ABSTRACT

UYSAL, ZEYNEP CIGDEM. Architectural Type as a Cultural Schema and Its Cognitive Use in Architectural Design: An Analysis of the Aga Khan Award Winning Dwellings in Turkey. (Under the direction of Kristen Schaffer).

This dissertation examines the relationship between the cognitive concept of cultural schemas and the architectural concept of types, and subsequently investigates the cognitive function of types in the course of architectural design. The concept of type was investigated by previous research mostly in terms of its function in the analysis and the interpretation of architectural products. In terms of its function in the generation of architectural products however, there seems to be a need for further research. On this basis, this research focuses on the generative role of type in architectural design and examines its position in creativity from a cognitive perspective.

By observing architectural types as essential attributes of culture and examining their culturally formed schematic position and cognitive function in architectural design, this study attempts to question 'how we could conceive creativity differently if we consider culture through the use of cultural attributes such as architectural types'. Having such an attempt, it intends to find out in a broader perspective, the possibility that lie in the use of cultural information in architectural design. Examining the cultural, cognitive and creative aspects of the concept of type on this basis, the study sets out to 're-theorize' its position and cognitive function in the course of architectural design in an attempt to find out its role in creative production. In order to observe, analyze and exemplify how types are creatively used in the course of architectural design, it conducts a case study on the Aga Khan Award for Architecture winning dwellings in the context of Turkey.

Altogether, the dissertation develops as an interpretive theoretical inquiry that is supported by case study research, with data collection methods such as theoretical survey, archive search and field study, in an attempt to develop a cultural and cognitive theory of architecture that focuses on the cognitive function of types in architectural design. As a result of the theoretical survey on the position and cognitive function of types in architectural design and the empirical survey on the cases that demonstrates different architectural approaches, where types are creatively used in the course of design, the dissertation supports

the proposition that that types have a generative value in architectural design and that the creative act can benefit from them in reaching towards noble and innovative solutions that value continuity in architecture. Through such an examination about the value of types for creative production, this dissertation attempts to contribute to the field by developing the critical perspectives about the nature of architectural design and by broadening the view on creativity in architectural design and education so as to acknowledge the value of prior knowledge and cultural information therein.

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Architectural Type as a Cultural Schema and Its Cognitive Use in Architectural Design: An Analysis of the Aga Khan Award Winning Dwellings in Turkey

by
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APPROVED BY:

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DEDICATION

This dissertation is dedicated to my husband Ozgur Urey and my parents Leyla Zumrut Uysal and Ali Riza Uysal.

BIOGRAPHY

Zeynep Cigdem Uysal was born in 1979 in Ankara, Turkey. Upon her graduation from TED Ankara College Private High School in 1997, she was admitted to Middle East Technical University, Department of Architecture in Ankara and began her architectural education in 1997. During her undergraduate years, she took interest in the history and theory of architecture and considered pursuing her academic studies further in the graduate school. Following her graduation from the university with a B.Arch degree in 2001, she enrolled in the M.Arch program in the Middle East Technical University, Department of Architecture in the same year.

With a keen interest to study the theoretical and contextual factors that are considered to shape the evolution of the built environment, she attempted to gain an understanding about the cultural, social, economic and political premises lying at the basis of architectural production in her Masters education. In her master's thesis entitled as "Architectural Interpretations of Modernity and Cultural Identity: A Comparative Study on Sedad Hakki Eldem and Bruno Taut in Early Republican Turkey", she has tried to observe the decisive influence of the cultural polarity of the Turkish context and the resulting search of a proper 'cultural identity' on the architectural production of the Early Republican Turkey. She attempted to demonstrate the critical and practical strategies that were devised in the architecture of the time, by examining the architectural attitudes of two prominent professionals, namely Sedad Hakki Eldem and Bruno Taut.

During her studies in the M.Arch program, she participated into two research projects in the Middle East Technical University, Department of Architecture, which were led respectively by the Kerkenes Project Team and TAÇDAM (Center for Research and Assessment of the Historic Environment). Both of the projects were on the archeological assessment of the historic environment and they were conducted in a joint program supported by the Architecture Department. Through participating in these projects she had the chance of experiencing the development of academic research and participating within a collaborative teamwork towards the development of a project.

Following her graduation from the masters program with a M.Arch degree in 2004, she enrolled in the PhD program again in the Middle East Technical University, Department of Architecture in the same year and simultaneously started to work as an architect in several architectural and constructional firms in Ankara.

In 2005 she decided to attend North Carolina State University, College of Design to pursue a doctoral degree in design in the USA. Working as a Research Assistant under the guidance of Dr. Kristen Schaffer there, she started to explore the cognitive functions of the cultural information in architectural design. During her studies in her third year, she has also worked part-time in the Research and Extension Unit of the College of Design, to help with the development of research about the commissioned projects to the unit. Developing her research area later as to include the architectural types, she has presented her research in 2008, respectively at the 3rd Annual NC State Graduate Research Symposium in Raleigh and the Sixth International Conference on New Directions in the Humanities in Istanbul. Zeynep has graduated with her doctoral degree in design in May 2012.

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CHAPTER 1

INTRODUCTION AND METHODOLOGY

"At any given time the man-made world is inevitably the measure we use to determine the direction of change. Whatever we think of it, the world around us provides the basis for decisions about the future. We are keenly aware of its deficiencies, but not always so aware of its strengths. From time to time it is wise to pause and consider whether when we change something, we consider what we might be losing. The corollary to this is to look back to see whether what we lost yesterday might, with little effort, be regained." (Ronald Lewcock, 1988, p. 87)

1.1. INTRODUCTION

Architecture could be seen as a cultural system of representation that issues the formation and transfer of meaning through architectural forms. In this system, both the production and the reflexive interpretation of architectural products are involved in the practice of meaning making (Hall, 1997, p. 2). The meanings or the messages that are incited by way of architectural forms are encoded and decoded by way of a cognitive process of managing information. In this process, the utilization of cognitive processes and structures, such as categorization or cognitive schemas, come to the fore as tools that function in the production and reception of architecture.

As suggested by Stuart Hall, representations about the world guide our thinking and structure our thought (Hall, 1997, p. 2). In other words, we give things meaning by how we represent them. Through systems of representation, such as language or architecture, the stimuli is processed, meaning is produced, consumed and reproduced (Hall, 1997, p. 17). Of all these representations that provide us meaning, some exist cognitively within our minds and some physically out there in the world. Among them, a big bunch belongs the shared realm of culture and formed by way of the interaction between our shared cognitive structures and their physical expressions. On this basis, our ordinary conceptual system in terms of which we think and act is tied deeply in our culture and the cognitive structures of most fundamental concepts in a culture determine the way we think and act (Hall, 1997, p. 3,

22). In this sense, culture possesses a fundamental role in terms of its effect on the production and reception of meaning through the systems of representation. As a cultural system of representation dealing with the production and reception of meaning through its forms, architecture is also subject to the use of these cognitive processes and structures, through which it incites particular cognitive behaviors and interpretations in its viewers/users, recalls the kinds of social and cultural practices that shape their cognitive behavior, and produces new works that reinforce and house those behaviors and practices.

The literature on the cognitive role of culture for the field of design brings up two different aspects, which are respectively 'culture's cognitive role in the interpretation of design products/artifacts' and 'its role in their creative production'. Revolving around the reception and generation of designed artifacts in this fashion, it forms a framework where the 'interpretation', 'production', and the 'designed cultural artifact' are connected over the cognitive use of culture, in the form of cultural attributes such as architectural types and precedents.

Within this framework, the cognitive function of cultural knowledge in the interpretation of the artifacts (and in the understanding of new information) accumulated a considerable research interest. However the cognitive role of culture and cultural attributes in the design and production of cultural artifacts still seems to be an area that needs further attention. In this study, within this two partite cognitive role of culture, which is for the interpretation or the analysis of the cultural artifact and the production or the design of it, the focus will essentially be on the production, rather than the interpretation. (Figure 1.1)

Having in mind this relationship between interpretation and production that nestles onto the cultural artifact through the cognitive use of culture, this study will question 'how we could conceive creativity differently if we consider culture through the use of cultural attributes such as architectural types'. In this framework, the study will observe 'architectural type' as an essential attribute of 'culture' in architecture and will examine its culturally formed schematic position and cognitive use in architectural design.

Searching the answers within the literature on creativity, culture and cognition, the study will focus on architectural type in an attempt to 're-theorize' the position and cognitive

use of culture in architectural design. With an attempt as such it will try to articulate a theory of architecture on the cognitive use of type in architectural design and its relationship with cultural cognitive schemas. Through such an examination about the value of type for creative production, this study will attempt to contribute to the field by developing the critical perspectives about the nature of architectural design and by broadening the view on creativity in architectural design and education so as to acknowledge the value of prior knowledge and cultural information therein.

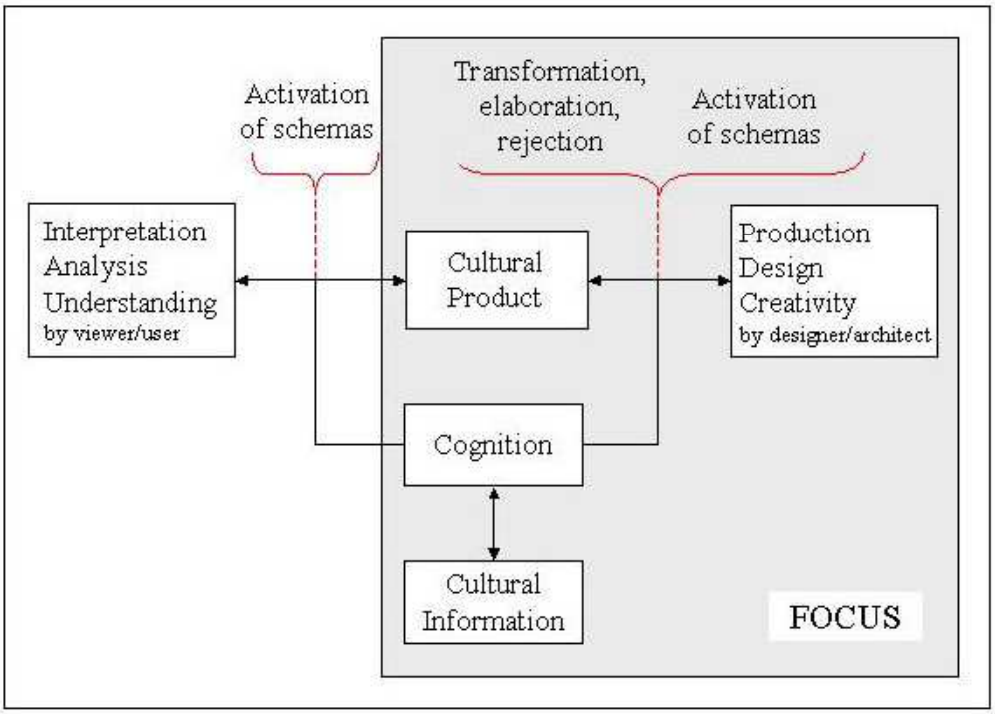

Figure 1.1. Focus of Research

The observation of the culturally formed schematic position of type and its cognitive use in architectural design must be based on cognitive assumptions that evidently necessitate a cognitive approach to study the notion. On this basis the theoretical survey for this research necessitates pondering into four key areas that open up the subject for cross examination, which are broadly on ‘culture’, ‘cognition’, ‘architectural design and creativity’, and ‘architectural type’. This theoretical survey would help in understanding and addressing the

nature and use of architectural type, as a cultural attribute that is processed cognitively in the course of architectural design.

Studies on cognitive theory suggest that ‘cultural ideas’, in the form of “shared knowledge, ideas, skills and values, which humans acquire and express in the material systems of artifacts and the built environment” (Lawrence-Zuniga, 1997, p. 49), are directed and reproduced by cognitive templates that are called ‘cognitive schemas’ (Johnson, 1987, p. 19). On the general level a ‘schema’ orders both the general and the specific features of culture and is an attribute of a group of people who share values, beliefs and ideas that are transmitted to members through enculturation. As a reflection of it, the built environment signifies the encoding of the schema and the members of the culture translate from it specific formal cues resulting in appropriate behavior (Lawrence-Zuniga, 1997, p. 49).

In cognitive literature, schemas are defined as the “embodied patterns of meaningful experience” (Johnson, 1987, p. 19). As the word pattern suggests it, they are cognitive structures that have in themselves abstract yet coherent and meaningful configurations. This coherent and abstract pattern of schemas are utilized as the initial structures for the cognitive activities of perception, evaluation and memory and become the inherent structures that both control the taking of information and the reflection and production upon it. In Mark Johnson’s words, they act both “as patterns of action as well as patterns for action” (Johnson, 1987, p. 21).

The comparative survey on schema and type demonstrates a correlation that exists between these two notions. On the basis of being abstract mental structures that both become active in the reception and production of information, type and schema act identically in the cognitive level. In architectural theory, type is defined both as an abstract conceptual form and as a cognitive facility, which acts as the context for the systemic actions of perception and production (Habraken, 1985, p. 40). It is defined as the schema or the outline of a form that works in the process of spatial articulation (Argan, 1996, p. 244). Acting as a schema, it both controls the perception of information and also influences the creative production by being the initial representation of the design problem. It becomes the first structure, or the abstract structural common denominator, from (or onto) which new designs could be

generated through various creative manipulations. Identical to schema on these terms, it acts both as the pattern of action and also as the pattern for action in architectural design.

Given that type exists as the abstract formal and functional structure, which is produced naturally in time by the architectural culture it belongs to and which is cognitively used as the preliminary structure in the interpretation and production of architectural products, it could be portrayed as a form of 'cognitive schema' based on culture. It exists as an essential cognitive facility for design, in the same way as schema exists as an essential facility for thinking and reflecting upon. Acting similar to schema in the cognitive level on these terms, type exists both as an operative tool for interpretation and as an effective tool for creation (Tice, 1993, p.163-164).

As suggested by James Tice, type has the capacity to harbinger change in this sense. Allowing for the transformation of its known state, type allows for creative production in architectural design and brings together interpretation and production on a common ground. For Tice, the ability to conceive transformation within types and even between types is unmistakably crucial if the interpretative nature of analysis and the dynamics of the design process are to be fully engaged (Tice, 1993, p.163-164).

In this study, type will be viewed as a phenomenon onto which the cognitive, cultural and creative aspects of architectural production are intermingled. It will be observed, not as a mechanistic phenomenon in its own sake, but as a form of 'human cognitive attribute' that is active both in the interpretation and the production of architectural artifacts. It will be explored as to find out whether it exists as a cultural schema in architecture and will be studied as to understand its use in creativity and architectural design from a cognitive perspective.

The cognitive approach to creativity seeks to understand the mental representations and processes underlying creative thought. It has been proposed by cognitive literature that creativity involves essentially ordinary cognitive processes yielding extraordinary products and insights, developed by the creative subject depending on his/her use of conventional cognitive processes (such as application, analogy, combination and abstraction) applied to knowledge already stored in memory (Sternberg & Lubart, 1999). Creativity happens in this

context by the coordination of learned or known information into new structures, which are considered both novel and also appropriate to the conditions of the desired solution. What is suggested by these studies is that creativity always happens over an amount of prior knowledge. The leap taken over it could be small or big, but it always begins with knowledge stored in memory.

Design research also shows that the initial stage of architectural design, which is the representation of the problem, is guided by mapping of the problem with preexisting knowledge structures, like cognitive schemas, which enable the understanding of the problem situation. It is shown that designers employ types, prototypes and precedents as cognitive reference points to initiate design. They are found to analyze existing systems in search for analogies, which they employ as first solution concepts or starting points for their current design problem. Here, the development of new ideas occurs by the recognition of recurrent patterns or analogies among familiar schematic knowledge domains. The synthesis of such associations from numerous domains initiates novel design and becomes the starting point of creativity in architectural design (Jansson, Condoor, & Brock, 1992).

In this sense, creativity in architectural design becomes a process of adapting prior knowledge. What is perceived, what is already known and their relationship determine the process of thinking and the course of design. Mental structures such as schemas, or types in design, which carry our prior knowledge, inevitably become active in this process accompanying architectural creativity. As shown by cognitive studies on the subject, creativity in design does not occur as ‘creation of something out of nothing’ in this sense, but it originates essentially from something, such as cultural schemas, that of types or precedents.

In this process, the preliminary structure of type acts as the initial framework where variation and change could later take action. Type operates as the basic mental structure or the ‘schema’ of thought in architectural design, which acts as the primary ‘way to know’ that guides the course of thinking and initiates the design process. In the perception and reception of the problem, its familiar schematic structure is compared and matched with the new situation and utilized for representing and understanding it. In creative production on the other hand, it becomes the context onto which new ideas are developed by successive

creative manipulations. Likewise schema, it acts as the first key conception, which is adapted, contradicted or transformed towards new and original solutions in the course of design. It is ‘acted’ on later; it is either destroyed or transformed, but it exists inherently in the beginning of design thinking (Moneo, 1979, p. 23).

Therefore, operating both in the perception of existing information and the production of the new ones, type represents the employment of the cognitive familiar in architectural design. Brought to life as a response to practical demands of different cultural contexts, it intertwines the conventional and innovative aspects of architectural design through its cognitive characteristics. Establishing this connection of convention to innovation, it functions as a cognitive schema based on culture in architectural design.

This study will examine the cognitive use of ‘type’ in architectural design and observe its position as a ‘cognitive schema’ that represents and operates onto ‘familiarity’ based on ‘culture’. Taking it as the initial ‘familiar’ structure, which could be used, elaborated, transformed or rejected in the course of design, the study will refer to ‘type’ within the reciprocal relationship between culture, cognition and creativity.

It will investigate the culturally formed schematic presence of type in architectural design and examine how it operates and how it is manipulated in the course of design through a cognitive perspective. It will observe the design gambits that are used over types to transform them and it will try to analyze how the disruption of the known patterns of types can produce new architectural works so as to form the creative act. To put it briefly, the study will observe the position and cognitive use of type in architectural design in an attempt to illustrate its potential value for creativity in the design process. In a broader perspective, it will try to find out clues about the value of cultural information in architectural design by working within the framework on type.

Considering the contrasting views about creativity that see it either as ‘creation from nothing’ or ‘creation from something’, this study will probe more into the latter and will attempt to offer an alternative to the “current fascination with novelty as the primary design strategy”, by demonstrating the value of type for creativity in architectural design (Tice, 1993, p. 162). It will propose that types can work as generative conceptual tools in

architectural design enhancing creativity and they “allow us to develop a design process, which is able to construct links with history and memory”. They “help us learn from the architecture of the past and understand the space-form languages characteristic of certain localities” (Assi, 2003, p. 1-5).

Therefore this study will suggest that working with types in design exists as a method that provides for the user, visual and cultural continuities in the existing contexts and helps the designer to approach to those contexts with sensitivity. This connection has the capacity to restore the existing disconnection between the designer and the user in the building process. On this basis, this study will stress the value of this connection formed between the interpretation and production of architectural products over the common ground of culture, leaning on the fact that architecture is a public art that shapes the shared human environment.

In order to observe and exemplify this issue within this framework, a case study will be included, which is about the Aga Khan Award for Architecture winning dwelling projects in Turkey, within a timeframe of 1970-2008. This case study will be used as the exemplar ground to test the theoretical inferences developed in the previous sections with an aim to find out the possibility that lie in the use of traditional types in architectural design.

