Analysis of housing quality in Famagusta with emphasis on interiority

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***Abstract*- This research studies and analyses the quality of indoor spaces of residential buildings through case studies in Famagusta, North Cyprus, considering the theoretical issues of housing and through document review and direct observations. Possible factors considered in this study included several items such as spatial dimensions, zoning, colours and materials, furniture, structural organization and lighting. The main problem in this regard is the uncertainty about the quality of residential projects in Famagusta. Failure to meet architectural standards, low quality buildings, abandoned projects, unpleasant architectural appearances and other difficulties are from other problems. In addition to the intrinsic significance of housing quality, this issue can also be significant here since there are a lot of foreign students living in Famagusta and qualified housing is one of the necessities which should be provided for international students. This research was an attempt to find out the qualitative problems through defining five case studies among residential buildings. The techniques used in data evaluation were drawing, sketching, computer simulation and utilizing photographs. The results of the study shows that almost every residential unit meets the standards of properly benefiting from natural light and the factor in which most units fail to meet the necessities is furniture used in furnishing.**

***Keywords*- Housing quality, Indoors, Residential buildings**

I. INTRODUCTION

There have always been significant reasons to evaluate housing. The first important reason in this regard is increasing criticisms and unsatisfactory among residents (Amole, 2008). In addition to dissatisfaction, such evaluations make it easy to recognize the problems of current housing and necessities and requirements for future housing (Preiser, 1989). Thus, carrying out such studies is increasingly needed and necessary. Discussions related to housing quality have always been investigated in different societies. As a priority in individual's welfare, habitation should have standard features in order to be described as a qualified place. Obviously these features depend on a variety of factors such as culture, economy, society, climatic conditions and generally location. Therefore, knowing the influential factors of housing quality is a necessity in order to analyze a residential environment, making further decisions for improving qualitative level of residential quarters and prevent the replication of such defects in other same cases.



Figs. 1. 2. 3. JPEG images of residential indoors and outdoors in Famagusta, by author. 2013.

After viewing different research projects previously done in this field, it was necessary to provide a list of qualitative factors before starting observations. Therefore, the required factors are concluded from former similar research projects through document review. These factors became the base of evaluations in my research. Because of the vastness of the field of housing, this research focuses on indoor spaces of residential buildings so as to find out the qualitative problems with more investigating details. Meanwhile, it can be considered as an effort to propose solutions to promote the level of housing quality from an architectural perspective.

This research was an effort to find answers to questions such as; which factors can be the most significant ones in specifying the quality of indoors? What is the current housing and construction status in Famagusta, North Cyprus? Has housing quality been considered importantly in Famagusta up to now? Obviously, it is possible to find out the resources and roots to answer these questions when we focus and zoom on inside the residential spaces. Therefore, one simple idea in qualitative evaluation of housing is to find out whether these projects satisfy the residents in different ways or not (Liu 2003). Thus, there was a need to define case studies among residential buildings which caused most dissatisfaction with their residents. Figures 1 to 3 are captured from case studies. When I came to Famagusta for the first time, I searched among many of residential neighborhoods to find an appropriate rental apartment. Searching and talking to local people, I found out that some residences specifically were

defamed because of their unsatisfactory indoor spaces. In this regard, I chose five defamed buildings which their residents had the most negative attitudes toward living in as case studies. They include different types (one-bedroom, two-bedroom and studio flats) and have been selected and assessed among residential buildings and in different locations in Famagusta. The method of assessment will be described in the following sections. The indoor environments and related aspects have been generally observed and analyzed and the results are consequently presented using tables and charts.

II. LITERATURE REVIEW

When we talk about developing countries, in fact we are talking about many different home environment factors and conditions, exactly the same as developed countries. There has always been an outstanding stress on the quality of indoor spaces in developed countries. But the important point which makes differences here is the issue has not been significantly stressed in the third-world countries as said before. It has been underlined constantly and successively during the past that life satisfaction of residents strongly depends on the quality of their residences and settlements (Bekroz and Kellekci, 2007). For instance, considering building as a product, Ashford, (1992) explains quality as a mass and integration of all features those altogether and influentially make a product allowable to the general market. But in many cases residential buildings are not what residents or demandants exactly expect. Marans and Spreckelmeyer, (1981) presented a model of residents' satisfaction which demonstrates that assessments of objective environmental characteristics and also environmental satisfaction affect both occupants behavior and satisfaction. Researchers identified a wide range of different factors as problems in quality accomplishment according to their points of view. For instance, Fryer, (1998) recognizes deficient supervisory as significant as lack of expertise when defining such problems. Since we face housing debates and issues in different countries and geographical features and by distinct individuals, therefore, welfare can be recognized as an innate feeling of humans as Haghighat and Donnini, (1999) describes. There are many combinations of qualitative factors used by researchers. Muhicˇ and Butala, (2004) also introduce such qualitative criteria as significant and influential factors when studying the residents' status in different geographical conditions. There are many theoreticians can be named as ones who have worked in the field of architectural analysis such as Simon Unwin and Geoffrey H. Baker. With this regard, they insistently put an emphasis on realizing the analysis' compound and components which can help us to perceive architecture and as a tool to run our concepts and ideas (Baker 1996, Unwin 2003). In order to gain skills in architectural analysis methods, there are three important references written by Simon Unwin; 'Analyzing architecture', 'Twenty buildings every architect should understand' and 'An architecture notebook'. Just like for Ching, Unwin also uses drawing and sketching as a tool to point out the qualities and details of his cases through evaluating the plans, sections and perspectives (Frier, 2011). Marie Frier, (2011) is another researcher who has used analysis aspects including function, emotion, realm, construct and principle in her Ph.D. thesis. In a research conducted by Nejati, (2010) she describes that the comfort of indoor spaces of residential environments depends on 9 factors; artificial and natural light, dimensions and areas, quality of interior design, materials and details, size of main spaces (bedroom, dining room and living room), quality of main spaces, size of secondary spaces (kitchen, bathroom and water closet), quality of secondary spaces, and flexibility of spaces. A combination and modification of all these criteria assisted me to provide an appropriate feasible list of qualitative factors which can be used in my evaluations. It is not irrelevant here to say that the subject is mostly disregarded in Turkey.

