

Identifying Problems Generating From Street Pattern Residential Schemes- A Case Study of Jamshoro

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Abstract: The morphology of street patterns has been the subject of many studies in recent decades, there have been few attempts to quantify the street patterns. For this study, we measured and compared the trending street pattern in Jamshoro, listed down all the types of street pattern trending there along with their rising problems related to sun & wind orientation. The pattern according to which housing societies are developed in Jamshoro are different as they are designed by different Architects & town planners, making socio- psycho issues for inhabitants, most of the houses have to sacrifice for the wind & light. Aim of this research is to identify the orientation issues with respect to wind & light related to street patterns & Providing better solution for the development of eco-friendly Residential scheme. For this purpose, we visited these residential areas, conducted case studies, reviewed literature in order to get keen observation on how others cope with these issues, and conducted un structured interview from the inhabitants. The adopted methodology of research will help us in sorting out the major issues with most appropriate solutions for the development of eco-friendly residential scheme.

Keywords: Street Pattern, Murk society, Jamshoro

1. Introduction

As the birthplace of Indian culture, the towns of the Indus Valley represent an important & rich source of information concerning urban development in subcontinent. The Indus River is one of the largest & most important rivers in south central Asia. From its source in the Himalayan Mountains to its terminus in the Indian Ocean it traverses a course of over 2,000 miles. For millennia it has been an essential route for travel, trade & communication & has been the source of much of India's agricultural production. The valley which surrounds the Indus River has witnessed the birth, growth, and death of many cities. Excavations of Indus towns have demonstrated the most ancient town planning in the world. The grid pattern (straight streets intersecting other straight streets at right angles) is among the most common and universal types of town planning [Datta, Partho].

The importance of urban design in contemporary world for forthcoming or existing urban spaces stands unavoidable as it provides smooth operation & a space to live openly. There are abundant definitions of urban design but in general a majority of these definitions illustrates urban design work as a bridge between planning and architecture (Frey, 1999). Principally in this research the role of street pattern in light of urban design, is discovered through user experience and perception. The study articulates the issues faced by the users due to poor orientation of houses, while planning the urban space. From small towns to megacities' infrastructure of urban spaces, street patterns, orientation with respect to sun & wind is a significant component for the optimization of mobility that reduces fatigue for users. These issues hold a distinguished portion of the urban design.

To manage these problems of urban design for the fastest growing city especially cities of developing countries is a serious challenge. It is mainly because, in developing cities, expansion is observed without the consideration of development of infrastructure or proper urban planning without the bridge between architectural planning of housing & civil infrastructure design, many of the true prospects of street pattern in such cities would be unable to achieve. It impacts directly on daily routine & lives of consumers. Street pattern play a vital role in every aspect of while, from parking a car up to orientation according to win d& light. The main roles of designing street pattern include

- Functionality
- Accessibility
- Connection of the city with other cities
- Connection of main arteries of the city with suburbs routes

2. Problem Identification

The arrangement of houses in a row, design of road & pattern according to which housing society is developed in Jamshoro is different as they are designed by different Architects & town planners. They are making socio-psycho issues for inhabitants, most of the houses have to sacrifice for the wind & light. Street pattern in Jamshoro is complex & diversified but lack basic orientation of sun & wind which effect the life of users.

3. Aim & Objective

Aim of this research is:

to examine the issues related with street pattern in residential schemes of Jamshoro, and the objectives include:

- Identifying the orientation issues with respect to wind & light related to street patterns &
- Providing better solution for the development of eco-friendly Residential scheme.

4. Research Material & Method

Research methodology includes Survey of residential areas at different peak hour of day, in order to get the extra ordinary results regarding the quality & quantity of light & wind. literature review will help in getting our hands on how the other people get over the problems related with street pattern & urban development. Case study of some of the residential schemes of Jamshoro & other residential scheme will be conducted, to analyze the pattern & problems of each housing scheme.

5. Literature Review

According to an author **G. boeing**, the street pattern is organized basically in the light of the rules and bylaws that constitute by the developing authorities in built environment, the traffic & pedestrian lines that mark the human movement within city and create a complex urban system (**Jacobs, at el**). The spatial order of the cities based on the street pattern that reshape whole physical formations or urban entities within the city limits especially in neighborhood (**Mohajeri, at el**). The street pattern graphs or plans are based on the street lines, cul-de-sac, dead ends turnings and focal points at cross sections (**Porta, at el**). An author along with his members considers the spatial logic and geometric ordering that arises through street network orientation (**Boyer, at el**).