Corresponding to the aim of this study, a case formed by Aga Khan Award for Architecture winning dwellings from Turkey would be relevant to observe and specify the generalized theoretical propositions inferred from the survey of the literature on culture, cognition and creativity. As the award initially possesses a sensitivity for the development of innovative yet culturally sensitive architectural responses, which communicate with and try to understand the existing cultural substance while contributing to it, the projects selected from its cycles present a fertile ground to observe the relationship between creativity and cultural schemas, that of types and precedents. As the projects selected and nominated to Aga Khan Award cycles use the familiarity provided by type or precedent as the initial step towards new solutions and as they use culture by adding to it, adjusting to it or trying to do something with it, the projects provide a viable ground to observe the theoretical inferences about types in architectural design and to identify the creative contribution in them as to answer what kind of a creativity they possess.

In addition to the correspondence of the aim of the award with the subject of this research, there are also other practical reasons that would facilitate the study of the projects selected from its cycles. The thoroughness and availability of the project documents, such as the technical reviews, client's records, architect's records, jury reports, drawings and photographs of the projects, held in the archives of Aga Khan Foundation is an opportunity for the analysis of the projects. Additionally, as there are reports written by the architects themselves about the projects, the projects are meticulously described and their characteristics and methods of design are narrated from first hand. Therefore the buildings can be studied both as examples of explicit methods and also as physical demonstrations of architects' intentions. Moreover, as the projects are already assessed according to their success and level of creativity by the evaluation criteria of the juries of Aga Khan Awards, the case study will have a solid basis in terms of the selection of the projects and the assessment of their level of creativity.

With an aim to observe the buildings physically, to reach to relevant resources, and to be acquainted with the culture they were produced into, the cases are selected from my native country Turkey. The four dwelling projects from Turkey are examined according to the case study research criteria to reveal their methodologies of using cultural attributes in their designs. In order to provide the cases a common ground, they are selected as to have one functional type, which is dwelling. As suggested by James Tice, dwelling is the most appropriate ground for typological studies as it "lends itself notably well to typological analysis". The main reason of this is that the basic problem of dwelling has changed very little over time, unlike the other building types that have changed radically in time with new technologies and new program requirements. As Tice explains, "the continuity of fundamental human needs and basic dwelling themes, such as the need for privacy and community, access to light and air, proximity to nature, has given rise to distinct housing types in diverse cultures that constitute a general housing framework that remains relevant even today" (Tice, 1993, p. 162). Therefore, for conducting a typological study with an aim to analyze the use of types in architectural products, selecting dwelling as the functional common ground of cases would be a reasonable choice.

Within this framework, the case study included the collection of contextual and archival evidences about the projects. It conducted a field survey in the project areas, typologically analyzed the traditional contexts in order to find the types that the dwellings were referring to, typologically analyzed the dwellings themselves, and lastly made a comparison of those original types with the dwelling projects in order to detect how those types were manipulated in the course of their design.

Typological analysis is used in the analyses of cases as it would provide "insight into the architect's thought processes" and the traditional architectural contexts they refer to. As suggested by scholars, typological analysis allows us to understand "not only the buildings, but also the way architects think and how they design. As the typological characteristics used in design represent the features that architects manipulate during the design process, typological analysis demonstrates the intentions of the architect and the gambits used in the design process" (Amole, 2007, p. 86). Moreover, it helps to "identify and recognize the regional and cultural influences in the design of buildings" (Amole, 2007, p. 77) and "allows the researcher to understand and learn from culture" (Assi, 2003, p.1). Therefore, typological analysis is used in this study so as to find which types/cultural schemas are referred to in the selected projects and how they were manipulated as related to the specifities of the cultural context they are in.

1.2. OVERVIEW OF CHAPTERS

In order to reach to an educated judgment about the research topics summarized above, a survey of literature across various disciplines concerning the topic, which are mainly on culture, cognitive psychology, creativity and architectural design, and architectural type will be carried out to detect the structurally significant and operationally similar notions within each body of literature, which would reveal the use of types in architectural design. The body of knowledge and theoretical inferences gathered from this survey will be used for thinking about the role of architectural type and precedent as forms of cultural schema in architectural design and will be employed in the analysis of the case studies, namely the Aga Khan Award winning dwelling projects.

Having such a research goal, the second chapter will conduct a theoretical inquiry on the use of culture and cultural schemas in cognition. In order to do this it will study the definitions and implications of culture, the position and use of culture in cognition, the use of cultural schemas in cognition and in the interpretation and production of the cultural object.

The third chapter will conduct a theoretical inquiry on the position and cognitive use of culture and cultural schemas in creativity and architectural design. In order to do this it will firstly look at the studies of creativity and examine the definitions and implications of creativity, the position and use of cognition in it, cognitive processes and the cognitive use of prior knowledge, culture and cultural schemas in creativity and the approach towards 'creativity out of nothing' versus 'creativity out of something'. Secondly, it will look at architectural design studies and will examine creativity and creative process, cognition and cognitive processes, cognitive use of prior knowledge, culture and cultural schemas in architectural design and in the interpretation and production of the architectural product.

The fourth chapter will conduct a theoretical inquiry on the position and cognitive use of type in creativity and architectural design. In order to do this it will study the definitions and implications of type, its history, the general attitude and critique towards its use in architectural design, its position and use in cognition and its relationship with culture and cultural schemas. And it will make the first theoretical inference, which will propose type as a form of cultural schema that represents culture in architectural design. Then, it will look at the studies on type in creativity and architectural design in the light of the preceding sections and will examine the position and cognitive use of type in creativity and architectural design and the use of type in the interpretation and production of the architectural product. On this basis, it will make the second theoretical inference, which will talk about the cognitive use of type as a cultural schema in architectural design.

And lastly the fifth chapter will talk about the case study on the Aga Khan Award winning dwelling projects in Turkey (1970-2008). It will include the analysis of the four dwellings, which are respectively Ertegun Residence (1973) and Nail Cakirhan House (1971) in the province of the city of Mugla, Gurel Summer Residence (1971) and B2 House (2001) in the province of the city of Canakkale. The chapter will firstly talk about Aga Khan Award

For Architecture and study its history and mission; secondly it will give a brief information about the architectural context in Turkey by talking about the architectural movements and mainstream ideologies in architectural circles within the time period of 1920-2012; and thirdly, it will give a brief information about the 'Turkish House' by examining its general characteristics. After these, the chapter will move on to the analysis and assessment of cases. In the analysis part, it will talk about the architects of the buildings, the physical context of the buildings and the dwelling types of the region, the general characteristics of the buildings, and the typological analysis of the use of the reference types in their design. In the assessment part, it will make an evaluation of the creative contribution in the transformation of types, of the relationship of the end product to the context, and of the architectural approach of the project according to the cognitive theories of creativity.

Lastly, the concluding chapter will make a final evaluation in terms of the theoretical inferences on the cognitive use of cultural schemas, that of types and precedents, in architectural design and in terms of the possibility offered by culture and convention for architectural design. After that, it will present some future research directions.

1.3. CONCEPTUAL FRAMEWORK AND RESEARCH QUESTIONS

1.3.1. THEORETICAL PERSPECTIVE

The theoretical perspective of this study could be described as analytical structuralism, which is fed by the critiques and premises of post-structuralism. The research concern of this study, being an understanding of the nature of design through the cognitive use of types, necessitates to look 'beyond the observable phenomena' for grasping 'the interrelationships between different set of variables' (Lawrence, 1989, p. 41), which are postulated to be linked by unobservable cognitive models. This concern orients the theoretical perspective of the research towards an analytical structuralist perspective, which is more specifically placed onto the subcategory of 'cognitive structuralism' that sees embedded cognitive structures in the formation and processing of knowledge.

Functioning with the idea that "the true nature of things may be said to lie not in things themselves but in their relationships, which we construct and perceive between them"

(Nesbitt, 1996, p. 32-34), structuralism looks at phenomena to see "the system of observable relationships", or the structures, existing between them and tries to examine their reciprocal relations (Lawrence, 1989, p. 39). As a theoretical perspective, it could be defined as "that approach - to any subject - which has its object as the laws of solidarity, the reciprocal relations of the different facts under observation, rather than considering these facts in isolation" (Lawrence, 1989, p. 40).

It explores the codes and conventions that exist between the phenomena and tries to understand the code, the rule-governed system, which suggests "a set of possibilities for understanding and communicating physical, social and behavioral characteristics of human culture" (Lawrence, 1989, p. 63). It sees meaning not as inherent in objects or phenomena themselves but in the relationships, or in the structure that exists between them. What it tries to explain, especially in analytical structuralism, becomes "the interrelationships between different set of variables that are postulated to be linked by unobservable logicomathemathical models", or what is termed usually by structuralists as 'transformational interactions' (Lawrence, 1989, p. 40).

As it is asserted by Lawrence, structuralists, particularly analytical structuralists, ground their approach in human cognition, stating that "the world exists as it is apprehended by human mind" (Lawrence, 1989, p. 45). The examination of the structures is crucial for structuralists because of this motive: the structure that is constructed among phenomena by human cognition and intellect defines the knowledge of those phenomena. Thus we 'know' the phenomena because of the structure we ascribe onto them. The meaning is maintained by this structure.

In social sciences, structuralist theories mainly uphold that the scientific studies of human societies and culture cannot be restricted to observable phenomena. On this line, the human knowledge and understanding depend primarily on theoretical analysis that 'goes beyond manifest empirical phenomena and encompass the tacit ideas, processes, or structures responsible for material culture' (Lawrence, 1989, p. 38, 39). The revealing of the inherent structure governing the studied phenomena is crucial for structuralism for inferring fundamental principles about human culture.

In architectural theory, this perspective is also used extensively in research, mostly in design methods and in historical studies. Structuralism's search for understanding the 'code', or the rule-governed system, which suggests "a set of possibilities for understanding and communicating physical, social and behavioral characteristics of human culture" (Lawrence, 1989, p. 63) is crucial for architectural theory as it tries to bring architectural meaning to life in an attempt to go beyond the manifest empirical phenomena seen in the surface. It entails epistemological and theoretical points of view for architectural theory that act as *lenses* through which the cultural characteristics of the society, which become the *context* and the *condition* of *meaning* for the understanding and legibility of architectural productions, could be interpreted.[1]

As architectural theory is based upon the 'interpretation' of the historical and actual architectural phenomena, this attempt is invaluable for this study as it provides the sophisticated understanding of the phenomena studied and the raise of the consciousness about the subject in the field. This study will use this perspective for the understanding and interpretation of the nature of design through the use of types.

Nevertheless, it must also be acknowledged that structuralism is criticized today on account of being an ahistorical, deterministic and outdated perspective that prioritizes only the structural relationships held by phenomena, by overlooking the meaning and value possessed by them. It is criticized by post-structuralism in this sense, on the basis of its assignment of a self-sufficient value to the structures it analyzes. Post-structuralism itself on the other hand still attaches importance to the structural relationships held among phenomena, while also regarding the meaning and value assigned to those relationships. Criticizing structuralism by rejecting the self-sufficiency of the structures that it posits, it argues that to understand any object, be it a literary text or a cultural artifact such as a

[1] Structuralism has the epistemology of subjectivism, which states that "reality is shaped by a congeries of social, political, cultural, economic, ethnic and gender factors and then crystallized into a series of structures that are now taken as 'real', immutable." It is also under the umbrella of the research paradigm called interpretivism (or naturalistic paradigm), which states that "ontologically there are multiple, socially constructed realities and epistemologically it is neither possible nor desirable to establish value free objectivity". It acknowledges the role of interpretation and creation in the research. It assumes that knowledge and meaning are acts of interpretation. On this basis, it explores patterns of meaning and concentrates on the characteristics of shared meaning and understanding. (Groat & Wang, 2002, p. 26-33)

building, it is necessary to study both the object itself and the context or the system of knowledge that produced that object. It states that, since the meaning is attributed to the object by its reader in accordance with his/her position, every object may have multiple meanings depending on the position of their readers or interpreters (Bensmaïa, 2005, p. 92-93). It suggests on this basis that a successful analysis of objects (or forms of material culture) should include both the analysis of those objects themselves and also their contexts and their perceiving subjects that interact with them (Gottdiener, 2005, p. 111).

In this sense, this theoretical perspective is valuable for this study as it underlines the importance of the 'cultural position' by bringing to the fore not just the structural relationships embedded in the construction of the built environment but also the meanings and values that are assigned to it by the cultural and contextual experience. On this basis, this research will also make use of the premises of post-structuralism in its attempt to understand the position and cognitive use of types in the interpretation and production of architectural products.

1.3.2. CONCEPTUAL FRAMEWORK

As mentioned previously, in accordance with the aim of the research, which is to investigate the culturally formed schematic position of architectural type and its cognitive use in architectural design, the dissertation ponders into four key areas, which are on 'culture', 'cognition', 'creativity and architectural design' and 'architectural type'. As a result of the literature survey on these areas, the conceptual framework follows a route that starts from the notion of culture and moves respectively on to the subjects of cognition, cultural cognitive schemas, creativity, architectural design and architectural type. In light of the data studied on these areas, it lastly goes on to the case study, which is on the Aga Khan Award winning dwelling projects.

In this framework, the research firstly investigates the concept of culture and cognition interdependently and examines their relationship by way of focusing on the position and use of cultural cognitive schemas. On this basis, the first part of the research,

adopts a conceptual framework where culture, cognition and cultural cognitive schemas are studied in relation to one another.

After this first part, the theoretical survey follows on to investigate the cognitive use of cultural schemas in creativity and architectural design in the second part, by studying the literature on the position of cultural information and cultural schemas in creativity and architectural design. After that, the research moves on to the third part where the position and cognitive use of type in architectural design is studied in relation to the previous subjects of culture, cognition, cultural schemas, creativity and architectural design.

After all the information is collected from these surveys, the research continues with the study of the actual architectural products, which are the Aga Khan Award winning dwellings in Turkey, in light of the theories studied previously. As a result, the conceptual framework of the dissertation follows a linear but interdependent route that flows respectively through the subjects of culture, cognition, cultural schemas, creativity, architectural design, architectural type and the cases of Aga Khan Award winning dwellings. (Figure 1.2)

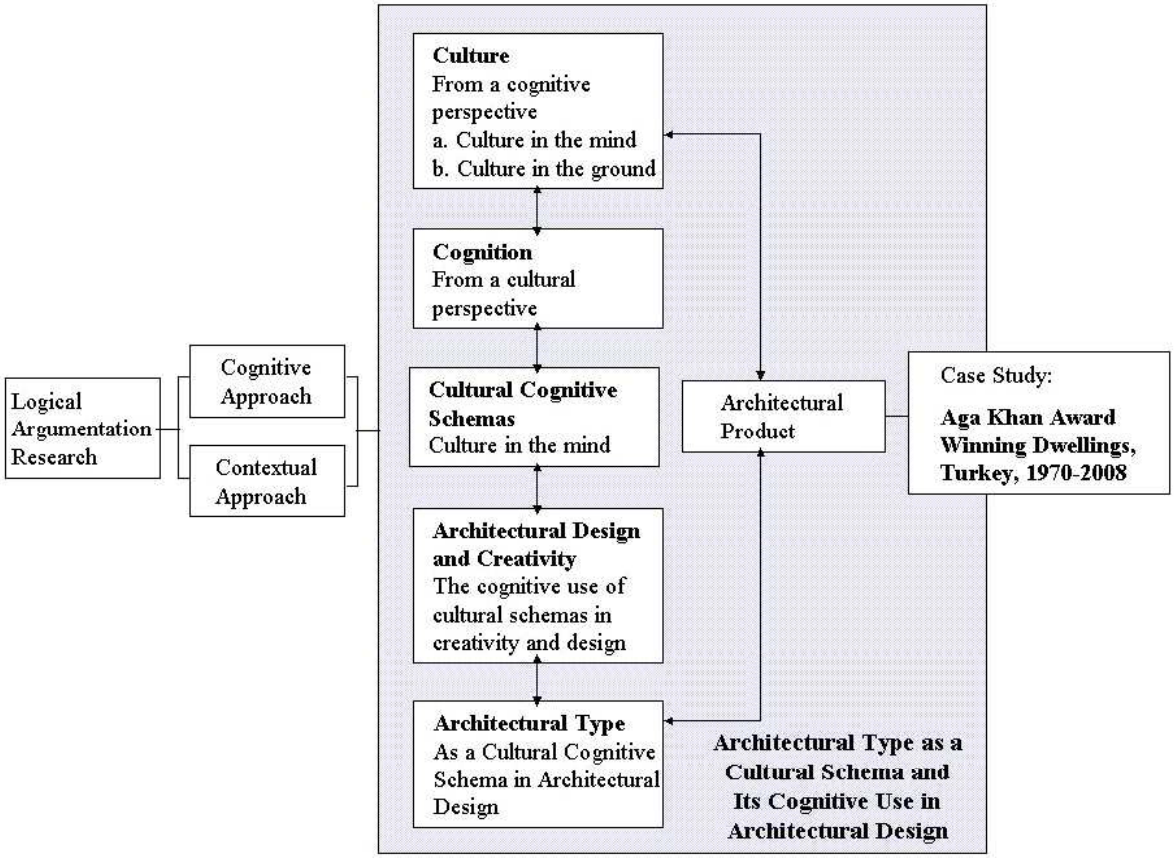

Figure 1.2. Conceptual Framework

1.2.3. RESEARCH QUESTIONS

Based on the conceptual framework, this study will ask the following main questions:

- Is architectural type a cultural schema that operates in the creative process of architectural design?
- How is architectural type used cognitively in architectural design/creativity?

It develops by asking the following subquestions:

- What is the cognitive role/position of ‘culture’ in architectural design?
- How are cultural schemas such as type or precedent related to culture?
- What is the value of type for architectural creativity?

- How could we conceive creativity differently if we consider type and convention?

Based on these questions, this study will have the following hypothesis:

- Architectural type is a cultural schema that is cognitively used in creativity as the first step towards new solutions. It has a crucial value for creativity in architectural design.

1.4. METHODOLOGY

1.4.1. RESEARCH DESIGN OVERVIEW

This study will be a theoretical inquiry designed to examine the cognitive role of architectural type and its culturally schematic utilization in architectural design. The case study, which will be on the use of types in the Aga Khan Award winning dwelling projects in Turkey, will be used as a vehicle to observe the theoretical inferences developed previously.

As the research will depend mainly on theoretical discussions that are based on cognitive assumptions made on culture and creativity, it will use the research strategy of 'logical argumentation' in the theoretical sections. Later in the examination of the Aga Khan Award winning dwelling projects in Turkey, it will use the strategy of 'case study research'. Altogether the research will be a form of logical argumentation research grounded in an architectural case study.

As the research objective is broadly the articulation of a 'cultural and cognitive theory of architectural design', logical argumentation research strategy works as an appropriate tool, as it epistemologically and strategically supports a theoretical understanding that rests on human reasoning. Described as an approach of constructing logical conceptual frameworks, which would interconnect previously unknown or disparate group of phenomena into an explanatory system (Groat & Wang, 2002, p. 301), logical argumentation fits to the objectives of this research and determines the traits, tactics and the end product of the theoretical inquiry in this study.

The end product that will come up with this theoretical inquiry will be the development of a conceptual framework that will realize the interconnection of three

disparate theoretical networks on cognition, creativity and type, in order to understand design process and to detect the role of type in it. In line with logical argumentation strategy, the objective aimed through this conceptual framework will be to build a 'cultural discursive logical system', which would have "theoretical clarity and rhetorical power attained through using a discursive language that roots the validity of the claims to the larger realms" of culture, cognition and creativity, by systemic analysis and explanation (Groat & Wang, 2002, p. 303). As the research will develop as a systematic study, in which detailed logical connections will be provided in a variety of ways to frame the overarching argument on type, the theoretical argument will take the form of a 'treatise', where the connection between theory and case study will be observed as a valid form of study (Groat & Wang, 2002, p. 335).

