Notes on Perceptual Qualities of Space: Dwelling Spatial Organization

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Submitted to the
Institute of Graduate Studies and Research
in partial fulfillment of the requirements for the Degree of

Master of Science
in
Architecture

Eastern Mediterranean University
June 2013
Gazimağusa, North Cyprus

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ABSTRACT

Space is a very complex phenomenon and has engaged many areas of discipline for a long time. This complexity is even starker in architecture where it is not only an abstract phenomenon that exists in the mind, but also a concrete corporeal reality, that critical juncture where the mind and body of the user interact with physical space. User-space relationship is a dialectical process where space affects users and users influence space during occupation. Moreover, much emphasis has been put on the functional qualities of space and the design of dwelling spaces has not been an exception in this regard. On the contrary, the effects of spaces on users are not solely based on their functional qualities. By extension, function-based design of space with objective functional requirements and spatial measurements to the required square meters is simply not enough for users' satisfaction which occurs at many levels. This study therefore argues that spatial design, in order to be successful, must take into account the subjective aspirations of users in conjunction with the objective functional requirements, and post-occupancy allowances made for the enrichment of the spatial experience through time.

Using the sample analyses based on documentary research as its methodology, this thesis aims to have a review on the non-measurable qualities of spatial organization in dwelling spaces within the framework of two main theoretical concepts: Morris' (2004) "sense of space" and Ola Nylander's (2007) work on the "non-measurable qualities of space." Accordingly, the objective is to investigate and discover the

spatial qualities provided by space organization that potentially turns space into ‘place’ as people (users) would it to suit their social, economic and cultural aspirations and their everyday lives and the lessons that can be learnt from this as useful knowledge to be applied in house design.

As a result, seven key factors were found to be relating to the non-measurable quality of space organization in dwelling space. After investigating these key factors, in three well-known samples the essential role key factors were derived in the characteristic of dwelling spatial organization. Also, this study find the possibility that dwelling spatial organization provide a Focal space within them that determine the characteristic of the spatial organization. This study can contribute to the design process and help achieve common values that could explain the process of perception of space and the reasons that some spaces become more pleasant for the users and how potential activities become important in such circumstances.

Keywords: Keywords: Spatial Organization, Dwelling Spaces, Sense of Space and Place, Non-Functional Spatial Features, Non-measurable Spatial Qualities

ÖZ

Mekan, oldukça uzun bir zamandan beri, bir çok disiplinin ilgi alanı içine giren karşık bir olgu. Onun bu karmaşıklığı, soyut bir zihinsel olgu olmanın çok ötesinde somut bir fiziksel gerçeklik olarak belirginleştiği mimarlık alanında daha da güçlüdür. Çünkü burada mekanın bu fiziksel gerçekliği üzerinden kullanıcının zihinsel ve algısal etkileşim içinde olması sözkonusudur. Kullanıcı ve mekan ilişkisindeki bu dialektik süreçte, mekanın kullanım süreci içinde hem kullanıcı hem de mekan etkilenmektedir. Hatta bu, işlevsel kalitenin göreceli olarak daha belirgin olduğu konut mekanları ve onların tasarımında da aynı derecede önemlidir. Ne var ki, mekanın kullanıcı üzerindeki etkisi, çoğu kez salt uygun mekansal büyüklüklerin tasarımına indirgenmiş bir işlevsellik kalitesi ile ilgili doğrudan bağlantılı olmamaktadır. Çünkü, mekanın işlevselliği, kullanıcının bir çok düzeyde ve boyutta ortaya çıkan mekansal tatmini için yeterli değildir.

Bundan dolayı bu çalışma, daha başarılı bir mekan tasarımı gerçekleştirmek yolunda, kullanım sürecinin zenginleştirdiği mekansal deneyimler aracılığıyla mekanın objektif fiziksel özellikleriyle birleşebilen subjektif bir kullanıcı algı/duyum ve tatmini olduğu gerçeğini gözönünde bulundurmanın önemini ortaya koymayı amaçlamaktadır.

Bu doğrultuda çalışma kapsamında once kapsamlı bir literatür taraması yapılarak, konut temelli mekansal kurguların ölçülemeyen özelliklerini; biri Morris'in (2004) 'mekan duygusu' diğeri Nylander'in (2007) 'mekanın ölçülemeyen kaliteleri' gibi iki

kuramsal çerçeve üzerinden keşfetmeye, irdelemeye ve anlamaya girişir. Böylece bir mekanın ‘yer’ olabilmesi potansiyeline olanak sağlayan mekansal kurguların özelliklerini ortaya koymak ve bu yolla konut mekanlarının tasarımına nasıl katkıda bulunmayı amaçlanır.

Sonuçta, mekansal kurguların ölçülemeyen kalitesi ile ilgili yedi faktör üzerinde yoğunlaşılır ve bunlar üç özgün konut örneği üzerinden örneklenir. Aslında bu konut binalarının mekansal kalitesin bu yolla bir kez daha analiz edilmiş olur. Burada odak mekanı (Focal Space) kavramı bu örnekleme çalışmasının bir sonucu olarak ortaya çıkar ve mekansal kurguya karakter kazandırırdığı gözlenir.

Anahtar Kelimeler: Mekansal Kurgular, Konut Mekanları, Mekan ve Yer Duygusu, İşlevsel Olmayan Mekansal Özellekler, Ölçülemeyen Mekansal Kaliteler.

Dedicated to my family and my true friends

ACKNOWLEDGMENT

I would like to express my gratitude's, to my family and friends who always believed in and encouraged me. Specially Mr. Payam Mahasti who supports me through difficulties and Mr. Fodei Conteh because of proof reading of this work. Also to my supervisor Assoc. Prof. Dr. Turkan Ulusu Uraz, she was to one who guided me throughout the study and spent all of her time for me. Her support and trust is valuable to me, I really owed to my dear supervisor.

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INTRODUCTION

The essence of architecture is space. Architects are responsible for the creation of space with the relevant characteristics in functional, aesthetical and structural qualities – as in the Vitruvian triad: utilitas, venustas and firmitas (Vitruvius, 1960). Evans (1978) puts it thus, that architects add to buildings the qualities that make them not only aesthetical but also practical and functional. Architectural design gives dwelling spaces their functional, aesthetic and habitable features by incorporating the life and/or social needs of the inhabitants. The resultant spaces are perceived and lived through time. Through time and the memories of different events and rituals, people tend to get attached to their dwelling spaces making the perception and experience of space a function of the space-time continuum.

In architectural thought, there is nothing like an empty space; all things have their particular location and position in space **(**Meiss, 1990). Space also includes activities or functions; that is to say, every activities or functions of human beings require a space. Most of the time an activity becomes the main feature, which identifies a space. This is why space is never just a simple shape and volume and the main reason why space making is the essential parameter of architecture. Therefore, the main concern of architects and others who thinker with the built environment is and

has been to create space for human activity; the essentials of everyday life that continually reorganizes and re-defines space through time – that is space in a continuous state of flux in the Norberg-Schulzian sense.

Space could not be a relatively simple physical agenda for every day life. The first challenge for the architect is to define a space with a number of qualities for its users. Although every space has its own qualities, these qualities provide the spatial components, which are not only supposed to define a space but also to have a significant effect on the user and his/her overall experience of a particular space. These qualities simply are defined by spatial boundaries. Spatial boundaries define space within its organizational pattern and consist of tangible, solid or corporeal and intangible qualities, which are the basic tools of space design. Space design includes horizontal or vertical planes as spatial boundaries, with their solid, tangible or corporeal features in the form of walls, floors and ceilings. These qualities also include intangible ones like light and shadow, color, and textual and haptic characters. Besides the importance of the tangible and intangible space characteristics, space is basically a volume, which serves certain functional requirements as well as preserves human needs. As conceptualized by Ching (1979) :

> "Space contently encompasses our being through the volume of space, we move, see forms and objects, hear sounds feel breezes, smell the fragrances of a flower garden in bloom. It is a material substance like wood or stone yet it is inherently formless. It is visual from quality of light dimensions and scale, depends totally on its boundaries as define by elements of form, as space begins to be captured, enclosed, molded and organized by the elements of form architecture comes into being" (Ching1979 P. 103).

However, compared to the intangibles, the tangible aspects of space are most of the time easier to visualize and apply in a space design. It is more practical to imagine the void by defining its solid boundary and by extension, even easier to shape the spatial boundaries according to certain functional needs. Apparently, space boundaries in Architecture which define a space usually have two functions: the first, is to define space and the proportion of it whereas the second is the security of the place usually carried by the exterior walls which separate it from the outside (Semper, 1989).

Mostly it is more difficult to apply the intangible components and use them in the most relevant way, which needs more design experience, enthusiasm and concern. On the other hand, the tangible and intangible types of components are the essential tools of an architect as a creator who is asked to design a particular space according to people's needs in their everyday lives but also to satisfy their social and psychological needs.

Though, in the process of design there are still some questions which need to be answered for the architect: should it be space designed simply as a functional objective matter or can we isolate a space from other spaces and basically consider the perfection and peculiarity of it? Hillier's (1996) question also supports this idea, "how far space can be seen as an objective independent thing-in-itself?" (Hillier, 1996, p.18). The main message in this question is that we should not see space as purely a functional and simple single physical object. Space is a phenomenon in architecture, which is a part of space organization and it is contained by this spatial order whereas it is container of other spatial relations. Accordingly, every space

affects and is affected by the other spaces; a characteristic which is directly related to space organization and the designing of it.

In this case, the short-term users do not only use the spaces, but also live in it and present themselves through experiencing it. Spatial impression of users differs from the long-term effect of space on users. Most of these are not based on the functional qualities of dwelling spaces. Functional requirements are the main considerations in functional designs. Ando (1991) explains the importance of functional design:

> "Architectural creation involves contemplating the origins and essence of a project's functional requirements and the subsequent determination of its essential issues" (Ando 1991, p. 256).

The functional qualities rationalize the process of architectural design. In Ando's (1991) conception of this rationalization of design, he argues that behind the promotion of the universalization of architecture is the idea that functionality equals economic rationality. However, the design process of dwelling spaces is mostly based on the functional qualities. This statement should be supported by introducing functional qualities of space and the affection of these qualities (Ando, 1991). Wright (1954) sees, from his own point of view, the functional quality of spatial elements in this order: the cognizance of "wall" was not the side of a box; the wall was enclosure of space representing protection against heat or steam only when it was necessary. However, the other performance of it is to bring the outside world into the inside of the house and at the same time the inside of the house has this potential to go outside. In this order, working on the wall as a wall as well as playing the function of a screen, a feature to opening up space with the control of building-materials (Wright, 1954).

The function-based qualities are essential in defining space not only as a functional feature but also as a meaning of architecture. Functional requirements are the main considerations in functional designs. This idea is buttressed hear by reiterating Ando's (1998) critique of rationalization of design that was highlighted previously; quoted here in more details, he says:

> "… behind the promotion of the universalization of architecture is the idea that functionality equals economic rationality. The principle of simple economic rationality does away with the rich, cultural aspect of architecture. Similar buildings are being constructed throughout the world, and cities are losing their individuality to become ominously monotonous …" (Ando 1998, p. 450).

This critique clearly underlines the idea that the provision of functional qualities in design is rooted in the provision of functional requirements, which are the features designers take into account and according to which they create space. These qualities have the rational prospect of the design. The economic perspective on architecture also concerns this aspect of the design. Nevertheless, space is a phenomenon in architecture, which is usually designed and defined by, mostly, architects.

1.1 Problem Definition

The effect of space on the user as well as the post-occupation influence of users on the space is a two-way path. However, while it is generally believed that design of dwelling spaces are mostly based on functional qualities, the effects of the designed spaces on the users are not solely based on their functional qualities. This statement is commonly supported by intensive research on the quantitative and qualitative dimensions of functions and their role in design.

The relationship of users to space is based on two different types of experiences with dwelling spaces: one is the short term based on visual sense of space; the other is long-term, based on living experience through which capturing the sense of place could be achieved. These two types of relationships create two types of effects; one could be a simple impression whereas the other may have more serious and deeper effect on the user. However, both are not believed to be directly based on the functional qualities of dwelling spaces (Hertzberg, 2000).

Evidently, functional requirement appears to be the most objective and basic issue of house design development. Space and user relation show the true color of each other (Hertzberg, 2000). People could be attached to space by their experience. The quality of space and the spatial experience through these qualities make living within a particular space an unforgettable phenomenon in people's minds. Not only spatial and visual qualities but also the character and meaning of space become significant components of these qualities (Nylander, 2007). These qualities could be considered as non-measurable qualities of space. Partially provide by fixed or tangible space defining elements, well defined functional approaches to space require events, which also are more safe and easy to deal with. As well as non-fixed or intangible space features.

The human experiences in a space are not only dependent on the (space's) perceptual or physical characteristics but also on the previous spatial perceptions and experiences of the users with which they both evaluate and enrich it (space). These previous spatial perceptions and experiences could have personal and psychological or cultural roots. According to previous experiences, the user develops his/her

personal attachment to a space in different degrees or levels and perceives it as meaningful or not meaningful. These experiences could be a function of accumulated, psychologically based, experiences over a vast array of time from the first perception or experience of space within a user's cultural and social milieu.

This is where the problem to this study lies. Function-based design of space, which deals with only the objective functional requirements and spatial measurements to the required square meters, simply is not enough for users' satisfaction, which occurs at many levels. This study therefore argues that, in concert with the objective functional requirements, the subjective aspirations of users must be incorporated into any successful spatial design and post-occupancy allowances made for the enrichment of the spatial experience through time – in short, gradually making space into place eventually. From this point of view characteristics of space organization rather than a single space becomes more crucial.

1.2 Aim and Objectives

The main attempt in this study is to have a review on the non-measurable qualities of spatial organization in dwelling spaces within the framework of two main theoretical concepts: Morris' (2004) "sense of space" and Ola Nylander's (2007) work on the "non-measurable qualities of space." Taking these two theories as theoretical lenses, this thesis focuses is on the concepts of 'sense of space' and 'place' because the non-measurable spatial qualities of dwelling spaces are achieved through these two spatial concepts. Accordingly, the objective is to investigate and discover the spatial qualities – tangible and intangible – which space organization provides to potentially turn space into 'place' as people (users) would it to suit their social, economic and

cultural aspirations and their everyday lives and the lessons that can be learnt from this as useful knowledge to be applied in house design.

1.3 Theoretical Framework

As mentioned above, this thesis uses as its theoretical base the works of David Morris (2004), the "sense of space" which has been discussed before him by the philosopher Maurice Merleau-Ponty (1964) and the work of Ola Nylander (2007) on non-measurable qualities of space. Nylander's research on space mainly centers on the non-measurable qualities in dwelling spaces. His work has been influential in contributing to the understanding that space is not a solo phenomenon and not perceived as a limited object as well as helping people to understand space organization from different points of view.

Morris (2004) also works on the sense of space. His work generally concentrates on the bodily experience of space and the significance of it on the process of perception. The importance of bodily experience in a space and the connection of it with the quality of space is a major concept in Morris' work. Morris mainly sees this process from a philosophical viewpoint. Additionally, he draws on Merleau-Ponty's research on the human perception and the sense of space in most of his work.

1.4 Methodology

The methodology of this thesis deals with qualitative data analysis using the sample analyses based on documentary research includes the analysis of the contents of literature in order to identify the main variables, which emerge from the main themes of data collection in the process of literature review to be clarified in the discussion process. This process involves several steps: The first is the definition of space. This step involves the search for the understanding of space definition and space qualities

to understand the meaning of these concepts and their architectural contents, which are, selected dwellings (samples). These concepts develop the main base and reflect the meanings and essential variables of each concept.

Secondly, the space organization in dwelling is the basis for analyzing the text. This process starts from space and continues to perception of space, short term and long-term occupation, daily life and, at last, space organization and spatial articulation. Besides, in step two the major goal is to assign and explain variables of all these concepts.

In the third step the research tries to count the common values, which are repetitive in space and space quality of dwellings as well as space organization to identify the particular variables, then mark them and assign these variables and classify them. Step four integrates these variables with the non-measurable qualities of the house that Ola Nylander's (2007) research reveals. Within the process of analysis of these variables, the study provides discussion to clarify the variables and their role in the study. Lastly, as a result of the discussion and findings within the literature, the conclusions are drawn.

1.5 Chapter Structure

The chapter structure of the thesis includes four chapters. In chapter one, the introduction, this thesis tries to introduce the subject and clarify the problem that generates the whole research process. It also discusses the aims and objective, the main focus, the methodology, the theoretical framework and the limitations to the study.

In the second chapter, it concentrates on the basic concepts of space, spatial perception and spatial quality. In the final part of the chapter two main concerns are on the sense of space concept and daily life in dwelling spaces. Furthermore, the main achievements of this chapter deal with the basic relation of space and spatial quality within the concept of sense of space to describe the human relations to the dwelling spaces.

The third chapter attempts to have a review on space organization from different perspectives. Then match the key factors with the sense of space concept and daily life values with it. In the final part of this chapter, main concern is on the non-measuring qualities of dwelling spaces according to the Ola Nylander achievements.

