



RESEARCH PAPER

**Syntactic Comparison of Traditional Courtyard and Modern Houses
of Khyber Pakhtunkhwa, Pakistan**

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ABSTRACT

The purpose of this research is to investigate the syntactic characteristics of traditional and modern house plans in the Khyber Pakhtunkhwa province of Pakistan for the syntactic parameters influencing privacy. The design of homes has always considered the requirements of the people who live in them. Geographies, cultures, and communities have a diverse spatial configuration for the homes. Livelihood spaces have an established spatial order reflecting the society, social order as well as the personalities of the dwellers. This research used simulation and Floor plan drawings as the primary source of data for justifiable permeability graph-based space syntax analysis. Results show that modern houses offer better options for privacy due to the higher value of relative asymmetry (0.29) and greater tendency toward asymmetry as compared to traditional courtyard house layouts. The home with asymmetrical designs includes many control spaces, so entering other rooms requires crossing through the control spaces.

Keywords: House Layout, Modern House, Privacy, Syntactic Analysis, Traditional House

Introduction

The design of homes has always considered the requirements of the people who live in them. Geographies, cultures, and communities have a diverse spatial configuration for the homes. Livelihood spaces have an established spatial order reflecting the society, social order as well as the personalities of the dwellers. Since time has a direct impact on people's behavior and thought processes, houses' internal workings and typologies also change over time to meet the needs of their inhabitants. According to general observation, in the late 1900s, people had little regard for privacy in their homes because they loved to interact and spend most of their time with each other. As time went on, however, people began to prioritize their own privacy, and so the human thought process also changed. Buildings, however, have recently undergone uneven and undesired adjustments that are not based on actual demands but rather are merely constraints. The introduction of modern architecture in Pakistan, particularly after 1980 and onwards, can be credited with starting this trend. Hereafter, local architecture, which was deeply entwined with rich traditions, was altered as a result of modernity in architecture. As a result, the quality of residential buildings changed. Additionally, individuals' needs and capacities also change over time (Baldwin and Tomita, 2008).

Space and human relations are interrelated. A family is a socio-economic structure of the society which though small, but functions as a keystone in shaping the future of society. To play this role efficiently it needs a dwelling space, a house of the required characteristics and privacy.

(Sungur and Çağdas, 2003). Privacy is a strong assortment character of a space, which needs to be apprehended in an equivalent manner. Spaces can be characterized not just according to their level of privacy as well as the capacity to regulate privacy. Strictly classifying locations as either public or private is a less effective strategy. Architectural space and its numerous components should regulate privacy in order to function effectively. According to users' demand, space and its components needs to have the ability of increasing or decreasing privacy (Georgiou, 2006). In the vernacular architecture of Khyber Pakhtunkhwa province of Pakistan, houses are based joint family system, with a central courtyard connecting all spaces of the house. The courtyard is a multifunctional space acting as a space for family gatherings, guest entertainment, family functions as well as light well for ventilation child paly area are few from a large list of functions. Now the trend has changed due to modernization and the dwelling have transformed from an open courtyard house to small units having functions.

The purpose of this research is to investigate the morphological characteristics of both traditional and modern house plans in the KPK province of Pakistan. The degree to which the morphological characteristics of both styles influence the privacy is assessed through space syntax and its methodology to a sample of modern and traditional house layouts.

Literature Review

Housing is a significant parameter in the formation of social character, and for the establishment and maintenance of social relationships. it impacts everyday life of the individuals as it is associated with the control over life circumstances (Dunn, 2000). Over the years, significant changes could be observed in dwelling styles, it is because house is a dynamic itself and not only grows but also change in size and configuration in response to change in the household (Omer, 2011). A courtyard house is referred to as an enclosed open-air space; an uncovered space that is completely or partially bounded by walls or structures. Courtyard houses have been in use in residential architecture for almost as long as man has lived in constructed dwellings.

According to Margulis (1977), privacy is ambiguous and unclear, and it is impossible to define it specifically because any definition has to consider the values of the society in question at the moment (Mellors, 1978). Typically, this term is used in at least four different contexts: the freedom to choose isolation, the freedom to enjoy undisturbed closeness with a chosen number of people, the right to maintain anonymity around others, and the freedom to maintain privacy by withholding any personal information (Forgas and Jones, 1985). So, maintaining one's privacy can aid in balancing the authority exercised by others with high social standing (Kelvin, 1973).

