Islamic-Iranian Regionalization of Rapoport's Environmental Behaviour Study (EBS) Model for Home Space Design

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Abstract

This study aims to present an adapted model of Rapoport's environmental-behavioural study model for home interior spaces design according to family relations in Islam. Suggested model is designed in regards to Islamic content in the boundaries of Islamic-Iranian concept. The research results were confirmed by the use of Delphi Method. Proficiency examination of this model, introduced as an educational tool of home space design model, was carried out through two undergraduate student groups of analyse and control. Results show that the analysed group designed their home space system in relevant to Islamic thought by high percentage, whereas no much difference is noticeable in creativity and aesthetic aspects of both examined groups

Keywords: Environmental Behaviour Studies; Home Space Design Model; Design Education; Islam

1.0 Introduction

Home as the main place for settling the family requires a special structural organization. Family is an organization consists of both internal and external relationships, and home, as a place allocated to family requires curtain special division which fulfil the family requirements, activities, and relationships. Therefore, separation of personal and non-private (public) spaces and their connections in the home designing are crucial issues. Spatial organization delivered from Islamic lifestyle determines cultural values in relation to religious culture of community. Understanding the home spatial organization based on the Islamic family relationships, has a vital importance, which influences on the promoting of the student's plan content. In this regard, it is necessary first to recognize the family needs and relationships to represent them in the interaction between the spaces. The main idea behind establishing model for home spaces values is the visual boundary, visual connections, accessibility and hierarchy of spaces between private and public spaces of the home. The successful application of the suggested model in "home design studio" will be measured based on the level of creativity and application of conceptual factors in their final design.

2.0 Literature Review

The interaction between environment and behaviour (Environmental Behaviour Studies (EBS)), has been the topic of many studies. (Lang, 1997, Rapoport, 2005, Miess, 1989, Sanoff, 1971, Ujang, 2017, Collado, 2017, Alexander,1977). According to Rapoport Anthropology has a crucial impact on the environmental behaviour and at the same time culture plays a dramatic role in human's behaviour. There are different kinds of environment-behaviour systems that are shown in the Fig. 1.
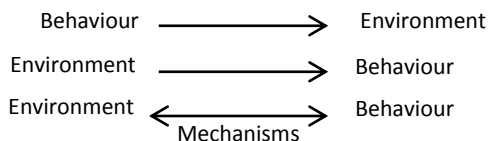

Figure. 1: The kinds of Environment-Behaviour Systems in EBS *(Rapoport, 2005)*

Based on his opinion the culture is the main factor in all three cases. And it is necessary to study the relationships between culture and environment in the EBS framework. EBS is a quite a multidisciplinary field which include various knowledge. Among all them, "Anthropology" can be directly linked to EBS as it can also cover many cultural aspects. (Rapoport, 2005) According to Rapoport (2005), home is a multifunctional structure,