In the second part of the chapter three, the study tries to conclude the main factors between different concepts like sense of space, space organization and sense of reality (Ola Nylander achievement by research on non-measurable qualities of space) on the context of dwelling space. The common key factors of these three concepts become the non-measuring qualities of space organization in dwelling spaces, which are also called as potential qualities. In the second phase of chapter four this thesis tries to clarify the potential qualities on different samples. This work is done according to the Ola Nylander methodology on his research on non-measurable qualities of dwelling spaces.

Chapter four deals with the discussion of the findings to make the final conclusion. It also suggests recommendations for further study, which could be a continuation of

this present work or as a separate study building on the shortcomings that this may have.

1.6 Limitations

The study of space is a wide area that cuts across different disciplines and subject matter. It is hard to deal with every aspect of it and certainly not in the scope of this work. Therefore, this study limits itself to the investigation of the non-measurable qualities of spatial organizations in dwelling spaces. Moreover, because of the qualitative nature of this study, the dwelling spaces that are discussed come with different examples from different contexts, which are used to clarify the particular concept of discussion as defined in by the theoretical framework.

Chapter 2

PERCEPTION AND SENSATION OF SPACE THROUGH THE DAILY LIFE EXPERIENCES

As it has been clearly stated in the preceding chapter, this study is interested in the perceptions and experiences of people with regards to the non-measurable qualities of spatial organization in dwelling spaces. While there is a gap in the literature regarding the identification of non-measurable qualities in dwelling spaces, it is essential to describe the notions of space, spatial qualities, perception, sense of space and daily life in dwelling spaces. Non-measurable qualities enrich the human perception and experiences in the space. Therefore, it is a concept related to the space particularly dwelling space in which people intend to live. Thus, non-measurable qualities occur in human lived space. Space is a phenomenon. This phenomenon creates by dialectic between inside and outside, boundaries and enclosures, which appear in an order as well as centralized. Lived space is equal to place. Place has a close relation with the lived world (Seamon, 1982). Since this study concerns itself with the subject of the non-measurable qualities, place is the concept for consideration and converting space to place will be the recurring theme in all the discussions.

Exploration of the notions of space and place conducts interpretations in this study. In other words, understanding the sense of space and the relationship between space and lived place become the main consideration of this chapter. In dealing with the

intended subject, space definition, perception of space, spatial qualities, sense of space, non-measurable qualities and place is analyzed and then procedure of converting space to place.

2.1 Space Definition

Space is more an idea rather than a portrayed concept. When one puts this idea into words, one almost loses it (Hertzberger, 2000). However, there are several attempts since antiquity to the present to define the phenomenon that 'space' is. Aristotle describes space as a container of items, inclusively covering whatever is within the edges of the sky. Space is restricted externally and occupied internally (Meiss, 1990).

Moreover, Weber (1995) explains the influence of space on our perceptions as a phenomenon that is not only perceived as the corporeality of a physical object but also as the shape of the void within the objects. Also, Hertzberger (2000) add to the concept of space in his description of architectural space as an entity shaped by its surroundings and otherwise shaped by the objects that exist within it. All the features that surround a space or are included within it are perceived by us. A simple view through the space makes an illusion of relief and distance.

Space is not simply a physical entity, yet the architect mainly defines it by giving form to architectural elements like walls, floor, ceiling, door, window (Rapoport, 1969). On the other hand, it is an important functionally oriented volume for the user who requires a physically defined boundary to this non-physical reality. In fact space is an emptiness or void (Antoniades, 1980). When architects talk about the qualities of space, they actually refer to the qualities of this non-physical existence, which are formed by physical, tangible and fixed spatial boundaries.

Therefore, architectural space consists of two different parts or components namely, tangible or solid (also fixed or corporeal) and intangible or void (non-fixed). These are the two basic important entities of architecture and design; whereas the first group is characteristic of architectural form, the second is characteristic of architectural space. The first is perceived externally while the second is perceived internally (Antoniades, 1980).

The tangible components or parts cover horizontal, vertical planes as physical spatial boundaries; the intangible or non-fixed ones include light and shadow effects, smell and sound and also color and texture of space. The intangible components are more responsible to provide feelings in a space. Both these attributes, that is, the tangible and intangible space characteristics are provided either by the spatial boundaries or by the life and functions that take place within them (Hertzberger, 2000).

2.1.1 Tangible Components of Space

As mentioned earlier, vertical and horizontal planes and their physical appearances are the major tangible components, which define architectural space as well as identifiers of spatial boundaries. These boundaries become important not only because of protections reasons but also for psychological reasons. According to Kaika (2004) the establishment of boundaries between open and closed, inside and outside and private and public spaces generates various feelings in the user. The boundaries could expand or decrease the private, social and even natural boundaries of users.

According to Ching (1979), space could be fundamentally defined as a substance, which becomes the context for human actions and other objects, fills the distance

between them and expands considerably in a three-dimensional area. This description is not limited to the outside; it also includes the interior of architectural form. Similarly, Von Meiss (1990) opines that:

> "… architecture is the art of the hollow; it is defined both from the interior and from the exterior; walls have two sides. We penetrate it our bodies and not only with our minds …" (Meiss 1990, p. 133).

Therefore, the tangible components of architecture as mentioned before define space and the characteristic of inside and outside of the space. Several features could be recognized as the tangible components of architecture. According to Ching (1979), these components could be used to design and identify space, points, lines, and planes; they are all design elements, which are representations of the real architectural ones in the design process.

Furthermore, the tangible components have both the traits to be visual and haptic, so they are usually defined as forms and volumes. These are the major visual features, which are perceived by the users; "form can be defined as a basic element, which determines the basic character and features of the volume" (Ching 1979, p. 44). As a matter of fact, users recognize these volumes and forms in daily life as wall, roof, floor, column and window. For example, Miller (1997) identifies space's basic elements in architecture wherein base and overhead planes are established parallel to each other. Here, base planes suggest the floors whereas overhead planes form the ceilings in architectural spaces (Miller, 1997).

2.1.2 Intangible Components of Space

Intangible components of space are more complex concepts to discuss about. Norberg-Schulz (1980) acknowledges this fact when he asserts that:

> "our everyday life-world consists of concrete 'phenomena'. It consists of people, of animals, of flowers, trees and forests, of stone, earth, wood and water, of towns, streets and houses, doors, windows and furniture... But it also comprises more intangible phenomena such as feelings" (Norberg-Schulz 1980, p. 6).

As he mentions, 'feelings' are 'intangible phenomena' in our daily lives. Feelings could be interpreted as spiritual experience, in other words, as intangible, subjective phenomena. This particular experience, like all other human experiences that we know, inevitably takes place in space. However, occurrences of these experiences, by their very subjective nature, are hard to define. It is almost impossible to describe or label them in concrete terms. In the words of Pallasmaa (1996), expressing the essence of intangible feelings of space,

> "An impressive architectural experience sensitizes our whole physical and mental receptivity. It is difficult to grasp the structure of the feeling because of its vastness and diversity" (quoted in Nesbitt 1996, p. 453).

A nonphysical experience may be challenging to understand. It can also be that an intangible component of architecture is something that simply moves us by the affective influence in our senses in some manners to evoke our inner passions on a deeper level. These inner feelings are not just perceived by the users. Architects also understand and feel the intangible phenomenon of a space. According to Antoniades (1980), the creation of certain feelings in a space makes the space meaningful for architects. A successful dialectic between space's physical elements and human beings in space is a certain approach for architects in architectural design.

Architects and designers should understand the needs of the user in space to create physically and mentally comfortable areas for users according to users' activities,

cultures and certain expectations. Haring (1995) put this in different words; what is hidden here beside the activities, is the facts between the experiences and aspirations of the clients. It is a necessity for architecture to contribute to providing them to the clients (Haring 1995, in Wilson 1996). The understanding and perception of space through previous experiences is a challenging subject in architecture. For example, Hillier (1996) claims that spatial experiences are delivered throughout the subjective filter of perception and that the users' previous experiences become the main concerns for them as interpreted language and culture (Hillier 1996).

The human experiences in a space can be translated and understood through feelings and past cultural experiences. According to the previous experiences the user could have attachment to the space or perceive it as a meaningful phenomenon. These experiences could be collected from the first perception of a space going on through the cultural traditions and social activities that provide certain feeling about the activities and space. Rapoport (1970) also entertains this idea. He opines that to clarify and understand spatial symbolism that projects certain feelings, architects should be aware of the underlying culture of people or inhabitants of the spaces they design as these are essential to people and they are concerned about it (Rapoport, 1970).

That said, architects could also use their own experiences to define space in similar ways. According to Franck and Lepori (2000) we learn how to connect with space as inhabitants of space during our childhood. We could use the same contribution to inspire and design our surroundings (Franck and Lepori, 2000). This means that

childhood experiences and connections with space during that period of life could be useful to the practice of design for architects.

From the above discussions, a case can be made from psychological theories which state that the subconscious level is a collection of memories and experiences that serve as archetypes which release to the conscious level of the human mind and make the behaviors and characteristic of a person. For instance, Jacobi (1971) claims that even the archetypes at the conscious level have their own effects, which are beyond our conscious and rational mind (Jacobi, 1971). This seems to confirm the suggestion previously discussed that the intangible components of space could not be simply categorized, basically because of different subconscious level of experiences , which are different to every user.

2.2 Perception of Space

The theory of perception has not been spared different perspectives by different theorists in the diverse fields of psychology and, not least, in the field of environmental psychology. The arguments center around the process of perception but that is beyond the scope of this study. Therefore, the discussion here is an attempt to highlight some of the definitions and/or descriptions of visual perception in general. Generally speaking, perception can be said to be "that process by which a mental image, or percept, of an object or phenomenon is acquired. This is a process of segregation and unification by which environmental stimuli are organized into specific forms" (Weber 1995, p. 52). J. J. Gibson, one of the leading theorists in this area puts it even more succinctly in his attempt to explain visual perception of space:

> "Direct perception is the activity of getting information from the ambient array of light. I call this a process of information pickup that involves the

> exploratory activity of looking around, getting around, and looking at things. This is quite different from the supposed activity of getting information from the inputs of the optic nerves, whatever they may prove to be" (Gibson 1986, p. 147)

Hillier (1989) also adds previous experience and cultural perspective on to it. Physical perception could be defined as boundless space of visual information. The visual information is arranged as sensual impressions into patterns that embody the previous experiences and cultural identity (Hillier, 1989). Visual quality of perception is a significant tool to experience space. However, it is not completed if the person does not have an opportunity for using all of his/her bodily function and sense through spatial experience. According to Pallasmaa (2012):

> "The perception of sight as our most important sense is well grounded in physiological, perceptual and psychological facts. The problems arise from the isolation of the eye outside its natural interaction with other sensory modalities, and from the elimination and suppression of other senses, which increasingly reduce and restrict the experience of the world into the sphere of vision." (Pallasmaa 2012, p. 39).

Thus, spatial perception starts with the visual observation but it becomes complete by other sense perceptions in a space. The process of perception is the phenomenon that includes all of the human senses. These senses could be helpful in the process of perception through the bodily experience. According to Heidegger (1977) "I'm never here only, as this encapsulated body; rather, I'm there, that is I already pervade the space of the room and only thus can go through it" (Heidegger 1977, p. 257). Such an experience could not be only visual; to perceive a space, the presence and experience within the space have the priority in understanding the space. As Norberg-Schulz (2000) says:

> "To understand perception as a visual process there is not only satisfactory, indeed the term should be replaced entirely by presence understood primarily as a corporeal identification with environmental forms"(Norberg-Schulz 2000, p. 128).

Therefore, perceiving the space is completed through the senses as well as the experience of the elements and the pattern of space. However, all spaces together as spatial organization define each space and the usage of it in the process of perception. According to Turner (1996) the primary relation between the user and the space is not just narrowed to facing the space as an object to the individual observation (Turner, 1996).

Subsequently, the deeper level of perception of space should be discussed, which implies the conscious and subconscious levels of perception. According to Norberg-Schulz (2000) verbal language for people could be assumed as architectural language in the process of perception, which includes connections or relations between the architectural elements. These relations could be figurative as architectural language could be seen as the figurative form of the space or more precisely abstract order or unity of their gestalt (Norberg-Schulz, 2000).

Thus, it is also reasonable to look at the fundamental points that gestalt laws present. According to Lyons (2001) Gestalt is not an arrangement of elements, although it is a new feature in the process of relations, which are present together in particular combinations (Lyons, 2001). They are also design-based abstract categories, which define and explain how gestalt laws work. These categories; proximity, symmetry, similarity, common fate, continuation, isomorphism, closure, figure ground, focal point, simplicity, good form and unity (Schamber, 1986; Chang, 2002). In the field

of architecture, these laws are the basics for combining the context with the experience of the users from the spatial organization. According to these rules users could perceive and process what they recognize from a space. According to Norberg-Schulz (2000) architects should understand their way to manifest the figures of space (Norberg-Schulz, 2000).

2.3 Introduction to Diverse Qualities of Space

Hesselgren (1982) posits that the experience of space is generally attached to movement and time. Consequently, both of these are obliquely notable in the perception of architecture (Hesselgren, 1982). The perception of the quality of space is impossible without a real bodily experience. Experiencing something bodily means one has a perceptional parallax from it, which suggests that one perceives and understands through movement - as one changes one's position in space - and time. This is the unique capability of space which makes it complicated to understand with parallel meanings for different users. Therefore, space quality perception and experience of the space work hand in hand. These harmonies of perception of space are inevitable. As Pallasmaa (2012) puts it:

> "… our bodies and movements are in constant interaction with the environment; the world and the self inform and redefine each other constantly. The percent of the body and the image of the world turn into one single continuous existential experience; there is nobody separate from its domicile in space, and there is no space unrelated to the unconscious image of the perceiving self …" (Pallasmaa 2012, p. 40).

Important to the perception of space is the theory of 'proxemics' a term coined by Edward T. Hall (1966) in his book "The Hidden Dimension" in which he described people's behavior patterns in culturally bound personal spaces and how they tend to organize their spaces in their buildings or dwellings. In a very personal experience,

we have a personal space in which we define our actions and relate to others through the symbolic invisible bounded inside and outside of it (Hall, 1966). Moreover, this experience of personal space becomes a major contribution to how one perceives architectural space. The main progress in this spatial experience is to understand the space quality according to the other factors and dilemmas that always have their own effects on our experience as users in spatial boundaries. According to Johnson (1987) the spatial and experimental distinction of inside and outside is a great contribution to the understanding of the actions and spaces around.

However, the main experience of a space begins with its tangible elements and the main features of the space at this level become objects of experience. Lefebvre claims that space is an objective medium conceived by those who use it and within it space shows its true color (Lefebvre, 1991). Therefore, space derives its potential and its meaning from the memories, past experiences, and actual activities which take place in it at the present time through the bodily experience of space. This perception provides a meaningful sense that is known as the 'sense of space'. Kahn (1979) seems to give primacy to human activity in giving form and meaning to space in the spatio-perceptual experience with the tangible elements providing the necessary conditions to support that activity and make it happen (Kahn, 1979 in Lobell, 1983).

These discussions suggest that human activity is what plays the leading role in defining and giving form to space and its overall experience. The patterns of human actions assist to inspire architects in the creation of the form and space (Franck and Lepori, 2007). This is the space Norberg-Schulz (1971) conceptualizes as existential

space in which human activities, bodily experiences, and perceived thresholds become major factors in defining space for human habitation in architectural space.

2.4 Measurable Qualities of Space

Architecture of the dwelling spaces is seen as the integration of measurable and non-measurable aspects of space. The measurable, functional, and practical qualities of the dwelling spaces simply contain all of the aspects that can physically delineate, measure and quantify space. These aspects of the dwelling spaces are usually described in the industrial standards; that is, the result of building standards' demands on the practical functions of the dwelling space (Nylander, 2002).

As Pevsner (1972) states, the main causes of modern architectural evolution are function and construction. It was an artistic style felt right in the world of the mind not in the world of matters (Pevsner, 1972). So, Pevsner tries to explain the importance of the function and practical aspects of architecture as the beauties of artistic style perceived only by the mind. However, change of society and the people's lifestyles create new needs. One of the main architectural spaces that is affected by this is the house. Asplund (1998) claims this in other words in the beginning of the Modern Movement. A great mobility among people requires a greater need. This leads to a necessity for open spaces and freedom in the living spaces for people. As a consequence, achieving functional qualities of space became the foremost priority for the Modern Movement and this was partly due to the result of the economy on architecture. He further states that these qualities brought about an audacious but important innovation in human relations, new social rules and technological achievements and new conditions for living. This situation forced

professional ideas towards different directions whether we accept it or not (Asplund, 1998).

However, the dwelling spaces become familiar to the users as well as the users attached to these spaces. This process develops the new concepts of dwelling spaces lead to the concept of home that consider the dwelling spaces as a place for living, also the term house as a tangible bodywork of the home. The function of the house completes the householder; home becomes part of his/her identity and character; and habits, behaviors, likes and dislikes merge together in the dwelling spaces. The modifications of these aspects become the joy of life for humans. Adam (1987) in the biography of Eileen Gray (1987) puts it this way: man rediscovers his joy and feelings through what is built as home in architectural construction; the home not only completes him but also becomes the extended version of him (Gray, 1987 quoted in Adam, 1987).

