USER INTERVENTIONS IN TURKISH MASS HOUSING

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Abstract

The intent and aim of the research was to look at a particular house type i.e. a terraced house with four floors, which is one of the popular designs commonly used in the last ten years in mass housing projects in Turkey. There are four alternatives of the type related with the cross-sectional relationship with the ground floor level. Emphasis was placed upon the "semi-cellar type" assuming that even though the level of residential satisfaction gradually increases with the possibility of interpreting the use of the open-plan floor space, and by proposing new design elements to create more adaptable and flexible spaces, the users may still experience dissatisfaction with designs where the space cannot be revised. With the use of a questionnaire, participants judged their own house as a whole and evaluated its uses for different functions and activities, complained in respect of changes required, and finally outlined their plans for the future. Despite the high level of satisfaction with having a garden (a unique characteristic in apartment-saturated Ankara), the aspect of dissatisfaction mostly referred to was the kitchen-garden relationship (or lack thereof). The residents, especially the older ones, were generally dissatisfied with the multi-storey design of their house. They prefer to remain on the backyard level without changing floors in different seasons. Besides, the users spending the longest time in the house complained more than the others and the people spending variable time in the house stated that they preferred to change the floors in different seasons. As compared to larger families, the smaller families were more likely to change floors.

Keywords: *Mass housing; Flexibility; Interior; User Intervention.*

INTRODUCTION

Users become invisible during the production process to the extent that they are only perceived in terms of quantities of "stereotypical human beings" (Habraken, 1972: 8). In fact, to ensure a healthy physical environment (Ruesjas, 1997) and to ensure his needs and desires are met the user has to be involved in the life cycle process of housing (Broome, 2005: 65-75). Lawrence (1987), for instance, worked on terraced houses, not to uphold the typicality of the samples, but to illustrate the applicability of general principles in a defined context. This study has indicated that the renovation and rehabilitation of housing stock, in the absence of any involvement by the residents, results in serious consequences that can inflict or impose conflicts onto their lifestyle.

Researchers and scholars of the "social design movement" as defined by Sommers (1983), began to view housing as a dynamic process rather than the production of instant delivery objects. As Norberg-Schulz mentions (1988) important problems result from the mutability of the action-structures. It is difficult to determine alternatives that will fit those users who have different aims and behavioural backgrounds. Cooper-Marcus (1977: 159), however, contends that research into the needs of the users and the social analysis of buildings is the key to designing housing that will meet and satisfy all user needs, and, in theory, accommodate change. Whilst this information is useful, it alone does not guarantee ideal housing for a diverse group of users that may change significantly over the life of a building (Griffin, 2005). Herman Hertzberger (1991) highlights the dangers of this approach to design in his book: Lessons for Students of Architecture:

Housing is still designed according to what local government bodies, investors, sociologists and architects think people want. And what they think cannot be other than stereotyped: such solutions may well be roughly adequate, but they can never be wholly satisfactory (Hertzberger, 1991: 158).

Stressing the problems of industrialized housing, Habraken developed a far more sophisticated

approach, called "Open Building" to mass housing in the 1970s. With this approach Habraken has seen housing as a flexible, dynamic and incremental activity, where the architects can certainly design each individual dwelling, but that this work must follow the control of the occupant. In Habraken's method the frame is structurally organized in such a way that it allows users to choose the layout for their houses, which is most appropriate for them.

There is another production method called "mass customization", which builds on, the concept of, "Open Building developed by John Habraken over 30 years ago. Mass customization is based on the variations of a design, built on the idea of serial repetition in order to decrease the cost. So, in the twentieth and twenty-first centuries, the paradigm has shifted from mass production to mass customization, with the support and development of digital technologies (Larson, 2000: 361). Mass customization has become one of the most "popular" methods in decreasing the cost. Variations are used instead of repetitions and different alterations within a basic framework are created (Larson, et. al., 2001: 366).

According to Hamdi (1991), the main priority of flexibility is a response to change and obsolescence to meet future demands. Flexible buildings offer choices to occupants, "where everyone should be able to fit out his house as he wishes" (Rabeneck et al., 1973: 698-727). The Hellmutstrasse scheme in Zurich (1991) by ADP Architectur und Planung is one of the most sophisticated flexible housing schemes of recent years (Till & Schneider, 2006: 10-11). In fact the interior layout of a unit has to be adjustable to allow for different patterns of use not only at the time of occupation, but also during occupation (Schneider & Till, 2005). Friedman (1997) developed three house designs to allow for expansion within the original home, and to allow for the greatest possible user customization within the house. So, open plan floor was introduced to maximize the potential range of uses in the restricted interior space.

