (Mean integration=1.240).

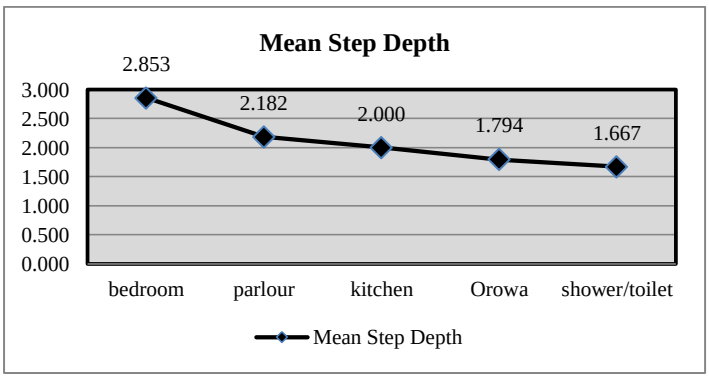


Figure 8: Line chart of Mean step depth of key spaces in Orowa Genotype

5.1.1 Orowa Genotype Space Label Typologies

Thirteen of the seventeen floor plans were ringy structures, but often involved using an external door to maintain continuity of the ring. (Mean number of rings = 1.0). A high proportion of all the space labels in the genotype were in dead-end A-spaces (56.7%), with 14.4%, of B-spaces, 20.6% of C-spaces and 8.2% of D-spaces. In summary, the Orowa genotype was one of the shallowest found in the larger sample, and the Orowa space itself being very shallow in the domestic complex, and often occurred on an ring connected to the outdoor space, but with no purely internal rings found in the Orowa genotype. It is a genotype that is strongly dominated by function spaces with very few purely transition spaces occurring in most floor plans demonstrated in a very low ratio between the transition space (T) and function space (F). This ratio; the T: F ratio = 0.139 highlights the low use of transition spaces or mediator spaces in linking key spaces to each other, and function spaces connect directly to each other. Amorim (2001) defined mediator spaces (based on his study of Brazilian pre-modern and modern houses), as transition spaces which create a 'buffer' between the three sectors fundamental to most domestic complexes- the living, service and sleeping areas/sectors. The orowa spaces were usually a C or D-space, that is, usually with several connections or lying on a ring (11 of the 17 were of these types). The parlour was either on a ring or off it (evenly split between A, B, C, and D-spaces), while the kitchen and bedroom were predominantly dead-end terminal spaces; that is, A-spaces.

5.2 The Double-loaded Corridor (with segregated kitchen) Genotype

Only five of the Orowa houses belonged to this genotype; hereby referred to as the DL-Corridor (seg. Kit) Genotype, but it was the most frequently occurring genotype in the larger sample of 160 households. It is typified by the corridor being the most integrated space, although the Orowa in this type was also strongly integrated in the few floor plans where they occurred. The corridor in this genotype is usually central with double rows of rooms on either side of it, and serves as the main connective space. As such, the longer, narrower corridor was invariably slightly more integrated than the Orowa in this case. The corridor, sitting room and kitchen were shallow in comparison to the bedroom and bathroom, and the overall mean step depth of the genotype was 4.308, which was relatively shallow in the larger sample, but deeper than the Orowa genotype. Many of the houses had a predominance of dead-end A-spaces, reflected in the overall pattern 55% A-spaces, 12% B-spaces, 27.4% C-spaces and just 5% of D-spaces. Overall, the parlours and kitchens had a mixture of C and A/B spaces, and the kitchens were usually directly linked to the exterior. Bedrooms were mainly A-spaces, though a significant number of C-Spaces also occurred.

6 Activity Patterns and Space Use in the Orowa House

Both genotypes had a relatively small functional core in comparison with newer housing types, that is, only a few space labels were found to be common to the majority of the plans; at least 66% of the floor plans. The more traditional genotype seems to be the Orowa Genotype, as it also had the smallest functional core with just the parlour, bedroom, and Orowa as its functional core (see Table 1). The DL-Corridor (seg. Kit) Genotype with its slightly larger functional core (parlour, bedroom, corridor, verandah, bathroom and orowa), includes transition spaces (corridor, veranda) which is almost completely absent in the Orowa Genotype (see Table 2). The idea of the functional core is about the level of functional complexity normative in a genotype. It was noted that the integration value of a space label increased as a space moved from group III; being of peripheral importance in the genotype, to group I and becoming more mainstream to a particular way of life. The converse also occurs, as the Orowa space; a core functional space in the Orowa genotype becomes a group III space label in the DL-Corridor (seg. Kit.) Genotype.