The dual complementary approach of logical argumentation and case study research will allow me to develop a theoretical understanding of the nature of architectural design and creativity while letting me develop critical perspectives about the role and position of architectural type. Here traits of logical argumentation will be used so that the research will have 'broad systemic applicability', by framing of a conceptual system that has wide explanatory applicability and universal explanatory power; 'paradigmatic innovation', by taking previously disparate factors and interconnecting them into a unified framework to shape a discourse at paradigmatic level; and 'testability', by making 'sense' to a wide cultural audience to be accepted as 'logical' within the cultural milieu it is in (Groat & Wang, 2002, p. 308, 309, 310).

In forming the conceptual framework two approaches will be used under logical argumentation strategy in viewing the position of type in creativity: cognitive and contextual approaches to creativity. Seeking to understand the mental representations and processes underlying creative thought, the cognitive approach to creativity will be used in this study to guide the understanding of how the mental structures, such as schemas and types, operate in architectural design to yield creative results. And, focusing on creativity in its social, cultural, or evolutionary context and seeing creativity as a context-based activity that cannot be dissociated from its social, cultural, or evolutionary context, contextual approach to creativity

will be used in this study to emphasize the role of social and cultural context in the description of the case studies of creativity (Sternberg & Lubart, 1999).

The case study on the Aga Khan Award winning dwelling projects will be the ground to assess the conceptual framework. Described as “an empirical inquiry that investigates a contemporary phenomenon within its real life context”, case study research strategy determines the methods that will be used in the examination of the cases. In line with it, the research will have a focus on multiple cases studied in real life contexts; will try to explain casual links by exploration; will be guided by the previous theoretical development; will use multiple sources of evidence: such as archives, artifactual inventories, formal and spatial analyses; and will attempt to develop generalizability to theory by replication of cases, in which multiple cases will act as multiple experiments (Groat & Wang, 2002, p. 346-362).

The cases will be studied both as examples of different design methods and also as physical demonstrations that completed all their phases. The connections that will be devised from the theoretical study will be observed and exemplified through their documented work and typological analyses. The study will collect contextual, archival and on site information about the selected Aga Khan Award winning dwelling projects, in the context of Turkey, within a timeframe of 1970-2008.

As it could be followed from the diagram of research (Figure 1.3), the study will evolve through four consecutive steps that follow each other by forming proceeding connections. The first three of these steps will be realized through logical argumentation, while the last one, which connects the theoretical inferences with the case study on Aga Khan Award winning dwellings will be executed with the case study research strategy.

In all the steps logical argumentation tactics of definition, relation, rhetoric and analogy will be used. The definitions of important terms in theoretical and case study parts will be made so as to “form the conceptual delimitation of the scope of the system as well as its contents”. They will be the building blocks for constructing the conceptual framework (Groat & Wang, 2002, p. 312).

The relational propositions between these definitions will be used for making the system coherent and will ensure the explanatory dependability of the framework. The

relationship between the terms will depend on *syllogistic framework*, which is constructed of a primary and secondary premise leading to a third and necessary conclusion. (A=B, A=C, therefore, B=C. In the same logic: Culture=Schema, Culture= Type, therefore, Type=Schema) (Groat & Wang, 2002, p. 312-316).

The research will also use the rhetorical tactics to "make sense", by forming links to the components of the system. It will use the rhetorical tactic of *association*, in which the cultural (discursive) treatises will connect to the larger transcendental realm of cognitive psychology. It will use the rhetorical tactic of *authority*, in which the authority of the system will depend on the "coherence of its argumentation and its explanatory power" and on the "connection to a larger body of literature saying related things" (Groat & Wang, 2002, p. 312-316).

The logical system will be constructed by the tactic *analogy*, in which "the new system is predicated upon a likeness between attributes and behavior of its contents and attributes of other metasystems" (Groat & Wang, 2002, p. 331).

In the first step, following the separate theoretical examination of the definitions and uses of culture and cognition, theoretical links will be established between them that bind cognitive schemas to culture to form the first keystone of the theoretical framework.

In the second step, the theoretical groundwork about cultural schemas will be compared with the separate literature on 'architectural type', and the *first theoretical inference* will be established based on the commonalities that exist between them. This connection will form the first proposition that will underlie the study, which assumes that architectural type exists as the 'cultural cognitive schema', which exists as the primary step of architectural design.

In the third step, the proposition on type's role in design and creativity will be associatively reflected and compared with the literature on 'cognitive theory of creativity'. Based on the observed commonalities between these two bodies of literature, the *second theoretical inference* will be established as a proposition about the 'cognitive use of type in architectural design and creativity', which will propose type as the primary cultural cognitive schema that operates in design'.

In the last step, the second theoretical proposition will be reflexively combined, compared and examined through the case study on Aga Khan Award winning dwelling projects in Turkey. This last step will test the implications of the theoretical sections through an in depth analysis based on contextual, archival and on site information.

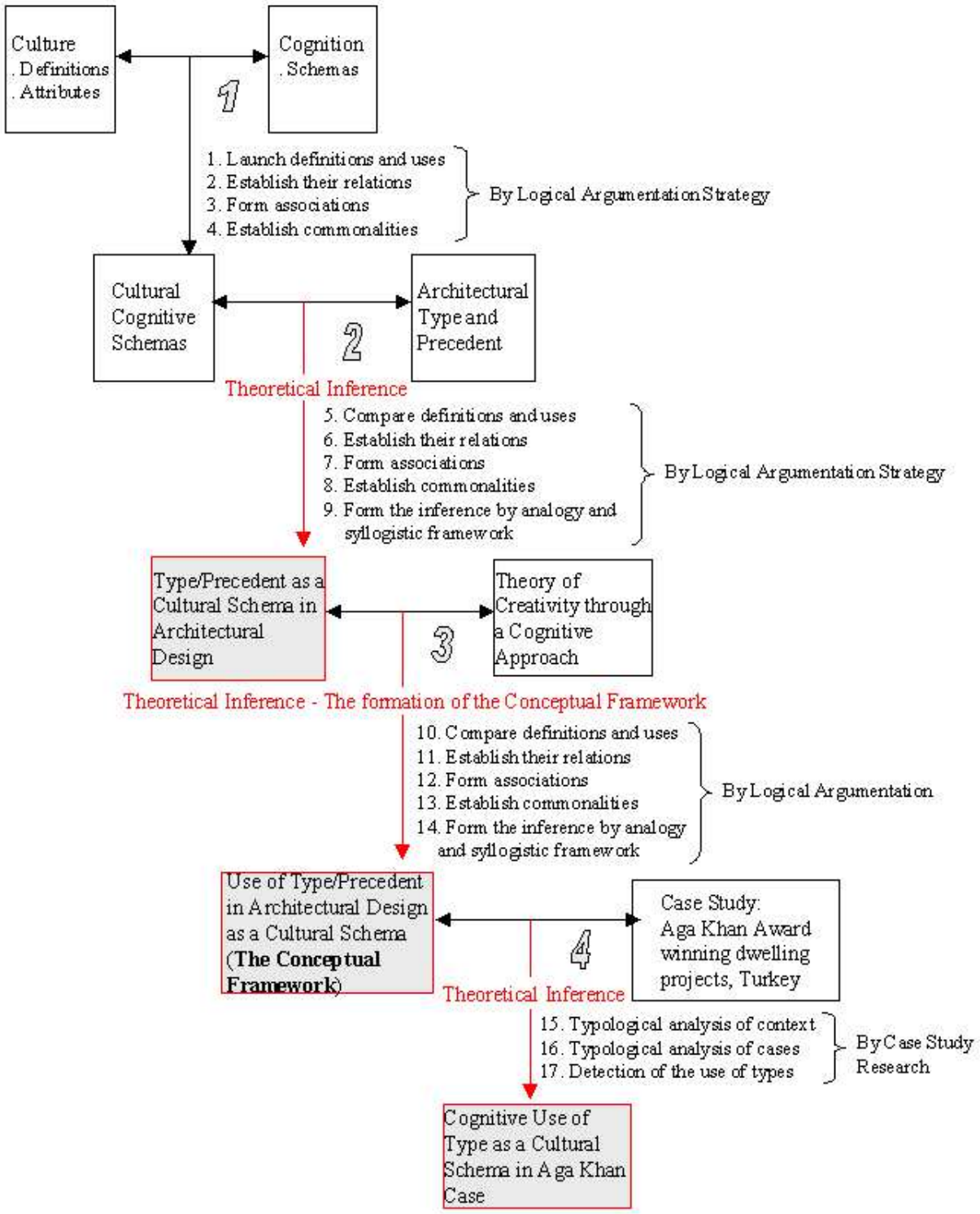

Figure 1.3. Research Design Diagram

1.4.2. STRENGHTS AND WEAKNESSES

One significant strength of logical argumentation research is that it is very useful in providing theoretical foundations for a range of empirical manifestations and in situating a large and diverse amount of theoretical literature into a single conceptual system. It acquires great explanatory power by its end product, which is the conceptual framework. Moreover, as the theoretical explanation is based upon internal consistency, the system is hard to refute (Groat & Wang, 2002, p. 334-335). This way, logical argumentation research provides this study a means for a *holistic approach,* which will let an in-breadth theoretical examination of the topic possible (Groat & Wang, 2002, p. 167). Furthermore, implementing a contextual approach, it will also have a wider focus, acknowledging the social and cultural context affecting creative cognition.

However a major weakness of this approach will be the lack of rigorous quantitative data. Neither the logical argumentation nor the case study research is testable and empirically evident. Thus the research will not be based on testable theories and solid empirical evidence. The interpretations will have to be personal and they will depend on personal emplotment. As the internal logical consistency does not guarantee accurate explanatory power, the measure of the accuracy of the theoretical part will be more flexible than what could be attained by other research strategies (Groat & Wang, 2002, p. 167). For this reason, the theoretical propositions will be tested with the attendant critical evaluation by way of the case study (Groat & Wang, 2002, p. 334-335).

The case study will attempt to illustrate the more generalized theoretical propositions attained by logical argumentation (Isaac & Michael, 1981, p. 48). As it will involve the contextual/cognitive approach, it will provide a level of detail and authenticity to the study. Having the strengths of the case study research, it will focus on the embeddedness of the case in its context, have the capacity to explain causal links, have the richness of multiple data sources and have the capacity of generalizability to theory (Groat & Wang, 2002, p. 341-360).

However it will also have the limitations of the same strategy, in which the causality might be multifaceted and complex; the challenge of integrating multiple data sources in

coherent way will be present; the procedure will be flexible as there are fewer established rules for it; and it will be limited in its representativeness because of its narrow focus (Groat & Wang, 2002, p. 341-360). Moreover, the selection of the cases might also appear as another limitation if it is not shown that the aim to prove the theoretical preconceptions does not direct their selection. In this research this limitation is tried to be overcome as the idea of proving the theoretical underpinnings by the case study is replaced by their rightful examination for an unbiased observation of the theoretical underpinnings. The case study will only present a picture where the theoretical interpretations could be observed.

1.4.3. DATA COLLECTION METHODS

For the theoretical part (steps 1, 2 and 3 in the research diagram) the study will depend on published information, such as books or journal articles, on the subjects of culture, cognition, architectural type and creativity. On the case study part (step 4 in the diagram), it will depend firstly on primary means, such as the physical examination and documentation of the buildings by direct observation, photographing and drawing; and on secondary means, such as the publications of Aga Khan Architectural Awards, archival study (the documents about the projects, such as the technical reviews, architect's and client's reports, project summary, graphic images and jury reports, attained from the archives of Aga Khan Trust for Culture) and field survey, in which the buildings are visited personally, documented by taking photographs and examined in accordance with the criteria of assessment established before field study.

1.4.4. DATA ANALYSIS

The data analysis in this study is made in two parts: the analysis of the theoretical information and the analysis of the case study. In the theoretical part, the information that is gathered on culture, cognition, type, creativity and architectural design is comparatively analyzed according to the logical argumentation research criteria as to detect the position and use of type in architectural design. As shown in the research diagram, the methods of logical argumentation research are used in the analysis, by bringing forward the 'definitions',

establishing their ‘relations by syllogistic framework’, forming ‘associations’ between them by ‘analogy’, expressing those relations by way of the ‘conceptual framework’ developed, and expressing them in ‘rhetorics’. Two main theoretical inferences are formed at the end of this analysis. The first is about the relationship between types and cultural-cognitive schemas; and the second is about the relationship between the use of types in design and the cognitive use of prior knowledge in creativity and architectural design. The first theoretical inference came about as the semblance of architectural types with cultural schemas and the second theoretical inference came about as the cognitive use of types in design as cognitive schemas that exist as the first stepping-stones towards new solutions.

In the case study part, these theoretical inferences about the use of types are observed and analyzed on Aga Khan Award winning dwellings from Turkey. The data collected about the cases by literature survey, archive search and field study are analyzed in several steps. For each case, firstly the architects of the buildings are studied so as to give their brief biographies and guiding principles in design.

Secondly, the physical contexts of the buildings are studied as of their geographical regions, their cities or towns and their sites. For this reason, the master plans, zoning legislations and the site plans are taken personally from the municipalities to be used in this analysis. Altogether, the climatic, geographical, cultural and architectural characteristics of the region are explained briefly.

Thirdly, the frames of reference of the buildings, which are the contexts of the reference dwelling types addressed in the designs of the buildings, are typologically analyzed so as to detect and record the types existing in those contexts. This typological analysis detected the characteristics and examples of these types present in the reference contexts and produced their schemas. In this analysis, basically the floor plans, sections and elevations are studied, as they are the most basic elements revealing the typological characteristics of the buildings.

Fourthly, the general characteristics of the buildings, such as the project specifications, resident characteristics and general formal/morphological characteristics are analyzed and explained in order to open them up for further analysis.

Fifthly, the buildings themselves are analyzed in terms of their design so as to see how the reference types are manipulated and changed in the course of their designs. The analysis is made on the site plans, floor plans, mass articulation (size and height), elevations, structure and materials, spatial qualities, and significant details such as color and ornaments. The typological analysis in particular, is based on basically the floor plans, sections and elevations of the buildings, as they are the most fundamental architectural tools that could show the morphology of the buildings, enabling us also the exploration of architect's thinking in the course of design. In this analysis, the qualities, which differentiate them from the traditional types, are brought forward as to reveal how those generic types are used and manipulated. Here, the reference types are compared with buildings so as to see their similarities and differences. This comparison enabled the detection of the methods and the level of transformation of the types in the design of the buildings.

Lastly, the assessment of the design of the buildings is made based on the level of creative contribution they have in their transformation of the reference types and according to their relationships and harmony with the context they are in. For the assessment of their creative contribution, the design strategies of the buildings are evaluated according to the cognitive theories of creativity.

1.4.5. QUALITY STANDARDS

Being an example of interpretivist / naturalistic paradigm, this study should be evaluated according to the quality standards devised by Guba for this paradigm[2], which are set as 'credibility' for truth value, 'transferability' for applicability, 'dependability' for consistency; and 'confirmability' for neutrality.

[2]The identifying characteristics of naturalistic paradigm was set by Guba as: the recognition of multiple realities; the assumption that generalizations are not necessarily possible in all instances; the understanding that a research design may emerge as the research proceeds; and the belief that the researcher and the respondent influence and are influenced by each other. (Groat & Wang, 2002, p. 37, 38)

1.4.5.1. CREDIBILITY

Credibility entails the idea of 'establishing truth value by taking into account the natural complexities inherent in the situation or circumstances being studied' (Groat & Wang, 2002, p. 38). Among the ways of enhancing credibility that are described by Guba, the possible ones that will be utilized for this study will be 'prolonged engagement at the site', which would be realized during the physical observation of the cases; 'persistent observation for identifying pervasive qualities as well as atypical characteristics', which would be realized in the investigation of the cases; 'peer debriefing', which would be realized during the course of research by interacting with other professionals and colleagues; 'triangulation', which would be realized by investigating a variety of data sources, investigators and different perspectives; and 'establishing structural corroboration or coherence', which would be realized by testing every interpretation against others (Guba, 1981, p. 84, 85).

1.4.5.2. TRANSFERABILITY

Transferability describes 'the extent to which the conclusions of one study can be applied to another setting or circumstance' (Groat & Wang, 2002, p. 38). As the theoretical study will emerge as a form of logical argumentation that inherently has 'broad systemic applicability', which is construed by framing of a conceptual system that has 'wide explanatory applicability' and 'universal explanatory power', transferability will depend in this study on the universality of the overall conceptual framework that I will propose. In terms of case study part of this study, the two ways devised by Guba, which are 'the collection of thick descriptive data' that will permit comparison of this context to other possible contexts and 'the development of thick description' of the context, which will provide a very detailed account of the circumstance and condition of the object of study, for making judgments about fittingness with other contexts, would be realized for enhancing transferability in studying the case developed on the cases.

1.4.5.3. DEPENDABILITY

Dependability is defined as a notion, which suggests that 'there is a fundamental consistency within the data', but there are also 'apparent instabilities arising either because different realities are being tapped or because of instrumental shifts stemming from developing insights on the part of the investigator as instrument of research' (Groat & Wang, 2002, p. 39). In the case of this research, dependability will tried to be enhanced by an 'audit trail', which will document the practical and reflective stages of the research process (Guba, 1981, p. 87).

1.4.5.4. CONFIRMABILITY

As Guba declares, confirmability of the data and interpretations of the investigator takes the place of objectivity for naturalistic paradigm (Guba, 1981, p. 87). The two techniques suggested by Guba to enhance confirmability, which are 'triangulation', that is collecting data form a variety of perspectives by using a variety of methods, and 'practicing reflexivity', that is intentionally revealing the underlying epistemological assumptions in the formulation of research questions and research statements (Guba, 1981, p. 87), will be utilized in the course of this research, both in the theoretical part and the case study.

CHAPTER 2

THE POSITION AND USE OF CULTURE AND CULTURAL SCHEMAS IN COGNITION

> *"Think of culture as a network of interrelated schema with analogies as the ties that create paths along which generalization and innovation occur." (Paul DiMaggio, 1997, p. 281)*

2.1. CULTURE: DEFINITIONS AND IMPLICATIONS

Culture is depicted as one of the most complicated words in English language. Coming from the Latin *coloere*, it emerges as a pre-modern term that covers a wide margin of meaning stretching from cultivating, tending and inhabiting to worshipping and protecting (Eagleton, 2000, p. 2). Originally, it refers to a process of cultivation as for the transformation of nature by human beings.

Until twenty-first century, it sees many shifts in its meaning. It becomes about sixteenth century that culture passes onto a new stage of meaning, which starts to denote the process of human development (Eagleton, 2000, p. 87). In the eighteenth century, the term culture comes to be synonymous with 'civilization', in the sense of a "general process of intellectual, spiritual and material progress" (Eagleton, 2000, p. 9). Coming to nineteenth century, its meaning shifts from being the synonym of 'civilization' towards being the antonym of it. Signaling the historic shift from rural to urban existence or from the 'traditional' to 'modern' social order, culture starts to symbolize what is stable (Eagleton, 2000, p. 10). While 'civilization' starts to denote an 'imperialist' meaning that becomes associated with mechanical, fragmented and utilitarian progress, culture becomes the name of a 'romantic critique of early industrial capitalism' and a holistic, organic and re-collective idea that is brought by modernity (Eagleton, 2000, p. 10).