influenced by social, cultural, environmental, religious and economic factors. As far as Building a "House" is concerned it is a cultural phenomenon in which its formation and organization are influenced by the culture that has produced the house. The "shape" and "organization" of it, is also influenced by its basic culture.(Rapoport, 1969, p.46) Gifford(1998) believes that, most people prefer to live in homes that meet their cultural needs. Because the settlements that promote a culture accomplish the behavioural patterns of that culture. Organizing the spaces shall comply with the requirements of any ideology and their values.(Rapoport, 2005, p.39) Diagram below indicates the interactions between different parameters in analysis and design of the spaces.(Rapoport, 2005, p.142)(See Fig. 2.)
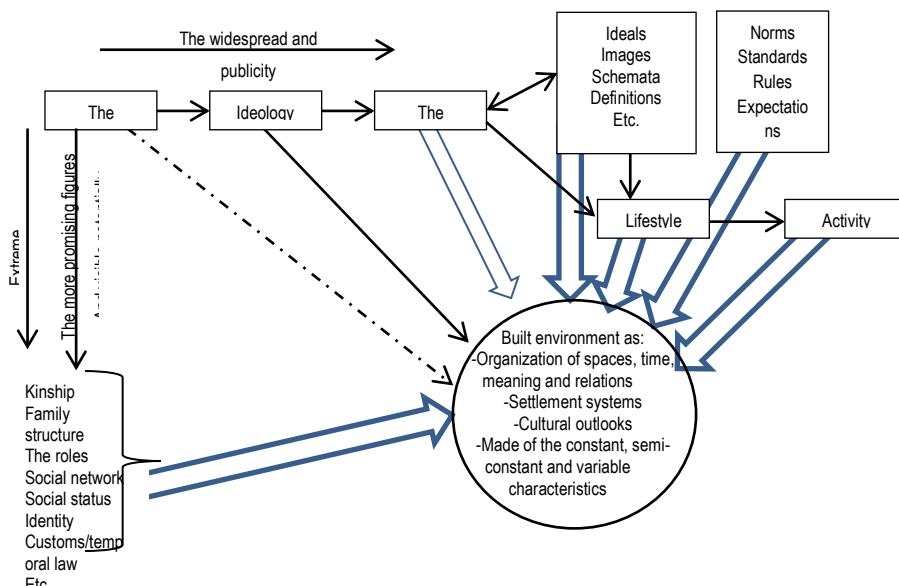

Figure 2: Segregation of cultural layers and their associations with built environment, such as house. Thickness of arrows comply with the possibility and clear relations between various components.
(Rapoport, 2005)

Recent research in UK shows the significant effects of lack of sufficient space and inappropriate connections between the spaces on the family relationships. (Roberts-Hughes, 2011)

Alexander (1977) is keen on the theories of achieving to timeless and immortals design techniques. His patterns, in home designing, are for both an extended and nuclear families to enhance the relationship within them. Lang's theories of behaviour (1997), have been the main reference for several studies including home designing.(Ghafourian, 2012) at the

same time, many researches have been conducted on the housing properties from the perspectives of Islam.(Mamat, 2017, Haeri, 2009, Sartipipour, 2004).

The attempt to channel the theoretical framework to the functional result is quite necessary as expressing quality cannot lead to promoting design to promise appropriate family relations. Application of the result in education is also quite important. The modelled Profile in this article is an attempt to obtain applicable output from the qualified studies. The resulted spatial organization of space with the regard of meaning and form can be applied in the educational process of home design.

3.0 Methodology

Logical reasoning and documentation study method have been the main tools to achieve family relationships parameters over this course of study. Logical reasoning and Delphi method have been applied for the realization of home spatial components. Both Mann-Whitney and Kolmogorov-Smirnov static tests have been undertaken for testing the success of the model in the design studio.

3.1 Theoretical Foundation

3.1.1 Familiar Relationship in Islam

Family organization is one of the most important elements in home designing. In definitions, nuclear and extended families are separated from each other. (Lang, 1997) In nuclear families that are the focus of this article- there are interpersonal relationships between woman/man and children. A category of family relationship can divide into internal and external relationships, (Giddens, 1989)

Internal relationships are considered as the behaviours between family members. And external ones are between family members and the others inside the home, for instance: the guests and the neighbours.

To develop the intended Profile, the emphasis is evidently on the relationships (from the Islamic point of view), which affect the organization of spatial order of the house.

3.1.1.1 Internal Family Relationships:

Internal family relationships consist of the relationships between parents and children, relationships between children (siblings) and the relationships of spouses.