In Turkey only a small number of private, mass housing co-operative examples, built by small companies, are personalized by their users and in any of them users contributed to the construction process. Examples of the system, one of which is discussed in this paper, offer flexible open plan floors with an integrated infrastructure. Stewart Brand's book: How Buildings Learn (1994) explains the inevitability of change in buildings. In the work explained below the details of the mass housing co-operative examples personalized by their users are given to know how a building type might learn from its users.

TURKISH MASS HOUSING EXPERIENCE

In the 1970s, Ankara was the first city in Turkey to realize mass housing projects funded by private companies. However, the dwelling units were designed for any type of user, considering neither the occupants' characteristics, nor the changing needs of residents over time. In general, a rosy outlook of the future resulted in a mass purchasing of "dream houses" and caused a large exodus from the city to the surrounding suburbs. This rush has subsequently been experienced in all major Turkish cities (Dokmeci et al., 1996: 241-251), even though the housing shortage might have been solved with planned mass housing projects (Baskaya & Firat, 2003: 81-89).

Some mass housing examples built by qualified companies are usually presented as finished and offer no possibility to alter or revise either the structural or non-structural components of the finished building. Some mass housing, described as co-operative housing built by small private firms, however, is presented with a completed exterior, but in many cases, the interior space usage is not completely defined by the designer and / or the construction company. Such projects have unfinished interior, which offer an opportunity for users to complete their houses as they wish. Before the co-operative hands over the administration of their housing to a local 'housing administration', where such 'no changing' rules are usually put into practice, many users, risking possible fines, make revisions even to the exteriors of their houses. In some cases, residents convert the original design to such an extent that it is difficult to identify the original form from the attached elements. Steward Brand ironically expressed that the credo: form follows function had been transformed into function melts form (Brand, 1994: 157-158).

There has been little effective research carried

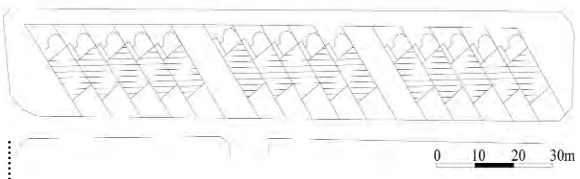


Fig 1. Site plan

out in respect of the mass housing problems in Turkey. The study carried out by Altas and Özsoy (1998) presents the results of a comparative analysis of four 2-bedroom type apartment units, with different layouts and physical properties. In the research, the adaptability of the original layout of the dwellings has been questioned. A further piece of research work was carried out by Kazaz and Birgonul (2005: 1548-1556), in which the levels of satisfaction in households in respect of the quality of 17 delivered services in high rise and medium rise apartment units were considered. It was observed that residents in both types of apartment units could make some modifications in five years time. Nonetheless, they could not apply all the desired modifications, although they generally had a strong wish to do so.

CASE STUDY

By looking at user expectations and consistency of use (and, consequently, the degree of user satisfaction), the following research examines the interior flexibility of a particular mass housing type --actually one of the variables of the type-in respect of four groups of single family houses, in the housing estates of the Ankara suburb of Cayyolu. These housing estates studied in this paper are mass housing settlements completed by small private firms in the late 1990's.

The whole house occupies a net area of 170 m2 and a gross area of 190 m2 (Fig. 1 and Fig.2). The houses have a front garden and backyard, and are "attached" to each of the neighbouring house in a saw tooth pattern, altering in orientation. The gar-



Fig 2. Original floor plans for Type 1

den dimensions vary with each house depending on the plot size, but the front garden is usually much bigger than the backyard.

The plan layout of the housing type and the interior usage are the same throughout, but the cross-sectional relationship with the ground floor level alters in four different ways due to the sloping nature of the site. These four alterations are considered to be important in respect of the conclusions reached in this research paper. The explanations provided below clarify the types of houses.

Type 1: This is a semi-cellar type of house. The front garden level, where the main entrance is located, is on the level of the living room level and the backyard is level with the lower ground level, which forms a semi-cellar type space, open on one side to a backyard garden. A living room balcony stands on two large columns and provides a sheltered veranda for the back garden (Fig. 3).

Type 2: The front garden level of this semi-cellar type is on the same level as the lower ground level and the backyard is on the same level as the living room (the main entrance level). The main entrance is accessed by a flight of stairs from the front garden (Fig. 4).