This shift in the meaning of 'culture', from a 'progressive' implication to a 'static' one that denotes a meaning of an 'entity', is described by Raymond Williams as a "response to a society in the throes of a painful change", which is generated by the anxiety of the cultural dissolution that modernity brought about (as cited in Eagleton, 2000, p.11). From

then on ‘culture’ develops in the form of an anti-capitalist critique denoting specially ‘a distinctive way of life’ or a ‘specialization to the arts’ in general. In this respect, as opposed to the progressive, unanimous development of ‘civilization’, ‘culture’ comes to highlight the national differences (as cited in Eagleton, 2000, p.9).

In late nineteenth and early twentieth centuries, under the influence of German writer Herder, as well as the Romantic movement and the rise of nationalism, ‘culture’ comes to be associated with the specific and variable cultures of different nations and peoples’ – that is described the way of life of particular groups, peoples, nations or periods (Du Gay & Hall, 1997, p. 11). It is at this point that it starts to denote increasingly the ‘national culture’ (Elias, 1998, p. 230). As Terry Eagleton states, the flourishment and re-use of ‘culture’ in this period, results from nationalism’s aspiration of defining a stable national identity. ‘Culture’ here ‘provides the terms in which a group or people seeks its political emancipation or when an imperialist power is forced to come to terms with the way of life of those it subjugates’ (Eagleton, 2000, p. 25).

In early twentieth century, following Mathew Arnold’s prominent book *Culture and Anarchy*, the word ‘culture’ starts to refer to “a state of intellectual refinement associated with the arts, philosophy and learning”. Arnold uses ‘culture’ as “a pursuit of our total perfection by means of getting to know, on all the matters which most concern us, the best which has been thought and said in the world” (Arnold, 1869). This meaning persists today when culture is used to refer to the ‘high arts’ as compared to ‘popular culture’ (associated with the ordinary and unsophisticated knowledge) or mass culture (associated with the mass media) (Du Gay & Hall, 1997, p. 12).

It is in late nineteenth and early twentieth centuries that the current definition of ‘culture’ emerges, as associated with the rise of social sciences. Starting to outline its relation to ‘meaning’, the social definition of ‘culture’, emerges as “a description of a particular way of life which expresses certain meanings and values not only in art and learning but also in institutions and ordinary behavior” (Du Gay & Hall, 1997, p. 12). Here, all social practices are depicted to be organized through meanings, which make them operate as signifying

practices to be studied by giving greater emphasis to their cultural dimension (Du Gay & Hall, 1997, p. 13).

Today, different definitions of 'culture' reveal different theoretical bases for understanding and evaluating human activity. In dictionary, there are six different definitions for the noun 'culture':

1. Enlightenment and excellence of taste acquired by intellectual and aesthetic training
2. Acquaintance with and taste in fine arts, humanities, and broad aspects of science as distinguished from vocational and technical skills
3. The integrated pattern of human knowledge, belief, and behavior that depends upon the capacity for learning and transmitting knowledge to succeeding generations
4. The customary beliefs, social forms, and material traits of a racial, religious, or social group; also: the characteristic features of everyday existence (as diversions or a way of life) shared by people in a place or time
5. The set of shared attitudes, values, goals, and practices that characterizes an institution or organization
6. The set of values, conventions, or social practices associated with a particular field, activity, or societal characteristic. ("Culture", 2012)

Within these definitions, three broad categories of usage could be deduced as Raymond Williams puts it:

1. The independent and abstract noun which describes a general process of intellectual, spiritual and aesthetic development coming from eighteenth century
2. The independent noun whether used generally or specifically which indicates a particular way of life, whether a people, a period, a group or humanity in general, from Herder.
3. The independent and abstract noun, which describes the works and practices of intellectual and especially artistic activity. (Williams, 1983, p. 90)

Within these categories, the anthropological and sociological emphasis stands basically on the view of 'culture' "as whole way of life" and "the production and circulation

of meaning" (Lechte, 2003, p. 45). In archeology and cultural anthropology the reference to culture or *a* culture is principally to material production while in history and cultural studies the reference is primarily to signifying or symbolic systems (Williams, 1983, p. 91).

In anthropological perspective, 'culture' specifically describes the way of life of a certain people or group, which is reflected in all areas of society, such as language, religion, clothing, system of manners etc (Lechte, 2003, p. 45). More broadly, it gathers two meanings, which understand 'culture' either as

1. A distinct pattern of shared beliefs, customs, values, activities and things, which identifies attributes characteristic of a group of people. (eg. Japanese Culture); or
2. As the acquired knowledge human groups use to adapt to their environment such as shared knowledge, skills, values and intuitions. (Lawrence-Zuniga, 1997, p. 42)

Comprising all these different aspects, Kroebe and Kluckhohn define culture in a more comprehensive way as:

> "The collective name for all behavior patterns socially acquired and transmitted by means of symbols, constituting all the distinctive achievements of human groups, including their embodiments in artifacts by which intellectual and cultural features are given practical effect, such as buildings, tools, machines, art objects etc." (Kroeber & Kluckhohn, 1952, p. 65)

Looking into all these different definitions, a general definition yet could be made which covers all the major attributes of the term 'culture'. As it will be referred in the context of this study, culture is:

> "The system of shared knowledge, ideas, skills, beliefs, customs, behaviors and values, which humans acquire to cope with their world, to transmit from generation to generation by learning and express in the material systems of artifacts and the built environment". (Lawrence-Zuniga, 1997, p. 49)

Within these definitions the 'shared, taken for granted knowledge' appears as the most crucial characteristic of culture; which determines its function within society. As indicated, it becomes through these 'shared meanings and shared maps of knowledge' that culture enables people to 'make sense' of things around them; let them communicate and

formulate ideas. As Stuart Hall suggests people are able to communicate the way they do as they share the same conceptual maps, which let them interpret the world in similar ways. Members of the same culture think and feel about the world and understand it in similar ways on the basis of these shared sets of concepts, images, and ideas, or the same 'cultural codes'. This is what determines to 'belong to the same culture' (Hall, 1997, p. 4, 18). Thus, culture underlines the crucial role of the shared values, which construct the symbolic domain of social life (Hall, 1997, p. 2, 3) and it becomes through those cultural practices that the meaning in society is constructed and produced (Du Gay & Hall, 1997, p. 13).

2.2. THE POSITION AND USE OF CULTURE IN COGNITION

Cognitive theory and its view of culture, informs us about the cognitive processes and phenomena that are active in the processing and production of cultural information. As Sperber argues, there are two possible perspectives, which are both necessary and complementary, for the analysis of the use of culture in cognition: a cognitive perspective on culture and a cultural perspective on cognition (Sperber & Hirchfield, 1999, p. 117). In this section, both of these perspectives will be viewed successively in order to form an informed judgment.

Coming from Latin *cognoscere*, which is "to become acquainted with or to know", cognition is defined as 'the act or process of knowing' including both 'awareness and judgment' ("Cognition", 2012). Being concerned with the way, in which we perceive, understand, store and remember external stimuli and objects, cognitive science examines cognition and studies how human reason works in relation with these cognitive processes (Augustinos & Walker, 1995, p. 32).

As Nisbett et. al explains, starting from 18th and 19th centuries with British empiricist philosophers Locke, Hume and Mill, continuing to 20th century mainstream psychology with Jean Piaget and to modern cognitive science until lately, there was the persistent assumption that cognition and cognitive processes were universally the same for all normal adults (Nisbett, Peng, Choi & Norenzayan, 2001, p. 291).

An exception to this view was experimental psychologist Wilhem Wundt's, who thought in 1910's that 'when cultures and histories diverged, cognitive processes would also diverge' (Nisbett & Norenzayan, 2002, p. 3). Nevertheless, in 20th century, there were basically four assumptions about cognition, which accepted that:

1. Basic cognitive processes were universal for all the humans and every human being had the same set of attentional, memorial, learning, and inferential procedures.
2. These basic cognitive processes were working exactly the same for everyone.
3. The growing child was getting equipped with all the knowledge it needed via these cognitive processes that collected the information from the environment.
4. As the socio-cultural context of different human beings was different, the contents of their minds were eventually different. (Nisbett & Norenzayan, 2002, p. 2)

According to Nisbett et. al, this assumption of universality was strengthened by the computer analogy, which suggested that brain was the hardware, inferential rules and data processing procedures were the universal software, and output was the beliefs and behaviors, which were eventually different for different social groups. The basic cognitive processes, which are categorization, learning, inductive and deductive inference and causal reasoning, were thought to be identical in all human groups (Nisbett, Peng, Choi & Norenzayan, 2001, p. 291).

However, recent research showed that although some cognitive capabilities are still found to be universal, such as exemplar-based categorization, inductive and deductive reasoning, long-term memory and covariation detection, cognition changes according to different cultures. This affect of culture and social environment in cognition was left out of cognition studies until 1970's, which drew strong criticisms later. As Nisbett et. al explains, in contrary to this exclusion it was recently shown that culture and cognition affect and constitute each other reciprocally and as culture differs geographically, cognition differs cross culturally (Nisbett, Peng, Choi & Norenzayan, 2001, p. 291). As cultural practices use certain kinds of cognitive processes, those cognitive processes in turn maintain the continuation of those cultural practices (Nisbett & Norenzayan, 2002, p. 3).

This view that sees culture as fundamentally shaping thought has been central to modern cognitive anthropology ever since. However it had also its earlier proponents. One of them was the linguistic relativity or Sapir-Whorf hypothesis, which proved that the particular language people speak affected thought (Nisbett & Norenzayan, 2002, p. 6). The other was the prominent Russian School of Lev Vygotsky and Alexander Luria, which held the belief as early as 1930's that cognitive processes develop from practical activity which is 'culturally constrained and historically developing'. According to this view, cognitive activity was social as well as mental, and cognitive processes were developing in line with cultural tools, which were either symbolic, such as language, or material, such as architecture (Nisbett & Norenzayan, 2002, p. 10, 11).

This Vygotskian conception has created a contemporary research area, which is called 'situated cognition'. Situated cognition suggests that cognitive activity depends on the particular social context in which the activity takes place. Methodologically, it prefers to study the cognitive activity in its natural setting (Nisbett & Norenzayan, 2002, p. 10, 11). In general terms, it proposes that societies differ in their mindsets and argues that while different cultural groups show differences in their models of cognition, individual cognition also appears as greatly characteristic (Bracey, 1991, p. 714).

As an example to this proposition, the research of Oyserman et al. shows that societies socialize their members to be able to use collective or individual mind-sets dependent on context. It was found that in Western societies people focus first on decontextualized meanings (individual mindsets), whereas in Eastern societies they focus first on contextualized meanings (collective mindsets) (Oyserman, Sorensen, Reber & Chen, 2009, p. 217). Through surveys it was shown that East Asians and Westerners reasoned differently in accordance with their cultural upbringing (Nisbett, Peng, Choi & Norenzayan, 2001, p. 291-310). This way it was shown that in different societies, culture offers specific models for ways of thinking and behaving, and cognitive processes are shaped with the assistance of cultural elements (Ardila, 2005, p. 187-188).

For Nisbett et. al., this cognitive difference that is caused by cultural variation shows itself in three significant areas, which are 'differences in cognitive accessibility of a given

cognitive process', 'differences in the selection of the cognitive process according to a given problem', and 'differences in the invention of complex cognitive structures that are formed out of universal cognitive primitives' (Nisbett & Norenzayan, 2002, p. 28). This means that different cultures use different cognitive processes in different frequencies and this causes different cognitive structures to occur.

To put it in a nutshell, situated cognition proposes that differences in social context cause differences in cognition. In this sense, cognition is seen as contextualized, that is defined by social context, cultural artifacts, physical spaces, tasks, and language (Oyserman, Sorensen, Reber & Chen, 2009, p. 217). It is suggested on this basis that people operationalize mind-sets as cognitive schemas that involve content, procedures, and goals, which either decontextualize or contextualize meaning (Oyserman, Sorensen, Reber & Chen, 2009, p. 219).

Similar to this line of thought there also appeared another theory called 'distributed cognition', which was developed by Edwin Hutchins in the mid 1980s. According to that theory human knowledge and cognition are distributed across individual minds and artifacts and cognition develops by the interaction of the individual with his/her cultural environment. It states that cognition occurs as a process of information that results from an interaction with symbols in the environment (Nisbett & Norenzayan, 2002, p. 10-11).

In the late 1970's, the studies of categorization and category based reasoning, which was initiated by Eleanor Rosch, also had its take on culture's affective role on cognition, by suggesting that 'the basic level' categories, which are the most commonly used knowledge structures, were basically culture specific (Nisbett & Norenzayan, 2002, p. 15). Lately, cognitive anthropology has developed schema theory for a sufficient description of cultural symbols (Ross, 2004, p. 163).

Very recently, an area within anthropology called 'culture and cognition' has started to attract interest from interdisciplinary fields. In the last 30 years, combination of anthropology and psychology was already active and paying attention to the subject of culture and cognition's impact to each other. However, in the last 15 years or so, this field has specifically been defined to study culture in terms of its impacts on thinking and behavior

(Ross, 2004, p. 1). The field of 'culture and cognition' was defined as to refer to 'the way a given people view their world, the specific premises they hold, and the reasoning they use to arrive at conclusions based on these premises' (Rose, 1968, p. 9). Culture is studied in this context by 'explaining the system of rules the people attempt to apply in their daily activities' and describing 'the cognitive processes, which have become standardized' (Rose, 1968, p. 9).

In this field, journals such as *Culture and Psychology* (published first in 1995) and *Culture and Cognition* (published first in 2001) started to be published and particular research programs have been given a start, such as 'Culture and Cognition Program' in University of Michigan and 'Culture, Language and Cognition Program', in Northwestern University. These journals and research programs try to study culture in terms of the active cognitive processes and structures working for it and study cognition in terms of its relationship with and affect to the cultural context (Ross, 2004, p. 1).

To summarize, it could be suggested that, except the computational brand of cognitivism, there are basically two views in modern cognitive science today, which accept cognition successively as an internal mechanism or as a socio-cultural phenomenon. The first view is described as cognitive perspective (or cognitivism) and is concentrated on the symbol manipulation within the individual, not paying attention much to the surrounding sociocultural context. It states that human behavior is generated by mental models or representations, that is by "internal" resources. The second on the other hand is described as the sociocultural approach or the situated (and distributed) cognition, which regards the context in the development of cognition and states that participation between the shared environment / artifacts and people determines the cognitive development of individuals (Troadec, Zarhbouch & Frède, 2009, p. 486).

2.2.1. COGNITION FROM A CULTURAL PERSPECTIVE

As Edward Hutchins states, the first approach takes cognition as a mechanistic phenomenon in its own sake and puts culture in a peripheral role. Finding this approach as majorly flawed, Hutchins argues that studying cultural materials in laboratories as isolated from the cognitive processes of the larger cultural system makes them unrepresentative of

human cognition. For Hutchins, cognition can only be totally understood in the wild, that is in the cultural context it is in (Hutchins, 1995, p. 367).

In view of that and along with the latest studies, there appeared a third approach that goes beyond this opposition between cognitive and situated perspectives, which emphasize their connection by taking the individual as interacting with the environment through various symbolic structures, which are both “internal”, such as mental models, and external, such as cultural artifacts (Troadec, Zarhbouch & Frède, 2009, p. 495). In this view it is emphasized that cognition and culture act together in shaping the behavior of people and they are essentially unique to each social context (Raza, Kausar & Paul, 2006, p. 140).

Therefore, all in all, it became widely accepted today that cognition and thinking grows in a cultural context and that the operation of human minds is noticeably influenced by cultural processes. On these terms, knowledge is accepted both as a cognitive and a cultural phenomenon (Olson & Torrence, 1996, p. 9) and therefore, as a product and producer some of the knowledge out there, culture should be studied both in terms of the systems of social relations and in terms of the internal cognitive activity (Wertsch, 1985, p. 159). For that reason cognition and culture, and also their studies, are deemed interdependent.

As Norbert Ross argues, there are two main reasons for cognitive studies to include the study of culture and reciprocally cultural studies to include the study of cognition. The first is that culture does not exist as a separate entity outside people, rather it comes out of the cognitions of individuals and it influences how people think and act. And the second is that, because of the former fact, the cultural context in which those individual cognitions are formed has to be studied (Ross, 2004, p. 153). To put it in another way, culture itself is both an effect and a manifestation of human cognitive abilities and cognition occurs in a cultural context and uses the tools offered by culture, such as words, concepts or beliefs (Sperber & Hirschfield, 1999, p. 117). As Sperber argues in this framework, minds are not just informed and transformed by culture, but they are produced by culture, and they are produced differently by different cultures (Sperber & Hirschfield, 1999, p. 131).

Therefore, cognition and culture are mirror images in many ways. Culture in this sense, as Merlin Donald describes it, is

> "the collective component to cognition that cannot be contained entirely within the individual brain. It is the accumulated product of individually acquired knowledge that has initially been expressed in a form comprehensible to other members of a society, tested in the public domain, filtered and transmitted across generations." (Donald, 1998a, p. 11)

2.2.2. CULTURE FROM A COGNITIVE PERSPECTIVE

In this framework, cognitive structures of individual minds influence the culture that is produced and in turn the culture within which the individuals are in affects their cognitions (Donald, 1991, p. 10). The steady process of driving individual minds within an evolving culture and taking them under the influence of that culture is called as 'emergent enculturation' (Donald, 1998a, p. 11). In this process, culture forms the environment and in turn the individual contributes to this cultural environment. This interaction that fuses, maintains and allows the communication of culture is provided by "cultural transmission" (Ardila, 2005, p. 186). For Donald the byproduct of such a context is the 'public representational domain', which is the 'realm of expression' where the interaction of individual minds creates knowledge and custom, which are then shared by all members of the culture (Donald, 1998a, p. 11).

For Donald, human cognitive evolution starts at this point when the 'isolated minds' of people have evolved towards a 'collective mind', which started to express and represent itself by using cultural symbols (Donald, 1998a, p. 11). Donald's hypothesis is that modern human mind evolved through a succession of major adaptations, each of which led to a new representational system, such as speech, writing etc, and eventually to the invention of symbols which were used for representing reality (Donald, 1991, p. 3). This public representational domain is created by the cognitive system, which is contained both in the brains of individuals and in the representational systems shared by the collectivity (Donald, 1998a, p. 12).

Today, cognitive anthropology in general views culture as 'a pool of traits', that of mental representations, practices, or artifacts existing in a population (Sperber & Hirschfield,

1999, p. 126). However, in most anthropological research in the past (in 1960's), culture was taken as a homogeneous and coherent entity that existed as an integrated whole (Sperber & Hirschfield, 1999, p. 132). It was viewed as a "seamless web" that was unitary and internally coherent across groups and situations. This view however is challenged today. It is mostly accepted by recent works that culture is fragmented across groups and inconsistent across its manifestations. There is the current view of culture as a 'toolkit' or 'repertoire' that sees culture as "a collection of stuff that is heterogeneous in content and function" (DiMaggio, 1997, p. 264-267).

Today, it is proposed that culture exists in three different dimensions: as 'internal representation' that includes basically thinking and feeling, as the 'behavioral dimension' that includes the ways to behave and relate with others, and as 'cultural elements' that include the physical elements typical of a human group, such as clothes, ornaments, architecture etc (Ardila, 2005, p. 185). By combining these dimensions, Sperber explains that cultural facts are formed as "distributions of causally linked mental and public facts in a human population", which are distributed all through the population via interaction and communication and become what we recognize as cultural in the end (Sperber & Hirschfield, 1999, p. 126).