3.1.1.2 The relationships between parents and children:

The relationships between parents and children are emphasized in Islam (Holy Quran: Asra: 23-24). Some of the primary bases in parents and children relationships in Islamic thoughts, which are effective in spatial design of the house, are:

Supply demands:Several materialist and spiritual demands are responded in family organization, and in the relationships between parents and children and children themselves. Love and mercy, mutual rights, corporation, etc. are some of the materialist and spiritual family requirements:

Love and mercy: These two factors are considered to be a fundamental phenomenon in family relationships. The deeper and wider they get, the more calmness grow in family life. The examples include mercy aspects in family conversations and with children and kind behaviors. (DelshadTehrani, 2009, p.64)

Reciprocal rights in family relations: Relationships between children and parent in Islam, are adjusted based on the mutual rights. Children's rights in Islam can be summarized into four categories: safety, welfare, justice and education. (DelshadTehrani, 2009, p.151)

Parent's rights are highly praised in holy Quran. (Ankaboot: 8) Appropriate spatial organization can provide a suitable context to deliver the rights of the family. This topic is discussed in the further parts of the article.

Cooperation in the household activities: Cooperation and collaboration in family are noble issues and highly recommended by God in holy Quran: Cooperation together in charity and piety.(Maedeh: 2)

3.1.1.3 Relationships Between children:

Relationships between children are an important matter which home spatial organization can provide a required condition for these relationships. In the family and reciprocal relationships, children gradually practice socialization. They learn some of the behavioral patterns such as loyalty, support, domination, and competition. In Islamic views, Love, mercy, play, compassion and respect, etc. are some of the existing parameters in relationship between children.

3.1.1.4 Spouses Relationships:

There are some rules that must be noted such as love and mercy, respecting mutual rights between woman and man and supplying their demands at home and in relation with each other. (Holy Quran, Room: 21)

3.1.1.5 External Family Relationships:

In this category relationship between family members with others such as guest and neighbors are noticeable. House design should comply with these relationships without interrupting daily family activities. The inner family life will be disturbed if the relationships between the home spaces are not organized with consideration of internal family relationships in the case of presence of the guest. One of the most important patterns of external family relationships is the relationship between family members with guests and neighbors. The fulfillment of these requirements needs special functional principal.

3.2 Home Spatial Organization

Home spatial organization contains relationships between public, semi-public and private areas. Public, semi-public and private spaces are closely connected, while each of which maintains its origins and significant. (Gruter, 2009, p.224)

Miess(1989) studies in thresholds are considered to be the baseline for achieving physical factors in quality connection of different spaces. In this regard, two kinds of relationships between spaces can be identified: Penetration and proximity. There are three main roles for limitations and thresholds based on Miess (1989) that are functional, protectional and spiritual roles. They can be applied to reach physical parameters in the relationship within spaces. The penetration of two spaces in functional aspects is used for accessibility, also in protectional context for selective sights and spiritual aspects is used to create a hierarchy. (See Fig. 3)
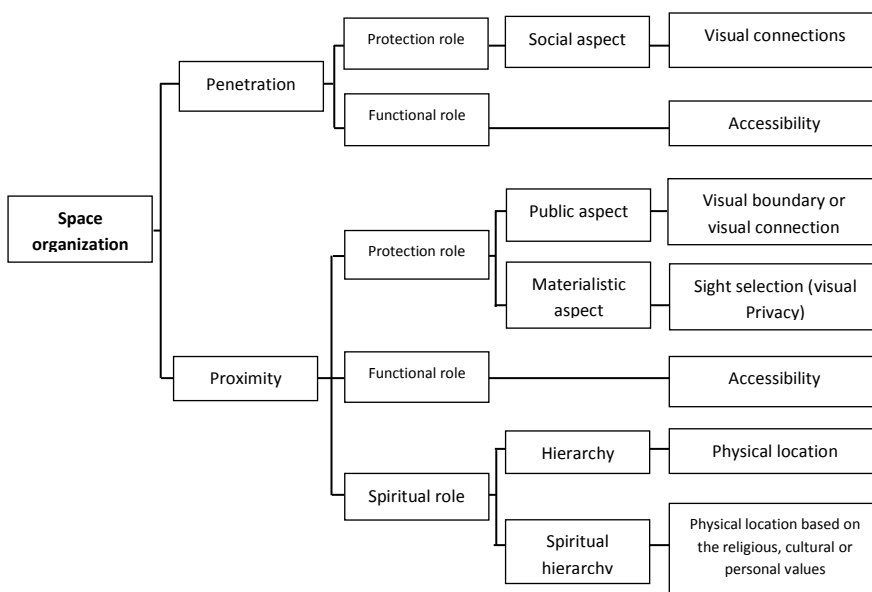
Figure 3: Space organization and its types
(According to Miess(1989)