Type 3: The front garden and the backyard are on the same level and the lower ground floor forms a living space open on one side to the backyard and on the other to the front garden. Similar to type-1 houses, a living room balcony stands on two large columns and provides a sheltered veranda to the garden floor. The main entrance is from the front garden with stairs reaching the main entrance level (Fig. 5).

Type 4: The front garden and the backyard are on the same level and the main living area, where the main entrance is located forms a living space open on one side to the backyard and on the other to the front garden. The lower ground floor in type-3 becomes a basement floor in these type-4 houses (Fig. 6).

Each housing estate studied in this work has around 90 houses including almost all the alternative styles of the housing type. However, this research focuses on type-1 houses as one of the popular designs commonly used in the mass housing projects in Ankara. The cross-section of type-1 houses is believed to be the most problematic among all. Similar to type-1 houses, type-4 houses are also very commonly used examples, but a pilot study and several site observations, revealed that the housing type, with the least problems is that in

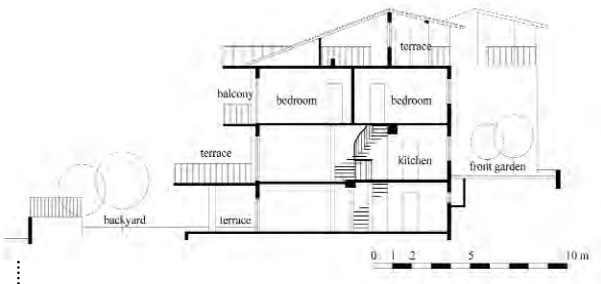


Fig 3. Type 1 house typical section

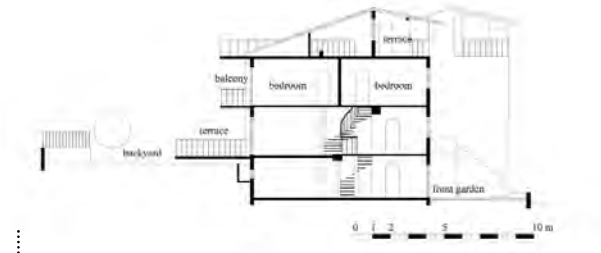


Fig 4. Type 2 house typical section

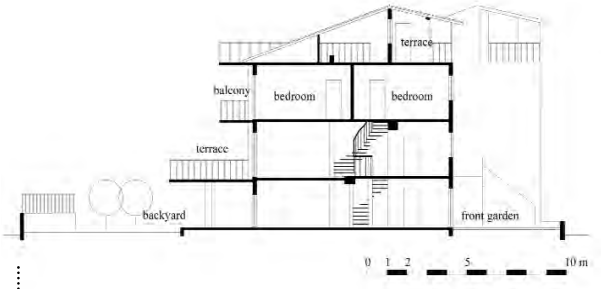


Fig 5. Type 3 house typical section

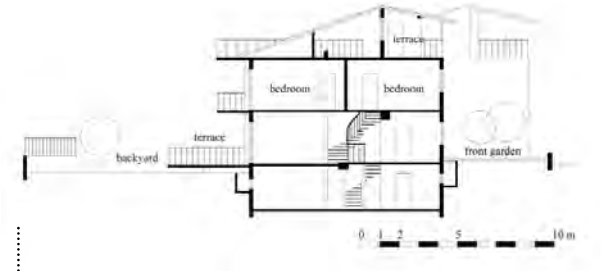


Fig 6. Type 4 house typical section

which the front garden and the backyard are both on the same level, with easy access to the main living room. Despite the problems they have with the use of different floors, type-2 and type-3 houses are not included in this research as they are so rarely built.

In the four housing estates used, the co-operative handed over the houses to the users in the late 1990's. The houses are distributed to the members by means of a draw, which is a formal procedure that all the housing co-operatives have to follow in the presence of a notary public. At the time, every house was completed to the same level: plastered and painted on the outside, all doors and windows had their hardware attached. The interiors of the houses were not plastered or painted, and the wet spaces on the ground floor, first floor, second floor and the attic floor were without sinks and toilets. The houses were handed over without cupboards and kitchen furniture (Fig. 1 and Fig. 11).

INTERIOR FLEXIBILITY OF THE TYPES

It is a type of dimensional framework that facilitates the possibility of having alternative room sizes and layout, by moving and repositioning the walls, the location of the kitchen, the windows and the doors independent of the original framework. Actually, the idea of open floor use introduced on three floors (main entrance level, the lower ground level and the attic) could allow the owner, as opposed to the designer, to define the space according to their particular needs. These three floors have no fixed design alternatives, except in the wet spaces (Fig. 2). As mentioned, the houses were even supplied without kitchen furniture. Thus, the users had to re-evaluate their needs and their financial resources, especially in respect of the construction of a kitchen (Fig. 7). This meant that they had to decide on which floor they were going to live, cook and eat, and how many floors would require heating. These decisions were all, therefore, dependent on the financial status and the personal preferences of the residents.