As a need to explain the concept of habitation or dwelling, it is generally a place of comfort and welfare and where one could take refuge after finishing daily works, difficulties and routines, although it doesn't merely mean as a shelter. It means human beings do not expect habitation only as a place to rest or live under its roof or ceiling and in a few limited square meters. In fact, the meaning of habitation is something beyond a place restricted by walls and ceilings. As a matter of fact, habitation could be the basis of having a meaningful relation with a place where may include different levels of public and private aspects of our lives. This relation is resulted from a try to find identity, or in other words, sense of belonging to a place (Unger, 2006). Human beings can be able to dominate on themselves but only if they are provided with appropriate, suitable habitation and consequently assured with their position in this world. Humans should be aware of their place and know how to stand in that position in order to gain the meaningful experience of existence. This knowledge is required for us not only to experience living in this world but also to know ourselves. This is why habitation includes all places created by human so as to implement and actualize his/her existence. But we practically have summarized the meaning of habitation upon its most basic function; providing physical comfort, welfare and refuge for residents. Pakzad, (2010) explains house as a corner where we return to after experiencing different dimensions of the joint world around us. It means as a place where the world shows its unmediated and pure appearance. It doesn't mean to become isolated, but indicates a kind of relation with the world; a secret relation in private residence. Concept of healthy housing in architecture, rapid population growth and consequently increasing demands for habitation and residence have caused many changes in providing templates and standards of habitation design. Apartment complexes have become more popular in major cities and the price of land and estates categorizes urban quarters and residential units according to citizens and residents' economic status (Nejati, 2010).

This phenomena which has been previously occurred in many of developed countries for a long time leads to a wide range of studies in this regard. Recent studies consider and focus on mental, physical, legal, natural and cultural dimensions of residents in such habitations and dwellings. Today, skyscrapers, towers, tall buildings and dense complexes are mainly and significantly considered dedicated to commercial, administrative and non-residential usage. But if it is needed to establish dense residential complexes, first of all, its construction domain should be limited and secondly, these complexes should be established in specific and appropriate lands with proper area including enough open spaces surrounding them. These complexes are often used for young couples and few-members families or as dormitories.

Nevertheless, people of developed countries are not willing to live in such complexes or habitations.

Many studies have shown that at least in countries such as America, Australia and Canada, people prefer to live in single-family private houses rather than other kinds. People demand proper space and easily access to facilities. Many people spend high costs, much time and energy when commuting to work and recreation places. As it is obvious now, in developed countries, people think of living in high dense complexes as returning to past periods. But when population substantially increases, living in high dense residential complexes becomes inevitable and unavoidable. This problem is more severe in countries like Singapore with limited lands. It should be noted that designers and architects are responsible for providing environments that satisfy stockholders' needs. They also should pay enough attention to interests of long-term functions of environments. However, it is not easy, because people of future will not be able to pay costs of decisions that are being made today. Designers and architects should be able to provide users and occupants' needs of privacy and control based on cultural norms through design. It is possible to achieve this goal both in high and low dense (Hoseini, 2007). A desired level of identity should be provided for occupants of residential buildings as equal as inhabitants of single-family houses. Identity is a part of symbolic aesthetics features. But it is significant to know that not all people equally believe in having external identity for single residential units. Whenever conditions change, new arguments are needed. Designer should consider people demands in order to satisfy their identity needs. When conditions change, new argumentations will be needed. There are also similar conditions in single-family houses. There are priorities among factors such as price, size of rooms, private and public spaces, satisfaction and efficacy of communicative spaces. In our culture, public spaces are mostly neglected and after construction finishes, we concern about this fact and wonder why our buildings and indoor spaces are not pleasant (Lang, 1987).