Table 1: Functional Core Space Labels in Orowa Genotype

Orowa Genotype (17 floor plans)		
Space labels that occur in at least 66% of the floor plans	**Space labels that occur in btw 33% - 66% of floor plans**	**Space labels that occur in less than 33% of floor plans**
PARLOUR	Kitchen	Toilet
BEDROOM	Shower room	Main bedroom
OROWA	Corridor*	storeroom
	verandah	

Table 2: Functional Core space labels in DL-Corridor (segregated kitchen) Genotype

DL-Corridor (segregated kitchen) Genotype		
Space labels that occur in at least 66% of the floor plans	**Space labels that occur in btw 33% - 66% of floor plans**	**Space labels that occur in less than 33% of floor plans**
PARLOUR	Toilet	Dining room
KITCHEN	Main bedroom	**OROWA**
BEDROOM	Storeroom	study
CORRIDOR		
VERANDAH		

A review of the functional core shows that the kitchen is not part of the functional core in the Orowa genotype, principally because most of the kitchen related activities are often done in the Orowa space. Also, water supply was often from wells, collected rainwater, public taps or streams, lacking the fixity of pipe-borne water. The activities that take place in the functional core spaces are discussed below.

6.1 Convention of Space Use:

An inventory of twenty activities was built up from the respondents' answers, and a profile of the use(s) found in each of the functional core space in both genotypes shows a wide range of uses in the overall sample and at the individual household level, that is indicative of relatively low specialization of space use.

The parlour was found in a smaller number of the dwelling in the two genotypes. It is typically used for family living and relaxation, reading, studying, eating, and occasionally for activities incompatible with the reception of guests, e.g. cooking, in the DL-Corridor (seg. Kit.) genotype. In the Orowa genotype, the use of the parlour is more often restricted to use by the head of the household for receiving his (male) guests, whilst it is more of an everyday space in the DL genotype. It is very generic in use; with seventeen object categories found in the parlour (e.g. furniture, electronic gadgets, fridge/freezer, crockery, print material, fan, unused items, bowls etc), and eight different activities also occurring in the space.

The bedroom is often allocated to each wife and her young children, or as a separate room for the husband/head of a household. It is the most common space label in the Orowa house as well as in the total sample. Apart from using it for sleeping, dressing and storage of clothes & shoes, the bedroom was sometimes also used for eating, for storage of non-perishable food, cooked food, and other personal effects (clothing, religious objects (amulets), jewellery, valuables). Seven different activities were found in the bedroom in the two genotypes, and 13 different objects categories were found in the Orowa genotype, and 19 object categories in the DL-Corridor (seg. Kit.) Genotype makes it quite non-specialised for both activities and objects. The bigger object arrays in the DL-Corridor (seg. Kit.) Genotype is most likely due to the fact that the dwelling is occupied by non-related multi-households hence fewer things are likely to be kept in the communal areas due to a lower level of trust.

The Orowa space is almost exclusive to the traditional genotype, and is usually between 3.5 to 4.5 metres wide. It serves as the circulation link to many rooms in the dwelling, as well as being an important activity space for cooking, relaxation, and storage, despite the fact that it is shared with other related households. It is a hub of activity with fourteen different activities found in the space in the twenty-four dwellings. Eighteen object categories were also found in this space- regular furniture, space furniture, culinary related items, keeping the animals being reared (at night), portable water storage, fuel, motorcycles/bikes etc. Table3 the activities that constitute at least 5% of the total responses highlighted in grey.

Table 3: Activities found in the Orowa space and the frequency of each activity.