Realizing the importance of dwelling spaces as home, requires that the organizing should not only be restricted to locating the walls and allocating the main functions, it is more essential for architects to deal with the making of a place called home. As Jung (1969) proclaims, “home always is the home”. This is the first place for thoughts and conscious dreams; it is the place full of purity and security! Home couldn’t be a box with four neutron walls; it is the place, which is experienced and which becomes a symbol of a person, a family, motherhood, a symbol of security (Jung 1969).

Residence in a certain house engages human beings into the network sense perception, memory, experiences, language, environment and the social relationships. These activities and spatial functions occur in the dwelling spaces. Places and personalities continuously constitute and complete each other. Combined experiences of life and living within the locations make most of the memories and thinking paths (Ingold, 2000). The main concept, which Ingold introduces, is that not only the experiences are shaped in the dwelling spaces but also the memories daydreams and thinking paths. It is a mutual relation between place, humans and time.

All these feelings and experiences begin with the occupation of the dwelling space. Before occupation, a place can only be said to have a potential for all of these attributes. Residential spaces without any occupation are anonymous and belonging to no one (Franck and Lepori, 2000). However, relationship patterns grow with human occupation and life styles become visible and enhanced through connections between inside and outside, private and public, conscious and unconscious. These functions are predicted and designed by architects.

The physical and non-physical components of space could be shaped according to the either pragmatic, physical, psychological and societal comfort for the user. They can be measured by using different methods, which are varied according to the techniques from mathematical to the experimental ones.

2.5 Non-Measurable Qualities of Space

Space could be perceived and even used differently because of the cultural background of the perceiver. The cultural concepts are the main materials that build our minds and analyze our perception to come up with certain meanings. Lowenthal (1976) suggests that all perceptions involve some degree of conceptual categorizing which may cause differences in perception of similar spaces by different subjects (Lowenthal, 1976). In this process, previous habits, effects and memories conduct the mind. All the outcomes of the living experience of space, which are perceived, are analyzed by these particular experiences and memories. In other words, cognitive or cultural spaces could be defined by different groups of factors. These factors could be categorized in training, previous experiences, adaptation, memory and cognitive categories of the group (Rapoport, 1970).

To provide the characteristics of space and make the space more meaningful for the users may be the most challenging issue for designers. The actual power of architecture is to design by starting with the idea of the meaning and character of the space (Franck and Lepori, 2000). The meanings and characters combined with the usage and experience of the space through the variety of activities in the context of culture describe and define the space for the user. All of these processes are mainly observed, realized and finally kept by the subconscious mind of the user. However they have to be understood and even experienced by the architect.

Moreover, the matter of the mind and subconscious level of understanding has more influence of common cultural background rather than cultural differences. As has been argued earlier, the perception of space develops through the experience itself.

This process is completed by movement and act in every experience of the space. This combination of acts and movements in the sequence of time makes-up the comprehensive perception of the user.

Hertzberg (2000) believes that feelings arise in space when the expectation of the perceiver is different from what is presented or offered by a particular space. It is a strong viewpoint for designers to consider during the process of design Space has essential influence on the user likewise the inspiration of meaning and it is the feeling from that effect which is transferred to the perceiver or user. It is the most important factor in users' attachment to space. This again underscores the importance of bodily experience in space. Pallasmaa (1996) captures the essence of this in the following lines:

> "As buildings lose their plasticity and their connection with the language and wisdom of the body, they become isolated in the cool and distant realm of vision. With the loss of tactility and measures and details crafted for the human body-and particularly in the hand-architectural structures become repulsively flat, sharp-edged, immaterial and unreal" (Pallasmaa 1996, p. 20).

The other aspect of the non-measurable qualities of space is the development of the role in place attachment (Nylander, 2007). Place is not only defined by location. Place is a special concept; the key factors that make place special is the combination of it with the human values and regulation besides of natural environment (Norberg-Schulz, 1975). Moreover, not only is place combined with the natural environment and human behaviors but it also has a centralized character for human experiences. The main quality of place is hidden in the ability of place in the regularity as well as focusing on aims in the human experiences and regular daily behaviors (Relph, 1976). Evidently sense of place gradually occurs through the long-term living

experience with spatial complexities rather than single space simplicities. Architectural space is borne out of the relationship between objects or boundaries and from plans which do not themselves have the character of an object, but which define the limits for the object (Meiss, 1990). Every space is defined by its boundaries. Spatial relations set the boundaries and limits and joins spaces together accordingly. Space, says Hillier (1996), is created in architectural design by defining the relationship between boundaries or objects. The former (boundaries) are found on the plan and the latter (objects) characteristically are not but still do have – in reality - their own limits and boundaries (Hillier, 1996).

2.6 Latent Function and Manifest Function

Firstly, before discussing the manifest and latent functions, an introduction of three illustrated meanings in the built environment by Amos Rapoport will be helpful. In his book, "*Meaning of the Built Environment: A Non-Verbal Communication Approach*," Rapoport (1982) categorized meanings in the human built environment into three: high-level, middle-level and low-level meanings. High-level meanings are related to worldviews and philosophical systems, etc.; middle-level meanings include identity, status, wealth, power, etc.; lower-level meanings are everyday and instrumental meanings; for instance, accessibility, movements, seating arrangements, etc. He termed both the middle-level and lower-level meaning categories as latent and manifest functions respectively (Rapoport, 1982). Dwelling spaces designed by architects are part of the built environment and therefore inclusive in these functional aspects categorized as a meaningful part of the built environment.

The functions and actions, which take place in the house, become a part of the bigger category as these have meanings, and memories for dwellers. Moreover, Coolen

(2004) specifies the levels, which are more in accord with this conceptual phenomenon that is the creative process of the home for the dwellers. According to him, "people's activities and dwellings are primarily linked by lower-level meanings, although middle-level meanings also tend to be important" (Coolen 2004, p. 3).

This statement simply means the latent and the manifest functions are embraced by people's activities in their environment or dwelling spaces. Moreover, the latent functions are rooted in the low-level meaning functions but they proceed with time to become the identity, status, power etc. Conversely, the latent functions, which are of a higher order of consciousness, do, in time, influence the lower-level routine simple functions. So, the non-functional qualities do not only start to interfere with functional issues but also become rooted in the spatial functions and spatial arrangements. Therefore, people's actions in space, which could be completely functional, might also have non-functional meanings. Rapoport (1982) states that:

> "people pursue goals and values and that their actions, ideas and preferences are functional for the achievement of these goals and values. The meaning of a dwelling is believed to lie in the functional relationships between the dwelling features on the one hand and the goals and values of people on the other hand. Meaning is thus the mechanism that links people and dwellings and provides much of the rational for the ways in which dwellings are used. Meaning here is not part of a function, but an important function of a dwelling" (Rapoport,1988, p. 318).

On the whole and in the simplest of terms, latent functions, as the name implies in architectural terms, are the less expressed and often hidden functions that built form confers upon its inhabitants or users; that is, the sphere of status, power, identity, class, etc. These qualities, in conjunction with definable and expressed manifest

functions, form part of the multi-dimensional character of space and should therefore be considered in the design of dwellings.

The manifest functions represent Rapoport's lower-level meanings of the built environment discussed in the section above. It defines everyday life and instrumental meanings; for instance, accessibility, movements, furniture arrangements, cooking and eating, etc. (Rapoport, 1982). These are the openly expressed functional attributes of dwelling spaces. In order words, a kitchen expresses cooking and a dining room gives a hint about eating activities. The spatial organization and arrangement for these functions have a deeper influence on the dwellers (Weber, 1995).

2.7 Sense of Space

The sense of space is one of the concepts, which have engaged philosophers and architects alike. David Morris (2004) asserts that the concept, 'sense of space,' is based on all social experiences besides of perceptual experience in general; without it we would not achieve any sense of a world outside us (Morris, 2004). Moreover, Hertzberger (2000) argues that space endures in what one perceives in front or above them and that these perceptions attract one as a user of space. Perception of space gives one freedom of view and a view of freedom. Perceived space is more than one can fill; space is challenging to get hold of. Thus, when someone perceives and understands a space he/she will have fulfilled the experience (Hertzberger, 2000).

The sense of space is a matter of perception and this concept extends far beyond the scope of architecture, as it is generally a human phenomenon. That is to say, a sense of space is a concept, which gives meanings to every space and not only architectural

space although the latter consolidates all these diverse 'senses of space' into its fold and discipline. For example, Holl (1993) holds a similar view when he states that:

> "… when the intellectual realm, the realm of ideas, is in balance with the experiential realm, the realm of phenomena, from is animated with meaning. In this balance, architecture has both intellectual and physical intensity with the potential to touch mind, eye and soul …" (Holl 1993, p. 26).

But how can perception become so deep at different levels? At the philosophical level, Morris (2004) explains, there would be no perception at all without body experiences, which spread out among the things in usual depth. The ordinary depths of the world besides the extra-ordinary depth of the body are in exchange (Morris, 2004). Moreover, several philosophers advance the concept that not only things are combined into the extra-ordinary depth of the body, but also the extra-ordinary depth of the body seeps externally into things; either way, there is no static threshold among ordinary and extra-ordinary depth. It is irresistible to draw a fixed threshold. However, in doing so, we are commanding stability on something essentially flowing (Dewey, 1929; Merleau-Ponty 1962, 1963; Hegel, 1969 and Bergson 1991, 1998.). The fluidity of space comes over several ideas in philosophy and architecture. This property of space is of huge importance to the understanding of space thresholds and boundaries. Behnisch (1998) must have built on this concept in suggesting that architects could not achieve a sense of space, partially providing singular planning approaches to functional spatial requirements in the process of design, without considering the three dimensional perception of spatial enclosures and thresholds (Behnisch 1998).

The unstable threshold of ordinary and extra-ordinary depth displays a living tautness between bodies and the world. Rilke (1978) proposes that an angel who looks at the world may define the threshold according to the terms of material or construction as a door-sill; however, for mortals (people) who live in this world the threshold is one more bite of happiness for two lovers who should pass an old door-sill (Rilke 1978). This poetic example is all about a bodily experience in a space, which could be defined in the process of design by architects who understand the potentials of the "sense of space."

Morris again adds to the importance of threshold as a non-fixed perceptual phenomenon. There are thresholds and region crossings that identify things and spaces; in these cases, things become the elements, which manifest space thresholds. Relatedly, conflicts do not arise over previously fixed boundaries (Morris, 2004). The need of region crossing is inevitable in architectural perception. It is what unleashes the potential of architectural space and becomes the main sense in space. Heidegger suggests that moving creatures can unify the perception in space through motion particularly movement in the dwelling place of mortals (Heidegger, 1977). Once the borders are demarcated, the perceptual process can across the boundaries and simultaneously unify between the perception of a particular space and the other related spaces. Merleau-Ponty continues this theme on the concept of crossing the boundaries with body experience:

> "There is a human body when, between the seeing and the seen, between touching and the touched, between one eye and the other, between hand and hand, a blending of some sort takes place when the spark is lit between sensing and sensible, lighting the fire that will not stop burning until some

> accident of the body will undo what no accident would have sufficed to do...” (Merleau-Ponty, 1964, p. 163).

Frank (1995) and Spiller (1998) take a rather different perspective on the sense of place; a perspective that is more concerned with the theoretical non-existing physical bodywork at the level of perception. This could be based on the virtual or even a different kind of architecture. The merit of their thesis lies in the fact that virtual reality performs for ultimate dematerialization of body and buildings. Virtual reality does not exist at physical levels of perception and the experiences are not conducted through tangible elements but as the ‘illusion’ of moving images within a space that we misleadingly think we are occupying. For architects, cyberspace holds the potential to finally transcend the physical world (Frank, 1995; Spiller, 1998).

Nonetheless, in the architectural space the role of bodily experience is crucial because perception begins where body and world come into contact. Deleuze describes this idea as considering how our sense of space emerges from bodily experience through the world from the crossing of body and the space of the world in which we live (Deleuze, 1988). Additionally, Morris adds to the bodily experience the advantage of desire; life is a glimpse of desire, which crosses body, and the world in every second constitutes a living alteration between them. The crossing of body and world characterizes the first thresholds, the origin of all other thresholds and the essence of our sense of depth and space (Morris, 2004). Humankinds as living creatures always experience this bodily experience and desires which affect the perception of architectural space or any other space to develop the sense of space.

The matter of depth which is the beginning of the process of sense of space is a three dimensional problem which should be discussed as a matter of spatial perception. According to Morris, abstracting the matter of depth of three-dimensional space with the problem of two dimensional planning is more like converting a problem concerning bodies with depth into a problem of geometry and signs (Morris, 2004). To perceive as a human kind, according to Sartre:

> "… register an organization without distance of the things in my universe around that privileged object," to perceive "a total space which is grouped around the other, and this space is made with my space …" (Sartre 1956, p. 341).

Sartre in previous quote tries to describe, how people understand spatial organizations. People understand the space within their own perception and develop this perception from a single space to the whole spatial organization.

Likewise, Al-Haytham describes humans as moving creatures who perceive visually and also endure understanding of the richness of their spatial surroundings and texture by their bodily movements (Al-Haytham, 1989). Irigaray (1993) approved the concept of free bodily experience and the role of this experience in the perception of space: mankind had to construct a space for themselves since their appearance on land in which they move and act freely. They can perform and move at will. None of this is imaginable without the air opening up generously to their movements (Irigaray, 1993). The importance of movement and bodily experience is the major essence of depth of space, which in turn defines the sense of space.

On the other hand, Shaun Gallagher and Anthony Marcel demonstrate the importance of phenomenology of perception. Similar to Merleau-Ponty, they point out that the perceptual act is extremely contextualized when performing as a host but has difficulty affecting the similar kind of action when it is contextualized in abstract terms. To increase scientific or philosophical understanding of the sense of self, perception or movement, it is required to analyze such phenomena as contextually embedded, rather than comprised of abstract elements (Gallagher and Marcel, 1999). John Russon gives a related argument about the perception in his findings of habit and perception. Similar points about perception are to be discovered in the research of developmental psychologists who concentrate on the social dimensions of development and its influence on perception (Russon, 1994 &1995).

Merleau-Ponty (1964), however, clarifies the other conception, which has great influence in the process of perception: the body schema. The spatial perception becomes complete within a bodily experience. Bodily experience is the main feature for users to scale the space and understand it (Merleau-Ponty, 1964). Morris (1999) and Dillon (1987) claim that, every external perception is instantly synonymous with a perception of the body as much as each perception of the body is explicit in the language of external perception. It is a meaningful harmony, which could be understood by dynamically taking it up. This arrangement would communicate itself to the sensible world. The theory of the body schema is, implicitly, a theory of perception (Morris, 1999; Dillon 1987). Stratton supports this concept by explaining the main process of it; that the harmony of realizing has a sense of reflection, which has one's bodily style of looking at the world (Stratton, 1896; Stratton, 1897). Stratton's explanations show that there is a unified world that seems extraordinarily

related to one's body.

What essentially has been discussed so far is that perception begins with the crossing of body and world. This crossing involves movement, which is anticipatory, and habitual thereby adapting and establishing a moving schema of perception. All of these add to existing accounts by underlining that the body schema is not a system, which is quantified in advance of movement although it is created towards a movement schema, which offers a sense of perception. This discovery is practically descriptive in character. In clarifying this concept, Morris (2004) states that philosophers take the habitual characteristic of the moving schema of perception extremely, and concentrate on it as a progressive and expressive phenomenon (Morris, 2004). However, perceptual structure is a process that establishes its own organizing pattern. Several theorists including Geraets (1971), Dillon (1971, 1987, 1988), Gary Madison (1981), Bernhard and Embree (1981) and Waldenfels (1981) have all expressed the problem of structure as the problem of locating meaning in being.

An architect in the process of design makes effort to define space by the structure of perception and forms that are of pure existence and complexions. These features externally connected data, or ideas. Waldenfels (1981) described them as products of an intellectual synthesis. They are partly the outcome of a process, which is categorized as organization of realistic, rational and conceptual actions in the linguistic fields (Waldenfels, 1981). Therefore, it is rational to posit that meaning and sense are attached to moving, and bodily experience of the environments. Consequently, the delinquent of structure in movement becomes the problem of

sense in movement. Due to the conceptual movement and perception developed compared to the meaning in life, which is discussed by Heidegger as being in the world as well as Heidegger's Existential conceived as origins in movement (Heidegger, 1962).

There is a distinctive method to drive space in smooth flowing artery traffic versus a circulation jam. There are delicate differences between traffic jams in space. These differences do not result from anything general but from interacting in a given network of moving circulation. The circulation jam is not a consequence of abstract laws, but rather, a variety of movements form a moving structure that is the ongoing outcome of movements, which are so structured. In technical terms, the circulation jam manifests a phase of transition in space flow, rather than sequences of causes, which can be isolated from the flow (Daganzo et al., 1999; Kerner, 1998; Kerner and Rehborn, 1997).