The street pattern intensively influenced by the land type, cultural, traditional housing forms and economic conditions of authorities on urban development (**Jackson, 1985; Kostof, 1991**). The background of the street pattern goes back to Mohenjo-Daro and other Indus valley civilizations, where the street pattern grid played a vital role in controlling the sun and movement of people and right directions (**John Marshall 1931, M. Jensen 1984-1986**). **Kaiser** in 2011 stated that most modern day grid is based on the land use and available mode of the transportations from & to the markets and other facilities available near residential areas, Recently, scholars have studied street network order and disorder through pattern of circulation and orientation where functionality and aesthetics was measured against mobility and bylaws (**Courtat, at el**).

6. Case Studites

Case Study # 1- Mehran University Employees Cooperative Housing Society, Jamshoro:

Location: Mehran University Employees Cooperative Housing Society is situated at Junction of super Highway & Kotri Link Road, Deh sonwilhar bolhari, Taluka Kotri, District Jamshoro. Figure number 1 shows the master plan of MUECHS.

Brief:

MUECHS, is one of the oldest housing schemes in Jamshoro, particularly planned for the Employees of MUET. It consists of 3 categories of residential plots i.e. 500 sq. yds, 400 & 200 sq. yds. It is spread over an area of 196.12-acre area including an area of 9.75 acres of water works for society, it was designed & planned by Rehman Architects, Cantt, Hyderabad.

We can experience 2 types of planning within the society, one is back street planning other is enclosed planning. In Back street planning area, main road measures 40'-0", secondary road measure 35'-0" & the tertiary road measures 25'-0". Other plots include commercial & some are reserved for amenities. The enclosed planning has 50'- 45'-0" wide main road, along with 30'-35'-0" wide secondary road, the main entrance for each enclosure measures 20'-0". Each enclosure bears their own amenities, and some of the collective amenities are placed out of any enclosure in order to not to disturb the privacy & security of each house.

Field survey

The society was visited by the author several times & they master plan was also read by the author. The issues which author noticed at the time of surveys were, width of road & street was less, the construction waste of most of the houses were left untreated. It consists of more than one street pattern which changes the psychology of human mind while walking or travelling on the road, not a single periphery is used due to its irregularity in shape. Major part of the scheme consist of built environment, green spaces or entertainment spaces are less. Here we can see that the vendors are almost in every chunk of the society, and they pose a poor structure of society as you enter, the rain water & drainage water sometimes stand and give birth to several health issues.

The enclosed planning portion get quite sufficient air due to crossing & due to two-way road, but the area with back to back planning poses issues related to ventilation. 80% respondents of back to back planning stated ventilation as their major problem & due to which they have to pay a bulk amount of electricity bills. Students of young age claimed about the school to be far away from their house, and hence in harsh climate it become problematic to walk even small distances on peak hours of day, the lack of trees, plantation & vegetation in society lead the environment towards un healthiness & also create problem for the vendors.

Other social problems which were discussed include children playing on road due to the distance between their house & playground, which sometimes changes into street fights between children & the vehicle's owner. Parking is another major issue, due to which the social interaction of people changes in harsh conversation. Instead of providing one large entertainment space it is more applicable to provide small facilities at a suitable interval so that every person can avail it.



Fig . 1: Layout plan of MUECHS, Jamshoro. [12]

Case Study # 2- Educators Valley Housing Scheme, Jamshoro

Location: Educators Valley Housing Scheme, situated at Deh Moro, Jabal, Tapo Moro Jabal Taluka Kotri District, Jamshoro. Fig # 2 shows the layout plan of Educators valley Jamshoro.

Brief:

Educators valley is one of the under-development housing schemes in Jamshoro, it consists of two main categories of

residential plots i.e. regular residential plots & irregular residential plots. Regular residential category sub divided into 3 categories according to the area of plot i.e. A category-400 sq. yds, B category-240 sq. yds & C category- 150 sq. yds. Irregular residential category sub divided into 3 categories including A, B & C which are then further divided into sub categories, this sub division is due to irregular shape of land, it is longitudinal in shape, and consists of several irregular corners, which are used for commercial & residential plots. It is spread over an area of 71- acre, it was designed & planned by RAR associates, Qasimabad Hyderabad. 55.6% of the total land is filled with residential plots. 13% is given to amenities including parks, school, Eid-Gah & health, 25% of the land is used by the roads & the other remaining 0.4% is used for commercial area including shops which are regular & irregular in shape as well.

The scheme measures 80'-0" wide main road, leading from one corner to the other corner of scheme. Primary road measure 40'-0" where as the tertiary roads measure 25'-0". The type of planning is back street, and the back street is 8'-0" wide. Amenities are provided at an interval of distance in order to make it convenient for the public to utilize them.