Supporting the view that sees culture as a collection, Roy D'Andrade, who is a major anthropologist forming the important views of the subject "culture and cognition', argues that the items of culture are complex cognitive molecules (or schemas as he calls them), which are in the form of cognitive particles, blended into different physical manifestations, disseminated within societies, shared widely across societies, and internalized differently in human minds (D'Andrade, 2001, p. 256).

D'Andrade, states that culture is a very large pool of information transmitted from generation to generation and learned through a slow process of guided discovery (D'Andrade, 1981, p. 179). By guided discovery, a person learns from other people, from society or environment, through formal or informal means, through observation or by being taught rules. Through this way a person learns 'culture' in terms of "the knowledge, belief, art, law, morals, custom, and any other capabilities and habits acquired by man as a member

of society" (D'Andrade, 1981, p. 179). In this sense, cultural information involves the manipulation of content-based information rather than formal symbol systems (D'Andrade, 1981, p. 179).

D'Andrade states that culture is the source of most of the shared representations and processes by which we think and it is for this reason that it has to be studied within the framework of cognitive science (D'Andrade, 1981, p. 182). For D'Andrade, to treat culture consisting only of ideas is a mistake, for cultural ideas are always fused to their physical manifestations, through which they are learned, communicated and performed (D'Andrade, 2001, p. 249):

> "Each of the cognitive molecules that make up the shared learnings of a society is in variable ways fused to physical events: as the physical sign of a symbol, as an artifact, as a culturally constructed object, as a conventional externalization, and to role behavior through institutionalization." (D'Andrade, 2001, p. 251)

Likewise, proposing an integrated view of human cognition like D'Andrade, Hutchins states that culture is not any collection of tangible or abstract things, but rather, 'it is a human cognitive process that takes place both inside and outside the minds of people, in which our everyday cultural practices are enacted' (Hutchins, 1995, p. 354). In line with the theory of distributed cognition, Hutchins describes cognition fundamentally as a cultural process and states that a significant part of culture is also formed by cognition (Hutchins, 1995, p. 354).

Therefore, as summarized by Norbert Ross, culture includes both the mental processes that are transmitted socially and also the products of human behavior, such as material goods, which in turn feed those mental processes. Therefore the material goods, individual mental processes and the cultural environment they are in are always in a continuous interaction (Ross, 2004, p. 61). Culture acts in this framework through the interaction of 'shared cognitive structures and supra-individual cultural phenomena', such as material culture, media messages, or conversation, which trigger those structures to a certain degree (DiMaggio, 1997, p. 264). As Ross describes it on these terms, culture appears as:

> "the distribution of shared individual cognitions and representations and an emerging phenomenon evolving out of shared cognitions that themselves arise out of individual interaction with both the social and the physical objects (natural as well as artificial)." (Ross, 2004, p. 8)

This way, culture acts as an interpretive tool that directs attention and perception for individuals living in a society. As Markus et al. states, due to culture, meanings and representations that we use to communicate with each other are distributed across both in the minds of the meaning makers and in the products of the world (Markus & Hamedani, 2007, p. 9). Therefore, culture can be studied effectively in this context as the sum of mental representations, their public expressions and resultant behaviors in certain contexts (Medin, Unsworth & Hirschfield, 2007, p. 618).

2.2.3. COGNITION AND REPRESENTATIONAL STRUCTURES

The central hypothesis of cognitive science that still persists today suggest that thinking can best be understood in terms of representational structures in the mind and computational procedures that operate on those structures. While there is much disagreement about the nature of the representations and computations that constitute thinking, the central hypothesis still encompasses the current range of thinking in cognitive science.

As suggested by Stuart Hall, representations about the world are active in guiding our thinking and structuring our thought (Hall, 1997, p. 2). In other words, how we give things meaning are determined by how we represent them. Through systems of representation, such as the language or the cognitive maps, the stimuli is processed, the meaning is produced, consumed and reproduced (Hall, 1993, p. 17).

As explained by Dan Sperber, a representation establishes relationship between at least three terms: that which represents, that which is represented, and the user of the representation (Sperber, 1996, p. 32). If a representation exists inside its user, then it is called a 'mental representation', such as a memory, a belief or an intention. If the representation exists in the environment of its user, such as a text, then it is called a 'public representation'. In mental representation, the producer and the user of the representation are the same, in

public representation however, they are usually different. Contrary to mental representation, a public representation may have several users (Sperber, 1996, p. 32).

As Sperber states, mental representations constitute an individual's knowledge. Among these representations some are communicated frequently, distributed throughout the society, and thus have mental versions in most of the members of the society. These kinds of mental representations that are widely shared by the members of society are described as 'cultural representations'. As defined by Sperber cultural representations exist as a "fuzzy subset of the set of mental and public representations inhabiting a social group" (Sperber, 1996, p. 33).

Mental representations are formed and transformed by individual mechanisms and in turn inter-individual mechanisms cause the transmission of those representations through modifications of the environment (Sperber, 1996, p. 50). Formed by living experience, they exist as the products of our prior knowledge, which is acquired from cultural and contextual information. It is argued that through these mental representations, prior cultural knowledge influences perception, pattern recognition, assignment of meaning, and the reflexive production. Knowing what we see and how to look depends in this context on the knowledge we have. Cultural knowledge in this framework influences how we look for things to perceive. It is suggested on these terms that through mental representations, prior cultural knowledge permits the perception to occur, guides our perception of new information and enables conceptual production.

As Steven Pinker states, our everyday ease in generalizing or knowledge bears evidence that we have several kinds of mental representations inside our heads (Pinker, 1999, p. 89). Defined as the structures or processes in the mind that stands for *things*, mental representations are deemed crucial for explaining how the mind works (Thagard, 2005, p. 232). Along this line, most work in cognitive science assumes that the mind has those mental representations as analogous to computer data structures, and computational procedures similar to computational algorithms.

Cognitive theorists have proposed that the mind contains certain types of mental representations, which are the 'concepts', 'propositions', 'productions', 'scripts',

‘prototypes’ and ‘schemas’, and that it uses certain mental procedures such as ‘categorization’, ‘deduction’, ‘search’, ‘matching’, ‘analogy’, ‘rotating’ and ‘retrieval’. Those mental representations are proposed by theorists as the ‘building blocks of cognition’, which make up the information stored in long-term memory (Bruning, Schraw, Norby & Ronning, 2004, p. 47).

Viewed as the primary initiator of the building blocks of cognition, ‘categorization’ is defined as the cognitive process, which is crucial to human reasoning through its fundamental function in the reception and analysis of information. It refers to “how we identify stimuli and group them as members of one category, similar to others in that category and different from members of other categories” (Lakoff, 1987, p. 34).

As suggested by Augustinos and Walker, whenever we identify or label an object, we categorize it and we do this almost automatically with no conscious effort (Augustinos & Walker, 1995, p. 71). We respond to coming stimulus according to our past learning and categories. Categories let us simplify structure and impose order on the complexity of the stimulus world. This way they enable us to expect future behavior and experiences and to communicate more effectively (Augustinos & Walker, 1995, p. 71). In this sense categorization is accepted as “one of the most basic functions of living creatures, which is fundamental to perception, thought, language and action” (Mervis & Rosch, 1981, p. 89). As Mervis and Rosch argue, all models of categorization include abstraction in which the cognitive system acts "creatively" by using new categorical information in classifying the novel input (Mervis & Rosch, 1981, p. 103).

Representations and cognitive models that structure our thought are formed by way of categorization (Lakoff, 1987, p. 8). Cognitive models of use, such as concepts, propositions, productions, scripts, prototypes and schema, and cognitive tools, such as analogy and metaphor, are the outcomes of the cognitive ability of categorizing stimuli. It becomes through categorization that the common denominators of information are derived and therefore could be abstracted and molded into the structure of concepts, prototypes and schemas.

As an important kind of mental representation, ‘concepts’ are defined as the mental structures by which we represent meaningful categories. Particular objects are grouped together on the basis of perceived similarities: those that ‘fit’ the category are examples of the concept (Bruning, Schraw, Norby & Ronning, 2004, p. 45). Defined by Thagard as the mental representations of a class of objects or events that belong together, concepts partly correspond to the words in spoken and written language. They can be viewed as sets of typical features, whose application is a matter of getting an approximate match between themselves and the world (Thagard, 2005, p. 230).

‘Propositions’ are defined as the smallest units of meaning that can stand as separate assertions. They are more complex than the concepts they include. Where the concepts are the relatively elemental categories, propositions can be thought of as the mental equivalent of statements about the relationships among concepts (Bruning, Schraw, Norby & Ronning, 2004, p. 47).

‘Productions’ are the condition-action rules- if/then rules that state an action to be performed and the conditions under which that action should be taken (eg: production A: if car is locked, then insert the key in lock; production B: if key is inserted in the lock, then turn key).

‘Scripts’ are the schema representations for events, such as the script of the commonplace event of going to a restaurant or a movie.

‘Prototypes’ on the other hand, are defined as the better examples of categories, representing them in a most exact way better than the other members found in those categories (Rosch, 1973, p. 328-350). Developed by Eleanor Rosch, *prototype theory*, suggested the importance of prototypes in the understanding of categories and the presence of human capacities that are functioning in the formation of those categories. Rosch and other researchers have proposed that people learn category memberships through prototypical instances, the best examples of categories, before they learn the less typical ones.

Rosch argued that although all members of a category are related by ‘family resemblance’, prototype is the most basic and most cognitively efficient level of categorization (Mervis & Rosch, 1981, p. 92). Described as the basic level categories,

prototypes act as cognitive reference points, which are taken by people as to be more representative of a category than other members. For example, sparrows are considered as ‘better examples’ of the category ‘bird’ than penguins. On this basis, when the objects are similar to prototypes, they are recognized more rapidly than other members of categories at other levels (Mervis & Rosch, 1981, p. 92). Similarly, when the objects do not possess the central attributes of a category that are carried by prototypes, they are likely to be evaluated as unfamiliar to that category.

As Thagard indicates, psychological and computational interest in the nature of concepts boomed in the mid 70’s when researchers introduced terms such as ‘frame’, ‘schema’, and ‘script’ to describe the new view of the concepts. During 1970’s Minsky proposed that concept-like frames are the central forms of knowledge representations, and other researchers in artificial intelligence and psychology discussed similar structures called *schemas* and scripts. Psychologist David Rumelhart (1980) described knowledge in terms of concept like structures called ‘schema(s)’, or ‘schemata’ (plural form of schema), that represent, not the essence of a concept (like *dog*), but what is typical of it (Thagard, 2005, p. 60).

In the last two decades cognitive anthropologists proposed that it is the larger knowledge structures, which are ‘cultural schemas’ or ‘cultural models’, that provide continuity and coherency within a culture's systems of belief (Sperber & Hirschfield, 1999, p. 118-119). As Holland and Quinn argue, cultural knowledge is thought to be organized in sequences of these cultural schemas, or cultural models as some call it, that are also hierarchically connected to other cultural knowledge (Holland & Quinn, 1987, p. 7). As stated by DiMaggio, individuals are thought to experience culture as disparate bits of information, which are carried by schematic structures that organize this information. Culture is thought to be transferred as such by institutions and networks, which diffuse, activate, and select among its available cultural schemata (DiMaggio, 1997, p. 263).

2.3. CULTURAL SCHEMAS: THEIR USE IN COGNITION AND IMPLICATIONS FOR CULTURE

2.3.1. DEFINITION OF COGNITIVE SCHEMAS

'Schemas' are basically defined as conceptual structures, which represent our knowledge of objects, situations, events, actions and sequences of action (Wertsch, 1985, p. 154). They are described as the mental frameworks that we use to organize our knowledge, such as a program, which identifies objects or events on the basis of pattern recognition (D'Andrade, 1992, p. 28). As the subset of concepts, they are described as the hypothesized data structures that represent the knowledge stored in memory. They are presumed to serve as 'scaffolding' for organizing experience by controlling the encoding, storage and retrieval of information (Bruning, Schraw, Norby & Ronning, 2004, p. 22, 23). Delineated both as 'conceptual structures' and 'cognitive processes', schemas allow human beings to "store perceptual and conceptual information about the world and make interpretations of events through abstraction" (Derfer, 1995). As such, they operate both in the meaningful and effortless reception of information and also in the analysis and placement of it.

Schemas are utilized as coherent and abstract knowledge patterns that work for the cognitive activities of perception, evaluation and memory. As domain organized knowledge structures in long-term memory, they direct perception and attention, permit comprehension and guide thinking. Through this way they show the effect of prior knowledge and frames of reference in understanding / interpretation of incoming information and in creating new ones (Bruning, Schraw, Norby & Ronning, 2004, p. 6, 22, 23). As D'Andrade suggests, characterizing something as a schema implies that it contains "a distinct and strongly interconnected pattern of interpretive elements" that "can be activated by minimal inputs". On this basis schema is also accepted as an interpretation that is well organized, memorable and easy to activate (D'Andrade, 1992, p. 26).

In 'The Emergence of Meaning through Schematic Structure' by Mark Johnson, 'cognitive schemas' are defined specifically as the "embodied patterns of meaningful experience that emerge as recurrent structures based basically on the bodily experiences, our manipulation of objects, and our perceptual interactions with environment" (Johnson, 1987,

p. 29). As the word pattern suggests it, they are seen as cognitive structures that have in themselves abstract yet coherent and meaningful configurations. This coherent and abstract pattern of schemas is utilized as the initial structure for the cognitive activities of perception, evaluation and memory. Working as such, they both control the taking of information and the reflection upon it. In Mark Johnson's words, they act both "as patterns of action as well as patterns for action" (Johnson, 1987, p. 21).

Likewise, Augustinos and Walker define schemas as the cognitive structures that contain "the general expectations and knowledge of the world", which lend structure to the organization of the complex information in a meaningful way, so that we can use that information readily when needed (Augustinos & Walker, 1995, p. 32). As Johnson did, Augustinos and Walker also state that schemas act as abstract knowledge structures that both control the taking and processing of information, and also the inference and evaluation of it (Augustinos & Walker, 1995, p. 32). Being the existing knowledge structures, they basically act for the purpose of 'familiarizing' and 'contextualizing' social stimuli. This process of familiarizing novel or strange stimuli by comparing them to existing schemas, is called by Augustinos and Walker as 'anchoring'. During the anchoring of novel information, schemas guide the identification and organization of the new experience by providing the basic diagrammatic context of meaning, which is utilized in matching and comparing the incoming stimulus. In this process, they act like the "mental short cuts we use to simplify reality", by providing us some expectations about the social world. This way they guide us how and what we perceive, remember and infer (Augustinos & Walker, 1995, p. 68, 95).

2.3.2. SCHEMA THEORY

Schema theory gives emphasis basically to the role of an individual's prior knowledge in comprehension and in the process of meaning making. It suggests that individuals use such mental structures to understand new experiences, to select and process incoming information from social environments (Augustinos & Walker, 1995, p. 68). On this basis, the most significant function of schema is considered to be its offering organization to 'new

experience' by way of utilizing the prior knowledge (Augustinos & Walker, 1995, p. 43, 51, 110).

As explained by McVee et al., the concept of 'schema' is considered to be defined first by philosopher Kant in his work *Critique of Pure Reason* in 1781. Kant defined schema as an organizing structure that mediated the relation between the external world and internal mental world. He described it as a lens that 'both shaped and was shaped by experience'. For him, schema existed as a form of 'bias inherent in the mind' (McVee, Dunsmore & Gavelek, 2005, p. 535).

The second important scholar in the development of the concept of schema was F. C. Bartlett, whose work *Remembering* is cited widely as the source of the term by schema theorists. As McVee et al. explains it, Bartlett used the term schema first in 1932 and carried out experiments in order to investigate schemas as cultural constructs in memory. Bartlett saw schemas not just as 'in the head' phenomena but as an intermediate structures that constituted transactional relationships between the individual knowledge and cultural environment. For Bartlett schemas were the agents that showed "the constitutive role of culturally organized experience in individual sense making" (Bartlett, 1995).

French scholar Jean Piaget was also another important scholar in the development of schema theory. In his structuralist theory about the origin and development of cognition that he first published in 1952, Piaget asserted that human development existed as a dialectic process where the individual either assimilated new experience to his present schemas or changed his schemas to match his experience (Piaget, 1952). Piaget describes the evolution of schemas in three steps:

1. Assimilation, where an individual uses their existing schemes to make sense of a new event. This process involves trying to understand something new by fitting it into what we already know.
2. Accommodation, which is the change of existing schemas to respond to a new situation. If new information cannot be made to fit into existing schemas, a new, more appropriate structure must be developed. There are also instances when an individual

encounters new information that is too unfamiliar that neither assimilation nor accommodation will occur because the individual may choose to ignore it.

3. Equilibration, which is the complex act of searching for the balance in organizing, assimilating, and accommodating. It is the state of disequilibrium that motivates us to search for a solution through assimilation or accommodation. (Piaget, 1952)

These theories had in common the view that schemas were formed as a result of the transaction between the individual and the socio-cultural environment. Thus, they are thought to appear as a product of culture. This affect of culture in schemas however was not very much emphasized in the schema theory of 1980's (McVee, Dunsmore & Gavelek, 2005, p. 536). As explained by Augustinos, in 1980's, researchers who were exploring social cognition attempted to find out the mechanisms by which people understand their social world, how they represent social information in memory and how this new information is integrated with existing knowledge. They wanted to find out how people were processing, interpreting and understanding complex social information and they explored concepts such as schemas, categories and stereotypes with this intention. They argued that people understood and processed social information "by simplifying and organizing this information into meaningful cognitive structures called cognitive schemas" (Augustinos & Walker, 1995, p. 67-68). In these studies, schema came to be associated by many other terms that have slight variations from it, such as cultural model, mental model, idealized cognitive model, folk model, script, scene and frame (Derfer, 1995).

As McVee et al. explains it, schema theory first reached to its height of importance and generated most of its theory and research during the 1970s and 1980's (McVee, Dunsmore & Gavelek, 2005, p. 531). The contemporary concept of schema was developed basically in 1970's as the result of the studies made in cognitive science. D. E. Rumelhart, who is acknowledged as one of the founding scholars of the theory, has defined schema in 1977 as "data structures for representing the generic concepts stored in memory'. For Rumelhart and Ortony, schemas existed "for generalized concepts underlying objects, situations, events, sequences of events, actions, and sequences of actions" (Rumelhart & Ortony, 1977, p. 110). They are considered to hold light to how the existing information

interacts with new information in the cognitive processes of perception and memory. Furthermore, Eleanor Rosch's theory about categories and prototypes in 1977 and Mark Johnson's theory about the role of schemas and metaphor in reasoning in 1980 also had their impacts for the development of schema theory (Derfer, 1995).

Most of the early works on schema theory were conducted in 1970's by cognitive scientist, such as Marvin Minsky and Schank & Abelson, who attempted to explore the construction of knowledge via the computer metaphor. In these studies schemas were usually portrayed as fixed and rigid mental structures (McVee, Dunsmore & Gavelek, 2005, p. 537, 538). The schema theory that was developed in 1970's and 1980's asserted that meaning was accumulated in mental structures and schema development occurred due to the reorganization of these existing mental structures. According to this theory new schemas were formed only by way of analogy or the reorganization of the existing schemas. What was lacking in this theory was the initial source of schemas (McVee, Dunsmore & Gavelek, 2005, p. 542).

