

EFFECTS OF HOUSING MORPHOLOGY ON USER SATISFACTION

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Abstract

The purpose of this paper is firstly to investigate the parameters which have a role in the user satisfaction and what has to come to mind when speaking of ‘housing quality’; secondly, to investigate the relationship between housing morphology and user satisfaction. After some housing layouts have been analysed morphologically, it has been researched as to whether housing layout affects user satisfaction and to what degree. It is thought that the data that is collected will be useful in the design process of future housing layouts.

In the first part of the paper, needs and the parameters that affect user satisfaction are discussed. The effects of the environment on user are explained briefly. Then the quality concept is discussed and housing quality is explained. In the case study that has been made, the dwelling layouts of some housing settlements are analysed in terms of their morphological characteristics by applying Hillier and Hanson’s (Hillier and Hanson, 1984) syntactic analysis method, called the Gamma Analysis method. In the following step of the study, the relation between the numerical results obtained from the morphological analysis and satisfaction of the residents are examined. The results are evaluated via a statistical program (SPSS).

As a result of the morphological analyses and the post occupancy evaluation, it is found that, like the other parameters that affect the user satisfaction, the morphological characteristics of a dwelling also have a strong and clear relationship with user satisfaction.

1. Introduction

Spatial organisations of dwellings may be quite different in different periods, regions, cultures and societies. Societies establish an order on their living spaces and reflect their characters in these spaces. There is a relation between the space and human relations. The differences in social systems show morphological variety in dwelling layouts. The family contains the socio-economical structure of society in itself. Even though it is a small element, it forms the core, which makes up the future of the society. The family needs a certain space, namely the dwelling, to achieve this function.

The purpose of this paper is firstly to investigate the parameters which have a role in the user satisfaction and what has to come to mind when speaking of ‘housing quality’, secondly to investigate the relationship between housing morphology and the user satisfaction. After some housing layouts have been analysed morphologically, it has been researched as to whether they

affect user satisfaction and to what degree. In practice, it should be known which plan layouts are satisfactory to which level and in what ways they are unsuccessful in meeting the needs of the residents. It is thought that the data that is collected will be useful in the design process of the future housing layouts.

In the first stage of the study, the dwelling layouts of some housing settlements are analysed in terms of their morphological characteristics by applying Hillier and Hanson's analysis method, called the Gamma Analysis method, which develops some hypotheses about the relation between principal syntactic parameters and social variables. By using the morphological measure obtained from these analyses, the access graphs and numerical results are formed. Then the variety and the orderliness of the spatial organisation are exposed.

In the following step, a post occupancy evaluation has been handled by applying questionnaire forms and the data which obtained during this process are evaluated via a statistical analysis software.

2. Residents' Needs

We can analyze residents' needs under two main parts. The first part can be listed as physiological needs and the second part can be listed as psychological and social needs.

2.1. Physiological needs

In Maslow's hierarchy of needs (1964), the fundamental needs of human beings are defined as physiological needs and higher psychic needs. Physiological needs are needs such as eating, sleeping etc. "Higher needs" are the needs of security belonging, love, respect and self-satisfaction.

2.2. Psychological and social needs

Some classifications of psychological needs mention some hundreds of items. Thus there arises a problem of isolating those component elements of residential environment. The most useful classification of psychological needs in environmental studies seems to be Kocowski's containing 12 items of need (Kocowski, 1982): safety, attention, appreciation, importance, contact, affiliation, independence, activity, work & peace, beauty, positive self appraisal and sense & value.

3. The Parameters that affect the user satisfaction

Reviewing the literature, it was seen that the parameters affecting the user satisfaction are mentioned often but also they were in the form of small and separated lists. Following are the parameters that are used to predict the satisfaction of the residents from their dwellings in various studies: Parameters related to the user are: family type (with children/without children/crowded), socio-economical structure/social status, profession, previous environment (appropriateness of dwelling to housing stereotype), sex, age, education, income, and period of stay. Parameters related to the environment are: physical comfort, overall appearance and physical condition, accessibility/services, development scale, organisation (planning), rise in value and level of security. Parameters related to the building are: management, location, value and physical concept. Parameters related to the dwelling and spaces in the dwelling are: quality

of spaces, physical comfort, spatial organisation (design quality + functional relations between spaces and location of spaces in respect to each other), size of house, location of the house and dwelling aesthetics. Parameters related to human needs are: convenience, safety, need for social contact, freedom, activity, work and presence, beauty, meaning, value and social approval (need for social status).

4. Effects of the environment on the user

The influence of the environment on human psychology is unquestionable, although the essence and character of this influence has not as yet been fully clarified. The consequences of this influence, both in the sphere of the mental life of an individual and social pathology, have not yet been fully recognised. This is partly because they may be seen only after some period of time, so the connection between the results and historical potential causes is forgotten or disregarded (Niezobitowski, 1987).