There are different approaches to analyze the quality of residential environments. Each of them is resulted from a specific scientific area such as; anthropology, architecture, economy, environmental design, geography,

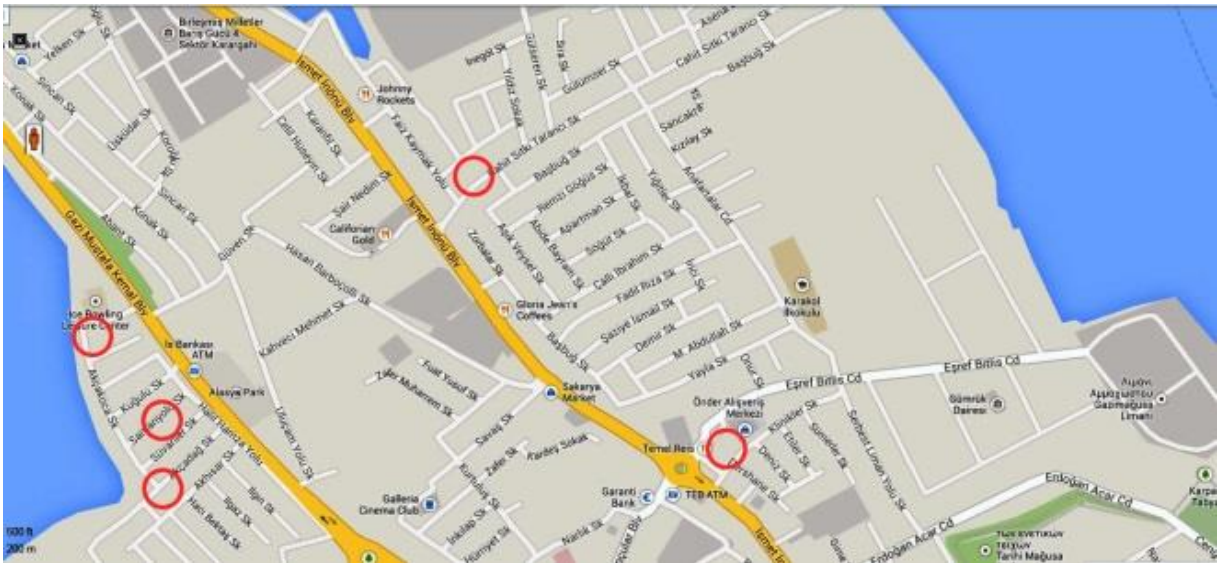


Fig. 4. JPEG image from location plan of case studies, google earth, 2013.

psychology and sociology. They are also resulted from application of implications and extension of issues related to their mental horizons. Nevertheless, study and analysis of theoretical texts and previous research works in this regard shows that many of researchers focus on residence satisfaction as an efficient and effective solution to measure the level of environment quality and some of them use after-occupation analysis methods. A qualified standard residence instills comfort and satisfaction sense into residents through its symbolic, social and physical features (Rafeeian, 2011). As mentioned before, qualitative factors of housing are different according to culture, society and background (related to context) in different countries and locations. According to previous research works in this field, the qualitative aspects generally are divided into four major groups: 1.spatial aspects 2.contextual aspects 3.social aspects 4.economic aspects. In the following sections, these aspects are briefly described.

Spatial aspects: The architectural characteristics of residential buildings, locating plan of residence, area and

dimensions and also spatial organizers are included as micro parameter of spatial aspects.

Context and background: These aspects mainly contain; natural characteristics of residential quarters, open spaces, plants and trees, health quality of environment, noise pollution, perspectives, security issues, location of residences and their access to main facilities of city (distance from city centers, health centers, educational centers, shopping centers and public transportations).

Social aspects: It includes people and their social communication with each other and social interaction of residents in their quarters.

Economic aspects: It describes economic aspects such as possibilities of buying house or a residential unit in an urban sector and having chance to continue as an estate's owner (Dursunt and Saglamer, 2009).

III. FIELD STUDY

Searching among residential quarters and viewing many of apartment buildings in Famagusta, as it is shown in Fig. 4, I selected 5 case studies which seriously were defamed by their residents and other neighbors because of their unsatisfactory indoor spaces. Since the aim of research was to target the qualitative aspects of indoor spaces, this selection was a try to study buildings which their residents had the most complaints about.