RESEARCH CONSIDERATIONS

Interior flexibility in mass housing design helps users find the quality she/he seeks in house design. What is suggested in this work is that the semi-cellar type (type-1) might have great inconsistencies in use due to the indirect relationship between the main entrance level and the preferred garden level. In respect of the types of users, it is believed that, even though the level of residential satisfaction gradually increases as a result of having the possibility of interpreting the open floor use, adding new design elements (users re-shape the free space of an uncompleted house), they may still experience dissatisfaction in situations where the space cannot be revised. Regardless of the four housing estates studied, it is believed that some users change their daily living space seasonally along with the changing weather conditions, whilst others prefer to stay on one level i.e. the lower ground level matching the backyard level.

One of the objectives of the present study was to expand the influence and impact of the age factor as an important independent variable in respect of the use of space. In particular, the task was to investigate the reactions of different age groups to functional quality. It is believed that the space can be interpreted differently by different age groups (20-40 and 41-60), i.e. older users are most likely to complain about multi-storey living and less likely to move floors with the changing seasons, even preferring to stay on the floor, which has only a small garden to the front. Depending on the time spent in the house and the family size, the responses given in respect of the functional quality of the house are also discussed in this paper.

According to Kaitilla (1993: 514-545), house designs should be flexible, allowing their users to actively interact in social, physiological, and physical spaces. However, this definition lacks the concrete empirical evidence that would be required in order to clarify how to accomplish this flexibility. This research aims to achieve an understanding of the concept of "flexibility in house design" in general. The research method is described below.

METHOD

Participants

A total of 69 type-1 houses were studied in the work. In respect of the examples studied, 55% of the participants who answered the questionnaire were women, 45% were men. 80% of the respondents were aged between 41 and 60, with the



Fig 7.
Alterations in different floors of the type

remainder between 20 and 40. The highest education level of the participants was: high school and lower, 22%; university graduate and higher 78%. The education level of the partners of the participants was: high school and lower 19%; university graduate and higher 75%; no-answer / no partner 6%. According to these results, the participant profile appeared to be predominantly university graduates.

Procedure

In this post-occupancy evaluation research, the questionnaire covered three main topics: (1) demographic properties (sex, age, education, work status, family size, ownership, income), (2) previous housing, and (3) existing housing (duration of stay, motive for moving, time spent in the house, difficulties with the house use, alterations made and alterations planned or wished). The questionnaire was responded to by one of the adults in the house. During the analysis of the collected data, some correlation tables were created. The results obtained from the answers were as follows.

DATA ANALYSIS AND RESULTS

According to the survey results, the percentages of family members living in the houses were: 1-3 persons 61%; 4-6 persons 39%. The number of house owners was quite high at 86%. The majority of the owners bought their houses via the co-operative (57%), while others bought their houses using their own resources (20%). A small amount of house owners bought their houses using bank loans (13%). 33% of the total number of users stated that



Main Entrance Level



Main Entrance Level

Kitchen and the Living Room are on the same floor



Main Entrance Level



Lower Ground Level



Lower Ground Level

Fig 8.
Decoration of different floors

they did not own any other house, and 57% stated that they owned another house that they rented out. As is typical in Turkey, 10% declared that they owned a vacation property apart from the house they already lived in. The surveyors were asked for their' personal evaluation of each household's income; 38% were judged to be in middle / middle-low income group, whilst 62% were judged to be in the upper middle income group.

The results show that the majority of the users (96%) used to live in Ankara city centre, in multi-storey apartment blocks, before moving to the site and consciously choosing the option of living in a home with a garden away from the city centre. In terms of this, the research assumes that those users who lived in both kinds of residences (city centre apartments and suburban houses) had the ability to accurately judge the advantages and disadvantages of these two types of houses.

Half of the participants stated that they had been living in their current house for 0-3 years, while the other half had been there for more than 3 years. The motives for moving from town to the suburbs were researched. 80% of the users stated that, "the type of house" (private house with a garden) and 78% of the users stated that, "the location of the house" (suburban life with fresh air) were the primary motives for moving. Besides these, 67% were tempted by "the high quality of the settlement," and 49% preferred to live in a, "larger and a more serviceable house". In fact the majority of the users of the examples discussed here had moved from downtown Ankara out to the suburbs, to be "close to nature" and to have a garden. This indicated that the functional quality of the garden was very important.