Field Survey:

Streets have always had a hierarchy in terms of connectivity and access. However, the ways in which the hierarchies are defined have been a point of debate throughout the history of urban planning. Relation is used in terms of the function of streets in terms of traffic flows instead of network function, results in the segregation of traffic and pedestrians as users of the street. The area is categorized by small plots with buildings up to 4 floors in height. Several buildings share common side walls and the amount of open space and vegetation in the area is very less. Streets developed haphazardly and wider commercial streets and narrower residential streets.

The commercial streets are shared by pedestrians, rickshaws, cars and *thelas* that are mostly for the loading and unloading of goods serving the shops along the streets. *Thela-waalas* selling fruits, nuts and other paraphernalia are found lining the edges of the commercial streets. These streets also get a lot of foot traffic, especially during the weekends. The narrow residential streets are mostly shared by motorized 2-wheelers, bicycles and pedestrians and are less crowded. Several buildings have a minimum setback of 1 m between them which has resulted in the formation of several very narrow alleyways weaving through the entire area.

These are mostly used by local pedestrians and occasionally by 2-wheelers. It bears single typology of back street planning which helps in proper ventilation of most of the houses, instead of provision of a large recreational space, the whole scheme was provided with more than 3 recreational space. According to the Architect, he designed it according to the bylaws with small changes according to the desire of children & senior citizens as these two persons faces a lot of issues for their outgoing & playing. The roads which faces commercial areas are wider because of the supervision of accommodating more people in peak hours & peak time of any occasion or celebration. The leftover or irregular spaces are not been neglected, some of them are treated as green space where as some are utilized as commercial shops.

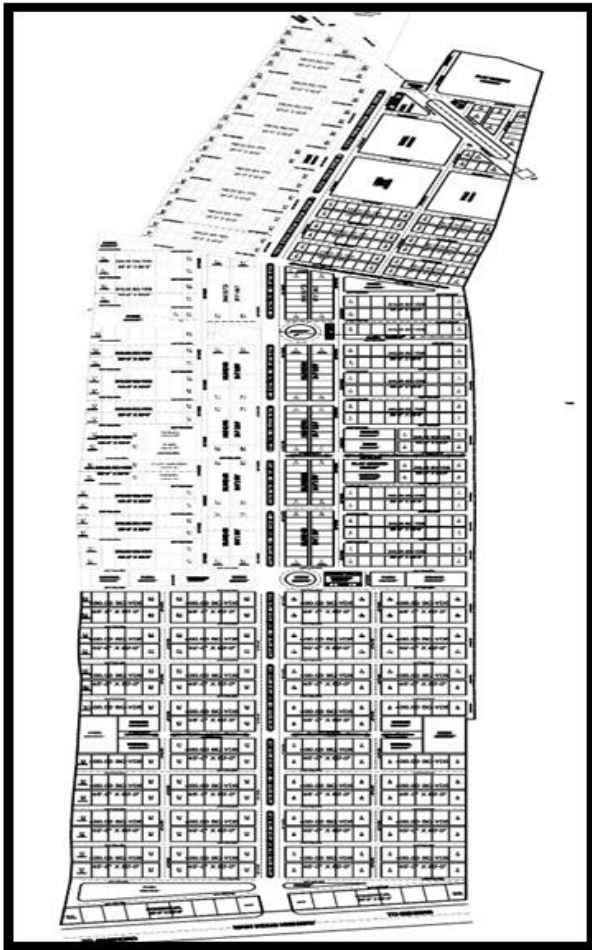


Fig.2: Layout plan of Educators Valley, Jamshoro. [13]

7. Results and Discussion

Case studies, literature & other field survey clear several pictures for the author and the result of complete research is divided into 2 parts. Case studies & interview. These both research methodology listed the problems of residential areas & the suggestions which the responder give is also worth considering. Here below the results of both methods is discussed separately along with the proposed technique while planning any region, scheme or society.

7.a Case Studies

Case studies shows that each street pattern has its own merits & de merits, if any street pattern laid properly can overcome majority of the problems. The street pattern give birth to several orientation issues which then lead to health & safety issues. Small initiative towards noise pollution control through the pattern in which houses are plotted can make a big change, the problems are mostly related with public awareness towards their responsibility of being the user of any property. The problem of orientation & irregular plots is due to the availability of irregular land on which housing scheme is going to build, builders & developers make compromises with the basic facilities which should be provided to the public for the sake of their marketing. Results

indicated that a road network with less connectivity, more cul-de-sacs and greater presence of loop streets were not safer for pedestrians than roads with the traditional gridiron pattern.