Low satisfaction levels from the dwelling can result in stress, health and adjustment problems and pathologic symptoms. It is very important that housing policies should encourage various structure types, which meet the needs and expectations of different social groups. In addition to this, insufficiencies in the fundamental dwelling norms may be harmful for health. Thus, it is very important to predict the fundamental housing norms and standards for housing policies. (Ukoha, O., Beamish, J., 1997)

5. Quality/housing quality and evaluation

Quality or degree of excellence appears to be viewed in many different ways, according to person and circumstance. A modern definition of quality offered by Burt was: “the totality of the attributes of a building, which enable it to satisfy needs” (Burt, 1978). Despite the great scope and long standing of attempts to clarify quality, much uncertainty remains. One gap is in the understanding of which attributes of completed buildings most influence judgments of quality. Determining the collective judgments made about a range of varied buildings, notable for their quality is an important step in determining these attributes. (Powell, C., 1987)

Evaluating housing projects is an essential part to the process of design in the built environment. The evaluation could be on a number of different bases. One of them is made through dwellers own judgment and assessment of the various components of the environmental quality of their settlements. It is a way of assessing the environmental quality and hence evaluating the success of a particular housing project (Khatab, O., 1993). The method used to illustrate dwellers’ response to different attributes of a particular environment is the environmental quality Profiles (EQP) technique introduced by Rapaport (1990).

In an evaluation study, the components of environmental quality are listed as: housing system, single family dwelling, density, spaciousness, greenery, cleanliness, spatial quality, topography and view, climate, location, non-institutional environment, overall appearance of settlement, overall appearance of building, low traffic level, type of neighbors, social status, social characteristics, convenience, and relative location. (Khatab, O., 1993)

And in a previous study, the principal purposes and benefits of POE were summarised as; fine tuning of existing accommodation, improving the quality of building briefs, improving the quality of design decisions, increasing knowledge of life cycle costs and building maintenance,

promoting understanding of all interest groups and developing a common information base. (Kernohan D., et. al., 1982)

6. Morphological Analysis of the Housing Units

“The most widespread opinion about space is that the spatial organisation is a sign of the common attitudes and the hierarchy of their different levels.” (Hillier, B., Hanson, J., 1984). In the context of this paper, morphology is meant to deal with the accesses between rooms, relations between spaces and diagrams of these relations. Focusing point is the access diagrams between separate spaces within a group of spaces. These diagrams of relations between spaces form the “permeability” structure within the dwelling. The building itself or drawings may hide the morphological diagrams and make the perception of that diagram very difficult. Thus morphology has a clearer and abstract form of revealing the relations between spaces. (Kırşan, 1996)

In Hillier and Hanson’s analysis method (Hillier and Hanson, 1984), the morphological characteristics of a plan layout are analysed with the help of some kinds of graphs called ‘justified access graphs’. In these graphs, all spaces of the house are appointed depth values according to a chosen space called ‘the carrier’. The carrier space in the analysis is the outside of the dwelling. According to their depth values, all the spaces are put on a horizontal line numbered with the depth of that space. All the spaces that have the same depth values are put on the same line.




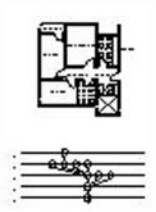
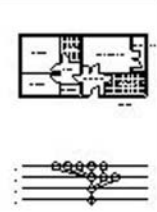
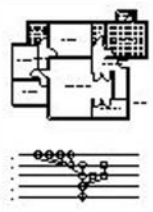
| | | | | | | |
|---|---|---|---|--|---|---|
| |  |  |  |  |  |  |
| No. Of Spaces | 10 | 10 | 11 | 9 | 9 | 11 |
| Depth of the Deepest space | 4 | 3 | 3 | 4 | 3 | 4 |
| Mean Depth(MD) | 2,60 | 2,40 | 2,54 | 2,55 | 2,44 | 2,91 |
| Relative Asymmetry (RA.)of System | 0,29 | 0,29 | 0,30 | 0,32 | 0,33 | 0,34 |
| Real Relative Asymmetry (RRA.)of System | 0,95 | 0,95 | 1,02 | 1,01 | 1,04 | 1,15 |
| Max. Point Value | 6 | 5 | 6 | 5 | 5 | 5 |
| Meanpoint value | 1,81 | 1,82 | 2,00 | 1,80 | 1,80 | 2,00 |
| E: Entrance H: Hall R: Living-room K: Kitchen B: Bathroom Ba: Balcony C: Corridor R: Room | | | | | | |

Table 1. Housing Blocks, Istanbul. Plan layouts and justified access graph.

After the graph is formed, the analysis points out that some numeric measurements should have been made. Those are; the number of spaces, the depth of the deepest space, the mean depth (MD), relative asymmetry (RA), real relative asymmetry (RRA), maximum vertex valency, space with the maximum vertex valency, mean vertex valency, cyclomatic number and relative distributedness (RD).