The relationship between physical parameters with theoretical foundation-Factors of family relationships in Islam- is the basis of spatial structure of the home in Islamic viewpoint.
This article investigates the relationship between spatial organization of the home with public, semi-public and private spaces. Public spaces are entrance, living and dining areas.

Semi-public spaces that are more connected with family members are: living room, private living area, kitchen and private places are master and children bedrooms.

3.2.1 Review of the home space organization based on the requirements of family relations in Islam

To respect the family relationships, it is necessary to apply the functional factors such as visual privacy, visual connections, access and hierarchy between public/semi-public and private spaces together. Logical reasoning and interview with home design experts is used in order to understand the relationships between these spaces in the home spatial organization.

3.2.2 Physical characteristics of the public zone:

According to Islamic view, Creation of visual privacy between public zone -which in most cases is applied for welcoming guests- and other parts of the house for family members are required (to create visual privacy). Blocking the view between the entrance and the internal spaces and also between living area and semi-public and private spaces (features 1, 2, 3, 4, 6 and 7 in suggested Profile) is the aim of this study. Based on avoiding of nobility and creation of introversion it is also considered positive from the Islamic perspective.(Holy Quran, Nour: 27) at the same time providing easy access between kitchen and living area(feature 5), is encouraged in Islam because guests can stay with slight of inconvenience for family members.

3.2.3 Physical characteristics of the semi-public zone:

In this section, the emphasis is on the creation of visibility and avoiding obstacle in visual communication. Creation of visual contact between living area and kitchen that are the most important parts in semi-public and familiar spaces, and easy access from the living room to the kitchen is also evaluated positive.

The visual connection between kitchen and living area to the entry of the home and more private zones(that is the place where children present in different times) and easy access between various parts(features 8, 9 , 10, 11, 12, 13) cause more relationships between family members. Increase in mercy, love in family relationships (relationships between parents and children and children's relationships with each other), respect to the parents, cooperation between the family members, raising children, compassion and kindness to children, supplying safety of the children are some of the benefits of applying the mentioned rules.

3.2.4 Physical characteristics of the private zone:

Placing master bedroom after the children's bedroom (feature 16) in the hierarchy organization and creation of space for the parents is taken into consideration, especially in holy Quran. (Holy Quran, Nour: 58) Creation of a private living room and visual connection between the private and semi-public family room (features 14, 15) can offer the possibility of

more family connections in different times of the day. And this arrangement based on Islamic viewpoint would strengthen many factors like; love and mercy in family relationships, compassion and love to children, possibility of playing with the younger children, providing the security of the children and materialistic and spiritual needs of the children.

To accredit the results of the logical reasoning method, home design expertise were interviewed. (By Delphi method) The result of this study offers enough persuading facts to achieve the home spatial organization in Islamic viewpoint. A brief of the statistical in Delphi research results is shown in the following table:

Table 1: Home spatial organization in public/Semi-public and private zone, Family relationships component/factor (behavioral outcomes) and average of answers from maximum five as very high, to each of the factors with use Delphi method