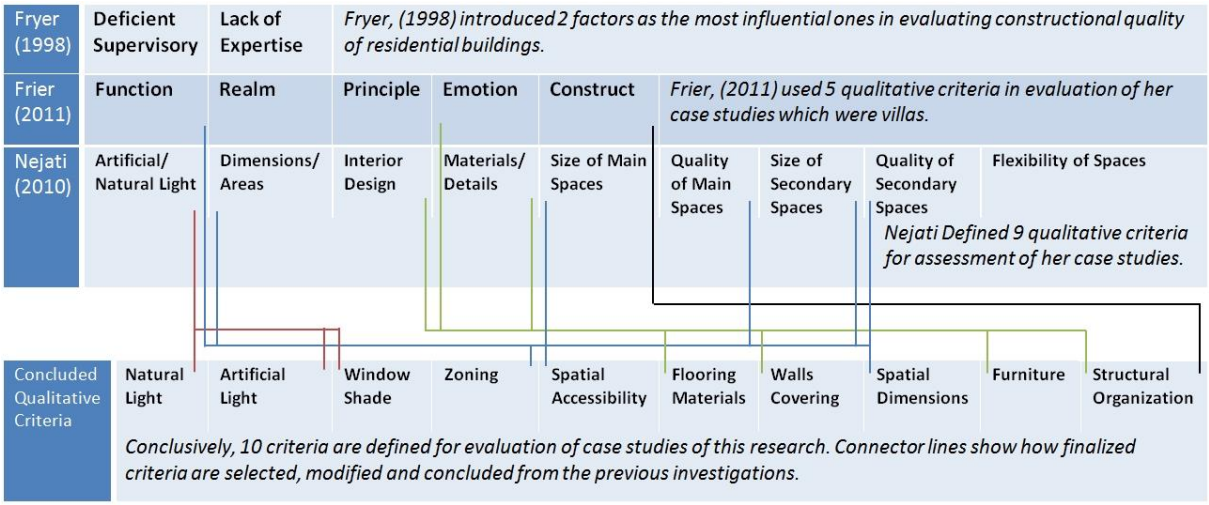


Table. 1. Influential factors in housing quality, by author, 2013

3.1. Case studies

Fig. 4 shows the location of five case studies which are determined and selected for observation and assessment. Three of them have access to Gazi Mustafa Kemal Blv. which include two studio flats and a two-bedroom unit. The other two include a one-bedroom unit in Gulseren and another two-bedroom unit close to Cami Cemberi. The following sections show how research methods and techniques are used to evaluate case studies exampling case study #3. It was important to find case studies in different types with possibility of having their residents' permission for doing observation and taking pictures. In the next sections samples of data evaluation will be described.

3.2. Data collection methods

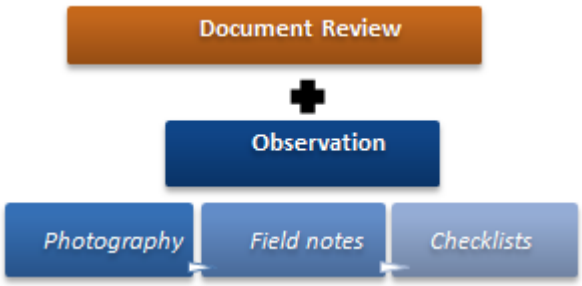


Fig. 5. Data collection methods and techniques.

As shown in Fig. 5, data collection methods include direct observation of case studies and document review. There was a need to study other articles or documents in order to understand and know some necessary and needed definitions, criteria, architectural standards and analysis methods. For instance, it was necessary to consider qualitative criteria in order to do the evaluations. Therefore, these factors should have been defined before observations. Factors considered in this research which influence the quality of interior spaces in residential buildings are evaluated in all case studies. Upper section of Table 1 shows a variety of criteria which have been considered influential in housing quality by other researchers; Fryer, Frier and Nejati. Each of these researchers has defined some criteria from their points of view and according to their studies to evaluate their cases. After studying their articles, I wrote another list of qualitative factors using and modifying the previous ones (In the lower section of Table 1). The required criteria had to be feasible, accessible and suitable under the conditions of context. They also had to be appropriate regarding the time limitations. The connector lines in the Table 1 show how each criterion of my list in the lower section is concluded from other factors of upper section.

A review of theoretical texts and past research works done in the field of residential environments and housing quality shows that many of researchers focus on theories of residents' satisfaction as an efficient approach to measure levels of environment quality.

Since this study is not conducted as a residents' satisfaction survey, the focus is mainly on qualitative factors and observation. A qualified residence which meets necessary standards instills senses of comfort and satisfaction into the residents through symbolic, social, and physical characteristics. The quality of urban residences possesses subjective mental value. This value is in a strong relation with the value of urban residences that includes significant features such as residents' individual satisfaction with their housing, urban quarters and neighbors. Therefore, subjective value of

urban residences generally is equal to total evaluations of features and constructive elements of environment.

As mentioned before, although the quality of housing includes several aspects, in this study, the evaluations are based on defined qualitative factors of indoor spaces in case studies and user satisfaction is not considered as a priority.

One of the most important implications derived from specialists' questionnaires is concept of physical comfort of indoor spaces, and it is assumed that most of people remarkably put an emphasis on the quality and quantity of indoor spaces and their home design. Variables which can be effective in this regard include; spatial dimensions, spaces and zoning(living room, dining room, bedrooms, bathrooms and kitchen), accessibility of spaces, home furniture, lighting (natural and artificial) and window shades, kind of materials and colors used in inside of home, walls covering and floorings in interior design, and structural organization and compatibility with plan.

Obviously increasing, decreasing or making any changes in the mentioned variables significantly affects the physical comfort of home.