The results were grouped according to the 'time spent in the house' based on the participants' working status is given. 35% of the working participants and the working partners only spent time in the house after work and at weekends. The users who spent the longest time in the house were the retired couples. They amounted to 32%; both the participants and the partners who spent variable time in the house (business persons, students, government employees, labourers and others) amounted to 20%; those cases where one user was retired and the other spent variable time in the house amounted to 13%.

After moving in, the users had to re-evaluate their use of house and decide on which floor they were going to live, cook and eat. According to the findings, the floor that facilitates easy access to and use of the garden was generally the most popular (Fig. 7).

According to the results, 46% of the house residents change their patterns of usage and daily living space seasonally along with the changing weather conditions. The simple explanation for changing floors and leaving the more popular gar-

LGL.: Lower Ground Level MEL.: Main Entrance Level		Winter-Summer Use							
		LGL- MEL		LGL- LGL		MEL- MEL		Total	
		f	%	f	%	F	%	f	%
Number of kitchen	One kitchen	14	20	4	6	-	-	18	26
	Two kitchens	18	26	26	38	7	10	51	74
Total		32	45	30	44	7	10	69	100

Notes: f: Subject number, %: Percentage value, *df*: Degrees of freedom, *P*: Significant level.
chi-square = 10.179, *df*=2, *P*= 0.006

Table 1. Floor use by number of kitchen

den level (i.e. the backyard level) in the winter is simply to heat one less floor. In 10% of the houses, on the other hand, the main entrance level was mostly preferred. Interestingly, this main entrance level does not have direct access to the backyard, i.e. the preferred garden level.

Changing the living locations throughout the seasons could be considered as resembling the traditional Turkish village-plateau seasonal change, even though the participants of this study have no experience at all with that type of living. In traditional Turkish examples, the new place for the summer is a small unit with a big oven adjacent to the perimeter of the garden.

The varying use of different floors in different seasons also affected the decoration of these floor levels. If the lowest level was frequently used for daily living, the main entrance level was decorated with traditional furniture and only used for entertaining guests (82%). The main entrance level, preferred for everyday living, was then decorated with comfortable furniture and used to entertain more intimate friends (85%) (Fig. 8).

After using the house for sometime the users may decide to have a second kitchen, depending on the difficulties they experienced with the kitchen-garden relationship (Fig. 7). This second kitchen might also be required at the beginning. Conventional natural ventilation via openable windows can achieve good levels of ventilation and summertime temperature control. However, high partition walls used in the lower ground backyard level prevents air from passing circulating, which means that kitchen odours are trapped in the space where sitting, dining activities also take place. The use of air conditioning machines (aspirator kind) is not practical or desirable all the time, simply because they are noisy and expensive, using a lot of electricity.

According to the results, the addition of a second kitchen was generally quite high (74%). It is interesting to see that users who have two kitchens prefer to live on the same floor in all seasons, abandon the other level with the other kitchen or only use it on special occasions (48% = LGL- LGL: 38% + MEL- MEL: 10%) (chi-square = 10.179, df=2, P= 0.006) (Table 1). Along with that, the idea of having two kitchens installed on two floors has contradictions in itself. The presence of the unused kitchen appliances (refrigerator, washing machine, oven, etc.) appears unnecessary and questionable. Nevertheless, when house residents change their patterns of usage and daily living space on a seasonal basis, problems do seem to arise in those houses with only one kitchen.

In situations where residents cannot afford a second kitchen and change their daily living space seasonally, they complain about the distance between the kitchen and the garden (52%). According to the results, a number of users, who have two kitchens, one on each living floor and who change their living space seasonally, were, for the most part quite happy with the arrangement (32%). Although the statistical results for "short distance" is not reliable. This might be due to the limited number of samples for a cross-tabs of the three variables (short distance: chi-square= 1.357, df=2, P= 0.507; far distance: chi-square = 9.035, df =1, P= 0.003) (Table 2).