Bernstein, whose research on Kinesiology, the foundation for dynamic systems theory, thinks it is erroneous and absurd to offer an account of human movement by installing the body in experimental and conceptual frameworks, which is well matched to analysis of machines. He proposes that studying the living, moving and working body is more proper to understanding the patterns of movement of the body and bodily experiences (Bernstein, 1967; Morris, 2002).

Bodily movement abridges in complicated patterns; for instance, shock turns into a surprised look or sanctuary. More developed emotional examples which could be considered as a bodily expression are thoughts and memories that condense around a

word, as in Citizen Kane's "rosebud," or, possibly, Merleau-Ponty's "sense." Sartre's 'emotions as consciousness' is a method of fleeing conditions by converting them to bodily expressions, which lets us handle movement by turning it into a different expression (Sartre, 1993). Movements are behaviors through being, plunders a body, which limits movement even transform or translating these movements across a body. It should be mentioned that each movement in the space, understanding or even shock could makes all the others reactions or somehow connect them. So perhaps philosophers like Merleau-Ponty have already rationalized the nature of a movement that differentiates by folding itself into a diverse expression, which could be related to the concept of Barbaras' 'by desire' (Barbaras, 1999; Barbaras, 2000).

As a summary, the process of realization and sense in the space starts with the perception. The perception of space is possible, through bodily experience. The inevitable fact of bodily experience is the realizing the depth of space, which is understand by the user through the perception of space. The concept of depth defines the thresholds of space. These thresholds not only describe the boundaries but also show the potentials of the space to the users activities. All these steps create the emotions as well as desire for the user within the space. This realization by the user develops the 'sense of space' for the user. These facts lead the users to understand the space with other spaces around. In other words, space could be understood within the spatial organization of it as a harmony for the user. This development from the single visual perception to the sense the harmony in the space could be define the sense of space.

2.8 Experiences or Movement-Based Relation of Space or Spatial Integration

The inside of spatial organization, what is perchance unseen but felt, the realm of embodied experience, of fear and dreams, is too "subjective" to be trusted or valued. This is the difference between claiming an exterior and dominating position, with seeing as the single sense, and occupying an interior intimate space that cannot be known or understood with a single look.

The user experiences and movements through space achieve spatial perception. Within these experiences, the awareness of the relation between inside and the outside is achieved (or occurred) as Arnheim says:

> "The primary awareness of being inside is directly reflected in the house as a surrounding shelter and in the semi-spherical sky of the architectural vault or cupola. It is supplemented secondarily by the experience of being outside other things" (Arnheim 1996, P. 46).

Perhaps Hall describes this experience and intimacy as he puts it in more personal terms that, the space around us, known as "personal space", is more interpreted as inside; an inside that is always be with us bounded invisibly but symbolically (Hall, 1966).

The outer appearance of the spatial organization becomes the public face dealing with what we want to show outside as a public image and what we display is impersonal. As Lefevbre (1991) puts it from his point of view**,** the living space for the user is not just represented or conceived when compared with the abstract space of the professional designers like architects, urban designers and planners. Spatial

arrangement for the user in the daily life becomes more and more subjective rather than objective (Lefevbre, 1991).

However, bodily movements in spatial organizations are curious and smooth. So far, Turner (1996) describes the body as that, which has been called natural, lived, legible and social. The body at first glimpse is the solid gesture, illusory, concrete and Metaphorical. On the other hand, when a body is present within spatial boundaries it becomes a moving matter with greater interaction with the environment, as a singularity or multiplicity (Turner, 1996).

Architectural language tries to define for the users the display of colors, edges, surfaces, hardness, softness, light, fixity and texture, with the arrangement and disarrangement, support on top and beside each other making 'thing' as image to explore (Sardello, 1985). As Cranz (1998) argues, it is authentic as it is justified by their experience and does not decrease the body to a machine. The concept of the self-being a joined psychophysical individual respects both the body and mind together (Cranz, 1998). Moreover, Pallasmaa (1996) offers another perspective to this relation between the user and the building:

> "… a building is not an end in itself; it frames, articulates, gives significance, relates, separates and unites, facilitates and prohibits. Consequently, basic architectural experiences have a verb form rather than being nouns …" (Pallasmaa 1996, pp. 44 - 45).

This approach to design expresses and materializes the movement factor in an architecture spatial organization. This concept and its influence, develops a rich resource for creating spatial qualities for users. Holl (1993) describes this influence

as when users move through space with a twist and new opportunity presents itself in front of them; a spectacle of overlapping perspectives from the space charged with a series of light and shadows. A collection of smell, sound, and material, texture from hard stone and steel to the lights and silk texture returns to us, enriches our experiences and frame the spaces in our everyday lives (Holl, 1993).

Hillman (1982) explains the exhibition of the senses together to perceive a spatial arrangement. The presented things and the sounds, smells and shapes which are perceived by the users invoke the users' reactions; responding to what they perceive and the language of these perceptions; the tones and gestures of this collective features among which the user moves to complete the process of perception (Hillman, 1982).

Grote (1992) believes that the spatial settings could be interpreted as varied potentials of everyday life; what architect’s design in spatial organization is the variety of experiences in daily living. There are many things that take place in spatial organization and they are created by time-based activities in the spaces. These events persist and become the characteristics, roles, and positions of the inhabitants (Grote, 1992). Sebba (1991) adds that, users learn various methods of inhabiting space from childhood and they could continue those methods nevertheless with the design of their environments (Sebba, 1991).

On the other hand, Strauss (1996) adds to this concept the importance of body schema, which allows users place themselves in their environment. It is an arrangement of directions and boundaries organizing the spatial relations (Strauss,

1996). Dwelling spaces are anonymous without any occupation; they would evidently appear as belonging to no one. For Newman (1980), spatial settings of residential complexes encourage no feelings until they are occupied (Newman, 1980).

The main problem with unsuccessful spatial settings according to Reeves (1988) is that they result from two types of damages: one, lack of relationship of the spatial residential organization to the site as well as to the people living in these spatial settings. The other is the lost opportunity, which could not exist in the spatial organizations for potential improvement and the richness of experiences. The design should generate solutions that are suitable for the context and the residents. In this case residents become capable of performing potential activities (Reeves, 1988). Louis Kahn describes this concept thus:

> "… new belief comes with new institutions that need to be expressed as new spaces and new relationships. The architectural realizations sensitive to the institution's particular from would set a new precedent, a new beginning. I do not believe the beauty can be deliberately created; beauty evolves out of a will to be …" (Kahn, 1985 quoted in Werthman, 1986, p. 257).

Chapter 3

3 DIVERSE POTENTIALS OF SPACE ORGANIZATION

As it has been clearly stated in the preceding chapter, users perception have essential role to understand spatial organizations. This study is interested in the non-measurable qualities of spatial organization in dwelling spaces. While dwelling spaces have an enormous importance at the perceptual level and development of the sense of space for human beings. It is obvious that experiences and the variety of these experiences become essential in this process. Moreover dwelling spaces have great effect on human psychology and designing such places is an essential task for architects. However, the understanding of the intangible experiences of dwelling spaces is not the only factor, which matters in the description of these spaces. The social and economic situations of the householders are equally important factors in the understanding of the concept of the home. For instance, the projection of self-identity and status in society becomes effective to the perception of the house.

Rainwater (1966) is of the view that, when the social and economic circumstance of a family improves, they do not perceive their home as a shelter or defense against the environmental conditions. In this situation, home becomes an excitement factor, an interesting existence that makes a major attraction for the family members to gather together (Rainwater, 1966). When the perception changes it is a first part of interaction with the environments the surrounding spaces of the home now can be joyful and they are perceived as a connection to the indoor spaces.

The inner and outer sides of the house define each other and help any perceiver to have an understanding of the main schema of the house. The influence of the house on householders is understandable if it is seen as a shelter to protect from the outside. For Arnheim (1996), the first glimpse of awareness of interiority is when the perceiver understands space as shelter. This perception of shelter makes for a better understanding of the outside space and realization of the difference between the inside-outside dichotomies (Arnheim, 1996). It is the first step for the perceiver to attach to the house at the conscious level of mind. It is, according to Downing (1992), a biography of householders; the mental image of the householders offering a particular biography for the designer to control the future of the design project (Downing, 1992). Furthermore, the mental image is not only a grasp of the indoor private space; it is part of a greater image, which is achieved in the process of perception.

Johnson (1990) explains the spatial and experiential distinction between inside-outside and between the inside spaces and the outside is a great contribution to the structure of our understanding of the world and the activities that follow. According to him, not only the indoor spaces and the relation between them are important to the final spatial image constructed through the perception of space, but that the relations between the inside and outside spaces also have a great influence on the structure of user perception (Johnson, 1990).

The architect and theorist Hugo Haring (1997) believes strongly that the spatial order of a house should engage with the order of actions that the house is involved with, an

order that must be revealed, not forced (Haring, 1997 quoted in Blundell Jones, 1997).

So the spatial relation in buildings, especially in the house, has a great importance for the architects and researchers who try to enhance the perception of the user from spatial richness through the potentials of their actions and their living perception of their daily life. However, before dealing with the characteristic of different organizations, it would be useful to deal with the basic relations between two spaces.

3.1 Design Approaches to Space Organization

To understand different aspects of spatial organization in architectural design, Schön (1992) practices design-sketching protocols to achieve an illustration of reflection in action through spatial relations. He states that designers respectively 'see' then 'move' in the designed spaces. The main sequence in designing is structured by seeing-moving-seeing; an interchange of designing as sequential movements and discovering as seeing which he categorizes in three major parts in design as well as designers' thinking processes:

- Literal visual apprehension of marks on a page
- Appreciative judgments of quality
- Apprehension of spatial Gestalts

Literal visual apprehension of marks on a page is the first step of design process. In this step designers starts to observe whatever they achieved during their sketches.

The sketches in this step could or could not have a specific meaning, however the first step is to apprehend in the design process.

Appreciative judgment of quality is the second step of design process. This step is the start point for creative thinking for the user. In this step designer start to see meaning, shapes and pattern from his/her sketches. See through the marks with a creative mind within the sketches is the basic identification factor of this step. This step of process also labeled as 'intuition' for the designers.

Apprehension of spatial Gestalts is the third step according to Schön (1992) categorizing design process. In this step, judgmental mind of the designer tries to grasp different patterns and match them with previous and known pattern of the mind. The most basic feature that mind use to achieve this goal is to behave according to Gestalt laws.

These three major categories are the main contributors to the process of designing in terms of spatial relations (Schön, 1992; Schön & Wiggins, 1992). This indicates that architects mainly attempt to identify the quality of spatial relations during the design process according to their values and norms related to the spatial sequences and order. On the other hand, Shilling (1993) and Turner (1996) emphasize the importance of spatial relations in the process of perception by users, although spatial relations could be the wellspring of design. This results from the arrangement and furnishing of a space which responds and renders support to the requirements of inhabitants. In other words, there is a pleasure in seeing and feeling the spaces of 'yes'- or responsive spaces. When a person's body is recognized as profoundly open

to its spatial surroundings, there is a possibility to see how it (spatial surrounding) is frequently perceived as unfinished; always having a great potential to attract the perceiver (Shilling, 1993; Turner, 1996). Therefore, the spatial relations, which are the outcome of an architect's intervention, describe not only the coherence of the internal space qualities but also offer a potential for the users to enjoy and spend their time in such spaces. These potentials make a great contribution to the sense of space and place.

3.1.1 Models and Archetypes

Dominant cultural or social values have a great influence on spatial organizations and design practices. Even textual representations as design outcomes, which refer to spatial organization's quality in architecture, are affected by dominant cultural or social values. The same perspective is offered by Franklin (2006) as he opines that, where all of the social and cultural aspects become deposited in the built environment, it is easy to clarify them from the variety of causes: the method, spatial apportions or frame, the appearance of specific building types; the alternative forms within each type especially housing (Franklin, 2006).

Some patterns are inflexible in the user's mind, and on the actions and reactions that guarantee their life style and survival (Salingaros, 2011). The layout and design style could be affected by the contextual culture or social values. Every society, according to its own cultural values in architectural design, creates and develops archetypes of the dwelling space organization. As Hertzberger attests:

> "if we want to respond to the multiplicity in which society manifests itself we must liberate form from the shackles of coagulated meanings. We must continuously search for archetypal forms which, because are associated with

> multiple meanings, can not only absorb a program but can also generate one" (Hertzberger 2000, p. 149).

Also, Norberg-Schulz (2000) suggests that the relationship between moments and aspects makes possible further acts in the use of space. There are aspects that define further spatial usage in certain archetypes, which could be categorized as memory, identification and orientation. Also there are specific aspects of architecture, which provide the orientation for the user such as figure, form, and space (Norberg-Schulz, 2000). All these aspects together provide the structure, by various methods, of the language of architecture. Alexander (1979) adds to the concept of archetypes in these lines:

> "when you understand as much about the forces which surround us as a person with that a living pattern language does, and when you build according to these forces the kinds of buildings which you make, are simply more like ancient buildings than like modern ones" (Alexander 1979, p. 525).

The elements of architecture are entirely interdependent. However, they have the ability to create relationships between each other and define the space that contains them. Also, when spatial features take place, the relation between the architectural elements both creates the new conditions and, at the same time, makes a relationship with the environment to manifest the space (Heidegger, 1973). The architectural language corresponds to its elements relations according to their Gestalts. This, like verbal language, provides the agreement in architectural language, which is acceptable by classifications. Principal variables by qualification with similar Gestalts can organize themselves as tangible figures in various conditions (Norberg-Schultz, 2000).

Therefore, a built form or, more briefly, a form could be placed in relation to other forms by means of propositions. Similar relationships appear between spaces in architectural design as spatial organizations or simply as space. To acquire the aspects of the language of architecture, three necessary studies need to be undertaken namely, typology, morphology and topology to understand perception as a visual process to the understanding and identification with environmental forms (Norberg-Schultz, 2000).

3.1.2 Space Organization Schemas

Lobell (1983), referring to Jung (1979), argues that archetypes are hidden in the unconscious mind of humans and could not be known until they appear in the conscious level of mind. However, archetypes are shaped diverse concepts and forms of human arts in several fields like architecture, music, and literature. It is also essential to understand their relationships with social structures and worldview. Through these, the archetypes can become apparent indirectly in major aspects of human life (Lobell, 1983).

In this context, spatial settings could be interpreted in the mind of the user as a complex or a hierarchic interaction of typological spatial vocabularies. The spatial settings are understood as they are manifested in plan layouts. Gibson's (1950) view to this concept is that, it is unimaginable to see the perception process only as an independent experience. Perception, which is based on the life experiences, is not only corresponding to a simple collection of sensory information about environments but also related to the previous experiences of the user (Gibson, 1950). Also, Gestalt phenomenology proves that the interaction between individual units is strong not

only because it has a great influence on proximity relations but also because of the conjoined function of these units (Katz, 1947).

Typology of architecture is in relation to the mental foundations of the users and designer. The concept of type would establish the foundation of architecture (Rossi, 1966). The main differences between model and type provide a concept to the definition of typology and could be understood with basic rules inherent in the design process. If forms are only designed by functional needs, types become regular principles of function (Pevsner, 1972).

On the other hand, Kahn (1962) believes that architectural design means creation and interpretation according to the forms and basic rules as type in the circumstances of a design process. However, Venturi (1977) tries to replace Kahn's formal achievements according to the conventional forms that are more related to the traditional types. Every unit could be assembled with the relationship to its background. It is not only interpreted by way of basic forms but always restricted to the predictable spatial settings (Kaschnitz, 1944). This is what Norberg-Schulz (2000) narrates about his own practice with regards to his dealing with typology:

> "… in many treatments of typology I passed from the universal Gestalt (the act of being) to the specific figure (the being itself) and vice versa. This was necessary inasmuch as the Gestalten of comprehension are understood only in their concrete manifestations, which in turn become significant as unities within the terms of here and now which are to say the implementation of Gestalt. In a certain sense I presented the type as mediator between figure and Gestalt. The type is more concrete than the Gestalt but unlike the figure it contemplates also variations of possibility …" (Norberg-Schulz 2000, p. 156).

The fundamental possibility of types, which could be, described according to the Gestalt values, defines a genre to identify design. However, the types make the main principles more than basic forms or regulations. These rules determine the figure and all that want to be (Norberg-Schultz, 2000). The typologies become archetypes of the human mind and they could be emphasized and described with the Gestalt values.

According to Färgfabriken (2011) the term topology "derives from Greek." It is defined as:

> "…a compound of "place" and "study." Used in mathematics and cartography, it describes the spatial properties of objects and the relation of different points in a terrain; distances between these objects and sites play a lesser role" (Färgfabriken, 2011, p.9).

However, in architectural terminology, it is described as the location differences in the specific pattern of spatial organization (Norberg-Schulz, 2000). Spatial organization illustrates space as an expansion into three-dimensional perception and satisfaction for human life. In general, space making becomes an art with regards to function and usage. In this case, the main implication of space organization comes back into play (Heidegger, 1973). The overall arrangement of these spaces should be topological and geometrical. The composition of the architectural elements in any case is the basic feature to achieve spatial organization. These spaces together establish diverse relations from the interior to the exterior.