The morphological characteristics of a plan layout than can be identified with these terms according to the numeric values: 'symmetric/asymmetric' and 'distributed/nondistributed'. These terms are related with the permeability and the depth of the system. Symmetry/asymmetry are about the integrating/segregating effects of a space in relation with the plan layout, and this characteristic is described by relative asymmetry which has a range from 0 to 1. Low value indicates that a space tends to integrate the system as a whole, and high value indicates that a space tends to be segregated from the space. Thus, if it is low, the plan has a quality of symmetry and the spaces are more equal in terms of permeability control. The RA value of a dwelling is equal to the mean value of the RA values of all spaces. RRA is a more sensitive measure of symmetry or asymmetry, in that takes into consideration the variation in the number of spaces in a plan layout. This value extends from 0 to above 1 (Shoul, 1993). Distributedness/nondistributedness is about the possibility of getting into and around in the dwelling in more than one way or only one way. This characteristic is described and relative distributedness (RD). The calculation of these measures is explained in detail in Hillier and Hanson (1984).

In the analysis presented in this paper, the staircase of housing blocks is chosen as the root space, and all of the above parameters were calculated for the dwellings in the sample. The results of the analysis are illustrated both graphically and numerically in Table 1.

The plan layouts of the dwellings do not have cycles; therefore, the RD value for all of them is zero. For this reason, RD has not been given in the table.

7. Effects of Housing Morphology on the User Satisfaction

In the questionnaire stage of the study (Sungur, 2001) applied to the residents, a questionnaire form that consisted of closed-ended questions, aiming to define the user satisfaction level, was prepared. The questionnaire was organised in 4 groups. The first group consisted of personal information, age, sex, occupation, etc, the second group was about the changes that had been made in the dwelling by the user, and the third group of questions covered the quality of facilities. The fourth group was about the satisfaction with the dwelling. The answers consisted of five choices, which represented different user satisfaction levels. So the user easily made declarations about the satisfaction level.

In the following step of the study, the relation between the numerical results obtained in the morphological analysis and satisfaction of the residents are examined. The results are evaluated via a statistical program (SPSS) in the form of correlation tables.

The first part of the questionnaire, which was mostly about the relationship between residents' characteristics and spaces in the dwelling, showed that satisfaction from the dwelling is related with the dwelling's storey level, years spent in the dwelling, dwelling age, residents' age, residents' marital status and residents' ownership of the dwelling.

When the results of the analyses are examined, the following data are obtained: as the number of rooms increase, it has been observed that the satisfaction from the spaces for children to play and study increases. As the mean depth of the dwelling increases, it was clearly seen that satisfaction from privacy increases. This situation shows that, as the number of controlled spaces increase and the access to those spaces gets further from the entrance of the dwelling satisfaction from privacy increases, in high values of RA, it was observed that satisfaction from the location of living room was high. This shows us that the tendency of living rooms to be separated from the system is in positive correlation with the satisfaction from the living room. It can be said that as the entrance space gets segregated from the system, the satisfaction from the kitchen in respect to the entrance increases, while the satisfaction from the location of bathroom decreases. It was observed that kitchens united with the system causes dissatisfaction. When bedrooms have RA values higher than 0.33, it was seen that the residents don't want to make any changes in the future. Similarly, the higher RA values provide increased satisfaction from the location of bedrooms in respect to the location of kitchen and entrance. These evaluations show that the bedrooms are more satisfying as they segregate from the system.

8. Conclusion

In this paper, a sample of dwellings in Istanbul has been analysed in terms of their morphological characteristics. The value, which shows the symmetry/asymmetry of dwellings (RRA), ranges from 0.95 to 1.15. A low value indicates that the dwelling has an integrated syntactical characteristic; and, generally, an entrance hall control the permeability to the other spaces. In contrast, a high RRA value indicates that the dwelling has a segregated syntactical characteristic. In such a dwelling the permeability of the plan is asymmetric. In other words, the plan has more than one control space, so that access to the spaces carried out by passing through the control spaces, and the deepest spaces have more privacy.

After a detailed analysis of dwelling spaces, it was observed that, to the extent of the overall dwelling as a space of the dwelling tends to segregate from the system, the satisfaction from the dwelling increases.

As the relative asymmetry of the whole system increases (that means, an increase of the segregation tendency of the spaces that form the whole system and the plan layout organisation of the system states a more linear and asymmetric diagram), it is interpreted that satisfaction from the dwelling and from various characteristics of the dwelling like privacy, clearly increases.

It is a fact that the syntax and the semantics of the dwellings are influenced by the social, cultural and economical characteristics of the inhabitants. On the other hand, like the other parameters (related with the environment, dwelling and user) that affect the user satisfaction, the morphological characteristics of a dwelling also have a strong and clear relationship with the user satisfaction.

9. References

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