After deciding on which floor to live (usually the

LGL: : Lower Ground Level MEL: .: Main Entrance Level			Winter-Summer Use							
			LGL- MEL		LGL- LGL		MEL- MEL		Total	
			f	%	F	%	f	%	F	%
Kitchen-Garden Relationship	short distance	Number of kitchen One	1	2	3	7	-	-	4	9
		Number of kitchen Two	14	32	19	43	7	16	40	91
		Total	15	34	22	50	7	16	44	100
	far distance	Number of kitchen One	13	52	1	4	-	-	14	56
		Number of kitchen Two	4	16	7	28	-	-	11	44
		Total	17	68	8	32	-	-	25	100

Notes: not far distance: chi-square = 1.357, df=2, P= 0.507
far distance: chi-square = 9.035, df=1, P= 0.003

Table 2. Floor use by kitchen-garden relationship by number of kitchens

one closest to the garden), the kitchen location was established first (the bathroom is not a problem because one is actually installed on all three floors) and the problem of multi-storey living for the elderly (still the most mentioned complaint at 55%) (Fig. 9) (chi-square= 17.426, df=1, P= 0.001) can be partly solved by not using the rest of the floors until they are needed. As the probability of the chi-square indicates, there is a significant relationship between the different floor use in different seasons and the age of the residents (chi-square = 20.170, df=2, P= 0.000). The elderly people mostly prefer to remain on stay on the floor which is level with the backyard, without changing the floor in different seasons (44%).

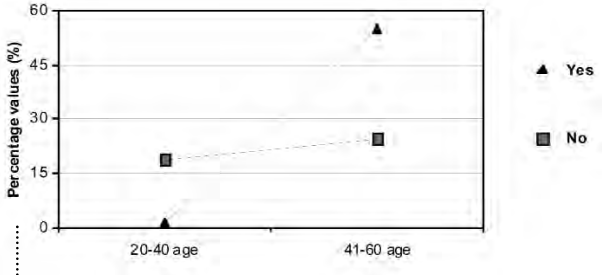


Fig 9. Problems of multi storey living by age.

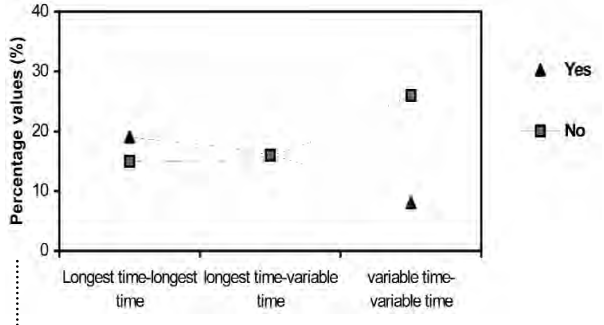


Fig 10. . Problem of multi storey living by the time spent in the house

The time spent in the house (couples' results were amalgamated) did not significantly correspond with the complaints about multi-storey living (chi-square= 6.232, df=3, P= 0.101) (Fig. 10). Despite the fact that the residents spending the longest time in the house complained (23%) more than the others, the people spending variable time in the house (20%) stated that they preferred to change floors in different seasons (chi-square= 23.527, df=6, P= 0.001).

According to the cross-tabulation of multi-storey living with family size, we can state that both less crowded (3 and less) and crowded (4 and more) families complained equally about multi-storey living (less crowded 30%; crowded 26%) (chi-square = 1.858, df=1, P= 0.173). As the probability of the chi-square indicates, changing floors in different seasons was statistically related to family size. In comparison to larger families (12%), smaller families were more likely to change the floors (35%) (chi-square = 9.982, df=2, P = 0.007).

FLEXIBLE DESIGN ELEMENTS

Apart from the design as a whole, there are also some design elements that require examination as a result of either their size or their location. In fact, the idle or unused status of some elements of the design (e.g. the roof terrace and the roof barbecue that was installed according to the original design)



Fig 11. Original facades and alterations carried out by the users

and the problems caused by the lack of other elements (e.g. entrance vestibule) were of great importance in 'user satisfaction' and 'house quality'. In fact, apart from the addition of kitchen furniture, the most preferred alteration was the "attic terrace enclosure" (open roof terrace) and the "enclosure of the space in front of the main entrance door" (Fig. 11).

In all house types, the attic floor terraces, which have mostly been enclosed with PVC framed glass panels of different colours, are described as "occasionally used" by most of the residents. The enclosure has the primary function of reducing the heat loss of the room below the open attic terrace. These enclosed terraces, with built-in barbeques, appear to be mostly used for drying laundry. In contrast to this, the washing machine is generally located on the lower ground level floor, and not on the attic floor.

Almost all of the users find the main entrance of the houses from the front garden problematic. There is no space for a cloakroom. This causes great problems when visitors come to the house, especially in Turkey where shoes are removed before entering the house and exchanged for house slippers. Some users prefer to remove the guest toilet from this entrance space, thereby enlarging the vestibule, or they keep the toilet and enclose the space in front of the main entrance door. This alteration can easily result in a fine or penalty by the estate administration, but it is done anyway. The possibility of the imposition of a fine makes some users delay making this enclosure. All these alterations are indicative of a functional deficiency that had not been foreseen or anticipated in the original design.