3.3. Data collection techniques

There are three data collection techniques used in this research; photography, using field notes and checklists. Observations are done using these three techniques. Checklists included the qualitative criteria listed in the lower section of Table 1. In fact, the observations proceeded according to the checklists step by step. The checklists were exactly the same for all case studies. I also used field notes containing digital sketches of the case studies and notes about them. Fig. 6 presents a sample of sketches I drew at the place using my tablet.

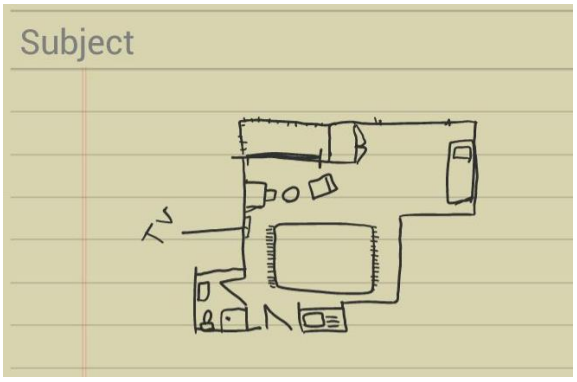


Fig. 6. Sample of sketches, Plan of case study #5; Studio flat type, by author, 2013.

3.4 Data evaluation

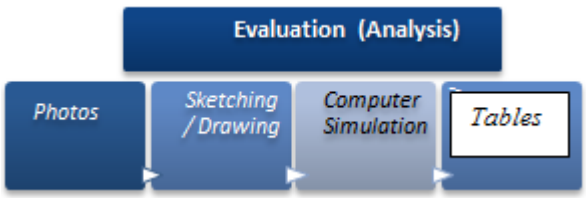


Fig. 7. Evaluation method and techniques.

Fig. 7 is a brief of how data evaluation and analysis is done in this research through using photographs, sketching, drawing, computer simulation, using tables and based on qualitative criteria defined in the previous parts. It should be mentioned that this section describes only a few number of pictures as samples of evaluation method while the assessment procedure has been done for all case studies.

3.4.1. Spatial dimensions

The spatial dimensions here are compared to the book 'Time-saver standards for interior design and space planning' written by Joseph De Chiara, Julius Panero and Martin Zelnik. As it is shown in Figs. 8 and 9, there are some inadequate or inappropriate spacing in planning which are specified with red color.

Fig. 8. JPEG image of case study #3, the red-color text shows inadequate length of space which should not be less than 700cm, by author, 2013.

Fig. 9. JPEG image is analysed based on spatial standards, the red-color text shows inadequate width of the bedroom which should not be less than 300cm. The green-color text oppositely shows the standard dimensions and spacing between the commode and the bed, by author, 2013.

3.4.2. Flooring materials and wall covering

The materials which are used in interior spaces of this unit do not meet the required qualitative standards. Flooring materials

contain only one kind of ceramic for all spaces including WC/bathroom.

It is suggested that hygienic spaces' flooring differs from that of other spaces which are all the same in this case. It is also suggested to cover all the vertical surfaces of bathroom with tiling with regard to the moisture factor. Colors used in living room and bedrooms are relatively close to cream and white. It is suggested to consider warm colors for kitchen and dining room. White and cream colors can be more appropriate for living room since they make furniture more conspicuous. Suggested colors are based on the book 'Pantone guide to communication with color' written by Leatrice Eiseman. This book presents lots of color combinations which can also be used in interior design. In Fig. 10 I compared the colors with a suitable Pantone's color combination and criteria. Fig. 11 introduces the components of Pantone's color combinations. It should be mentioned that all of these analyses are done digitally using a pen tablet.

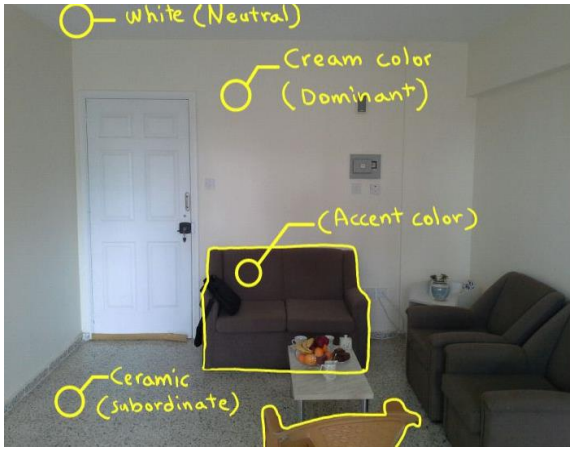


Fig. 10. JPEG image of the living room in case study #3, analysed based on standard colors and materials. Colors are compared with Pantone's color combinations, by author, 2013.