Physical component/factor		Family relationships component/factor (behavioural outcomes)	Average of impacts of Physical component on Family relationships (averages are result from Delphi method in 40 questions in a questioner from five experts arranged by the author)
Public zone	1.Creation of visual boundary between entrance and internal home places	Protection of family privacy at the entrance none family members and promoting family relationships.	4.6
	2.Creation of visual boundary between the kitchen and living room	"	4.4
	3.Creation of visual boundary between family area and living room	"	4.8
	4.Creation of visual boundary between the kitchen and the guest dining room	Protection of family privacy at the presence of the quest and facilitate his presence in the house for the family.	4.4
	5.Creation of the suitable access between the kitchen and the living room	Facilitating in hosting	4.2
	6.Creation of visual boundary between the living room and the guest dining room	Protection of family privacy at the presence of the guest and facilitate his presence in the house for family	4.2
	7.Creation of visual boundary between the living room and	"	4.6

	entrance of the private home zone.		
Semi-public zone	8.Creation of visual connection between the living room and the kitchen	Increase of mercy and love in family relationships(relationships between parents and children and children with each other), respect and good to parents, cooperation between family members, raising children, compassion and kindness to children, the safety of the children	4.3
	9.Creation of an easy access between the living room and the kitchen	Cooperation between family members, the safety of the children, possibility of playing with younger children.	4.4
	10.Creation of visual connection between the kitchen and the entrance of the private home zone.	Increase of mercy and love in family relationships(relationships between parents and children and children with each other), respect and good to parents, cooperation between family members, raising children, compassion and kindness to children, the safety of the children	4.03
	11.Creation of an easy access between the kitchen and the entrance of the private home zone	Increase of mercy and love in family relationships, cooperation between family members, the safety of the children	3.8
	12.Creation of visual connection between the family room and the entrance of the private home zone	Increase of mercy and love in family relationships, respect and good to parents, raising children, compassion and kindness to children, the safety of the children	4.24
	13.Creation of an easy access between the family room and the entrance of the private home zone	Increase of mercy and love in family relationships, the safety of the children	4.16
Private zone	14.Creation a place as the private living room in private zone	Increase of mercy and love in family relationships, compassion and kindness to children, possibility of playing with younger children.	4.6
	15.Creation of visual connection between the living room and the private living area	Increase of mercy and love in family relationships, the safety of the children	4.3
	16. Placing the master bedroom after children's bedroom in the hierarchy of spaces in private zone.	Compassion and kindness to children, Increase of mercy and love in family relationships, provide the needs of the relationships of both spouses.	4.15

Based on the Islamic ideology, the home organization profile (Islamic values model) is presented.(See Fig. 4) Positive assessments are recognizable from the impact of the home spatial properties on the family relationships.
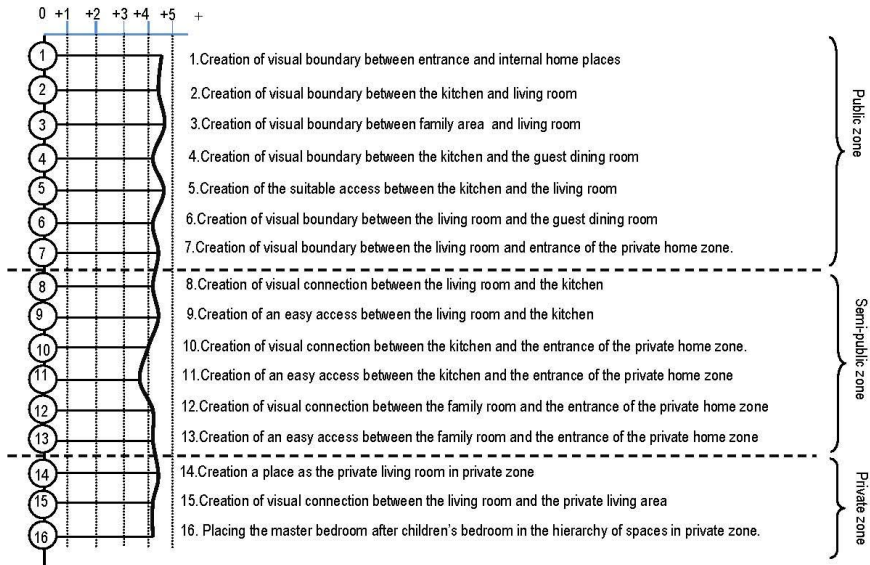

Figure 4: The home spatial organization profile according to Islamic viewpoint, the positive evaluated features based on the Delphi method is presented to increase the positive Islamic family relationship. The model shows the result in three different public, semi-private and private spaces.