However, in 1980's, an increasing consideration of social factors, such as the affect of culture and language in cognition, has emerged in the field, especially with the works of Vygotsky being more available in English (McVee, Dunsmore & Gavelek, 2005, p. 540). Socio-cultural theories, and especially the works of Vygotsky, started to bring in the role of language, social interactions and their reciprocal interaction with the cultural environment in the individuals' meaning-making processes. Therefore, in late 1980's, there happened to be a discrepancy in schema theory between the cognitivist view of schema as an in the head phenomenon and the sociocultural view that saw it as existing beyond the individual and within the social and cultural community of the individual.

The cognitivist view or the computational model of mind of most cognitive science in 1970' and 80's has portrayed the individual-knower as distinct from the world that is to be known. The individual represented the world through his/her mental representations. In this view, the knowledge of the individual was distinct from his/her socio-cultural context and the emphasis was placed on the cognitive structures and processes of the individual. What this

theory lacked was obviously the constitutive affect of the social environment (McVee, Dunsmore & Gavelek, 2005, p. 541).

In contrast to this view, the socio-cultural, or transactional theories as some call it, have argued that the "knower and the known, the person and the environment, are mutually constitutive of each other" (McVee, Dunsmore & Gavelek, 2005, p. 542). In this understanding, the meaning is considered to exist not just in the mind but also in the world; existing in the form of the relation the person has with his/her cultural environment (McVee, Dunsmore & Gavelek, 2005, p. 546):

> "Meaning includes patterns of embodied experience and preconceptual structures of our sensibility (i.e., our mode of perception, or orienting ourselves, and of interacting with other objects, events, or persons). These embodied patterns do not remain private or peculiar to the person who experiences them. Our community helps us interpret and codify many of our felt patterns. They become shared cultural modes of experience and help to determine the nature of our meaningful, coherent understanding of our "world."" (Johnson cited in McVee, Dunsmore & Gavelek, 2005, p. 546)

This view had very important openings for the conceptualization of the origins of the cognitive representational structures such as schemas. It portrayed that schemas are formed by means of the social interaction with the socio-cultural environment that the individual is in and they are essentially "cultural historical constructions that emerge only within the individual through transactions with others". This idea is in line with Vyogotsky's 'general law of cultural development' (McVee, Dunsmore & Gavelek, 2005, p.545).

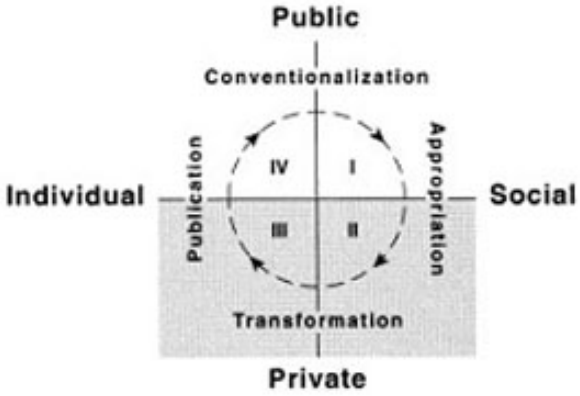

Figure 2.1. Vyogotsky Space (McVee , Dunsmore & Gavelek, 2005, p. 548)

As McVee et al. explain it, Vyogotsky demonstrates this theory by the diagram called 'Vygotsky space' (Figure 2.1). In this diagram there are two dimensions, which are the public-private and social-individual axes, that form the four quadrants which are the (1) public-social, (2) private- social, (3) private-individual, and (4) public-individual spaces.

According to the theory, a person's cognitive processes and structures originate and develop through quadrant 1 to quadrant 4, by experiencing different transitions in each quadrant. In quadrant 1, 'appropriation' takes place, in which "an individual appropriates certain ways of thinking acquired discursively in interaction with others. In quadrant 2, 'transformation' takes place, "in which an individual transforms and takes ownership of these previously appropriated ways of thinking". In quadrant 3, 'publication' takes place, "in which an individual goes public or makes observable through talk or actions, or both, his or her thinking that was previously private". And in quadrant 4, 'conventionalization' takes place, "in which the process whereby these public ways of thinking become conventionalized as part of the individual's own thinking and that of others". This diagram shows that knowledge construction occurs by the interaction between the public-private and social-individual spheres. For McVee et al., the origins and development of schemas follows this route, which basically results from the interaction of the person with his socio-cultural sphere (McVee, Dunsmore & Gavelek, 2005, p. 547).

Schema theory continued to develop in late 1980's and 1990's under the affect of these approaches (McVee, Dunsmore & Gavelek, 2005, p. 532). Although in recent years, some other terms such as the existing knowledge, topic knowledge or prior knowledge is getting used instead of 'schema' (McVee, Dunsmore & Gavelek, 2005, p. 534), schema theory is still important for the understanding of cognition as it shows the importance of prior knowledge and experience for the interpretation of new information. It shows how prior knowledge can shape the interpretation of new experience (McVee, Dunsmore & Gavelek, 2005, p. 538).

Today, it is generally acknowledged that 'schemas'[3] do not exist as isolated phenomena within the individual but exist as part of a social-cultural process, which is both public and private (McVee, Dunsmore & Gavelek, 2005, p. 532, 533). As suggested by McVee et al., our individual schematic understanding of the world is determined by, but not limited to, our socio-cultural transactions with the world. Schemas are formed and transformed as a consequence of these transactions with the world by means of material and ideational processes. According to McVee et al., the people who have a "broad repertoire of these ideal and material tools and a great command of that repertoire will be able to use this knowledge to their advantage" (McVee, Dunsmore & Gavelek, 2005, p. 556). In this sense, by controlling our interpretation of culture and getting shaped by that culture, schemas form the necessary linkage between culture and mental structure (McVee, Dunsmore & Gavelek, 2005, p. 550).

2.3.3. CHARACTERISTICS OF SCHEMAS

As summarized from the works of various important scholars of the subject, such as Rumelhardt or Augustinos and Walker, basic characteristics of schemas are listed below:

1. Schemas are 'theory driven structures':

As Augustinos and Walker suggests, an important part of our information processing relies on our prior knowledge, that is it is theory driven rather than data driven. This form of

[3] In this study, the plural of the word 'schema' is used as 'schemas' instead of 'schemata', according to the suggestions of the Publication Manual of the American Psychological Association (5th ed.).

processing starts with the comparison of incoming information with the existing schema. If there is a good match between the schema and the information, then the process continues with the imposition of the constitutive elements of schema onto the information (Augustinos & Walker, 1995, p. 73, 74). As Cerulo states, in this fashion, schemas sort out new data to enable the brain to connect new information to the prior knowledge. The brain 'normalizes' the new representations to fit in and conform to the active schema (Cerulo, 2002, p. 8). Here the schema provides both the context of meaning, its organization and its internal representation. This way schemas provide us "expectancies that guide the processing of information" (Augustinos & Walker, 1995, p. 73, 74).

2. Schemas are subject to automatic cognition (or categorical processing) rather than deliberate cognition (or data driven processing):

As DiMaggio states, between the two types cognition that are used for organizing information, which are the automatic and deliberate cognition, schemas act in and control automatic cognition in a routine and mechanical way by facilitating the understanding of things in a short time. As described by DiMaggio, automatic cognition is the routine, everyday cognition that is "implicit, unverbalized, rapid, and automatic" (DiMaggio, 1997, p. 270). It contains "rapid, effortless, and unintentional thought", which enables us to process information faster without much analysis (Harvey, 2010, p. 191). It is agreed upon that automatic cognition depends greatly and uncritically on culturally available schemata.

As argued by Augustinos and Walker, when the incoming information is unambiguous and relatively unimportant to the person, automatic cognition or, in other words categorical processing, is used in its processing. On these terms, this mode of processing is described as the default option in thinking, as it is much effortless, fast and efficient, where the person basically uses heuristic shortcuts and stereotypic expectations.

As schema consistent information does not require in depth processing; the information is processed automatically and the spare cognitive capacity left is used efficiently for processing time consuming and difficult information (Augustinos & Walker, 1995, p. 45). In this sense, DiMaggio calls this mode of cognition as 'highly schematic cognition' and describes it as "the realm of institutionalized culture, of typification (mental

structures), of the habitus, of the cognitive shortcuts that promote efficiency at the expense of synoptic accuracy" (DiMaggio, 1997, p. 269-270).

The other mode of cognition on the other hand, which is deliberate cognition, or data driven processing, is described as the "slow, considered, and measured thought" (Harvey, 2010, p. 191), which is "explicit, verbalized, slow, and deliberate" (DiMaggio, 1997, p. 260). As argued by Augustinos and Walker, this mode of cognition is used for thinking about important and ambiguous information and people use it only if they have to, such as when they are thinking about a serious problem, when they are dissatisfied with the status quo or when the existing schemas fail to solve the problem at hand (DiMaggio, 1997, p. 271-272), since it is slow, cognitively demanding, effortful and intentional (Augustinos & Walker, 1995, p. 76, 77). It requires critical, reflexive thinking that overrides the shortcuts of existing schemas stored in the brain by looking for different connections, relations, and expectations (Harvey, 2010, p. 191). Through this way, the individuals go over the structures of schemas towards a creative mode of thinking by way of transforming, elaborating or rejecting the existing structures of schemas. However such overrides are considered to occur generally rare since deliberate cognition is a harder and inefficient way of thought as it refuses the shortcuts that are provided by automatic cognition (DiMaggio, 1997, p. 271-272).

3. Schemas are energy saving devices:

As argued by Augustinos and Walker, schemas reduce the amount of cognitive effort spent for processing information as they save us from paying attention to every detail (Augustinos & Walker, 1995, p. 75, 76). They act as short-cuts by the use of heuristics during the processing of information. By simplifying and structuring the stimulus world for us, they enable us to process information in a shorter amount of time, which results from our need to use our limited cognitive capacity efficiently (Augustinos & Walker, 1995, p. 42, 75, 76). As Jansson et al. state, this way they basically provide a cognitive economy for us in our information processing (Jansson, Condoor & Brock, 1992, p. 258).

4. Schemas facilitate memory:

As stated by Augustinos and Walker, a good stimulus match to a schema facilitates the overall recall of information. As schemas guide the encoding and retrieval of information,

the schema consistent material is easier to encode and retrieve from memory and it takes less time to process it (Augustinos & Walker, 1995, p. 76, 77). Because of this, schema consistent material is better recalled and remembered than schema inconsistent material. As DiMaggio states along this line, people perceive information more readily if it is consistent with existing schemas and they remember schema consistent information much faster and more accurately. However it is also a fact that people may also falsely remember schema consistent events, which actually did not take place (DiMaggio, 1997, p. 271-272).

5. Schemas are evaluative and affective structures:

As schemas provide a context for meaning making and interpretation, they affect the evaluation and interpretation of our experiences (Augustinos & Walker, 1995, p. 78).

6. Schemas are hierarchically organized:

It is accepted by many scholars that schemas are embedded hierarchically within one another and they are stored in different levels of abstraction. While the more concrete ones are stored at the bottom, the more general ones are stored at the top (Rumelhart, 1984, p. 169).

7. Schemas are social in origin:

As stated by Augustinos and Walker, schemas are not just internal mental templates but they are "shared meaning systems that are shaped by cultural, historical, and political factors" (Augustinos & Walker, 1995, p. 110). They are considered to be attained in time from direct and indirect experience of the social environment. People collect a large repertoire of schemas from the environment, which they create by cognitively forming links between related phenomena and storing them as structures. Whenever one component is triggered, the whole schema becomes instantiated.

8. Schemas are stable and resistant to change:

It is known that schemas are hard to change. While, small inconsistencies with the schemas are generally tolerated and cause minor adaptations, only big contradictions can change the schemas (Augustinos & Walker, 1995, p. 81).

9. Schemas define the existence of a relation between components:

As Nisbett and Norenzayan explain, if something is ‘built into a schema’, it means that how its parts relate to each other and to the whole is already specified. Schema basically determines how the components are related to each other (Nisbett & Norenzayan, 2002, p. 5, 6).

10. Schemas are both structures and processes:

Schemas are considered both as structures and processes because the process of interpretation that is brought about by schemas takes place due to the physical structure of schemas (Derfer, 1995).

11. Schemas have a range of ‘slot values’:

It is argued that schemas can act as both structures and processes because they offer the abstract representations of information, which are stored in a range of ‘slots’. Schemas are assumed to contain slots, which hold the contents of memory as a range of slot values. These slots are thought to be filled in by specific experiences. When there is a near match between a schema and incoming information, where some of the slots are not filled in, the schema fills in that information by itself by ‘default values’. For example if we see a cat from the front, we assume that it has a tail behind without having the need to see the back, since the cat schema that is activated fills in that information for us (Derfer, 1995).

Therefore, the knowledge is perceived, encoded, stored and retrieved according to the slots in which it is placed. Whenever a particular configuration of slot values is linked with the representation of variables of a schema, the schema is said to be *instantiated*. Instantiation molds the information into a ‘familiar’ form. The information that is recalled through the ‘familiar structure of schema’ is said to be re-created by the individual (Bruning, Schraw, Norby & Ronning, 2004, p. 50). Summarizing these features thoroughly, Bruning et al. define schema as follows:

> “A schema is an abstract description of a thing or event. It characterizes the typical relations among its components and contains a slot or placeholder for each component that can be instantiated with particular cases. Interpreting a message is a matter of matching the information in the message to the slots in

a schema. The information entered into the slots is said to be subsumed by the schema." (Bruning, Schraw, Norby & Ronning, 2004, p. 50)

12. Schemas are not fixed structures:

Although schemas generalize the experience from the past, organize their regularities and provide the "automatic completion of missing components", they are not fixed and rigid structures. They are having constant regulations and adaptations according to the living experiences (D'Andrade, 1993, p. 142).

13. Schemas are reinforced by prototypes:

As D'Andrade states schemas are provided a rich source of content by the prototypes or the best examples of categories (D'Andrade, 1993, p. 142).

2.3.4. SCHEMA TYPES

According to Augustinos and Walker, schemas basically appear in the form of person schemas, self schemas, role schemas and event schemas. 'Person schemas' are the abstracted conceptual structures of personality traits, or person prototypes, that allow a person to "categorize and make inferences from the experience of interactions with other people". 'Self schemas' are the conceptual structures people have of themselves, which are described as "cognitive generalizations of the self, derived from past experience, that organize and guide the processing of self-related information contained in individual's social experiences". 'Role schemas' are the knowledge structures people have of the norms of specific role positions in society, which may refer to either achieved roles, such as a doctor role, or ascribed roles, such as age, gender and race. And lastly the 'event schemas' are the cognitive scripts that describe the sequential organization of events in everyday activities. They allow us to behave according to the expected behavior patterns in a society. The restaurant script, according to which the people sit, eat and behave in a restaurant, is an example to an event schema (Augustinos & Walker, 1995, p. 69, 70).

Stereotype is also a type of schema that "organizes information and knowledge about people from different social categories". They are described as the "mental representations of

social groups and their members that are widely shared" (Augustinos & Walker, 1995, p. 70). They are basically used to categorize people according to their shared characteristics.

In another type of categorization, Lakoff makes a distinction between proposition-schemas and image-schemas. Proposition schemas are thought to denote the concepts and the relations that are held among them. Images schemas on the other hand are described as gestalts that "convey knowledge of physical phenomena, such as shape and motion". They are described to be more schematic than visual imagery and they are thought to contain "not just visual components but also kinaesthetic information of all kinds". Image schematic thought is considered to be enabled by metaphorical thinking (Holland & Quinn, 1987, p. 25-27). As explained by D'Andrade image schemas are "abstract visual representations" while proposition schemas are "abstract language based representations" (D'Andrade, 1989, p. 810).

2.3.5. PRODUCTION OF SCHEMAS: ANALOGY AND METAPHOR IN REASONING

The study of reasoning is important for understanding how schemas work and how they are produced in the cognitive level. Referring to the mental manipulation of representations in the brain, reasoning is considered to involve mostly the mental models/representations, which are the most familiar and best understood to us such us our schemas (D'Andrade, 1989, p. 817). Analogy and metaphor appear as two important cognitive processes for the utilization of our models/schemas in the process of reasoning. Today it is generally accepted that schemas of all types are built by way of analogy and metaphor (D'Andrade, 1989, p. 810) and people are considered to go over their schemas to understand and reason about novel situations by making use of these two cognitive processes (Derfer, 1995).

2.3.5.1. ANALOGY

In cognitive science literature, analogy is defined as a domain-general mechanism of mind that exits as a central example of the power of symbolic thought, which distinguishes

the cognition of humans and perhaps other primates from that of other species. As analogical thinking depends on representations that can clearly express relations, many major computational models of mind have been based on analogical knowledge representation that express the internal structure of propositions (Gentner, Holyoak & Kokinov, 2001, p. 162).

Analogy is characterized both as the cognitive process of transferring information from a particular subject (the analogue or source) to another particular subject (the target), and as a linguistic expression corresponding to such a process. As a linguistic expression it is defined as comparison of two different things that are alike in some way; and as the cognitive process, it depicts the mental operation that makes connections between relations in two sets of objects (Thagard, 2005, p. 229). The analogical forms of language include exemplification, comparisons, metaphors, similes, allegories, and parables. Phrases such as 'like', 'so on', and 'as if' also depend on an analogical understanding by the receiver of the message having them.

In ancient Greek the word αναλογια (analogia) initially meant proportionality. Conceptually, it was understood as the identity of relation between any two ordered pairs, which relied on the mapping or alignment of the elements of source and target. The mapping occurs not only between objects, but also between relations of objects and between relations of relations. It produces the transfer of a relation to the target. On that basis, the word *analogy* refers to the relation between the source and the target, which is often, though not necessarily, a similarity. Analogical similarities often depend on higher-order relations, which are relations between relations. Thus, in a nutshell, analogy is basically described as the ability to think about relational patterns. It has been argued that due to this fuction it lies at the core of human cognition (Thagard, 2005, p. 229).

As Holyoak et. al explains it, for analogical reasoning we need to be able to express two situations, the target analog representing the new situation to be reasoned about and the source analog representing the old situation that can be adapted, applied to the target analog. Each analog is a representation of a situation, and the analogy is a systematic relationship between them. According to structure-mapping theory this process is called analogical mapping. It is defined as the process of establishing a structural alignment between two

represented situations and then projecting inferences about them. Structure mapping theory presumes that there are structured representations, which are made up of objects and their properties, relations between objects, and higher order relations between relations (Gentner, Holyoak & Kokinov, 2001, p. 200, 201).

Therefore analogy works by allowing people to form an analogical mapping (or structure mapping) between two domains that carry along the relationship between the components in the source domain to be applied to the target domain (Collins & Gentner, 1987, p. 242-248). In this process, the set of transition rules are carried to the target domain and a new (generative) mental model is built in the target domain to enable people to understand how things work in the new domain and behave accordingly in real life situations (D'Andrade, 1989, p. 820). According to the analogy hypothesis, people reason about unfamiliar domains through such analogical mappings (Collins & Gentner, 1987, p. 242-248) by making "direct mappings between domains" (Shore, 1996, p. 352). As Collins and Gentner propose, "any system whose transition rules are reasonably well specified can serve as an analogical model for understanding a new system" (Collins & Gentner, 1987, p. 242-248).

Holyoak et. al describe analogical reasoning as the mental process in which one thing is inferred to be similar to another thing in a certain respect, on the basis of the known similarity between the things in other respects. It consists of dealing with a new situation by adapting a similar familiar situation. To do this people acquire verbal and visual representations of situations that can be used as cases or analogs. They use processes of retrieval, mapping and adaptation that operate on those analogs.