CONCLUSIONS

As a result of this research, it was understood that the semi-cellar type was not wholly appropriate for user requirements. The point is that the house type has been constructed and is still being constructed with small alterations. However, the complaints can be accepted as evidence that the alterations to

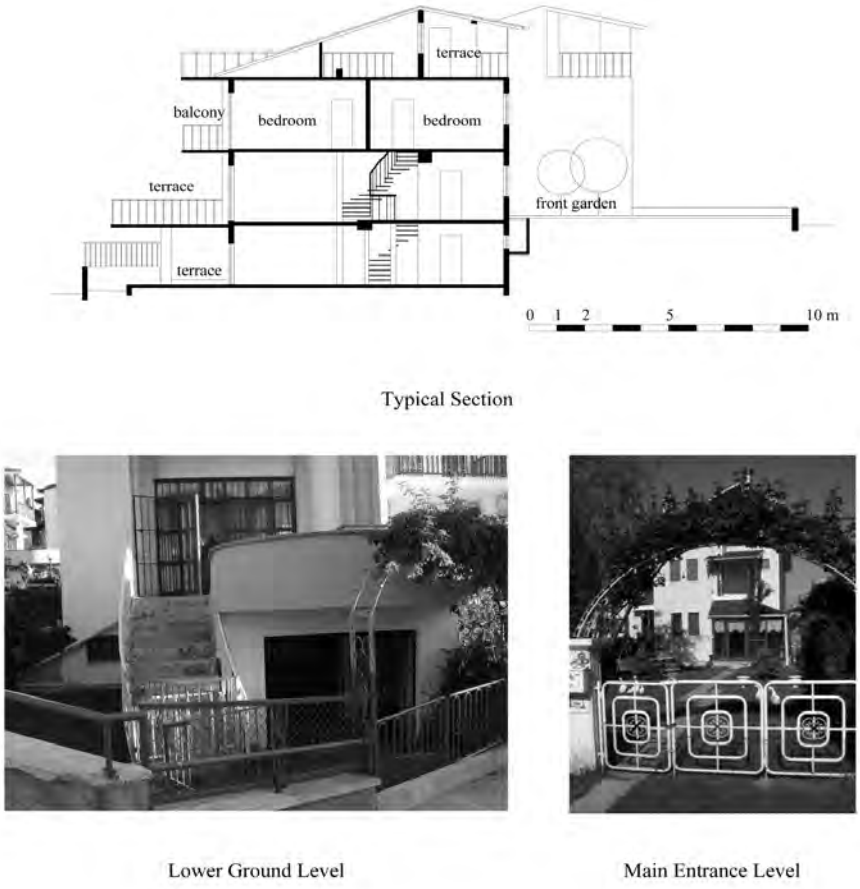


Fig 12. Mavikent housing estate

these houses types have not been fully completed. These functional complaints denote a direct contradiction to the fourth most important motive of moving to the suburbs: "a larger and more serviceable house". This means that the amount of rooms and the general size of the houses seem to be adequate, but the home itself is not easily serviceable due to its compact and vertical design.

The original living floor plans (the main entrance level and the lower ground level) connecting the two garden levels of this semi-cellar type need to be offered to its users in a different manner. The choice would be to enlarge the front garden space on the main entrance level, where the kitchen can be organized in such a way that the need for a second kitchen is minimal. This could also reduce the need for several living accommodation floors and reduce the number of complaints about multi-storey living.

Although it is not one of the housing estates discussed in this paper, some of the semi-basement types of the Mavikent Housing Estate in Cayyolu Ankara (the plan layout of the housing type and interior usage are the same as the house type discussed in this paper) have a big front garden open to the main entrance level, in which a kitchen is housed (Fig.12). The only difference in Figure 3 in respect of the Type 1 house is the size of the front garden and the backyard, which is completely opposite to the type in Mavikent. In conclusion, what is suggested here is that by re-associating the garden level with the kitchen, the users can also redefine the distance between themselves and the house, thus feeling more attached to the house.

Although the housing types mentioned in this article have some functional difficulties related to the inappropriate planning of the site, the houses have inbuilt flexibility in order to be able to cope with the changing needs of the user, e.g. the varying circumstances of peoples lives, needs and expectations. So, whatever the dissatisfaction with the design, the flexibility offered by this type of house is quite considerable, because it can offer a certain amount of freedom in order to re-shape what is given according to the required needs. Flexibility relates directly to the satisfaction of the users and they, naturally, tend to customize their

home to suit their needs and express their values. For that reason architects must allow for changes to the layout of a home throughout the life cycle of a family, in accordance with their changing needs. Such changes should be able to be are effected with the minimum of disruption and expense to the family (Friedman, 1987; Pantelopolous, 1993).