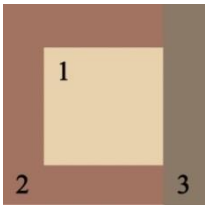
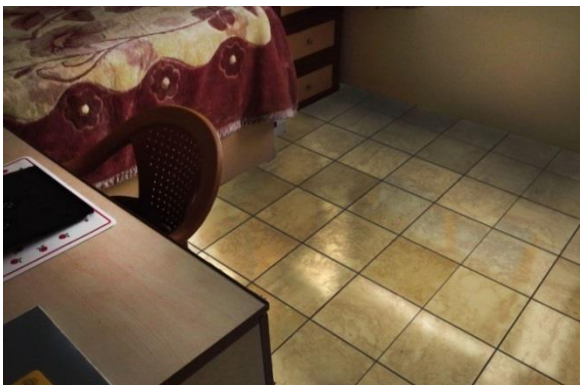


Fig.11.JPEG image of a Pantone's color combination and components suggested for the living room. Components: 1- Dominant Color (Pantone 467). 2- Subordinate Color (Pantone 4715). 3- Accent Color (Pantone Warm Gray 10). By Eiseman, 2000.

Fig. 12 is captured from the flooring of the bedroom in case study #3. Consequently Figs. 13 to 15 suggest 3 different flooring materials simulated in Archicad software.

Fig. 12. JPEG image of flooring of the bedroom in case study #3, by author, 2013.



Figs.13.14.15. JPEG images. Computer simulation of suggested flooring materials for the bedrooms in case study #3, by author, 2013.

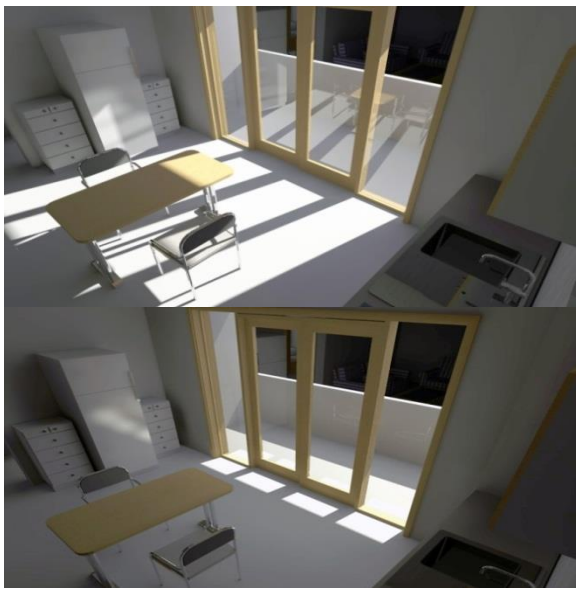
3.4.3. Lighting (natural and artificial) and window shades

This section shows the analysis of natural and artificial light in case study #3. Fig. 16 shows the opening and natural light status of the kitchen and living room in case study #3. Figs. 17

and 18 show how the opening and window shade let the sun light inside in 2 different times of the day.

This case appropriately benefits from natural light considering relatively large-size windows in all spaces including hygienic spaces. All spaces include simple general lighting without any special lighting design. In order to have more appropriate lighting, it is suggested here to apply indirect lighting and some design as shown in Figs. 19 to 21. All windows are provided with fitting curtains.

Fig.16. JPEG image of kitchen's opening, by author, 2013.



Figs.17.18. JPEG rendered images of simulation of Kitchen's opening and light status in case study #3 in the afternoon and at noon, by author, 2013.

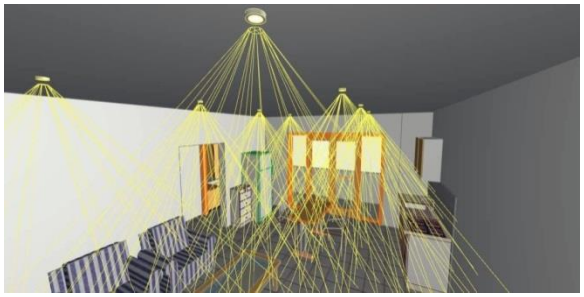


Fig.19. JPEG image of recommended artificial lighting for the living room in case study #3, by author, 2013.

Fig.20. JPEG rendered image of recommended indirect lighting for the living room in case study #3, by author, 2013.

Fig. 21. JPEG final rendering of recommended light design for the living room in case study #3, by author, 2013.

3.4.4. Zoning and accessibility

In order to analyze the zoning and planning of case studies, as mentioned before, drawings and simulation techniques were needed. These techniques are explained on case #3 in this section and used for all other case studies. Figs. 22 and 23 show that the whole area of case study #3 is well divided into two overall zones; general and private. But there is some disorganization with the entrance. The entrance door opens directly into the living-room which eliminates the possibilities to place a shelve for shooes and wall hanging rack. Figs. 24 and 25 suggest some changes in the unit's planning. Shifting the kitchen and sitting area not only makes both areas more clear but also it provides some space to place a shelve and a wall hanging rack. It also creates a better entrance and circulation as shown in Fig. 25.

Fig. 22. JPEG image of zoning and plan, by author, 2013.

Fig. 23. JPEG rendered image of zoning and plan, by author, 2013.

Fig. 24. JPEG image of recommended changes in the plan, by author, 2013.