All human civilizations share the underlying value of personal privacy. This privacy must not be infringed unjustly (Hanson, 2008). In Islam, the idea of privacy relates to the separation of men and women. To ensure family members' protection, it entails separating private and public locations (Naghi Zadeh, 2006).

In this study, environmental mechanisms are the subject. According to Rapoport (2005), an environment can either encourage or discourage certain behaviors, cognitive functions, moods, and other characteristics. This effect is particularly evident in the case of the home, which is the primary territory for the majority of people in terms for social interactions, privacy, and daily activities (Rahim and Hashim, 2012).

The most popular perspective on space is that its arrangement reveals people's views and the spatial hierarchy of the entire configuration (Hillier and Hanson, 1989). Morphology in this study refers to diagrams of these linkages, access between rooms, and relationships between spaces (Hanson, 2003). Access diagrams between various locations

within a collection of spaces are the main focus. The "permeability" structure within the home is created by these schematics showing the connections between the interior sections. Drawings or the structure itself could conceal morphological diagrams, making it challenging to see them. As a result, morphology has a better and more abstract way of showing how spaces relate to one another (Kirsan, 1996).

graphs referred to as "justified access graphs" are used to assess the morphological properties of a plan layout (Hillier and Hanson, 1989). In these graphs, a predetermined space known as "the carrier" is used to assign depth values to every room in the house. The exterior or outside of the configuration serves as the carrier space in the analysis and is called route space. All of the spaces are arranged on a horizontal line and given depth numbers in accordance with their depth values. On the same line are all the spaces with the same depth values. The study reveals that various numerical measurements relating to the characteristics of spatial configuration should be done after the graphs are created (see Figures 4 and 5).

These measurements include the mean depth (MD) of the spaces within the spatial system (house layout), the relative asymmetry (RA) of the spaces, and the real asymmetry (RRA) of the spaces. These characteristics play a big part in establishing out how private the internal spaces of the house are. Integration and permeability play significant roles in predicting how crowded or quiet a location will be (Hanson, 2003).

Often, connections between spaces change the integration of the entire configuration, making some areas of a home (the public areas) more accessible than others (private spaces). This sequencing of integration, regulate interactions between residents and with guests (Dawson, 2002).

In terms of numerical values, the morphological characteristics of a house plan can be described as symmetric, asymmetric, and distributed, respectively. These characteristics are connected to the spatial configuration's permeability and depth. The property symmetry/asymmetry is the subject of this study since it provides concrete information on the subject of privacy. In relation to the other spaces in the system, symmetry or asymmetry reflects the relative depth of the space (Hillier, 1993). A space's integrating (tending towards publicness) or segregating (tending towards more private) effects in relation to the design of the house are referred to as symmetry and asymmetry. The range of RA, which ranges from 0 to 1, can be used to describe this feature.

A space with a low value attempts to integrate the system as a whole, whereas one with a high value tends to be segmented from the space. This range starts at 0 and goes up to 1. Less than one (1) indicates the system's most integrated spaces and areas with the least segregation (i.e., less privacy), whereas more than one (1) indicates the system's most segregated areas. (Shoul, 1993; Sungur and Çağdaş, 2003). As a result, if it is low, the layout is symmetrical and the spaces have equal permeability control.

Material and Methods

This research used simulation and Floor plan drawings as the primary source of data for justifiable permeability graph-based space syntax analysis. Floor plan drawings are also an important, trustworthy, and convenient source for the research as they represent an abstraction of the design. (Manum, 2005). For this, information on the floor plans of both modern and traditional homes was gathered from the province of Khyber Pakhtunkhwa. By using a justified access graph, the layouts of modern and traditional courtyard houses were examined in for their syntactic traits, and comparisons were made.

Case Studies and Analysis

What sample of houses would be suitable as data is the first consideration when preparing to investigate the level of privacy in interior space of the houses in Khyber Pakhtunkhwa. Traditional and modern house plans have been selected for examination and comparison from 1980 to 2000 (traditional type) and from 2000 onwards (modern type). The primary sampling approach is to choose 5 house plans from both periods from five cities in KP. This decision is made based on the two different types of house layouts and how their internal spaces are distributed and configured. The primary source of information for space syntax analyses based on justified permeability graphs were floor plan drawings.