Activities found in the Orowa Space in both Genotypes	Cooking	eating	family living	food preparation	reading	Sleeping/dressing	general storing	entertainment	storage of reared animals	ironing	washing clothes	retailing	Toileting*	Other
frequency	13	9	8	6	6	4	4	4	4	2	2	1	1	1

7 Discussion: Syntactic & Spatial features of the Orowa house.

The general trend in the genotypes is a lower mean integration in the older examples, of which the Orowa genotype is the oldest. The enduring genotype: - the DL-Corridor (seg. Kit) Genotype was in-between. The mean overall depth pattern follows an opposing trend: - the orowa genotype is the shallowest, and the DL-Corridor (seg. Kit) Genotype in-between. There was also a major change from function-space integrators to transition-space integrators from older to newer genotypes, again with the enduring genotype, that is, the DL-Corridor (seg. Kit.) Genotype found in-between. These shifts also correlate with an increase in the popularity of single household dwellings and an enlarged waged economy. The by-product of this is the separation of certain functions from the domestic space, but in the multi-household dwellings studied here in which the households are related, there is less emphasis on privacy, and the lack of transition spaces as a connective tissue is an aspect of the lower emphasis on privacy in the interaction between the households. The Orowa genotype is completely devoid of internal rings, while according to Hillier (1998), a higher proportion of C & D-spaces usually corresponds to reduced step depth, which is consistent with the two genotypes analysed here. The lack of rings in the Orowa genotype is also less of an issue since all the households are related to each other and have a close interaction. Table 4 shows a comparison of space types in both genotypes.

Table 4: Genotypes and nature of spaces

genotype	**A-spaces**	**B-Spaces**	**C-Spaces**	**D-Spaces**	**C&D-spaces**	**A&D-spaces**
Orowa	57%	14%	21%	8%	29%	65%
DL-Corridor (seg. Kit.)	55%	12%	27%	5%	32%	60%

Generally the parlour, bedroom and kitchen are in A-spaces (dead-end spaces) in both genotypes, though there were a slight change of bedrooms being of a mixture of A and B-spaces in some of the newer genotypes. The parlour, kitchen and bedroom are segregated in both genotypes, but the parlour and kitchen are less segregated in the newer genotypes from the total sample. This shift is a result of social changes in the form of new activities and objects, new technology (pipe-borne water etc) and new ideas about social norms such as the kitchen becoming slightly more of a place where socialization can also take place. The two genotypes also had the lowest ratio of habitable rooms (HR) to the mean number of cells/convex spaces (C) in the total sample, signifying the small proportion of the domestic complex that was available to the households surveyed (Table 5), as well as low T: F ratios (see Table 6) partly as a result of the absence of mediator spaces.

Table 5: Genotypes and Spatial Variables (HR:C ratio)

Genotypes	DL-Corridor (seg. Kit.)	Orowa
Mean no of cells/convex spaces (C)	17.42	11.7
Mean no. of bedrooms	2.21	2.12
Mean no. of habitable rooms (HR)	3.44	2.88
HR:C ratio	0.20	0.25

Table 6: Genotypes and spatial variables (Transition: Function ratio)

Genotypes	DL-Corridor (seg. Kit.)	Orowa
Transition space: Function space ratio (T: F ratio)	0.165	0.139

Hence there is less reliance on the use of transition spaces to mediate between different 'sectors' in the genotype, and less emphasis on the need to separate inhabitant and visitor access in these types of living styles. In other words, the definition of privacy is less about separation between inhabitant and visitor, as most of the respondents in Orowa houses stated in the questionnaire that most space labels in their homes were accessible to a visitor. Although the Orowa is very much the centre of social activity in the Orowa genotype, and cooking was the most common activity mentioned by respondents, cooking was not segregated into a pure service space until the advent of the DL-Corridor (seg. Kit.) genotype, which is in response to changes such as the incorporation of water and drainage into a kitchen space.

7.1 The Orowa House and space use characteristics

There was very little spatial distinction between personal, sacred, and communal 'zones', in the domestic space and similarly, there was less emphasis on the separation of inhabitant- visitor circulation: - the bedrooms are generally accessible to close friends, but since most of the rooms are quite small, most of the socialising with non-inhabitants takes place in the orowa, or outside on the front porch/verandah. This was evidenced in both genotypes. Very few personal and habitable spaces exist in the Orowa house as evidenced in the HR: C ratio as well as the low T: F ratio which indicates a lack of mediator space, but which is compatible with communal living that is not incompatible with related families sharing space(s). Access for non-residents, was mediated not by spatial zoning, but by a combination of individual and cultural regulations that are usually known to the household and to the community. Most spaces are accessible to both genders except in a few cases where some religious shrines are barred from female access. There was also a lack of focus on individual privacy, or privacy as a spatial condition in both genotypes, invariably a consequence of the compatible aspect of extended family living in the Orowa house. Very few of the respondents in this house genotypes complained about being affected by the lack of privacy, supporting the notion that there is little demand for privacy amongst the different parts of the extended family. Household privacy was perhaps seen along the lines of inside (extended family) versus outside (community beyond), and any concerns about individual privacy seemed to develop mainly around the performance of bodily functions.