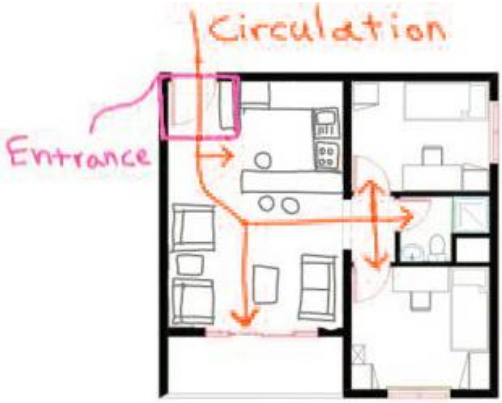


Fig. 25. JPEG image of modified entrance and circulation in recommended planning, by author, 2013.

3.4.5. Structural Organization

The constructional system used in all case studies contains concrete structure. This factor is also analyzed in all case studies as an effective criterion. The main problems in such structures are the unfolded columns, beams and shear walls which affect the quality of indoor spaces as in Figs. 26 and 27. Since many of construction firms in Famagusta design concrete structures for residential projects, this problem can be seen visibly in various dimensions.

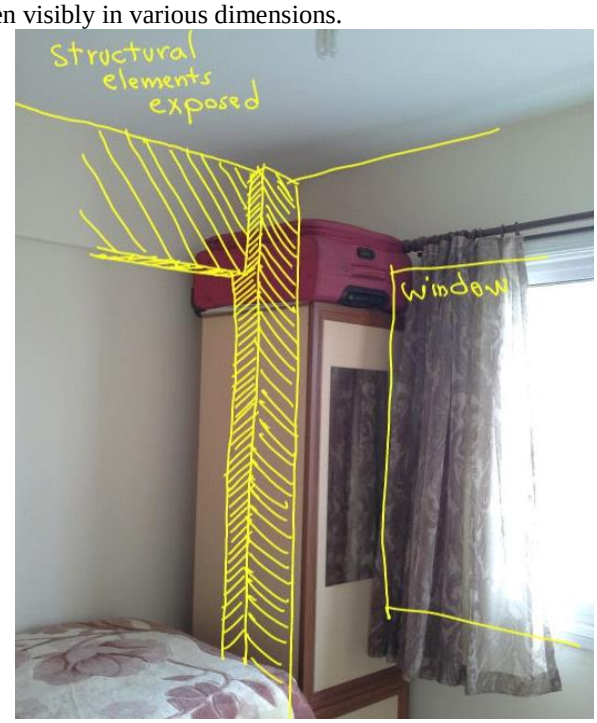


Fig. 26. JPEG image of unfolded structural elements in case study #3, by author, 2013.

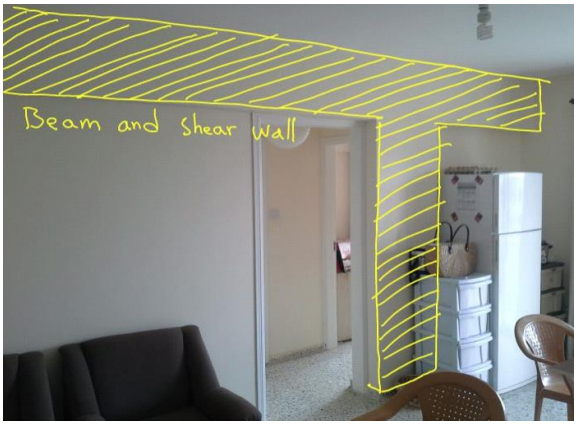


Fig. 27. JPEG image of unfolded structural elements in case study #3, by author, 2013.

IV. RESULTS

This research was an attempt to analyze and find out the qualitative problems of residential units through assessment of case studies. After demonstrating the qualitative problems, which is claimed, many of residential buildings suffer from, the results are concluded. After finishing observation and evaluation of case-studies, table 2 is developed to show the results of analyses. The qualitative criteria shown in the left side of Table 2 are considered for all 5 case studies. Case studies are listed in the upper row of the table including case study #1, case study #2 and etc. There are 3 levels of quality defined for each criterion in each case study. The 3 levels are STD (standard), DEF (deficient) and IMP (improper). Each of these levels contains some points in order to calculate at the

end. For instance, in the case study #1 a mark can be seen in the row of Natural Light and the column of STD. The meaning is that the case study #1 receives standards amount of natural light and has no qualitative problem with this criterion. Thus, 10 points can be considered for this factor. In the right side of the table, Total column shows the points each criterion gains from analysis of case studies altogether. For instance, Table 3 shows that all 5 case studies receive appropriate amount of natural light which leads to 50 points. Importing the data from Total column of Table 2 into the Chart 1 shows the overall

Case studies	Case study #1			Case study #2			Case study #3			Case study #4			Case study #5			
Criteria	STD 10	DEF 5	IMP 0	STD 10	DEF 5	IMP 0	STD 10	DEF 5	IMP 0	STD 10	DEF 5	IMP 0	STD 10	DEF 5	IMP 0	Total
Natural light	■			■			■			■			■			50/50
Artificial light	■				■			■			■			■		30/50
Window shade	■					■	■				■		■			35/50
Zoning	■			■				■		■					■	35/50
Spatial accessibility		■		■				■		■			■			40/50
Flooring materials		■		■				■				■	■			30/50
Walls covering	■			■				■				■	■			35/50
Spatial dimensions			■		■			■			■			■		20/50
Furniture		■				■			■			■		■		10/50
Structural organization		■				■		■		■			■			30/50

Table. 2. Final results of assessments based on qualitative criteria. STD: Standard, DEF: Deficient, IMP: Improper, by author, 2013.