On this basis, analogical reasoning is considered as the central process of human mind (or more specifically a logical operation that belongs to general intelligence) whereby humans solve novel problems. It is a central example of the power of symbolic thought, which distinguishes the cognition of humans and perhaps other primates from that of other species (Gentner, Holyoak & Kokinov, 2001, p. 162). It involves drawing parallels between novel problems and problems that have been solved in the past and allow us to use a familiar situation as a model for making inferences about an unfamiliar situation.

As Thagard and Holyoak argue, analogical thinking is the product of the evolutionary changes in the way animals represent knowledge of relations. Applied to explicit representations of knowledge, it can analyze, reorganize and recombine them to form new ideas. It provides a basis of intelligent transfer of knowledge, by using prior knowledge in new situations, in order to achieve goals that guide the process along relevant directions, such as the ease of hunger in the face of obstacles through novel ways.

It is a fact that to satisfy motivational and evolutionary goals, animals or humans must deal with novelty. Analogical reasoning is such a domain-general mechanism whose adaptive function is to enable humans to solve novel problems and in so doing achieve evolutionary goals of survival and reproduction (Pinker, 1999, p. 23, 43, 358). It is a powerful tool designed for attaining evolutionary goals in uncertain, novel environments and for solving problems not recurrent in the environment of evolutionary adaptedness (Chiappe & MacDonald, 2005, p. 5-40). Thus, organisms with mechanisms that allow analogical reasoning are more capable of solving a wide range of adaptive problems that are necessary for the continuation of life and therefore the ability of using analogy conveys an evolutionary advantage (Holyoak & Thagard, 1995, p. 21, 22).

2.3.5.1.1. STAGES OF ANALOGICAL REASONING

Analogical reasoning typically proceeds in four stages, which are the retrieval, mapping and adaptation stages that operate on the analogs:

1. You face a target problem to be solved.
2. You remember a similar source problem for which a solution is known. (Retrieving from memory)
3. You compare the source and target problems, putting their relevant components in correspondence with each other. (Mapping the source and target analogues to each other)
4. You adapt the source problem to produce a solution to the target problem. (Adaptation) (Thagard, 2005, p. 80).

Thagard argues that retrieval is governed by three constraints: similarity, structure and purpose. Two analogues are found similar to each other at a superficial level if they involve similar concepts. If the two analogs are very similar, mapping is quite trivial. But creative analogies often involve a leap (Thagard, 2005, p. 82). The analogs also need deeper structural relations between them; and the analogy is constructed only if the source analog is beneficial for the purpose of solving the current problem. The constraint of similarity, structure and purpose overcome the difficult problem of how previous experiences can be found and used to help with new problems (Thagard, 2005, p. 92).

Sternberg's model of analogy on the other hand explains the role of analogy in reasoning as a chain of processes that are followed in solving analogy problems. The steps taken in this process are described as follows:

1. Encoding of the terms of the analogy by scanning the problem.
2. Inferring a single relationship between a feature of the source stimulus and a feature of the target stimulus. This constitutes a theory of a relevant relation. In complex analogies, several mappings are possible.
3. A general mapping of the relationship between the specified features of the source domain.
4. The application in turn of the inferred relationship in step 2 to the second half of the analogy, for each of the choices for completing the analogy.
5. A response. (Shore, 1996, p. 352, 353)

In artificial intelligence, analogical reasoning is often called case-based reasoning. Case-based reasoning (CBR) is described as the process of solving new problems based on the solutions of similar past problems. A lawyer who advocates a particular outcome in a trial based on legal precedents or a judge who creates case law is using case-based reasoning. Case-based reasoning emphasizes the usefulness of retrieving and adapting cases or analogs stored in long-term memory when deriving solution to novel problems. It has been developed for purposes of computer reasoning as a four-step process:

1. Retrieve: Given a target problem, retrieve cases from memory that are relevant to solving it. A case consists of a problem, its solution, and, typically, annotations about how the solution was derived.
2. Reuse: Map the solution from the previous case to the target problem. This may involve adapting the solution as needed to fit the new situation.
3. Revise: Having mapped the previous solution to the target situation, test the new solution in the real world (or a simulation) and, if necessary, revise.
4. Retain: After the solution has been successfully adapted to the target problem, store the resulting experience as a new case in memory.

Likewise, computational explanations of analogy are organized along four similar dimensions:

1. Representation: Structures used in computational model to represent the information that plays a role in analogy. At the simplest level a computational structure can represent an object or concept.
2. Retrieval: Calling back the representations.
3. Exploitation: To produce the desired result of analogical reasoning. Several possible stages of exploitation have been proposed: elaborating the source analog, mapping it with the target to produce a possible answer, and evaluating or justifying the answer.
4. Learning: if an analogy is successful, it can be stored as an analog schema, as examples, concepts or rules. (Helman, 1988, p. 107-109)

The derivation of these steps of analogical reasoning are arrived both through tests with human subjects, and through the assumption that the human mind is a computer program, which could be studied and tested with the help of computer systems designed along the same principles with the mind.

2.3.5.1.2. CONCEPTUAL BLENDING

As Holyoak et al. explains, studies on cognitive functioning of analogy shows that structure mapping is inherent in all our thought processes. The research in analogical

mappings looking at the processes of inference transfer from a source to a target found that the essence of such processes lies in partially mapping and aligning structures and elements in the source and target, and then using the alignment and partial mappings to project additional structure present in the source onto the target. This creates an additional structure in the target. As Fauconnier argues, this additional structure can in turn be dynamically manipulated, yielding further relations and connections. And, building up target in this fashion becomes a way to enrich its conceptualization, to generate novel inferences, and to make predictions about the world (Gentner, Holyoak & Kokinov, 2001, p. 255).

This elaboration onto analogy is called 'conceptual blending'. It is argued by Fauconnier that standard examples of analogy and metaphor often turn out to be cases of conceptual blending with analogical or metaphorical cross-space alignment. Analogy and blending can overlap or coexist within cognitive processing. As he describes it, like standard analogical mapping, blending aligns two partial structures (the inputs); but in addition, it projects selectively to form a third structure, the blend. The blend is not a simple composition of the inputs. Through pattern completion and dynamic elaboration, it develops an emergent organization of its own. 'The blend can be used to provide inferences, emotional content, rhetorical force, and novel conceptualization' (Gentner, Holyoak & Kokinov, 2001, p. 256). This becomes the first seed for the creative endeavor.

As Fauconnier explains it, blends require cross-space structure mapping, just as analogy typically does, but that they are not analogical in purpose and function. To explain blending he gives the example of a ski instructor who tries to teach a novice to hold his arms correctly and look down the slope. The instructor tells the novice to imagine that he was a waiter in Paris carrying a tray with champagne and croissants. When the novice actually tries to mentally carry the tray while physically skiing, the blend emerges. The point of blend appears as the direct integration of motion. Its function is not analogical reasoning, (to draw inferences from domain of waiting on tables and projecting them onto the domain of skiing), but an integration of two images (Gentner, Holyoak & Kokinov, 2001, p. 256, 260, 261).

Therefore, conceptual blending adds to simple analogy the dimension of blended space, which produces an imaginative cognitive work acquired through it. As Fauconnier

depicts it, integrated action or thought can emerge in this fashion, without loss of conceptual access to the initial input spaces. This shows how the automatic and cognitively effortless integration of successive blends can lead to novel, creative integrated action that goes way beyond simple juxtapositions of partial similarities (Gentner, Holyoak & Kokinov, 2001, p. 265). Blending then becomes the cognitive process working over analogy that leads to creative cognition. As we shall examine in the following parts, we can observe this process of analogical blending also in design through the use and transformation of architectural types and precedents.

2.3.5.1.3. PRODUCTION OF SCHEMAS BY ANALOGY

The analogical processes applied to the representations of analogs produce the behavior and the aftermath of analogical reasoning can result in the generation of new categories and schemas, the addition of new instances to memory and new understandings of old instances (Gentner, Holyoak & Kokinov, 2001, p. 10). In this sense, analogy formation, or the mental construction of analogies, is described as the most basic process required for the formation of concepts and schemas (Shore, 1996, p. 352).

Holyoak et. al states that the activation of prior mental categories by some sort of input is also seen as an act of analogy making. As no instance of a category is totally identical to a prior instance, whenever a set of incoming stimuli activates one or more mental categories, an amount of slippage occurs. As Fauconnier depicts it, this process of inexact matching between prior categories and new things being perceived is analogy making par excellence. Along these lines, Gick and Holyoak confirm that analogy can provide in this sense the seed for forming new relational categories by abstracting the relational correspondences between examples into schemas for a class of problems (Gentner, Holyoak & Kokinov, 2001, p. 8, 503, 504).

This ‘abstraction of the relational correspondences into schemas’ is a very important process in the formation of analogies and the process of analogical transfer. As Gick and Holyoak state, the formation of analogies develops basically by two cognitive processes, which are “the discovery of semantic retrieval clues” and “the induction of a general schema

from the concrete analogs". The latter process is the aforementioned 'abstraction of the relational correspondences into schemas', which is specifically called as 'decontextualization'. Also termed as 'schema induction' or 'eliminative induction', the process of decontextualization involves "the deleting of the differences between the analogs while preserving their commonalities". Mapping across different semantic domains, it generates representations that produce schemas, which preserve the abstract relations common to the two domains and exclude the characteristics unique to each. It makes representations more generally accessible in this sense.

Through decontextualization, analogical reasoning provides general problem solving schemas that are applicable across a wide range of domains (Gentner, Holyoak & Kokinov, 2001, p. 83, 208). As Gick and Holyoak explain, schemas produced as such facilitate the retrieval and noticing of further analogies and therefore they are important for the construction of novel analogies. Novel analogies themselves on the other hand are important for the act of creativity by enabling people to go over their schemas that initiate those analogies. This feature of analogy becomes the source for creative cognition and plays a role in the generation of new concepts in science, problem solving, decision-making, perception, memory, creativity, design, emotion, explanation and communication (Gentner, Holyoak & Kokinov, 2001, p. 83, 208).

The construction of analogies and their relationship with schemas is explored extensively in cognitive psychology. DiMaggio for example lists four different ways in the construction of analogies that involve the processing of schemas, which are listed as feature correspondence, structure-mapping, emotional resonance and polysemy and semantic contagion. Feature Correspondence is defined as the process where "two schemata lend themselves to analogy (and thus to generalization across domains) insofar as they share particular features that create a correspondence between them". Structure-Mapping is defined as the process where analogy connects not just schemata on the basis of the shared particular features in common but whole domains on the basis of the structurally similar relations among the features. Emotional Resonance is defined as the process where schemas whose emotional content are intense are much frequently generalized across domains. Polysemy and

Semantic Contagion on the other hand is defined as the process where polysemous expressions, which have "distinct meanings that resonate with multiple schemata or domains" facilitate analogical transfer (DiMaggio, 1997, p. 281-282). These processes show us how the process of analogy works with schemas in making new connections building new schemas.

2.3.5.2. METAPHOR

Analogy is important also in the production and comprehension of language, since it emphasizes the use of metaphor. As Lakoff and Johnson indicate, it is seen that all metaphors have as their underlying cognitive mechanism the kind of systematic comparison that analogical mapping executes, although metaphor can go beyond analogy by using other figurative devices. Being the "understanding and experiencing of one kind of thing in terms of another", metaphor acts creatively by putting forth new connections that open the way of understanding new, abstract entities (Lakoff & Johnson, 1980, p. 5).

For Lakoff and Johnson, metaphor is pervasive in everyday life, not just in language but in thought and action. On the basis of linguistic evidence Lakoff and Johnson state that our ordinary conceptual system in terms of which we both think and act is fundamentally metaphorical in nature. Suggesting that our conceptual system is largely metaphorical, they argue that the way we think, what we experience, and what we do everyday is very much a matter of metaphor. The concepts that govern our thought govern our everyday functioning; and they structure what we perceive and how we get around the world (Lakoff & Johnson, 1980, p. 3).

To explain what it could mean for a concept to be metaphorical and for such a concept to structure everyday activity, they give examples from common concepts and phrases, such as the concept 'argument' and the conceptual metaphor 'argument is war'. They show that this metaphor is reflective in the everyday language by a wide variety of expressions (eg. "Your claims are 'indefensible'" or "He 'attacked every weak point' in my argument"). They detect that many of the things we do in arguing are partially structured by the concept of war. Though there is no physical battle, there is a verbal battle, and the

structure of an argument - attack, defense, counterattack, etc, -reflects this. It is in the sense that the ‘argument is war’ metaphor is one that we live by in culture, it structures the actions performed in arguing (Lakoff & Johnson, 1980, p. 4). As mentioned before, the essence of metaphor is described as the understanding and experiencing of one kind of thing in terms of another. As in the example where arguments and wars being different kinds of things and the argument is structured and thought in terms of war, the concepts are envisioned metaphorically and the action following them happens according to how they are envisioned. Here, metaphor is not just a matter of language, but it defines ‘thinking’. On this basis, Lakoff and Johnson argue that human thought processes are largely metaphorical (Lakoff & Johnson, 1980, p. 5).

The cases where one concept is metaphorically structured in terms of another is termed by Lakoff and Johnson as structural metaphors. In similar veins they also define orientational metaphors, which are set to organize a whole system of concepts with respect to one another. Most of them having to do with spatial orientation, such as up-down, in-out, front-back, on-off, deep-shallow, orientational metaphors are thought to arise from our physical and cultural experiences. To explain this Lakoff and Johnson give the example of the adjective ‘happy’ and the metaphor ‘happy is up’. They explain this by a wide variety of expressions (eg. “I am feeling ‘up’”or “That ‘boosted’ my spirits”). The physical basis of these are explained to be due to the drooping posture that typically goes along with sadness and depression, and erect posture with a positive emotional state (Lakoff & Johnson, 1980, p. 14-15). As a further remark, Lakoff and Johnson argue that metaphors do not draw on existing similarities but rather ‘create similarities’ by providing structure for the target domain.

Comparison becomes the primary process that drives metaphor and novel metaphors are understood by comparison with prior knowledge. Conventional metaphors on the other hand are understood by accessing stored abstractions, which are a product of past comparisons. (Eg: A child is like a snowflake invites comparison and the metaphor form a child is a snowflake invites categorization.) Through this way of channeling onto prior

knowledge, metaphors give rise to the production of new understandings of things and help in the formation of further analogies (Johnson, 1987, p. 98).

Therefore, starting on from schematic understanding of things, metaphor is considered to take the understanding one step further. As shown by Lakoff and Johnson, metaphor is included in the processes of inference and evaluation as a 'creative' act that results in the construction of new connections and meanings on top of the schematic structures we have. Through this way, it gives rise to the production of new understandings of things and it also helps in the further formation of new schemas (Johnson, 1987, p. 98).

2.3.6. CULTURAL SCHEMAS: IMPLICATIONS FOR COGNITION

Consequently, mental representations such as schemas are seen by cognitive psychologists as a major phenomena that determine the processes of information gathering and conceptual production. Here, the most crucial characteristic in terms of the use of schemas in our cognitive processing is the effect of prior knowledge and frames of reference in our perception, thinking and action.

As a determinant in the formation of most prior knowledge, the role of culture in this cognitive processing through the subsistence and operation of schemas is of seminal value. It is generally accepted today that culture exists at the very beginning of most of our cognitive experiences that define both the production and the reception of meaning through systems of representation. As DiMaggio rightly states for this reason, in order to understand the impact of culture on daily life, we have to understand first the cognitive assumptions about the role of culture in cognition, by way of understanding how the cultural schemas work.

Studies on cognitive theory suggest that culture, in the form of 'shared knowledge, ideas, skills and values, which humans acquire and express in the material systems of artifacts and the built environment', is directed and reproduced by cognitive schemas (Johnson, 1987, p. 19). Defining culture as "a network of interrelated schema", DiMaggio argues that the "basic unit of analysis for the study of culture" could be accepted for this reason as the cultural schema (DiMaggio, 1997, p. 263-287).

In a similar vein, in his book *Culture in Mind: Cognition, Culture and the Problem of Meaning*, Bradd Shore defines culture as "an extensive and heterogeneous collection of 'models', models that exist both as public artifacts 'in the world' and as cognitive constructs 'in the mind' of members of a community" (Shore, 1996, p. 44). As DiMaggio, Shore also states that cultural knowledge is disseminated in many different kinds of models/schemas. Being used interchangeably with schema in cognitive psychology[4], the term model is basically understood as a mental construct that is seen as "a way of representing the structured nature of cultural knowledge" (Shore, 1996, p. 45). As explained by Shore, mental models are described as the mental representations of everything out there in the world. Formulated as a concept first by Keneth Craik in 1943, mental models form basically the contents of our mind. As Craik explains "people translate external events into internal models and reason by manipulating these symbolic representations" and vice versa they "translate the resulting symbols back into actions or recognize correspondence between them and external events". [5]

For Shore, thinking culture as a heterogeneous collection of models, or schemas, is the best and most beneficial way for describing it, as it gives the opportunity to portray culture both as a mental - 'in the mind' - phenomenon and as a concrete - 'in the world' - phenomenon. It shows how cultural knowledge is attained and expressed from a cognitive point of view. The notion of model itself bridges the gap between culture as an 'object' and culture as 'mental representations'. Shore states on this basis that cultural models are found to be the empirical analogues of culture, but of course not in a simple sense (Shore, 1996, p. 44).

[4] Some sources claim that model and schema refer to organizations at different levels of abstraction. Schema is thought to be the more general form, while model is considered as its subset (Shore, 1996, p. 53). There are also sources that differentiate cultural models and cultural schemas. Norbert Ross states that all cultural models are cultural schemas, but not all cultural schemas are cultural models on the basis of the fact that cultural schemas are organization frameworks that determine how the models and schemas are related to each other (Ross, 2004, p. 47).

[5] For Johnson-Laird, the reasoning that depends on mental models follow three semantic steps which are "the construction of the mental model", "the formulation of a novel conclusion based on the model" and "a search for alternative models" (Johnson-Laird, 1998, p. 469.)

2.3.6.1. DEFINITION OF CULTURAL SCHEMAS

All in all, it is accepted that culture plays an important role in the development of shared schemas that become transferred in societies through generations. The term 'cultural model' is developed by anthropologists in order to specify this form of schemas. D'Andrade defines cultural models as "cognitive schemas, which are widely and intersubjectively shared among members of a cultural group". In this definition 'sharedness' is the key characteristic that makes schemas 'cultural models' (Derfer, 1995). Holland and Quinn on the other hand define them as the "presupposed, taken-for-granted models of the world that are widely shared by the members of a society and that play an enormous role in their understanding of that world and their behavior in it" (Holland & Quinn, 1987, p. 4). They are described basically as the "patterns of basic schemas that make up the meaning system of a cultural group", which govern how people experience and interpret their experiences in a large spectrum of life domains (Nisbett & Norenzayan, 2002, p. 5, 6).

The concept of cultural model first developed by Roger Keesing with the name of 'folk models', which was recast in his later works as 'cultural models'. Keesing described them as "culturally constructed common sense", which represented "a set of operating strategies for using cultural knowledge in the world" that were consisted of "a set of shortcuts, idealizations, and simplifying paradigms" (Keesing, 1987, p. 370).

For D'Andrade, cultural models/schemas form a major subset of the vast number of schemas people learn. These vary from "highly concrete and specific constructs like spoons and left-turns to high-level schemas for things like love, success, authority, pollution, and the like". As D'Andrade explains, cognitive anthropologists have devised various methods for the description of cultural schemas/ models since the 1970's (D'Andrade, 1992, p. 34).