Flexibility through mass customization in design might be a method of differentiating user needs. Therefore, one has to work on the concept of 'flexible' architectural frames, where the number and the dimensions of the spaces may be changed at will. Departing from Till and Schneider's point of view (2006), if one approach to "soft use" depends on the designer providing a physically fixed, but socially flexible layout, a more common solution is to provide raw space that can then be altered according to the needs of the occupants. But the provision of open plan alone does not suffice, or, at least, it may be inadequate in terms of open plan divergence possibilities. The designer has to precisely consider the best points for access, the position of servicing and the most efficient module size.

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REFERENCES

ALTAS, N. E. and ÖZSOY A. (1998). Spatial adaptability and flexibility as parameters of user satisfaction for quality housing. *Building and Environment,* 33 (5): 315-323.

BASKAYA, A. and FIRAT, F. (2003). Residential Dilemmas in Konya, Turkey. *Open House International*, 28 (4): 81-89.

BRAND, S. (1994). *How Buildings Learn.* New York: Penguin Books.

BROOME, J. (2005). Mass housing cannot be sustained. In P. B. Jones, D. Petrescu, and J. Till, *Architecture & Participation*, New York: Spon Press.

COOPER-MARCUS, C. (1977). User Needs Research in Housing. In Davis S. (ed.) *The Form of Housing.* New York: Van Nostrand Reinhold Company.

DOKMECI, V., BERKOZ, L., LEVENT, H., YUREKLI, H., and CAGDAS, G. (1996), *Residential preferences in Istanbul. Habitat International,* 20 (2): 241-251.

FRIEDMAN, A. (1987). *A proposed decision-making model for initiators of flexibility in multi-unit housing.* Unpublished Ph.D. dissertation, Montreal: Université de Montreal,.

FRIEDMAN, A. (1997). Design for flexibility and affordability: Learning from the post-war home. *Journal of Architectural and Planning Research*, 14 (2): 150-170.

GRIFFIN, C.T. (2005). *Defining Permanence: Structuring Housing for Incremental Change*, unpublished master thesis, University of Califormia Berkeley.

HABRAKEN, N.J. (1972). *Supports: An alternative to mass housing.* London: Architecture Press.

HAMDI, N. (1991). *Housing without houses: Participation, flexibility, enablement*. New York: Van Nostrand Reinhold.

HERTZBERGER, H. (1991). *Lessons for students of architecture,* Rotterdam: 010 Publishers.

KAITILLA, S. (1993). Satisfaction with Public Housing in Papua New Guinea: The Case of West Taraka Housing Scheme, *Environment and Behavior,* 25 (4): 514-545.

KAZAZ, A. and BIRGONUL M.T. (2005). The evidence of poor quality in high rise and medium rise housing units: A case study of mass housing projects in Turkey. *Building and Environment,* 40 (11): 1548-1556.

LARSON, K. (2000). The home of the future. *A+U*, p.361.

LARSON, K., TAPIA, M. and DUARTE, J. (2001). A new epoch: Automated design tools for the mass customization of housing. *A+U*, p. 366.

LAWRENCE, J. R. (1987). H*ousing, dwelling and homes: Design theory, research and practice.* Chishester: Willey.

NORBERG-SCHULZ, C. (1988). *Intentions in architecture* MIT Press, Cambridge, Massachusetts.

PANTELOPOLOUS, M.D. (1993). *Small living spaces: A study of space management in wartime homes in Montreal*. Unpublished thesis, Montreal: McGill University.

RABENECK, A, SHEPPARD, D. and TOWN, P. (1973). Housing flexibility? *Architectural Design,* 43 (11): 698-727.

RUESJAS, A.L. (1997). *The Mexicali experimental project: an analysis of its changes.* School of Architecture McGill University Montreal. Unpublished master thesis.

SCHNEIDER, T. and TILL, J. (2005). The Opportunities for Flexible Housing. *Housing in Europe: New Challenges and Innovations in tomorrow's cities*. Reykjavik (29 June - 3 July), European Network for Housing Research.

SOMMERS, R. (1983). *Social design, creating buildings with people in mind.* New York: Prentice-Hall Inc.

TILL, J. and T. SCHNEIDER (2006). "Flexible Housing: Hard and Soft." *Architectural Research Quarterly* (3).

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