Case studies	Case study #1			Case study #2			Case study #3			Case study #4			Case study #5			
Criteria	STD 10	DEF 5	IMP 0	STD 10	DEF 5	IMP 0	STD 10	DEF 5	IMP 0	STD 10	DEF 5	IMP 0	STD 10	DEF 5	IMP 0	Total
Natural light	■			■			■			■			■			50/50
	10	⊕		10	⊕		10	⊕		10	⊕		10			

Table. 3. Example of calculating points for each criterion, STD: Standard, DEF: Deficient, IMP: Improper, by author, 2013.

quality of housing in Famagusta based on defined criteria. Chart. 1 shows which criteria are less problematic in case studies and which are more. As an example, Natural Light factor shows 16% which is the highest percentage in the chart. It means this factor have had the highest quality in case studies and most probably in other residential buildings of Famagusta. On the other hand, Furniture factor shows 3% in the chart which means furniture have been paid the least attention and had the lowest quality. The chart also shows different rates for all other factors.

Eventually, the results revealed that which qualitative aspects of indoor spaces needed more attention, maintenance or modifications and which aspects met the required standards. It is now easier to imagine the problems which residential buildings of Famagusta currently suffer from. This research can be continued and expanded in larger scales regarding the significance of development for Famagusta and North Cyprus.

V. CONCLUSION

With regard to the theoretical fundaments of high-quality housing and according to the fact that most of researchers focus on the theories of resident satisfaction, a qualified residential environment is described as an environment that instill the sense of satisfaction and comfort to residents through symbolic, social and physical features.

The concept of *interiority* includes different factors such as; dimensions and quality of main and secondary spaces, flexibility of spaces, kind of materials, interior design, private and public zoning, and hierarchy of accessibility of spaces. Therefore, making changes in these variants can be effective through increasing or decreasing the comfort of indoor environments. As it is found out through this research, partial and egregious architectural and constructional defects can be seen in case studies through comparing them with determinant factors of qualitative evaluation. As it is seen in many similar projects, structural requirements and installations have also negative effects on architectural quality of indoors, although they can be solved at a high cost. Attempts toward decreasing construction costs are inevitable but if it causes lack of required quality, it will lead to more cost for owners. Most of residents in the mentioned case studies suffer from lack of useful and organized indoor spaces and this problem affects users comfort and welfare indirectly.

This research evaluated the quality-related factors in Famagusta, Northern Cyprus, although it is limited in several aspects. The most important limitations are evaluation criteria used in assessment. As mentioned before, there are many combinations of evaluation factors used by researchers in different contexts and conditions. The evaluation criteria used in this research are the most influential qualitative factors in its context. On the other hand, since doing observations at

private residential units needs the residents' permission, finding a number of case studies is counted as a limitation. However, further research should be done in this regard. Because of the vastness of this field, it was not possible to consider all qualitative factors of indoor environments simultaneously but it is suggested to do further research on *thermal comfort* separately as another influential factor in housing quality.

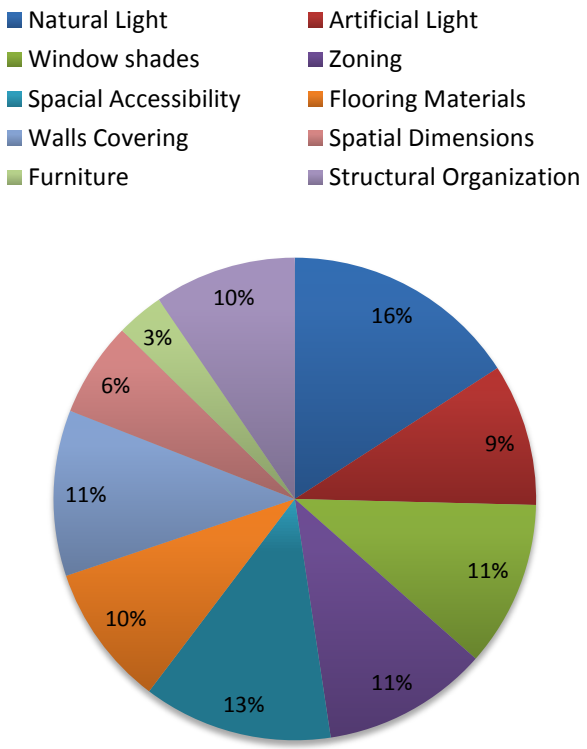


Chart. 1. The quality of each factor in residential buildings if Famagusta according to by author, 2013.

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