7.b Unstructured Interviews

Author conducted unstructured interview with the residence of housing scheme and also with the architect of under development scheme. 80 persons were interviewed about the problems they were facing. 50% people quoted the problems which include water deposition after rain, un even roads, difference in heights of building. Other 50% emphasis on merging of commercial & residential area, parking issues, different plinth levels, blockage of sun & wind & encroachments issues. The residents complain regarding the heightened buildings in front of their houses that these causes the wind blockage. Due to lack of check & balance each house has its own plinth level, the steps & ramp for reaching up to house is built on road, minimizing the size of road, which create uneven surface & problem for the pedestrian & traffic flow disturbs. Due to lack of parking within the houses, the cars are parked on road without considering the issue of congestion. The turning points of street causes severe accidents due to encroachment of corner plots; they block the vision of driver & causes accidents. Following table # 1 shows the questions asked at the time of survey and the responses of respondents.

Table # 1: Responses of Questionnaire survey

Questions	Responses	
Do you feel problem of water drainage?	Yes	50%
	No	50%
Do you have proper ventilation at your home?	Yes	70%
	No	30%
Do you have proper sun light at your home?	Yes	78%
	No	22%
Do you have parking at your home?	Yes	60%
	No	40%
What other problem did you face in society?	Turning of roads	18%
	Roads width	12%
	Encroachments	30%
	Illegal commercialization	40%
What problems do you find in infrastructure?	Height of buildings	30%
	Block vision due to turns	35%
	Commercial & residential plots merge	35%

8. Proposed Technique

The building sector has a large share of the world's total energy consumption. According to the international energy agency (2005) 30-40% energy is being used in the building. Up to 90% of the energy is utilized during the operational stage of building, for the purpose of heating, cooling and lighting. It's a matter of common experience that a large majority of residential building being constructed in Pakistan are not being designed in accordance with our climate. This means the government and private clients of these buildings consume extra energy to make them comfortable. By using sustainable cooling techniques, we can improve building design and can reduce energy bills by 30-40%. In proposed technique, we will firstly lay the houses according to the orientation so that maximum houses get the natural energy. The intersections would be considered so that they don't cause hurdle for pedestrians, then the heights of each building should be controlled according to the bylaws so that each house should get the privacy & security along with wind & light. The ecofriendly material for construction of structure & roads would be introduced in order to save energy & get a sustainable housing area. Height of building will be designed according to the width of road; which structure is facing in order to get the right amount of energy to come inside each house. The plinth of each house would be same so that the level of each buildings remains same & give an ambiance of visual rhythm. The position of park & other recreation would be near residence so that the children feel good. The area for hospitals, health care centers would be buffered from residential area to avoid congestion & rush. The commercial area would be designed away from other amenities so that the rush or peak hours should not disturb the whole scheme. It will be designed according to the bylaws & desire of end users, it will result in sustainable urban communities, it will be an example of "green print" for sustainable cities of the future. Layout & building materials would be at least 40% more energy and water efficient than conventional building materials. Road material will use low-carbon cement as well as other locally-sourced and verified materials. 90% of construction waste will be reused or recycled.

9. Conclusion

Street pattern are the key factor that influence the human life effectively, one can feel safer & secure if the street pattern is laid according to the psychology of human, Street pattern also give birth to health issues, energy consumption increases if the orientation w.r.t sun & wind is not considered while planning. Each type of street pattern has its own merits & de merits, but if used wisely, can be a blessing for the users, street pattern also effects the water & drainage system, street crimes & street accidents are also related to the street pattern, if laid properly can overcome these problems. Public become the victim of these all issues, those

schemes which are fully developed should work on the management & should go for other options regarding energy efficiency, health, safety & security issues, but those schemes which are under development should work on the development of energy efficient housing schemes along with the keen focus on by laws given by SBCA for particular are about the land usage, F.A.R, roads measurements & heights of building so that each house should be facilitated with sun light & wind.

10. Scope of The Research

This research will help in listing out the issues & problems related with street pattern, and will cover up all the types of residential street pattern, their merits, de-merits and problems related with every street pattern

11. Future Recommendations

In this line of research we can identify the issues of each proposed housing scheme in Hyderabad related with street pattern, and those schemes which are under development, we can reshape their street patterns according to our research, we can find out how street patterns effects on our daily lives, on our behavior and also in the development of well-mannered society specially shaping the brain of our children who spent their free time in streets.

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