The matter of proportions entails the reflection of scale and symmetry. Scale always refers to human measurements and how the totality of the spatial setting becomes more effective and pleasant when they conform to Gestalt values. The users'

comprehensive background and their relations to the spatial setting make a great link to their lives and daily living experiences (Weyl, 1952).

Therefore, thresholds, which were discussed earlier, that separate these two fundamental zones (mental and physical) in spatial organization become essential in architectural design. These boundaries generally assume the characteristic of architectural elements, which make these separations. That is to say, that architecture lies within these separations. Spatial settings create more region as a topological totality, which is not linear or even complex with a specific hierarchy. Hierarchy mostly indicates the primary or secondary level in the spatial arrangement of architectural elements. Modern architecture brings a new concept of place instead of space as an isotropic system of coordinates. In this case environment becomes quadrature, which returns to the spatial organization in the usage time period (Norberg-Schulz, 2000).

Spatial organization does not only create zoning and restriction on boundaries which separate spaces but also maintains a whole as a spatial setting which have the ability to make the connection between spaces like between interior and exterior. The spatial setting also has a rhythm, which is provided by the topology of the spaces in the organized movements. This concept implies a comprehension point of observation of the space as qualitative existence, space and architecture. This characteristic of space complements the concept of space in the spatial settings, which makes correspondence between interior spaces possible and between the interior and the exterior spaces as well. All of these help to make-up a figural quality of space (Norberg-Schulz 2000).

The interior and exterior relationships structure the whole spatial settings into the hierarchic series. Although the inside space is a familiar place for the user which could be previewed by the richness of space, memories and different function in it (Compodonico, 1983). All spatial relationships lead to the main concepts of 'within' and 'without.' The concept of 'within' directs spatial relationship within boundaries of a space and maintains the openings and entries to and from that space while the concept of without concerns the boundaries and separation in spatial arrangements (Simbolordbog, 1993).

Function-based schema illustrates spatial positions based on more objective issues that are independent of the user-related subjective issues. The functions of space become the primary interest because this is part of the functional and practical quality of the spaces. Many scholars share the view that spatial interaction as one of the important factors, which have contributed to the process of spatial organization, is functional-based (see Ching, 1979; Meiss 1990; Antoniades, 1992).

The spatial organization of any building and a house in particular could be formed according to architectural programs, which usually require various kinds of spaces. According to Ching (1979) these requirements could be listed as:

- Have a particular function or particular forms
- Flexible and free to be controlled
- Singular and have unique functions
- Could be grouped into same function or repeated
- Access to outdoor or exterior exposure

- Segregated for privacy
- Have easy access

The method of arrangement related to any of these spaces could clarify their positions or symbolic functions apart from the practical ones, and play an important role in the spatial organization of buildings (Ching, 1979). Thus, the functional, symbolic and positional requirements of the spaces could be effective in the spatial organization of buildings.

3.1.3 Basic Space Relations and Articulations

Space relations and articulations, which express the interconnectivity and coherence between spaces, is the foremost enterprise of architecture and the design process in spatial formation. Ching (1979) draws attention to the importance of space relations within buildings. Buildings are usually composed of several spaces, which are related to each other by functions, proximities and circulation paths.

He further outlines the basic ways in which spaces could be related and arranged into a coherent pattern and how any two spaces can relate to each other in the following four different ways (see also Figure1):

- Space within a space
- Interlocking spaces
- Adjacent spaces
- Space linked by a common space

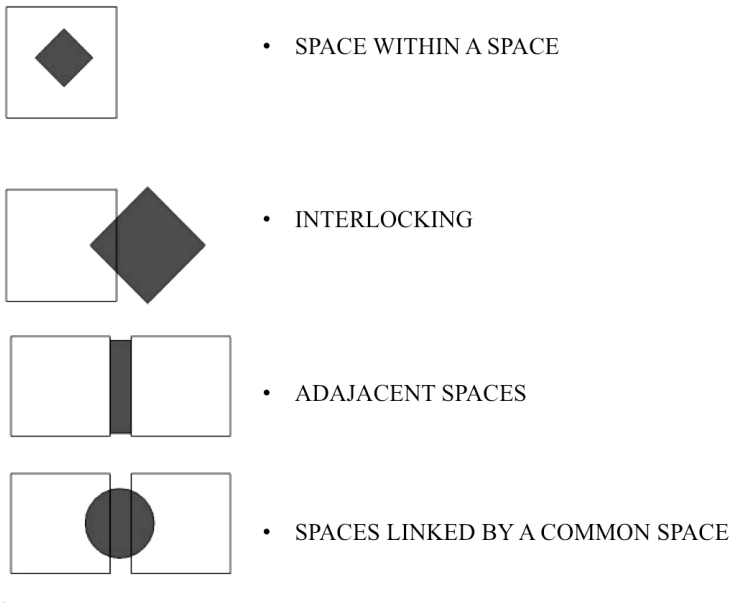

Figure 1. Four Categories of Basic Space Relations. Source: (Ching 1979, p. 195)

Space within a Space: space within a space is one of the form-giving characteristics of spatial relations. Ching explains it as a large space that contains within its volume a smaller space. This larger space has a role of envelope for the smaller space, which exists within it. The larger space in this kind of spatial relations has the role of three-dimensional field for the smaller space.

Interlocking Spaces: Ching describes the Interlocking spatial relation as two spaces, which have common parts shared in both spaces; these two spaces interlock with this common spatial zone.

Adjacent Spaces: Ching describes adjacent spaces as space relations that connect two spaces together beside each other. The level of visual and spatial continuity depends on the nature of the plan.

Spaces Linked by a Common Space: this is the fourth basic spatial relation which Ching introduces. This kind of spatial organization connects two separate distanced spaces together by adding another space in-between. The relation between these two spaces depends on the nature of the third space (Ching, 1979).

The basic space relations discussed above drive the process of design – being the main concern of architectural design process - from previously identified typologies (Schön, 1988). Architects, says Yi-Luen Do (2001), define boundaries and select specific features and relations to attract attention, and create their design on the spatial situation. Moreover, they achieve coherence that guides subsequent movements in the spatial formation through space relations (Do, 2001). To exemplify the importance of the unity and order that follows certain functional necessities or established sequences between spaces, Eisenman (1987) anagrammatizes the concept such that:

> "if you change the letters around from c-a-t to a-c-t, they are the same letters, but now it does not mean a four legged animal it means something else. So there is a fixed relationship between that particular fixed structure to an object" (Eisenman 1987, p.18).

3.1.3.1 Space Articulation: Juxtaposition or Interpenetration

In ordinary language usage, juxtaposition implies putting things side by side either to show a link or contrast between them; while interpenetration suggests the fusion of things one into another. These two devices, when used by designers, have profound effects on spatial relationships. As Meiss (1990) suggests, not only does the importance of order in architecture that arises from construction conclusively educates the eyes of the professionals and non-professionals but it also has effect on

their sense of beautifulness. This perception of regularity, once it has been reputable among users, in architectural design by transcending becomes simply construction requirements. However, the architectural order procures its own autonomy.

Repetition, alignment and juxtaposition of identical features contribute to the similar methods of construction intrude order on designed buildings and the cities (Meiss, 1990). Types of spatial organization are characterized by elements that define architectural spaces and their openings (Meiss, 1990). Architectural design contains space relation with different autonomies more or less. However, Meiss simply picks two kinds of spatial relations and emphasizes the concept of these two basic types: Juxtaposition and interpenetration.

Juxtaposition of spaces is more concerned with the privacy of spaces without any direct interaction with other spaces. These types of arrangements create order for all spaces to be beside each other where the only interactions between them are through the doors or windows (between them). In this type, the corners and boundaries of the spaces come into contact – they share common boundaries. Maintaining privacy between juxtaposed spaces is pleasant for many architects' clients especially in housing developments (Meiss, 1990; Antoniades, 1992). This does not mean that physical separation always lead to privacy or lack of interaction, especially where aural privacy is concerned; but that is another argument!

However, the sense of privacy in the juxtaposed orders becomes identically advantageous for the privacy that is needed in the spatial arrangements of the house. According to Howard (1993) people need to have time and space for themselves for

their emotional development and progress. This enables them to function effectively and to feel safe in their relationships to the outside world (Howard, 1993).

On the other hand, the interpenetration between two spaces creates continuity from one space to another. These continuities emerge the sooner the main elements of spatial definition are in place giving the impression or the signs of gathering to other connected spaces with an unlimited arrangement of interaction.

According to Meiss (1990), the spatial elements make a boundless contribution to interacting spaces gathering and defining them as a spatial organization (Meiss, 1990). The perception of these two organizations is different from the user side. The interaction with the other spaces so unreservedly makes a sense of freedom and attracts the movement of users in space through which the ability to imagine, spatiality is built and continuously re-built.

3.1.3.2 Geometric Schema of Space Organization

Moreover, Ching (1979) asserts that every spatial organization introduces a formal characteristic, which could be discussed through that formal appearance. The spatial relations and contextual response make a great range of examples of spatial organizations. All of these examples could be discussed in four major questions:

- What kinds of spaces are occupied and how are these spaces defined?
- What kinds of relations are established among these spaces and the exterior spaces?
- How does the entrance and circulation have an effect on the spatial organization?

- How is the exterior form of spatial organization responding to its context?

These questions are the basics of categorized spatial organization (Ching, 1979). According to the information above, Ching (1979) introduces five categories of geometric schemas of spatial organization as in Figure 2 below:

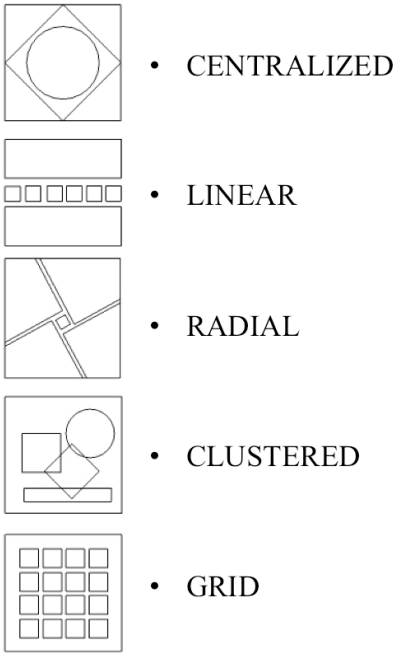

Figure 2. Five Categories of Geometric Schemas of Spatial Organization. Source: (Ching 1979, p. 205)

1- Centralized (A center dominates the space and all the other spaces become secondary)

2- Linear (A line of repetitive spaces in sequence)

3- Radial (A central space with the extension of linear organization in radial manner)

4- Clustered (Spaces gathered by proximity or sharing common spaces)

5- Grid (Spatial organization according to the three dimensions or structural grid)

These schemas are geometric orders (Ching, 1979). They help architects to imagine and visualize interior order clearly but they can hardly suggest any particular space quality, which may attract user sense of space and their place attachment. As it has been discussed earlier even if an architect creates space with perceptual qualities, they may not necessarily be able to provide the potentials, which may support the place's characteristics. This partially depends on the length of space relations and partially on the opportunities that spatial qualities offer to the perceiver or user.

3.2 Daily Life Qualities in Dwelling Space

Architectural elements are recognized as independent features, which do not only relate to each other but also define space (Heidegger, 1973; Norberg-Schulz, 2000). These features are the main tangible elements with which to define space as well as provide the intangible properties of space. One of the most crucial categories of spaces discussed in the process of design in architecture is the dwelling space. These spaces are interpreted as a reflection of the user, one of the exclusive qualities of the dwelling spaces. Architect hopes and dreams, beliefs and fears of the user needs are all reflected by these spaces and make the main structure of the spatial characteristics. Cooper (1974) believes that the homes of people are reflections of their imagination about themselves. The affection of the space on user behavior and lifestyle makes the dwelling space one of the most considerable spaces, which have the ability to shape human characteristics. It is the mutual connection between the dwelling space and the unconscious of human beings. The main question is how dwelling spaces are having such a great effect on the users? This could be explained by the everyday experience of the same social beings at home. As Bachelard

explains, home and non-home could be the main categories for the geographic partition of the world similar to the mind. That is, the mind divided into main parts: self and non-self (Bachelard, 1969). The main similarities between knowing ourselves and knowing our homes make mutual connections and understandings.

Moreover, Nylander (2007) add to this topic that dwelling spaces are influenced by cultural, social and family structure background of the users. There are several examples that show the spatial organization of dwelling spaces changed by the social and cultural factors. For instance, the French middle class family apartments divided into a two major part such as: service part at the rear and a leisure part. Nylander (2007) put it:

> "This layout also provided for parallel and independent circulation axes along each of the façades and through the center. These axes differ in many ways in terms of social status, room size, level of daylight, and degree of privacy. The arrangement of rooms in rows of contiguous spaces gave these apartments a high degree of axial directionality, particularly in the formal rooms along the street. The pattern of circulation meant that one walked through one room to get to another rather than along a neutral corridor" (Nylander, 2007. p: 19)

However, this arrangement becomes completely different than 1920 middle class homes in England. Nylander (2007) describe this spatial organization, the great multipurpose room become the heart of the apartment. All the other parts of the plan gathered around this multipurpose room. This room is almost invisible to the neighbors. This space makes a possibility for the family to gather together before the fireplace. Dining room and a living room are located on either sides of the great room. These spaces axially interconnected and aligned through general openings.

Furthermore, the potential which dwelling spaces offer are the incorporation of life. The householders develop their life skills and experience it in these spaces. So not

only do they become part of their character as to who they are but also they become a part of potential futures. The essence of time in the dwelling spaces makes a complete combination of life, skills and body. One's body understands and attaches to the experiences, which only could be done in the dwelling spaces. It is part of embracing life experiences through time. In the words of Lang (1985),

> "… inhabiting is an act of incorporation; it is a situation of active, essential acquisition. Incorporation is the initiative of the active body, embracing and assimilating a certain sphere of foreign reality to its own body …" (Lang 1985; p. 202).

Domestic users live in these spaces. These spaces do not only represent the cultural, psychological or lifestyle of the users but could also be expressions of the life and the daily experiences of users which go on in these spaces. The fact is that with all the signs and interpretation of the house, it is an undeniable fact that domestic spaces are the shelters that provide solace for the householders. These parameters had their own effect on the architectural movements especially in the modern era. The importance of the daily experiences and the depth of these experiences make these spaces demanding to design.

Every house has two main categories of spaces: the enclosed space of the inside (indoor) and the open space of the outdoor. These two spaces are completely different from each other. However, these spaces in dwellings permit the users to reflect and have imaginations about themselves. For Cooper (1974), the inside spaces are private; on the other hand, there are outdoor spaces which are completely public and become semi public in their main connections to the house. The indoor spaces reflect the inner self, who is only accessible by trusted ones and the public spaces is

our gesture (persona or mask) for the public (Cooper, 1974). Furthermore, inner spaces express the relationship and the affections of the users on a daily basis while the outdoor is the social view of the home. The social view is our reflection of our self-image to the others. It is the basic psychology of humans to present themselves better.

On the inner level of satisfaction of the home, Rappaport (1969) believes the success of humans is more likely to be satisfied by the healthy function of the inner resources rather than by the outer physical resources (Rappaport, 1969). It could be interpreted that the inner satisfaction of the home becomes the user's personal satisfaction, which may come from or lead to his/her success in life's other challenges.

Moreover, Casey claims that human experiences are place–based. In other word, to experience something you need to be in a particular space. "We are never without emplaced experiences. We are not only in places but of them" (Casey 1996, p.19). Every place or environment is a particular experience for mankind however; house as a certain private area for human beings is the most likely answer to the regular space for private experiences; that is, the deepest experiences we share with other trusted ones or they just become part of our private lives.

Hepworth (1999) believes that within the home there is a social organization, which define the private life inside. These private lives happens in the daily bases in the private spaces such as bedrooms, moreover a specific social interaction where possible in these spaces. However there is another part of the home, which contained the external structure both of these aspects of the home gave it its individual

character. The outer space encouraged an increasing fascination for public and social relation and the indoor space, which attract the householders for private social life (Hepworth, 1999). The architecture of the home is a combination of the two major categories of inside and outside. All the aspects of life defined and functioned by these two categories. The public life insures the relationship with the society and the private spaces provide the cover for private life. The individuals could have a relax life on both sides and this main achievement provides by the dwelling spaces. All these simple spaces, which planed and constructed with the walls and construction materials have tangible and intangible influence on the people's lives, which could be able to drive their lives.

The cultural effects on the interpretation of the spaces of the house can be very deep and can have strong affects on the details of the space or on the everyday functioning or operations of the users. There is a strong effect on the perceivers of the house to understand how comfortable the spaces are not only at the psychological level but also at the cultural and social levels. Social class are also another distinguishing characteristic of dwelling spaces. There are usually major differences in various communities between middle class houses and lower class dwelling houses (Rainwater, 1966).