The Orowa is a very important location of the majority of domestic activities and also for the storage of many everyday objects as seen in the activity profile and the list of objects enumerated in the preceding section particularly in the Orowa genotype. Many of the activity functions and objects that are usually kept in the Orowa, in the Orowa genotype were mostly transferred to the central corridor in the DL-Corridor (seg. Kit.) genotype when occupied by related families. While personal objects and valuables like are mostly kept in the bedroom, this does not necessarily translate into a public/private distinction, as the bedroom is often accessible to close friends, but comprised of a slightly less varied object and activity array in the Orowa house. The concept of public/private zoning seems different from that indicated in many western cultures. The Orowa, Corridor and Bedroom- constitutes the main focus of the activity and object arrays in the domestic domain in the traditional Orowa house, though the size of the object array in these spaces in the traditional houses were smaller in comparison to the newer middle class homes, while the converse was the case for activity arrays in these three key space labels. On the whole, the functional core spaces were non-specialised for both use (activity) and content (objects) in the

two genotypes. Finally, outdoor space (front & back yards, front porches, and verandahs) were an important aspect of traditional Yoruba domestic life, dictated in part by climactic conditions, and the lack of indoor plumbing. The yard/outdoor space was used heavily for food preparation and processing, doing and hanging laundry, small-scale planting, outdoor shower and toilet functions, animal husbandry and occasionally for religious activities (e.g. pouring of libations to the ancestors and festivals). Ceremonial cooking (and sometimes regular household cooking) small retail endeavours, and parties almost always took place outside; enabling interaction with other families and passers-by.

8 Conclusions

Many of the syntactic and spatial properties of the Orowa house as exemplified in the orowa genotype were compatible with the reliance on the use of exterior spaces. The following properties : - a) the preponderance of dead-end rooms (A-spaces), b) the non-distributedness of many of the plans, characterised by tree-like J-graphs coupled with the strong integration of the Orowa, which is the main interaction space for the extended family, c) the relatively shallowness of all interior spaces from the exterior, and d) less variation in the mean integration values of most of the key spaces (apart from the Orowa space and the Corridor); indicative of less syntactically differentiated spaces- all enhance the role of the exterior for many domestic activities. The minor variations in the integration values of the bedroom and the parlour also suggest that the space functions can be easily swopped.

Although many of the sample houses have actually been demolished to make way for more ‘modern’ interpretations, it is suggested that any attempt to develop or update this type must continue these relative shallowness, and the use of a strongly integrating space which can be the locus of the dwelling; a model that can be modified to suit non-related multiple households. The relative low T: F ratio is a distinctive feature of the extended family Orowa house; coupled with the absence of mediator spaces, is quite compatible with the co-habitation of extended family members. Mediator spaces were found to be important features of modern Brazilian houses as opposed to the pre-modern forms, and served important social roles as ‘boundaries’ between sectors. When the sectors are strongly isolated via the use of mediator spaces as was the case in the modern Brazilian houses, the different categories of users were easily prescribed, but when sectors are more permeable, interactions between differing categories of users in the dwelling becomes less controlled, unless social rules are put in place (Amorim, 2001). Understandably, the Orowa houses are occupied by extended family members hence a great deal of flexible use of spaces is usually acceptable. It is noted however, that mediator spaces can be integrated into a family house, to accommodate further separation between individual nuclear households in this system, and this seems to be the case in other newer genotypes that serve the middle class nuclear family households that were also part of the total sample, mainly for the creation of some isolation between the living, service and sleeping sectors.

9 Further Research

An immediate point for further study would be to replicate the study in the new dwellings in Enuwa town core, to see how the syntactic and spatial features have either been modified or eradicated in those houses which have often been built by more affluent and educated members of the extended family.

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