3.2.5 Education Evaluation

Undergraduate students of architectural design in-house design studio divided into two different groups. Analyse and control groups' of 15 people randomly selected, in order to evaluate the profile success. Analyse group people were educated according to the home spatial organization based on reasoning and Delphi method. And control group people did not benefit from this model.

The research data were collected by using the performance assess model and student placement according to the about 16 mentioned criteria. Students ranking carried out by the authors in all of the designs. In order to introduce the credibility to the grading process, five residential design experts were asked to grade between zero to five in the outlines criteria in six sets of each analyse and control groups. Zero score is the least creation, and five is the highest mark.

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At the end of the semester, the selected group of 12 including two projects of the lower class, two projects of the middle class, and two projects of the highest level of both groups was selected. The judges were asked to score the degree of creativity of the design, and give a score to the whole design, for evaluating the competing factors.

4.0 Results and Discussions

Due to the independence of the two experimental and control groups, independent samples exams were used. The data of this research were numerical (the scores that given to the case and control groups by the teachers). And six people were included in both groups, so Mann-Whitney and Kolmogorov-Smirnov static test were applied to compare the score mean. According to the assessment of "there is a significant difference between the mean scores of the analysing group and the control group mean scores", for evaluating in statistical exams, the null hypothesis is considered as the "no significant difference between the two groups". To perform this exam, SPSS version 18sofware was used.

Table 2: Comparing significant level of differences in 16 criteria of profile in two group of analysis and control according to the Mann-Whitney test and Kolmogorov-Smirnov tests

Groups	Number of person that examined	Mean of grades	Mann-Whitney U	Z	Significant level of the Mann-Whitney test	Kolmogorov-Smirnov Z	Significant level of the Kolmogorov-Smirnov test
Analyze	6	9.50	0.000	-2.882	0.002	1.732	0.005
Control	6	3.50					

Evaluation of the statistical analysis of the first 16 variables, show the significant amount of the Mann-Whitney of 0.002 and for Kolmogrov-Smirnov test as 0.005. According to confidante percentage of 95% both of the amounts are lower than 0.05, then null hypothesis for equality of the mean in the first 16 variables in both of analysing and control groups, is rejected.

In the other words, after rejection of the null hypothesis, analyse data have a significant better mean scores than the control data mean scores. It means that analyse group students have been able to design a spatial organization of the house closer to the realization of the family relationships elements comparing with the control group students.

For the student's creativity level, the significant level of the Mann-Whitney test is 0.394 and for Kolmogrov-Smirnov test is 0.441.With 95% confidential rate, both of the tests have a significant level of more than 0.05, so according to these two tests, there are no enough evidences for rejecting the null hypothesis. In the other words, creativity of students in performing the project was the same in both groups.

Table 3.: Comparing significant levels of no differences in creativity criterion in two analyze and control groups with the results of Mann-Whitney test and kolmogrove-Smirnov tests

Groups	Number of person that examined	Mean of grades	Mann-Whitney U	Z	Significant level of the Mann-Whitney test	Kolmogorov-Smirnov Z	Significant level of the Kolmogorov-Smirnov test
Analyze	6	7.50	12.000	-0.971	0.394	0.866	0.441
Control	6	5.50					

Table 4: Comparing significant level of no differences in total score criterion in two analyze and control groups with the results of Mann-Whitney test and kolmogrove-Smirnov tests

Groups	Number of person that examined	Mean of grades	Mann-Whitney U	Z	Significant level of the Mann-Whitney test	Kolmogorov-Smirnov Z	Significant level of the Kolmogorov-Smirnov test
Analyze	6	8.50	6.000	-1.932	0.065	0.866	0.441
Control	6	4.50					

As far as the total scoring is concerned, the significance level for the Mann-Whitney test is 0.065 and for the Kolmogorov-Smirnov test is 0.441. With 95% confidential percentage, both of these tests are higher than 0.05 and therefore there are no enough evidences for rejecting the null hypothesis. In the other words, there are no significant differences between analysing and control groups in the mean scores.