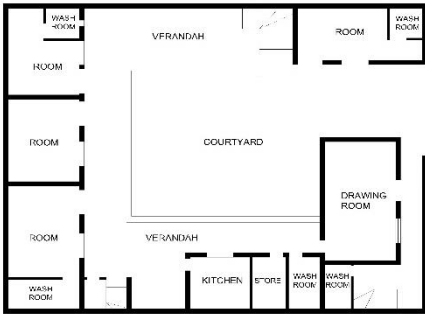
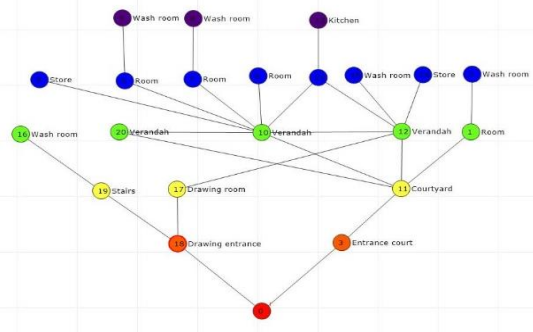
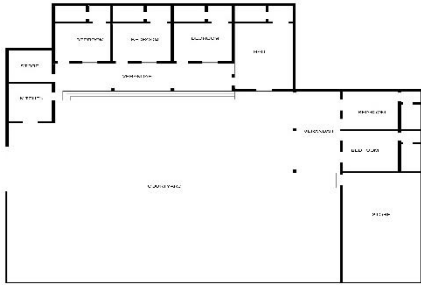
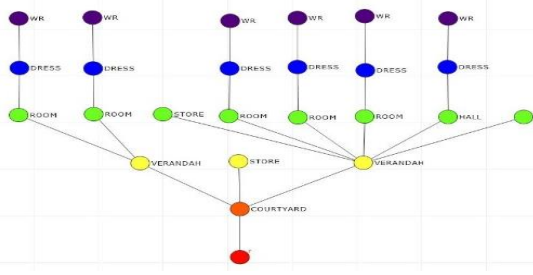

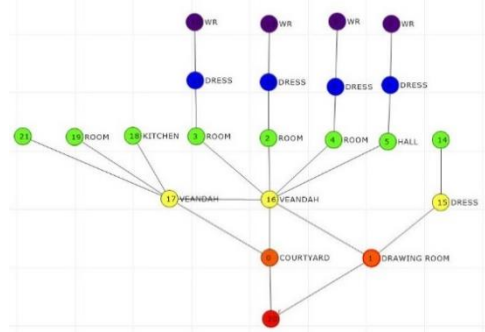
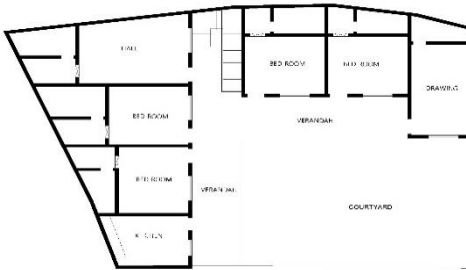
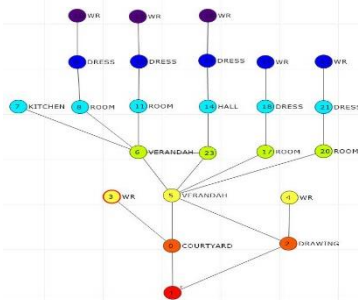
Table 1
Floor plans and Justified permeability graphs of modern houses

S. No	Floor Plan	Justified Permeability Graph
M-1		
M-2		
M-3		
M-4		

The most popular perspective on space is that its arrangement reveals people's views and the hierarchy of its many levels (Hillier and Hanson, 1989). Morphology in this

study refers to diagrams of these linkages, access between rooms, and relationships between spaces (Hanson, 2003). These characteristics play a big part in determining how private the interior areas of the house are. A space's integrating or segregating (less private/more private) impacts in relation to the design of the house are referred to as symmetry and asymmetry.