A rather different approach to dwelling spaces is introduced by Halttunen (1982). He believes that the furniture has an essential role in the dwelling spaces and it is a great contribution to the householder to ease social intercourse. It helps to present the house to look its best. The arrangement of furniture also makes a great contribution to encouraging circulation. Similarly, the hostess who arranges the rooms has this

delight to brighten and enliven the spaces. In short, replacing the furniture and the details in the house brings almost a fairy-like scene (Halttunen, 1982). Moreover the host could select and display decorative elements to exaggerate his/her achievements such as medallions, handsome books, engravings and photographs at strategic and vital places. This can also be done with any works of art, which they might own. In this case the main stage should be ready for a proper social intercourse. The decorative pieces in the house do not only give the opportunity to the host to present themselves at the social level but also a necessity in space organization of the house or simply a luxurious show. The dwelling spaces with the thoughtful design have the potential to be more pleasant and vital to the perceptual or other experiences. Little wonder then that Clarke (2001) suggests that modern household can be defined as a set of establishments for many needs and causes in the life, from economic management and social relations to holding historical positions relative to the modern class (Clarke, 2001).

In summary, houses could define all the aspects of life that have been discussed. The essential function of houses is not only the presence of the social and individual private life but also to enhance the life capabilities of the users. Modern life is complex and the complexities sometimes create a stressful environment in people's daily lives. Therefore, as a necessary human need, a shelter should not only act as a physical tangible object but also as an intangible asylum of mind and thoughts. The greatness of home, which provides the sense of place within the dwelling spaces, is to provide such space to relax the householder.

3.3 Potentials of the Schema of Space Organization

Potentials of the schema of the space organization simply suggest the spatial settings, which propose more potential activities for the users. These activities engage with the furniture, equipment, and spatial arrangements, which should be considered in the process of design. Frank and Lepori (2000) suggest that furniture, with any imaginable number of pieces and possible spatial settings, is essential to supporting the future possible use of a space (Frank & Lepori 2000). Moreover, Bernstein, the researcher of Kinesiology whose works and viewpoints have become foundational for dynamic systems theory, thinks human movement and actions through bodily experiences in conceptual frameworks are well matched to the analysis of spatial perception. So, he recommends that considering the living, the moving and the working body is essential to comprehending the patterns of movement of the body and potential bodily experiences (Bernstein, 1967; Morris, 2002).

Furthermore, these potential actions depend on the open-endedness of the environment. The quantities of freedom and limitations of the designed spatial settings contribute to this process. This point of view, which includes limitations and degrees of freedom of spatial organization and the innovation, is credited to Nikolai Bernstein (1967), who suggests that conceiving the human body movements on a machine model betrays the truth of the living body. Bernstein also argues that the machine model simulations critically misconceive control of movement (Bernstein, 1967; Thelen and Smith, 1994). More generally, on the matter of cognitive or cultural spaces, the machine simulations already failed through space defined by different scholars. The solid analysis of human movements should consider the

affection by training, adaptation, previous experience, memory, as well as cognitive categories of the group.

Architectural designs influence behavior and are also significantly influenced by any evaluation of spatial quality. Perceived space could be considered as a total, cognitive construct, based on psychological criteria, which are contained in subjective space. Many examples exist that suggests how objectively similar distances are perceived inversely through the conditional factor on what degree of control over movement. The other issue, which should be considered, is that perception also depends on location or quality (Frank & Lepori, 2000).

Christopher Alexander (1979) presents architectural spatial design of buildings, which is proven by a system, which contain proportions, actions, and relations. This attempt of Alexander identifies the spatial organization or pattern of space which represent living factors in the spatial settings for human livings. Similarly, Ching (1979) has classified the methods of space organizations; his work is a great contribution to the geometric categories of space organization and its principles remain fundamental in architecture spatial organization.

3.3.1 Non-Measuring Thresholds or Connections Between the Spaces in Dwelling Spaces

The non-measurable qualities in dwelling spaces are the main issues that Ola Nylander is engaged with in his works. Nylander's main critique is that, there are many architects who have a blurred concept about residential architecture without functional and dimensional qualities; however, one of the important parts of the home is the meaning and the concept of living in residential spaces (Nylander, 2002).

Moreover, for Norberg-Schulz (1978), architecture of residential spaces helps people to live the full sense of the meaning to “dwell”.

Architecture makes a living in spatial settings more than the fulfillment of the functional needs and practical desires (Norberg-Schulz, 1978). In the same sense, the concept of the house to Rybczynski (1988) is that, a house makes form relate to residents’ feelings and assembles them - the interface of the house idea. To dwell in a particular space means to be with the family, have intimate moments in this spatial setting with the sense of home that it embodies (Rybczynski, 1988).

Ellen Key (1899) adds another perspective to the idea of the house in her beautiful narrative that, there are delightful rooms with enjoyment and happiness in the air. There is an atmosphere that influences the heart, a sense of mystery amongst the everyday living, a kind of trust almost with the simple things that enlivens them and presents reality a fresh dimension (Key, 1899). Moreover, Bachelard suggests that the house is a great factor in everybody’s life and play an essential role in the lifetime of any individual. He adds, the non-measurable attributes are impossible to achieve in verbal language; however, they endure in the memory of everyone. People could reach the depth of their meaning through artistic expressions such as poetry (Bachelard, 1969).

Although, as stated earlier on, Nylander (2002) believes there are two types of qualities - the measurable and non- measurable - in dwelling spaces, he, however, places emphasis on the non-measurable qualities as the main purpose of perceptual concern in dwelling spaces; “the non-measurable attributes of residential architecture

are the qualitative, aesthetic and symbolic aspects that are important for our perception of the home" (Nylander 2002, p. 11).

He is not alone in this respect; the concept of perception of non-measurable qualities in dwelling spaces has been dealt with by many researchers in this area such as Henri Lefebvre. He suggests that perception is the starting point of the process which everybody incorporates in his/her dwelling spaces; a familiarity with the material and spatial relations through the spatial relation with each other and with the exterior part of the house (Lefebvre, 1990).

Furthermore, Nylander provides seven main factors through which these non-measureable qualities could be achieved and which could bring the qualities of long term living experience in the dwelling; these are:

- Materials and detailing
- Axiality
- Enclosure
- Movements
- Spatial figure
- Daylight
- Organization of spaces

He believes that through these seven factors he could propose a systematic design for dwelling spaces, which could develop the sense of non-measurable qualities in dwelling spatial settings (Nylander, 2002).

Material and detailing is the first factor that Ola Nylander (2002) mentioned in his book "The Home As Architecture" for architects to achieved non-measurable qualities in dwelling spaces. He describes the material and detailing as key elements in perception of home. Lefebvre (1991), develop the concept of appropriation that is recognized as cornerstone of the detailing and material perception. According to the concept of appropriation people tries to incorporates their dwelling spaces into their lives. Nylander also claims that familiarity with the house materials influence the relationship of the householder with her/his home.

Axiality is one of the key factors to provide non-measurable qualities in the house. Directional axes express a strong feeling of presents in house. Visual perception of axis creates anticipation for users, which they could confirm that by moving along the axial direction. Also, Axiality in the house creates the spatial circulation as well as contribution to user perception of his/her home by establishing a direct physical relationship to our perception of the architecture of the home. However, it is emphasize the important aspect of home visually.

Enclosure: According to Nylander (2002), Enclosure and openness have essential role in the perception of the user from its home. The feeling of security and privacy is providing by enclosure spaces in the house. At this point, the feeling of security and privacy become premier in house that users define the boundaries of outside with it, which is the complete contrast with boundless exterior space.

Movement, variety of possible movements and circulations in the house increase the richness of experiences that user have at home. Norberg-Schulz (2000) claims that

movement provides physical and corporeal relation for the users within the space. These relations help users to understand the information's from the space. Also Nylander (2002) declare that users subconsciously slow down to perceive the information to orient themselves in the dwelling spaces.

Spatial Figure refers to the shape and size of the space in plan and section. This concept brought up by Le Corbusier (1948), that spatial figure organized architects impression to avoid the 'Design Chaos'. This contributes to the designers to systematize their spatial design to generate form in suitable proportion.

Daylight, the importance of daylight in spatial perception is fundamental. Rasmussen (1957), believes that qualities of dwelling spaces could be provide as well as examined by the daylight within the architectural space.

Organization of Space, according to Ola Nylander (2002), spatial organization provide the opportunity for residents to stake out territory within public space is the most important aspect of it. Also, within the spatial organization of space not only the functional aspect of space has been serving but also it make a great contribution to perception of the space as a part of a whole spatial organization in the house.

3.3.2 Clarifying the Non-Measurable Potentials of the Schemas of Space Organization

As it is mentioned before, this study aimed to deal with basically two questions: What forms do the non-measurable architectural attributes of the home take in general? And what spatial variables and relationships influence our perception of the non-measurable attributes of residential architecture?

In relation to the former, the thesis tried to go mainly through theoretical research and the latter seems to need to be exemplified by the spatial qualities of the selected examples.

The literature review dealt with the sense of space or place and the 'sense of reality' as the main concepts. It has been shown that the sense of space is not only an architectural concept but that it is also a philosophical concept discussed by David Morris (2004) mainly following in the footsteps of Merleau-Ponty (1964). Additionally the concept of sense of reality has been discussed based on Nylander (2007) works on the non-measurable qualities in dwelling spaces.

Of foremost significance in this study is the identification of the potential qualities in the dwelling space organization, the principle of organization. Therefore, this study attempts to identify the process of perception and understanding of space and place concepts as well as spatial organization qualities which brings together several topics like perception, memories, previous experiences and potential of space for more actions and reactions it.

3.3.3 Sample Study

In this section the integrated key factors are applied to three different samples. The samples are selected from Richard Weston's (2002) book on the houses of twentieth century and Colomina's (1996) book on the dwelling spaces. The 20th century houses are considered as innovation achievements in dwelling spatial organization design. Weston (2002) believes the 20th century house to be the most appropriate and responsive example that designers tested the ideas and expressed architectural positions in design and built form especially in the Modern era. This era become significant in this study since some basic concepts based on the new understanding

of the spatial qualities and definitions, which are introduced by the pioneers of the movement in their discourse as well as practice such as 'Raumplan' 'promenade space', free/open, plan concepts.

Therefore, this study chose its samples from this significant era in the dwelling built forms. The following are the three choices from Weston's study (2002) on Modern house on which this study is based:

- Villa Savoy, Poissy, France, 1928-31, by Le Corbusier
- Schroder House, Utrecht, Netherland, 1924, by Gerrit Rietveld
- Muller House, Prague, Czech Republic, 1930, by Adolf Loos

The process of testing all of the key factors against the samples chosen includes plan analyses and interpretation from the current documents of the samples. Both of these methods are based on the studies of Colomina (1996), Ola Nylander (2002) and David Morris (2004). These samples are ordered from the flexible spatial organization (Villa Savoy) to the semi-structure spatial organization (Schroder House) and the well-structured spatial organizations (Muller house).

Villa Savoy - Le Corbusier

Villa Savoy (Figure 3a) is located on the Poissy, France. This example is used here to clarify the essential role of key factors of the non-measurable qualities within the space. Villa Savoy is one of the finest examples of the open plan. According to Weston (2002) the proportions of the façade in this and the figurative design of the façade in Villa Savoy is one of its kind. The complete calculated ratios and

proportion make a complete phenomenon in this design. However, the boundaries and the **spatial figure** of the plan are not vividly calculated. The spatial figure of the villa is completely influenced by the concept of 'Promenade'. The arrangement of interior spatial organization makes the spatial figure of every space unclear. On the other hand fluidity of the space is create within this arrangement.

Figure 3a. Main perspective of Villa Savoy by Le Corbusier.
Source: http://chamranart.persiangig.com

Material and detailing in the Villa Savoy is influenced by the Modern era achievements. The row windows and concert walls and columns are the signs of these achievements (figure 3g). The furniture is unfixed and the arrangements of the furniture change the spatial organization in the public spaces in the villa. This unfixed furniture enhances the flexibility of the spatial organization.

The main ramp in the house makes a great appearance for the **axiality** from the spatial arrangement. It is strongly located in the middle of all floors (Figure 3d, 3e, 3f). Within the axiality in the plan Le Corbusier tried to emphasize the spatial

arrangement as well as relate all of the floors together. The parallax imagery of the house begin within the ramp. According to Colomina (1996) the spatial characteristic of Villa Savoy achieved several frames of the space. Through these frames the visual perception of the house become possible.

Figure 3b. View of Spiral Stair of Villa Savoy by Le Corbusier.
Source: http://chamranart.persiangig.com

Villa Savoy is one of the major revolutionary ideas in the **spatial organization** of the house. According to Davies (2006) the work of Le Corbusier should be considered as an artwork for living. Spatial organization of Villa Savoy is achieved by the concept of the 'Promenade' geometrical forms, which was a new achievement for dwelling spaces in that time period.

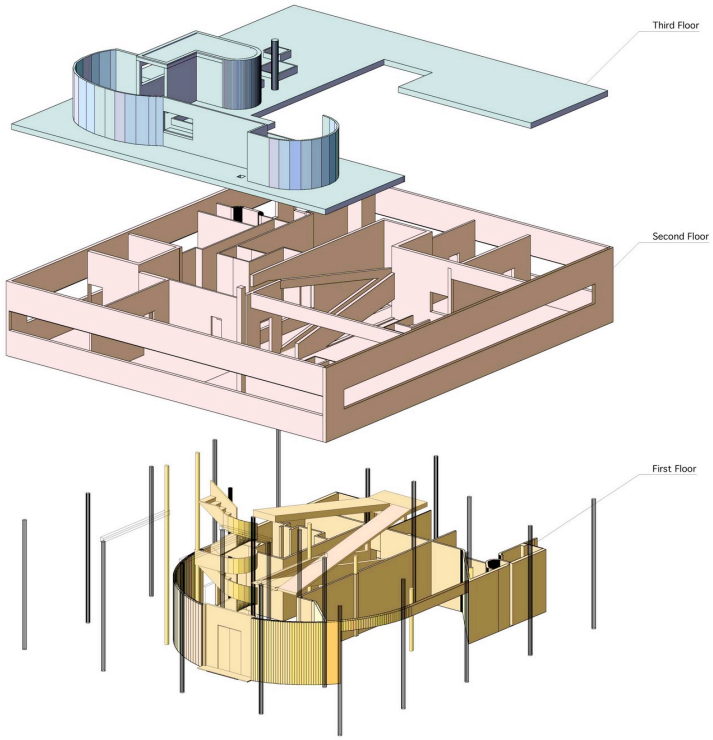

Figure 3c. Projected Floor Plans of Villa Savoy by Le Corbusier.
Source: http://1.bp.blogspot.com

The living arrangement of the users in Villa Savoy is provided within the Promenade (Figure 3c). The spatial organization of Villa Savoy is shown level by level. The connection between all levels is provided by the well-designed staircase as well as ramp by Le Corbusier (Figure 3b). The details to define spaces in this spatial organization are explained by Weston (2002):

> "The column grid alternates between wide and narrow bays, and the spaces similarity layered in contrasting zones from front to back. Certainly a hallmark of classicism is asserted and then denied: the ribbons windows forced the eye to the edges, and indicate are scattered around the premier of the plan" (Weston 2002, p. 44).

The spatial organization in Villa Savoy (Figure 3c) is a work of art as Davies (2006) puts it; it is a purist style of life. Such a spatial organization has a great influence on the user. Such complexity within the purity of design makes a non-measurable quality for this house. Villa Savoy could be considered as an example to demonstrate the role of spatial organization to provide the sense of space and place for the user.

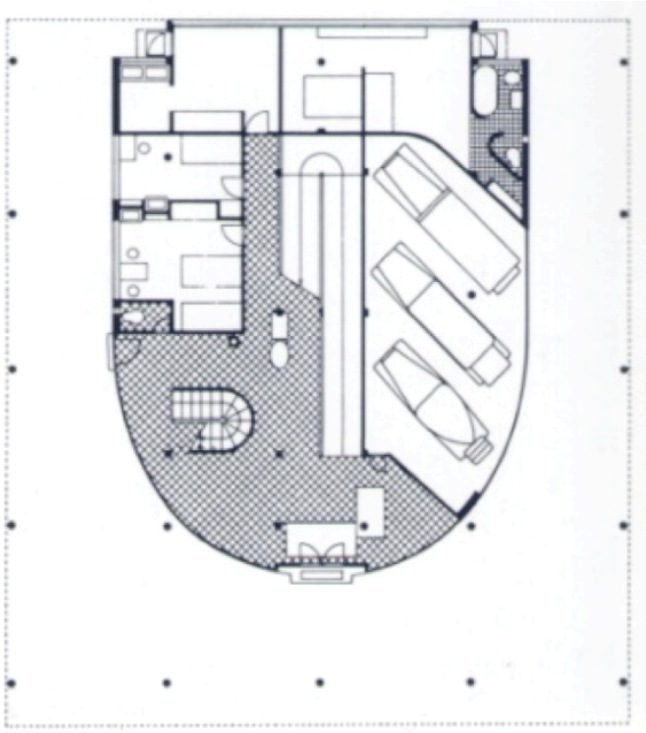

Figure 3d. Projected Ground Floor Plans of Villa Savoy by Le Corbusier.
Source: http://1.bp.blogspot.com

However, the **enclosure** in the Villa savoy has very strong influence on the characteristic of the villa. Villa savoy as a building is a complete enclosure to the environment. Visually it is connected to their environment but there is no integration between the built villa and the environment, even the entrance is utterly distinguished from the path (Figure 3a). Although, the interior spaces are integrated together and the enclosure concept would not be amplified. As Colomina (1996) put

it, the overlapping frame collection of the Villa Savoy is provided and constructed by walls from the environment.