Thus, the hypothesis of the negative effect of application of profile of values in home designing on the creativity of the students is rejected, as the results of the statistical analysis don't approve of the significant differences between these two parameters in both groups.

Comparative diagrams of modelled profiles of home spatial organization from analyse and control group in compare with the modelled profile from the Islamic viewpoint are as follow (See Fig. 5):

According to the diagrams, analyse group students designing, showed more fitness towered the values of Islamic home spatial designing in compared with the control group. At the same time, as the results of the statistical tests show, there are no significant differences between two groups in the creation and total scores. Therefore, this seems reasonable to emphasis on the application of right Islamic thought contents in designing besides creating innovative and aesthetical designs by students.
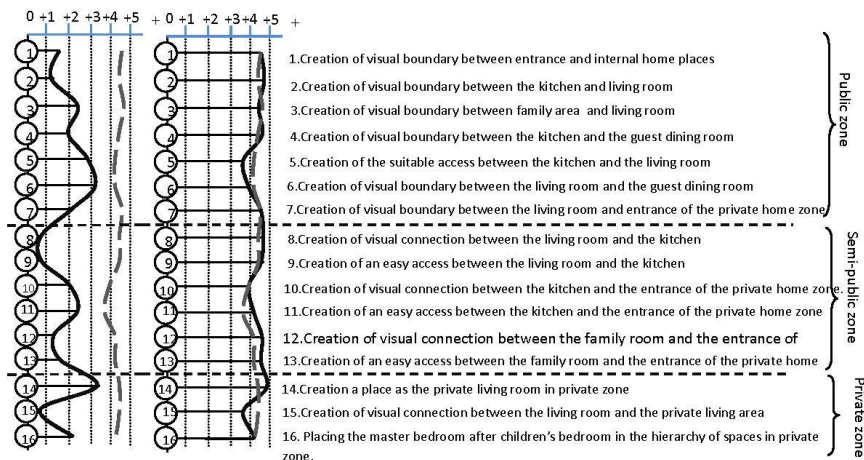
Fig. 5. Comparative evaluation among two analyse and control groups profiles in home spatial organization, right: analyse group students designing which has co-real fit to the Islamic profile, Left: control group students designing which fit less to the Islamic profile

5.0 Conclusion

This paper attempts to present a model of home spatial organization designing based on the components of the family relations in Islam, to increase the level of the social interactions among family members. It seems that with the application of the principles in the profile, effective results in moral and cultural values in family relationships and lifestyle based on Islamic views is conceivable. Consequently, a better education in home designing can be archived. This Islamic based profile which is presented in this paper is approaching to bring back the values and Islamic principles to the people's lifestyle to promote the family members relationships. And of course the main structure of the profile is formed around Islamic ideology. Obtained principles for the organization of the public, semi-public and private zones, are presented to be used by the; privacy visual-spatial components, visual connection, access and hierarchy of the realization of family components relationships. House public zone needs to create maximum visual boundary with the other house spaces and in semi-public zone more visual connections and removing off the obstacles must be noted. Private zone creates both private settings for small family gatherings and also providing a separate space for parents and children. To measure the success rate of obtained profile during the education of house designing the profile was accessed by the students. Student's projects were evaluated by a jury of design statistical evaluation analysis showing that the analyse group students achieved a positive result in the creation

of Islamic content in the design comparing with the control group students. In addition, no difference in creativity and total scores of the project is recognizable. So creation of content has no negative impact on the competing factors such as creativity. Thus, it is concluded that the application of this profile can lead to a better house designing by the students without any negative effects on the other aspects of the design. Measurement and analysis of the results of this spatial organization in house and apartment designing on the type and amount of the family relationships could be a challenge for the future papers.

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