Table 2
Floor plans and justified permeability graphs of traditional courtyard houses

S. No	Floor Plan	Justified Permeability Graph
C-1		
C-2		
C-3		
C-4		

The range of RA, which ranges from 0 to 1, can be used to describe this feature. A space with a low value tends to connect the system as a whole, whereas one with a high value tends to be segmented from the space. A low number denotes a space's propensity to fully integrate the system, while a high value denotes a space's propensity to be isolated from the space

Table 1
Result of Syntactic analysis for modern and traditional courtyard houses

Modern Houses	Step Depth	Total depth	MD	RA	Courtyard Houses	Step Depth	Total depth	MD	RA
M1	6	46.80	3.34	0.36	C1	5	65.09	3.09	0.20
M2	6	62.00	3.44	0.28	C2	5	95.04	3.96	0.25
M3	5	54.22	3.18	0.27	C3	5	70.18	3.34	0.23
M4	6	59.26	3.29	0.26	C4	6	85.08	3.69	0.24
Mean	5.75	55.57	3.31	0.29	Mean	5.25	78.85	3.52	0.23

Conclusion

Data from the above syntactic analysis demonstrate that modern house plans have an overall more spatial depth compared to the traditional houses, the average value for modern house is 5.75 while for traditional houses it is 5.25. The morphological properties of the sampled houses' conventional and contemporary home designs were examined. Both modern and traditional house plans have a mean value of (RA) lesser than 1, indicating that both have an asymmetrical spatial design. Yet, compared to traditional house layouts, modern house layouts provide superior design alternatives for privacy as they have greater values of (RA) and a higher tendency towards an asymmetrical structure. The home with asymmetrical designs includes many control spaces, so entering other rooms requires crossing through the control spaces. The deeper rooms, especially bedrooms, offer the most privacy. More control over mobility and a higher degree of social hierarchy, both of which promote privacy, are indicated by a higher mean value of (RA). According to the findings, modern house plans provide better privacy-related design solutions since they have a greater relative asymmetry value and a stronger tendency towards asymmetry than traditional courtyard home plans.

References

- Baldwin, E., & Tomita, S. (2008). Housing in response to the human life cycle. *Aging, Disability and Independence*, 1-17.
- Dawson, P. C. (2002). Space syntax analysis of Central Inuit snow houses. *Journal of Anthropological Archaeology*, 21(4), 464-480.
- Dunn, J. R. (2000). Housing and health inequalities: review and prospects for research. *Housing studies*, 15(3), 341-366.
- Forgas, J. P., & Jones, R. (1985). *Interpersonal behaviour: The psychology of social interaction*. Pergamon Press.
- Georgiou, M. (2006). *Architectural privacy: A topological approach to relational design problems* (Doctoral dissertation, UCL (University College London)).
- Hansson, M. G. (2007). *The private sphere: an emotional territory and its agent* (Vol. 15). Springer Science & Business Media.
- Hanson, J. (2003). *Decoding homes and houses*. Cambridge university press.
- Hillier, B., & Hanson, J. (1989). *The social logic of space*. Cambridge university press.
- Kelvin, P. (1973). A social-psychological examination of privacy. *British Journal of Social and Clinical Psychology*, 12(3), 248-261.
- Kirsan, C. (1996). *Knowledge-based design model depending on the morphological analysis of 19th century row houses in Istanbul* (Doctoral dissertation, M. Sc. Thesis).
- Hillier, B. (1993). Specifically architectural theory: a partial account of the ascent from building as cultural transmission to architecture as theoretical concretion. *Harvard Architecture Review*, 9, 8-27.
- Manum, B. (2005). Generality versus specificity: A study on the interior space of apartments. In *Proceedings of the fifth international space syntax symposium*. West Lafayette: Purdue University Press.
- Margulis, S. T. (1977). Conceptions of privacy: Current status and next steps. *Journal of Social Issues*, 33(3), 5-21.
- Mellors, C. (1978). Governments and the individual-their secrecy and his privacy. *Privacy*, 87-112.
- Naghizadeh, M. (2006). *City and Islamic architecture*. Isfahan: Isfahan Construction Engineering Organization.
- Omer, S. (2011). Housing lessons from the life of prophet muhammad (pbuh): the subject of privacy. Retrieved April, 23, 2012.
- Rapoport, A. (2005). *Culture, architecture, and design*. Locke science publishing Company.
- Rahim, Z. A., & Hashim, A. H. (2012). Adapting to terrace housing living in Malaysia. *Procedia-Social and Behavioral Sciences*, 36, 147-157.
- Shoul, M. (1993). The spatial arrangements of ordinary English houses. *Environment and Behavior*, 25(1), 22-69.

Sungur, C. A., & Çağdaş, G. (2003). Effects of housing morphology on user satisfaction. *Retrieved from <http://www.spacesyntax.net/symposia/ss4/shortpapers-posters>.*