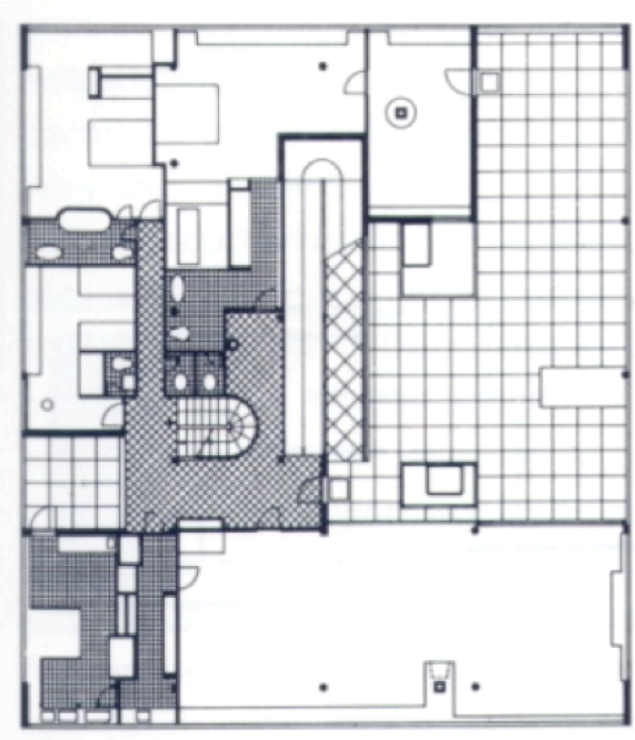

Figure 3e. Projected First Floor Plans of Villa Savoy by Le Corbusier.
Source: http://1.bp.blogspot.com

So, Villa savoy does not have a static characteristic, to perceive all of the building the user should move to collect several frames. **Movement** becomes an essential factor to perceive the building. The main relational feature for movement in Villa savoy is the ramp. However, the fluid spatial arrangement of the villa provides movement freely and for perception issues necessarily all over the place.

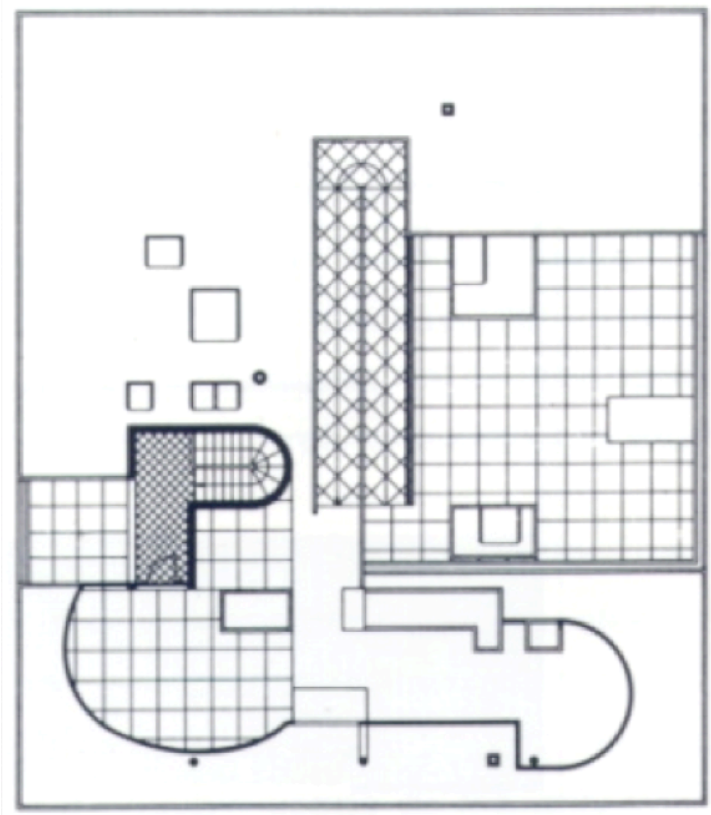

Figure 3f. Projected Second Floor Plans of Villa Savoy by Le Corbusier.
Source: http://1.bp.blogspot.com

The continuity of windows in Villa Savoy make a phenomenon called row windows in its time. The row windows provide an opportunity for the user to benefit from the **daylight** completely. It is noticeable in Figure (3c, 3d, 3f); the proportion of the openings compared to the wall mass.

Figure 3g. View of Spiral Stair of Villa Savoy by Le Corbusier.

Source: http://chamranart.persiangig.com

Schroder House - Gerrit Rietveld

Schroder house is located in Utrecht, Netherland. According to Weston (2002), this house was designed and built as a new start in the life of its client in its own time. It became afterwards one of the most important icons of the Modern movement as well as the design and usage of space. Such a deep architectural effect on a place makes the foremost importance to identify non-measurable key factor in this sample.

The first glimpse of the Schroder House on the right (in Figure 4a) shows the obvious difference between it and the neighboring house. Wright's idea of the destruction of the box matures in this building (Weston, 2002). Cubic lines are defining the form. Colorful elements start to identify the house from the outside. The elevation is completely similar to the Mondrian paintings characteristics (Friedman, 2006).

Figure 4a. Gerrit Rietveld, Schroder House in white Attache to a Neighboring House. Source: whc.unesco.org

The main assumption proportion in Schroder house from the façade is graphical. However, the **spatial figure** of the planning is not completely certain to discuss. The first floor has a complete open plan. This type of planning makes the whole floor a major thing to be noticed as frame space (Figure 4d). The partitions are moveable and every arrangement makes a different kind of spatial figure. On the other hand, in the ground floor plan (Figure 4c), the spatial figures of the enclosures are completely vivid.

The house itself is an identity icon in the mind of the user at it is recognized today. The **material** differences and different details in the façade from the neighbors make the major influence on the characteristic of the house from the outside. Weston (2002) revealed that every detail of the windows or the wooden material used in the

Schroder house reflect the Rietveld opinion about the characteristic of the house. Furnishing and the sliding partitions make a great effort on the characteristic of the interior space as an idea for spatial organization (Figure 4b).

Figure 4b. Gerrit Rietveld, Schroder House, Interior Space. Source: https http://inhabitat.com

The ground floor plan of the Schroder House (Figure 4c) does not only present itself as a different building but also starts to identify itself in the mind of the users. It is the combination of Modern exterior and Classical plane (Weston, 2002). In the ground floor, the **axiality** from the exterior comes to the interior of the house. The circulation of the ground floor is completely createed around the axes. This axiality helps the user to develop a sense of space during movement. As Morris (2004) puts it, the visual perception occurs around the axes, which is the first identification of the space in the mind.

Figure 4c. Gerrit Rietveld, Schroder House, Ground Floor Plan. Source: https://sites.google.com

Not only from the outside, from the inside too, the spatial appearance of Schroder House in the first floor (Figure 4d) identifies the space. Weston (2002) states that in this design the ground floor is conventional. The character of the first floor is unprecedented in its openness. The **spatial organization** could be easily transformed by partitions with furniture. Color planes are also perceived in the space. So, in this floor, Rietveld provides an open plan with complete flexibility and in the ground floor he make a benefit by interpenetrating space within each other and slicing them with the strong axiality to connect the interior space to the exterior.

The perception of the interior spaces could be interpreted as the relationship between the spaces and the usage of them. It is the first connection to the user to understand the potential activities that could change in the same spatial organization. Besides, De Gory (1998) writes:

"The relationships between the designated spaces are variable; sleeping to eating, dining to bathing, washing to working etc. Hence the flexibility of the house lies in its accommodation of changing relationships between events, context and the use of the space" (De Gory 1998, p.10).

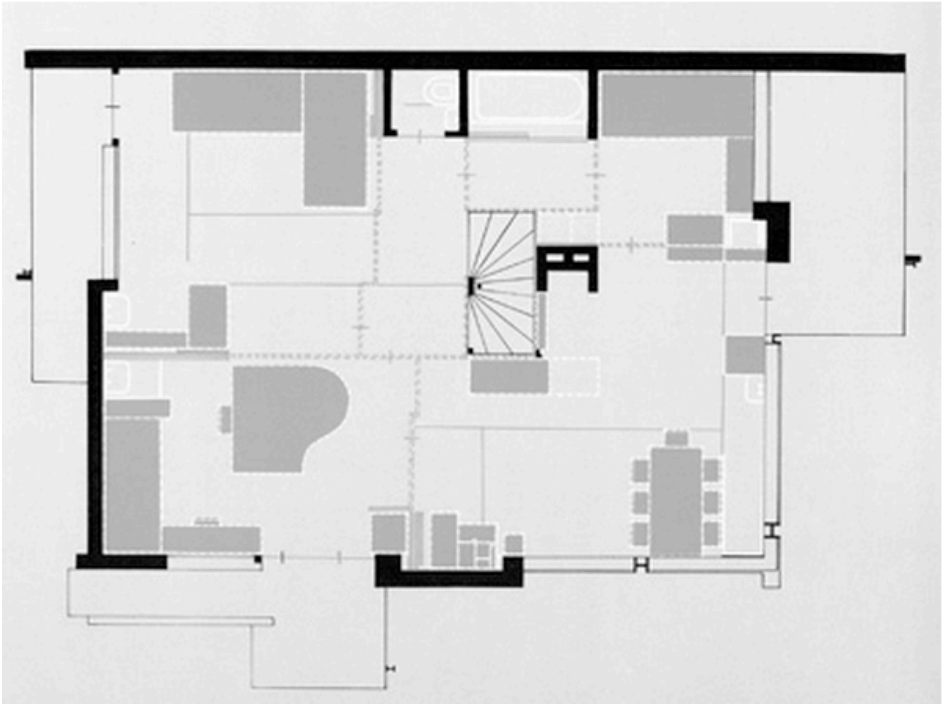

Figure 4d. First Floor Plan of Gerrit Rietveld, Schroder House. Source: whc.unesco.org

Although the **enclosures** in the Schroder house have a flexible and uncertain characteristic, the moveable partitions and the open spaces that connect the main areas together (Figure 4d) make the major unity of the floor as that one enclosure. On the other hand, the ground floor (figure 4c) plan vividly shows that the axiality, which exists in the plan makes a great contribution to determine the enclosures boundaries.

The **movement** pattern in the Schroder house is influenced by the axiality of the planning. All of the movements in the house are circulated by axis. Also, these axes

provide the boundaries for the enclosure spaces. So, not only movement is effected by axiality but also the accessibility to the spaces depends on the axes.

The boundaries of the Schroder house become stronger through the planning. This process makes a great deal on the usage of **daylight** within the dwelling space in this case. The complete flexibility and connection in the different spaces of the first floor (Figure 4d) makes a complete usage of daylight within the interior space. Daylight usage in the Schroder house makes a positive effect on the characteristic of the house. However, in the ground floor the axiality makes a great deal on the connection of the inside by the outside. These connections to the outside become a method to provide the daylight for this floor.

Muller House - Adolf Loos

Muller House (Figure 5a), designed by Adolf Loos in 1930, is located in the Prague, Czech Republic. This building has been chosen to clarify the key factor in the non-measurable qualities of dwelling spaces. This is because of the 'Raumplan' idea that Adolf Loos tried to emphasize in the design of it.

The strong sense of enclosure with the juxtaposition arrangement in the house makes a vivid and powerful image from the **spatial figure** of this house. The proportions of the enclosure spaces are similar to each other. The strong sense of spatial figures in the Muller house makes a strong influence on the users to understand the non-measurable qualities. It is the main factor in Muller house that touch the characteristic of the building so vividly and at the same time provide the non-measurable qualities in the house.

Figure 5a. Perspective View of Muller House by Adolf Loos.
Source: www.guardian.co.uk

The last non-measurable quality factor which is clarifed in this sample is the **material and detailing;** the materials in the interior spaces are make the foremost influence on the interior characteristic of the Muller house. Colomina (1996) states that, materials in the Muller house as well as the furniture used give the interior spaces gender characteristic. This gender characteristic, become part of the spatial characteristic, of the house as well as the non-measurable quality of it. For example, she considers, the theater box as a place for the lady of the house as well as the library, which is the place for the man of the house (Colomina, 1996).

The **axiality** in the spatial organization of Muller house is one of the weakest non-measurable factors in this design. The strong juxtaposition arrangement in the interior spaces makes the axiality of the house a weak feature between other non-measurable qualities. However, still the main connection between the levels and

circulations are lead by the axes within the spatial organization. This makes the foremost benefit in the minimum of appearance in particular spatial organization (Figure 5c, 5e, 5f, 5g).

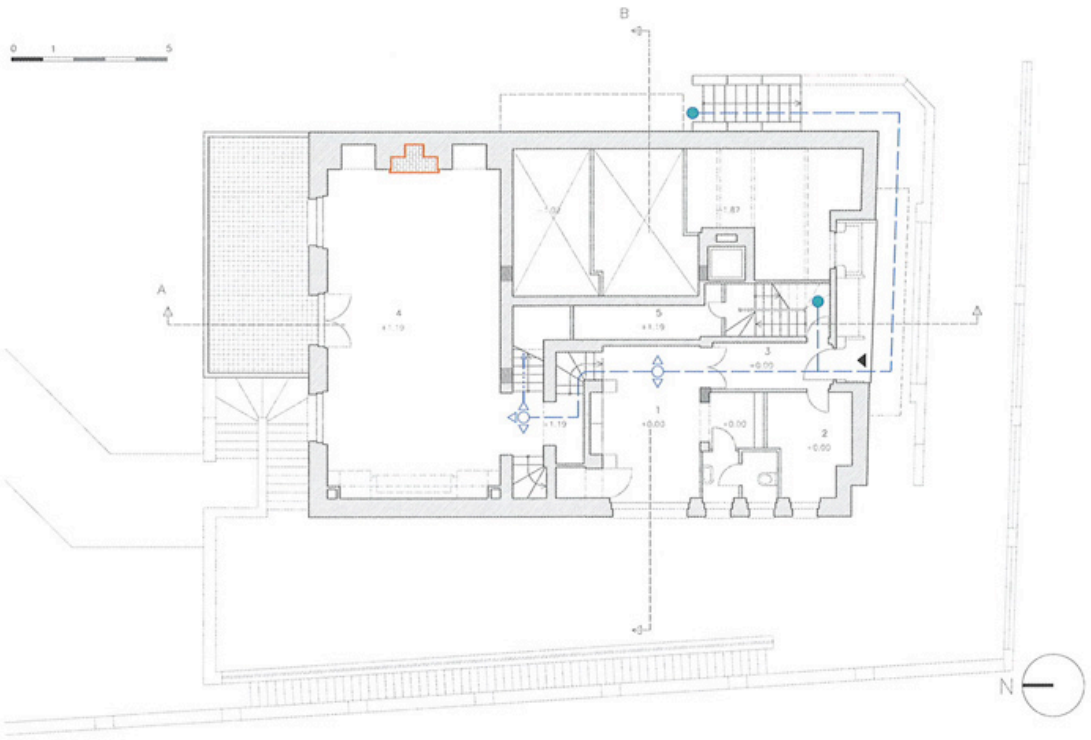

Figure 5b. Main Floor Plans of Muller House by Adolf Loos.
Source: http://www.mullerovavila.cz

According to Weston (2002), the 'Raumplan' idea is described by Adolf Loos as a planning of volumes, which was a revolution in movement and **spatial organization** in that period. Figure 5a above shows how the exterior view becomes almost cubic in this design. The only feature that breaks this cube is the roof terrace. This is one of the successful and mature examples of Raumplan in the Modern period. Weston (2002) puts it in this way: the plan mainly revolves around central stairs in multiple layers (Figure 5b). However, passing through an anteroom provides accessibility to the stairs. There are in all seven risers onto a landing before the main hall which

accessible via an anteroom. The main point that Weston is making is that accessibility or movement through the spatial organization is one of the essential features in the Raumplan.

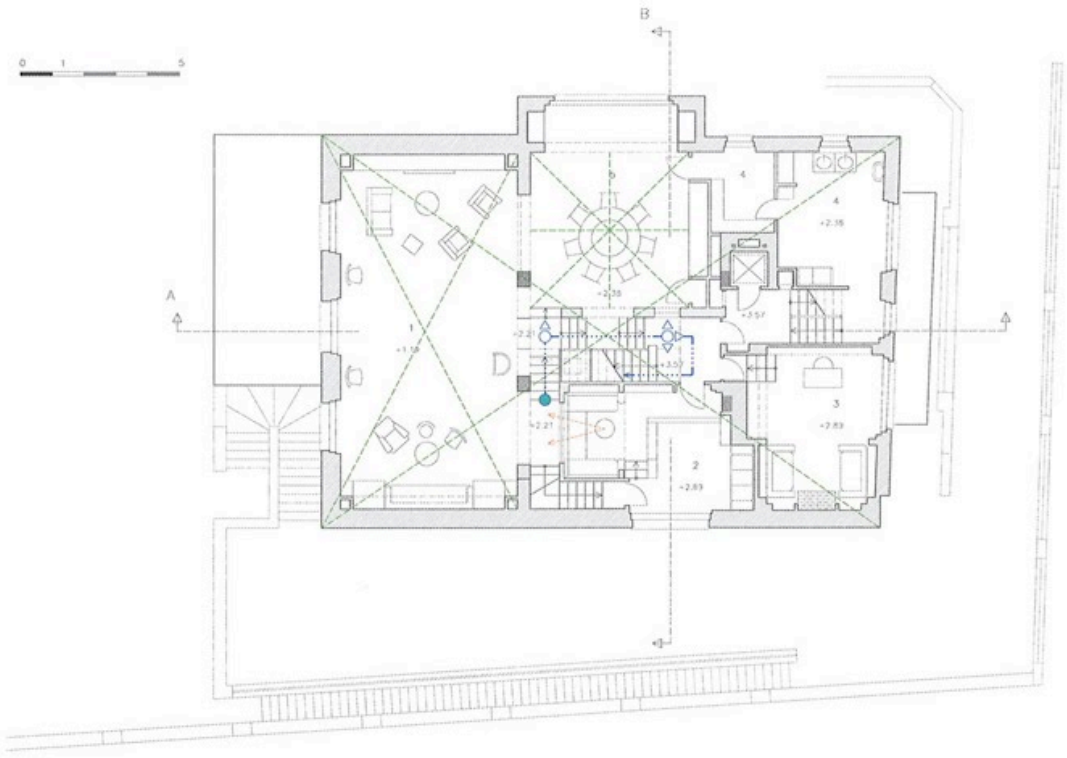

Figure 5c. First Floor Plans of Muller House by Adolf Loos.
Source: http://www.mullerovavila.cz

Enclosure in this Muller house has a strong concept of the juxtaposition space of the interior spaces. This arrangement makes the enclosure in this house as a strong concept. The boundaries, which determine the enclosures, are strong and vivid. The fixed furniture in the theater box has a great contribution to sense of the enclosure feeling in the house. As Colomina (1996) put it, the character of this house is placed piece by piece with boundaries, furniture, and spatial relations.

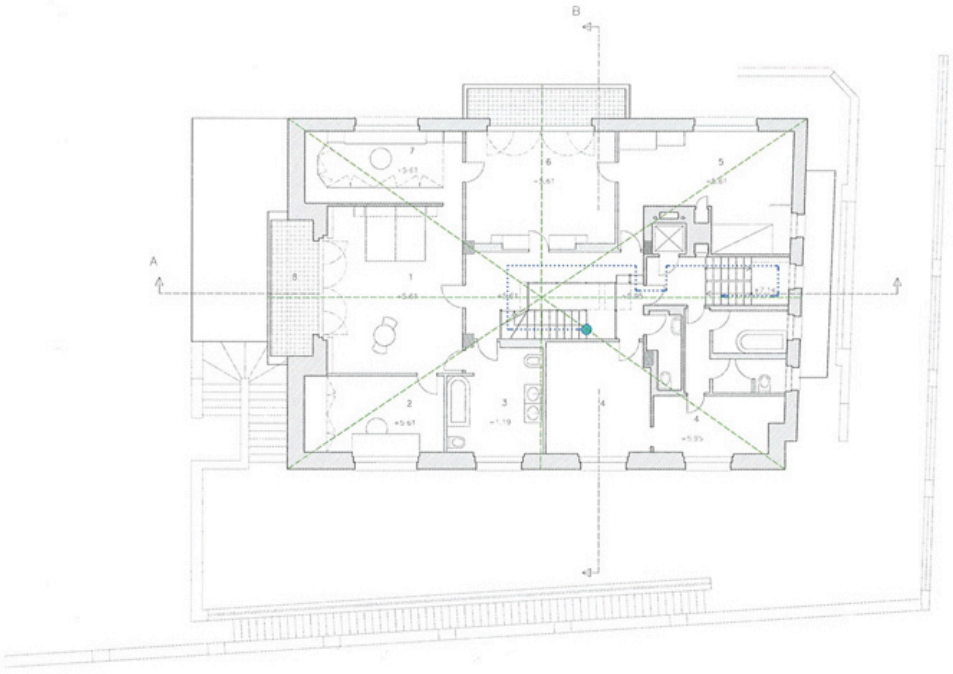

Figure 5e. Second Floor Plans of Muller House by Adolf Loos.
Source: http://www.mullerovavila.cz

The main point that is noticeable in the isometric view in Figure 5g from Muller House 'Raumplan' is the precise arrangement of the **movement** through this volume design. The movement in this architectural design is essential not only because of the perception of space but also because of the accessibility of the user to different parts of the building. The main core of the building (staircase) connects and unifies all the different levels of the building.

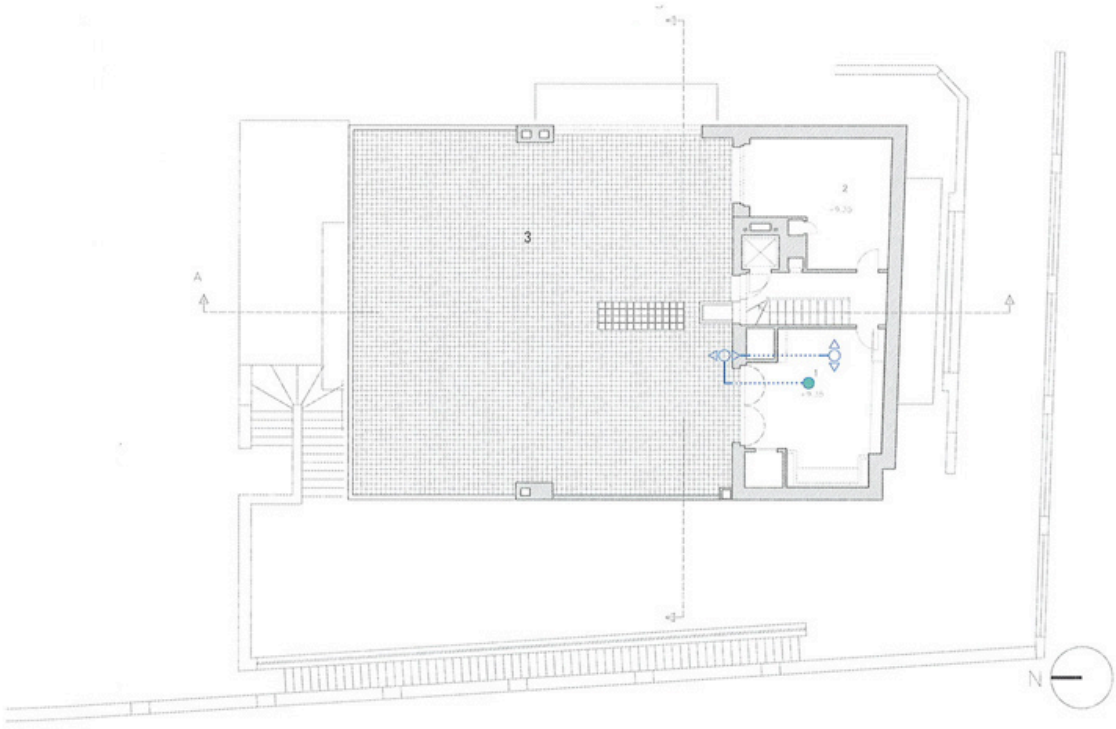

Figure 5f. Third Floor Plans of Muller House by Adolf Loos.
Source: http://www.mullerovavila.cz

The characteristic of Muller house and the juxtaposition arrangement of interior space lead this design to use several separate windows to provide the **daylight** of the house. All of the spaces have different windows. This lighting have essential role in the characteristics of interior spaces. Muller used the fixed furniture to deal with this phenomenon in his design.

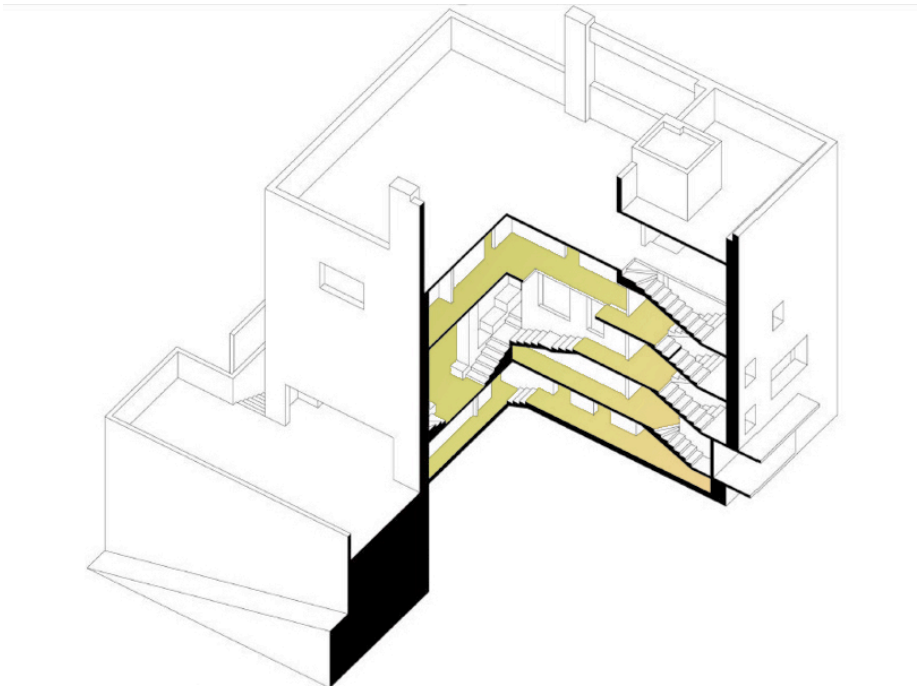

Figure 5g. Isometric View of Muller House by Adolf Loos.
Source: http://www.mullerovavila.cz

According to Colomina (1996), the daylights in the Muller house have a successful combination with the furniture arrangements. This combination is described as the fix furniture; fixed near the windows face to the center of the space. This particular position the householder has the view and advantage to see and control the activities and movements around the house. This phenomenon makes the sense of security to the householder.

Figure 5h. Interior View of Muller House by Adolf Loos.
Source: http://www.mullerovavila.cz

3.4 Consequences of Sample Study

This thesis tries to clarify seven factors of non-measurable qualities of Ola Nylander (2002) in three well-known samples. However, this research has achieved some other results in addition to the clarification of non-measurable quality factors. These achievements have been named as consequences of sample study.

The first finding concerns the relation between the non-measurable quality factors. There is a meaningful relation between the axiality and the movement in the spatial organizations, which are analyzed. In other words, the movements within the spatial organization are influenced by the axiality factor. In every case that axiality factor has a strong role, the circulation of the spatial organization is provided within the axiality lines in the plan. So, the simple assumption from this phenomenon leads to

the fact that movement and axiality are bound together within the spatial organization.

Secondly, the other influence of non-measurable qualities in the dwelling spatial organization is the Loop. Regarding to the sample study all of the spatial organizations analyzed in this research has loops in their plans. Existence of the loops in these plans simply means there are circles in the circulation of the spaces. This circles starts in a particular space and ends in the starting space.

Moreover, the other finding from these analyses is that every spatial organization has a particular method of directing the perception of users. For example, the Muller house entertains the idea that user could perceive the spatial organization vertically. However, in the Villa Savoy the visual perception of the space is horizontal. The direction of the user perception is one of the properties of spatial organizations.

Also, one of the interesting findings in the analyses is the 'Focal Space'. All of the spatial organization samples have a particular space that defines specifically within their arrangements. For example in the Schroder House the Focal space is open plan hall, in the Villa Savoy Focal space becomes the roof garden and in the Muller House the Focal space is the Theatre Box. Focal spaces are defined by the spatial organizations of dwelling spaces as well as the characteristic of the spatial organization that provide them.

At last, the non-measurable qualities of the space enrich the spatial qualities within the space organization. In every spatial organization there are some non-measurable factors that have stronger role. On the other hand there are some other non-

measurable factors, which have a weaker role. These roles and their importance within the spatial organization determine the characteristic of the spatial organization. This phenomenon also has influence on the characteristic of the Focal space.

In other words, the non-measurable quality factors determine the spatial qualities of dwelling spatial organizations. The influence of these factors also determine the characteristics of the spatial organization and Focal space in dwelling spatial organizations.

Chapter 4

CONCLUSION

This study has mainly focused on looking into and understanding the key factors of non-measurable qualities of space organization in dwelling spaces. It has been underlined that users understand dwelling space and its spatial organization through the process of perception. Efforts have been made to bring to the fore understanding of the process of perception, the importance of movement in this process and the daily life perception of dwelling space. Therefore, one of the contributions achieved in the process of this study, is the derived key issue from the works of the different theorist that have been reviewed and integrated in the context of this thesis.

Moreover, the study has attempted to clarify the basic concepts of space, space quality and sense of space and place. This is because these concepts are mainly contingent on the perception process in dwelling spaces. To understand the main bases or the underlying structures of the non-measurable qualities in dwelling space organizations, the study looks into the role of several important key factors. However, the main intention of this study, among other things, is reveal the concepts of 'sense of space' and 'place', which are seemingly enriched by the non-measurable spatial qualities of dwelling spaces. The intention is achieved through the support of two main theoretical frameworks, leaning on the works of two main protagonists, David Morris (2004) on the "sense of space" and Ola Nylander (2007) on the non-measurable qualities of space.

All human activities, from the simplest natural ones to the most complicated, require spaces to be carried out in. These spaces are often defined with particular boundaries. In the process of defining these spaces, there are set of values of space to be incorporated; this is the main essence of the architecture. This study has attempted to contribute, firstly, to the discourse on perceptual space and the understanding that, all spaces in spatial organization are perceived as a whole and the perception of space in serial order is more real living experience than the perception of a well bounded single space, because space has its meaning and its definition according to other spaces within the same organization. This is vividly underlined and verified in the content of the study. This study has also highlighted the significance of spatial boundaries and established that boundaries are always there whether subdued or bold. Without boundaries, setting spaces and making spatial organization become meaningless. Therefore, how boundaries define space and set the relation of every space with other spaces, which are named non-measurable qualities of space and introduced through the seven factors by Ola Nylander (2007) gained a special importance in the context of the study.

Although architectural space is not only a frozen moment or sculptural gesture, movement and the process of living develop a psychological pattern for the user. The major affects of these perceptions occur in the dwelling spaces. That is why movement becomes a defining characteristic in the process of spatial navigation in dwelling spatial organization. Furthermore, the potential activities in a space and the reaction to spatial organizations have underscored the importance of this study. To this end, this study delved into the common concept between philosophy and architecture called ‘the sense of space.’

The sense of space is known as the problem of the depth; how actual spaces make a great deal in human minds and how they affect them. Consequently, in developing the sense of space, users could achieve the sense of place. Place becomes more pleasant and memorable in the human mind and place qualities are not entirely measurable or functional. The unknown potentials of place make great attractions for users. Realizing the boundaries of space, which define the restrictions of space in spatial organization, completes this step. Somehow, they define movement or action and potential abilities of spaces. But it is not simply finished by movement; a great deal of perceptual opportunities should be preserved for the user.

The spatial boundaries in spatial organization are observed by movement and activities, which declare the potential of the place especially dwelling places for the householders. This movements and perception through it make a great contribution within the dwelling spatial organization to set the boundaries in the users mind and connect inside of the house with the outside. The actual achievement by the relation of inside with the outside is that it makes identical consciousness for the user to accept the dwelling space as a place, as well as helps to achieve spatial perception for the user. Every spatial organization leads the perception of the user in a particular way. The spatial perception of the user becomes complete and mature during the living experience either during short or long-term use. At this point, a space makes a huge impact on the unconscious level of the user and finds a characteristic for its consciousness to identify it as ‘place’.

This thesis sample study presents, the possibility of the existence of ‘Focal Space’ within the dwelling spatial organization. As one of the emerging concepts from the

study Focal space determines the characteristic of the spatial organization. On the other hand, the characteristic of the Focal space determine by the non-measurable quality factors of the space organization. The convincing presence of one factor alongside by other factors presents has a crucial influence on the spatial characteristic of 'Focal Space'.

All above mentioned theory-discourse based contribution to definition of space and space organization, will support students understanding of spatial qualities which may help to overcome number of difficulties in design teaching, as they are pointed out below:

- Encourage their imagination ability of space as a non-physical entity.
- Enrich their ability to develop a design scenarios based on life and life-based spatial qualities and characteristics.
- Develop ability and understanding of place making potentials of space and space organizations.

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