It is suggested that cultural models are normally formed by some conceptual objects and their relations to each other. For example, the schema, or the cultural model, of 'buying something' is considered to be formed by 'the purchaser, the seller, the merchandise, the price, the sale, and the money' and the numerous relationships among these components. Moreover this cultural model carries in itself not just the activity of buying, but also activities such as lending, renting, leasing, profit making etc (D'Andrade, 1987, p. 112).

As told by D'Andrade, because of the limited capacity of human short-term memory, which can hold at the same time at most seven (plus or minus two) chunks of information, cognitive schemas are considered to be composed of at most seven (plus or minus two) chunks. However, human mind can hold seven schemas as separate objects, and these schemas could also be complex ones that contain subset schemas under them due to their hierarchical organization (D'Andrade, 1987, p. 112).

This characteristic is also true for cultural models. D'Andrade suggests that due to this hierarchical character, cultural models "have a wide range of application as parts of other models". For D'Andrade, to have a sufficient understanding of a culture, a person should be acquainted with at least those models that are widely integrated into other models. The quality of cultural models to be 'intersubjectively shared' in a society also depends on this characteristic. As D'Andrade explains, being "intersubjectively shared", used and legitimized of a cultural model means that every member of the culture expects everyone to know and use that model. Therefore, it is deemed important to know how to use that model for that cultural community. The interpretations that depend on those models are not questioned and treated as "obvious facts of the world". They are not needed to be made explicit. An important example given by scholars for a cultural model is the restaurant script, which defines the overall general behavior and setting patterns that defines the activity of eating at a restaurant (D'Andrade, 1989, p. 809, 820-825; D'Andrade, 1987, p. 112-113).

As explained by Shore, cultural models are formed by two components, which are the 'instituted models' and the 'cultural-conventional mental models'. Instituted models are described as the external and public expressions of culture. They are the 'externalized' public cultural artifacts or 'social institutions' 'in the world', such as buildings, pottery or tools, which are also called as the 'material culture'. However they also contain the less palpable forms of culture, such as the conventional forms of speech, movement or social interaction. Conventional mental models, on the other hand, are the cognitive constructs of culture 'in the mind'. They are the "cognitive representations of the instituted models", which are "institutionalized when they are objectified as publicly available forms". Therefore the

‘instituted models’ represent the ‘culture in ground’, while ‘conventional mental models’ represent the ‘culture in mind’ (Shore, 1996, p. 44, 52).

It is suggested that there is a constant interaction between instituted models and cultural-conventional mental models’. People form ‘conventional mental models’ when they experience ‘instituted models’ and they form ‘instituted models’ when they express their ‘conventional mental models’. However there is not a simple and one to one correspondence between them because instituted models undergo an array of transformations when they are brought into mind, and the same is also true for the other way round. Shore calls this complex relationship between them as “twice-born character" of cultural forms (Shore, 1996, p. 51, 52, 68). For Shore the internalization of instituted models and the externalization of mental models may take place at different times, but altogether this interactive movement forms “the basic dialectic of cultural life” (Shore, 1996, p. 312).

However, Shore also states that culture is not the only way that people experience the world and make sense of things. As such, not all mental models/schemas are cultural-conventional models.[6] It is accepted that some models/schemas consist of the universal cognitive processes, such as the basic object categorization and some are idiosyncratic, which means they are formed out of personal experience and not shared. On the other hand there are also schemas that are the socially patterned “schematic representations of complex social phenomena”.

Along this line, Shore classifies mental models in two as personal mental models and conventional (or cultural) mental models (Shore, 1996, p. 46). Personal mental models are described as idiosyncratic models “that they are not shared in their details by others in the community” (Shore, 1996, p. 47). Cultural-conventional models on the other hand are “part of the stock of shared cognitive resources of the community”. They are the internalized form of shared conventions and cultural information out in the environment. They are described as the internalization of the ‘instituted culture’. Therefore their creation is more complex than personal models. As Shore explains they have "twice-born character": they are externalized

[6] For Johnson-Laird, the reasoning that depends on mental models follow three semantic steps which are “the construction of the mental model”, “the formulation of a novel conclusion based on the model” and “a search for alternative models” (Johnson-Laird, 1998, p. 469.)

as shared institutions (or as ‘instituted culture’) as well as internalized again as mental models. Their life depends on social exchanges and they exist as a means for society’s common meaning making (Shore, 1996, p. 47).

> “Cultural models are born, transformed through use, and eventually die out. Their continued existence is contingent, negotiated through endless social exchanges. Such shared models are a community's conventional resources for meaning making. To gain motivational force in a community, these models must be reinscribed each generation in the minds of its members. In this way conventional models become a personal cognitive resource for individuals.” (Shore, 1996, p. 47)

As they are both mental models, the cognitive processes that act in the formation of personal and cultural-conventional models are the same. They are both formed by a process of ‘formalization and simplification’ that is called ‘schematization’, in which the details are simplified and the information is structured into a schema. However there is a difference in their making in term of their origins. The cultural-conventional models are based on the internalization of ‘socially constrained experiences’. Their formation does not much depend on personal choice but it is socially constrained and guided by social norms (Shore, 1996, p. 47, 48).

As stated by Shore, the mainstream of research in cognitive psychology examined mostly personal mental models, while anthropologists basically argued that most mental models were actually cultural models. Cognitive psychologists argued that mental models were mostly “the subjective representations constructed by individuals in a relatively direct relationship with a physical environment”. However, cultural anthropologists asserted that cultural models were “intersubjective representations, constructed by individuals in relation to a social environment”. As Shore explains cultural anthropologists focused on social environment as they saw it as “a stock of shared social models that constrain and motivate the construction of cognitive models”. They stated that mental models were formed by intersubjective communication and not just by adaptation. Cognitive psychologists on the

other hand, looked at models in an attitude of ‘methodological individualism’. However, as Shore also argues there is truth in both of these approaches (Shore, 1996, p. 49-50).

2.3.6.2. TYPES OF CULTURAL SCHEMAS

Shore classifies cultural models in a large number of general genre forms. He first classifies them in two, which are the structural models and the functional models. The structural models are classified in themselves as linguistic and nonlinguistic models. The functional models on the other hand are classified in themselves as orientational models, expressive/conceptual models and task models (Shore, 1996, p. 56-65).

As Shore explains the most basic distinction between cultural models is between linguistic and nonlinguistic models. Linguistic models are studied more extensively by researchers than nonlinguistic models. They are classified in themselves as scripts, propositional models, sound symbolic models, lexical models, grammatical models, verbal formulas and trope models (Shore, 1996, p. 56-65).

Nonlinguistic models on the other hand are defined by Shore as “a heterogeneous collection of models that exploit a great diversity of sensory modes and representational forms”. They are classified in themselves as image schemas, action sets, olfactory models, sound image models, visual image models. Image schemas are called by Lakoff as "image schematic models" and described as “schematic images, such as trajectories or long, thin shapes, or containers”. Lakoff and Johnson argue that most of these schemas, such as up-down schemas (eg: happy is up, sad in down), container schemas, or movement schemas are derived by bodily experiences. As Shore describes, visual image models on the other hand are well examined by anthropologists and art historians. They include iconographic models, such as “culturally salient paintings, decorative motifs or color symbolism” (Shore, 1996, p. 56-65).

The functional models on the other hand, which are classified as orientational models, expressive/conceptual models and task models, questions what ‘what different kinds of work models do’. They are classified among themselves as well. Shore classifies orientational models as spatial models, which “orient people to the physical environment”, temporal

models, which are “culturally specific time frames”, social orientation models, which “orient individuals and groups to one another and to a socially differentiated environment”, and diagnostic models, which “provide conventional means of taking "readings" of important phenomena”, such as a meteorological model. Shore classifies expressive - conceptual models as classificatory models, ludic models, ritual and dramatic models, and theories; and task models as scripts, recipes, checklists, mnemonic models, and persuasion models (Shore, 1996, p. 56-65).

Table 2.1. Classification of Cultural Models/Schemas by Bradd Shore (Shore, 1996)

Types of Cultural Models/Schemas				
Structural Models		Functional Models		
Linguistic Models	Non-linguistic Models	Orientational Models	Expressive/conceptual Models	Task Models
• Scripts • Propositional models • Sound symbolic models • Lexical models • Grammatical models • Verbal formulas • Trope models	• Image schemas • Action sets • Olfactory models • Sound image models • Visual image models	• Spatial models • Temporal models • Social orientation models • Diagnostic models	• Classificatory models • Ludic models • Ritual and dramatic models • Theories	• Scripts • Recipes • Checklists • Mnemonic models • Persuasion models

2.3.6.3. CULTURAL SCHEMAS IN REASONING: ANALOGICAL SCHEMATIZATION

It is accepted that a large amount of the reasoning that people perform is based on cultural models (D’Andrade, 1989, p. 817). As Shore states, cultural models are used for processing information and for the construction of meaning, which is taken out of the big pile of information people gather in their daily lives. Shore sees meaning construction as an “assimilation” process in which people use their existing cognitive models as sources to understand novel experiences (Shore, 1996, p. 68, 319).

He describes ‘cultural meaning construction’ as a specific kind of assimilation, which requires two distinct cognitive processes. In the first process, the conventional form of a cognitive model is developed from instituted models existing in the social environment, and in the second process, a novel experience is formed for the person experiencing it, which still lets it to be shared as a cultural experience within the community. As Shore explains on this basis, meaning construction “involves the apprehension of novel experience as a kind of memory, through the active mapping of new experiences onto readymade models” (Shore, 1996, p. 319, 339). Shore proposes that the cognitive process underlying both of these processes between cognitive models/schemas is “analogic processing”, which is a process based on “direct mappings between domains” (Shore, 1996, p. 320).

As Shore argues, this kind of a meaning construction in general makes use of the process called ‘analogical schematizing’. During this process, “a store of previously learned foundational schemas’ is used in order to make a mapping between them and the incoming novel information for making sense of it. More specifically, the meaning construction that involves cultural models employs a higher order of analogical schematizing, in which cultural models are used as source domains for analogical schematization by enabling the community to form shared meanings. In such a process, the meaning construction is considered to be a cultural and social process (Shore, 1996, p. 354, 371).

> “Cultural models have a major role to play in the cognitive work of culture. They act for members of a community as shared and ready-made source domains for analogical schematization. They are the stuff on which the cultural imagination feeds. Such models and the more abstract schemas on which they are often based motivate a high degree of shared analogical schematizing for members of a common community. Through analogical schematizing, powerful equivalences (what we usually call "meanings") can be constructed and reconstructed, formed and reformed.” (Shore, 1996, p. 364)

Rarely, there are situations in which no learned schema/model exists. At those instances, new cognitive models are constructed to solve the situations. These new schemas can either be conventionalized and turned into cultural models/schemas or remain as personal

idiosyncratic mental models (Shore, 1996, p. 366). As D'Andrade suggests, these new cultural models and schemas are constructed by way of analogy and metaphor (D'Andrade, 1989, p. 810).

As Shore argues, the relationship between instituted models and conventional cognitive models is also mediated by analogical schematization. As explained by 'twice born' character of cultural models, the instituted models are recreated as they are internalized to become conventional cognitive models. Shore describes this process that is enabled by analogical schematization as a creative one that guarantees subjective regeneration of cultural models. This proposition states that cultural models are shared within a community but only in a limited way. They are not closed systems but they provide overlaps of meaning within a community (Shore, 1996, p. 371-372).

> "Because it is always an active construction by an intentional and creative mind, analogical schematization introduces a gap, "a crucial lifegiving contingency", between the conventional forms of cultural life and their inner representations in consciousness. This gap guarantees the ongoing regeneration of conventions through practice just as it makes possible intersubjective meaning. Thus, the dual creation, the two births, of cultural signs guarantees their double character as at once conventional and idiosyncratic constructs." (Shore, 1996, p. 371-372)

Therefore, on the general level 'schema' both orders general and specific features of culture and acts an attribute of a group of people who share values, beliefs and ideas transmitted to members through enculturation. As a refection of it, the cultural environment signifies the encoding of the schemata and the members of the culture translate from it specific formal cues resulting in appropriate behavior (Lawrence-Zuniga, 1997, p. 49). This economization brought by schemas is beneficial for the automatic experience of common cultural attributes. According to DiMaggio, it is this interaction of these shared cognitive schemas that determines our understanding of culture.

In this framework, culture is experienced by individuals as "disparate bits of information and as schematic structures that organize that information". As DiMaggio rightly argues culture exists as "a network of interrelated schema" and it lives in the interaction between these schemas that form people's cultural toolkits and external symbol systems that evoke and form these schemas (such as buildings, content of talk, media messages etc.) (DiMaggio, 1997, p. 269-274). In other words, culture enters into everyday life both as shared knowledge stored in the minds as cognitive structures and as also as its external manifestations in the environment, which is the material culture. Therefore, the relationship between schemas and culture is reciprocal. External cultural framework plays in the formation of schemas while schemas form people's 'cultural toolkits'. In this reciprocal relationship, culture comes to be identified with schemas in the cognitive level (DiMaggio, 1997, p. 263-287). In its equivalent role with culture, schema typifies both a cognitive process and a form of representation for culture.

2.4. CULTURAL OBJECT AND MATERIAL CULTURE: THEIR INTERPRETATION AND PRODUCTION

Our environment is basically the product of the 'informational pool of culture'. We are surrounded by buildings, roads, vehicles, appliances, furniture, which are all obviously cultural objects. As stated by D'Andrade, these objects are 'cultural' since the information that defines them, which describes their qualities or their use, is contained by the shared cultural pool of information. For that reason, we are able to use them by way of culture (D'Andrade, 1981, p. 180).

2.4.1. CULTURAL OBJECT

For du Gay et al. what constitutes the object as a 'cultural object' is the construction of meaning for that object, or 'bringing that object into meaning'. This is realized by the meaning that is attributed, or given to it by the viewer/receptor/interpreter. Therefore, it becomes those shared meanings held by the viewer that makes the object 'cultural'.

It is suggested that we understand or interpret cultural objects by way of constructing analogy from the things we already know and by representing them, or by 'mapping' them, onto what we already know (Du Gay & Hall, 1997, p. 10, 14, 18). How we represent these objects determines their meaning for us. As stated by Hall we can do this by way of the frameworks of interpretation that we bring to them (Hall, 1997, p. 4, 18).

Interpretation is described as 'the representation of a representation'. It is delineated as a form of 'paraphrase', which is produced to represent the content of the first representation by way of a similar content. As explained by Sperber, the double phased interpretation that takes place between public and mental representations of cultural objects, from the mental to the public and from the public to the mental, appears as 'communication'. On this basis, interpretation exists a form of representation that is used in the process of communication, through which people understand things (mental and public representations) and express themselves (Sperber, 1996, p. 34, 40).

As stated before, culture is involved in this process through the production and exchange of shared meanings. It underlines the crucial role of the shared values, which construct the symbolic domain of social life. It is through those shared meanings and shared maps of knowledge that culture enables people to 'make sense' of things around them and lets them communicate (Hall, 1997, p. 2-18). As du Gay et al. state this kind of a cultural process is also described as what organizes interpretation as well as the production of the cultural object (Du Gay & Hall, 1997, p. 10-18).

2.4.2. MATERIAL CULTURE

It is stated that human being's interaction with the material culture and the cultural objects held in it plays a fundamental role in the development of the human mind. In his work *Material Culture and Cognition: Concluding Thoughts*, Merlin Donald states that material culture and human mind have co-evolved since ancient times. The innate human behavior of tending and structuring the material environment with dwellings, earthworks and monuments, as well as with the smaller symbolic or functional forms of material culture, for the purpose of meeting the social and practical needs of the community, is both an indication

and a factor in the development of human cognition (Donald, 1998b, p. 181, 182). As Renfrew and Scarre suggests, material culture plays both a symbolic and a practical role in human affairs here, where it both reflects and constitutes his/her social relations and cognitive categories (Renfrew & Scarre, 1998, p. 1-3).

As Donald suggests, material culture both derives its meaning from the rich 'cognitive-cultural system', which is formed by customs, rituals and alike, and also frames, maintains and perpetuates this 'cognitive-cultural system' by being its externalization in the environment. It exists as the 'external symbolic storage', which is meaningful only in relation to the 'interpretive codes' carried cognitively by the people in the community. It is both formed by these codes and also becomes the context of the producer of these codes, which is the human cognition. People get clues from material culture to attain those codes. As Donald states, various forms of material culture, such as settlements, roads, site plans, or structures, form both the 'working framework' and also the 'stabilizing anchor' for most of human cognition. Therefore this continuing interplay between material culture and cognition, works both in the externalization of the collective memory and also in strengthening the power and durability of distributed cognition (Donald, 1998b, p. 181-187).

It is suggested that culturally modified environment and material culture affects the perceptual habits and cognitive preferences of communities. Several researches has been conducted to show this fact. One of them states that among Zulu, whose material cultural environment is mostly circular, less acculturated people prefer circles to squares in designs, unlike the people who have experienced European environments with mostly straight lines. Likewise, in his article "Material Culture and Cognition", Michael C. Robbins argues that the shape of a society's cultural art style is generally determined by the shape of its primary house type. Robbins states that in societies in which the main house shape is rectangular, there is a preference for straight lines in the cultural art style; and vice versa (Robbins, 1966, p. 545-548. Therefore our material culture and cognition are reciprocally constructive of each other. In this process our cognition again works by way of our schemas.

As explained by Evans, the general descriptor for "the cognitive processes involved in the acquisition, representation, and processing of information about actual physical

settings" is called the 'cognitive map'. A good cognitive map is considered to make the movement through an actual physical setting easier. This actual physical setting formed by a cognitive map is considered to be represented in the brain by the cognitive schema of that space, which contains both the semantic meaning of that space and also information about its location. The information of this setting is stored and retrieved by way of this schema (Evans, 1980, p. 259).

As explained by Evans, cognitive maps are considered to exist as types of schematic structures, which help people to understand environmental information related to location and orientation choices. In terms of how environmental information is processed cognitively to form these cognitive maps, the scholars agree on the view that environmental information is coded as cognitive representations, which are in the form of schemas, and then manipulated by analogy. It is suggested that schemas function selectively, giving emphasis to the spatial arrangement of objects in 'complex visual arrays' and not to the 'descriptive details of individual items'. As Evans proposes spatial memory contains higher order schematic structures that are partly obtained from past geographic experiences. These findings basically rely on research data that include basically hand drawn sketch maps of people who participate in the experiments and asked to draw what they perceive in their surroundings in order to find out the cognitive processes invoked in the process (Evans, 1980, p. 260-262). It is also suggested today that cognitive mapping differs cross culturally and is greatly controlled by social factors. Therefore, different socio-cultural groups have different spatial/architectural schemas (Harvey, 2010, p. 188, 198, 199).

One of the important works on this area is Kevin Lynch's *The Image of the City* in 1962, where Lynch suggests that cognitive maps of cities act mainly as orientation aids. Lynch defines five main features that form the cognitive maps of urban settings, which are paths, path intersections (nodes), landmarks, districts, and boundaries (edges) (Evans, 1980, p. 260).

Therefore it is suggested that there is a dialectical relationship between space and cognition, in which how we perceive, categorize, and remember space is determined by our cognitive framework. As Harvey explains, four different cognitive processes are

distinguished by cognitive scientists that are used in spatial cognition, which are attention and movement, storage and retrieval, overall cognitive functioning, and layout and representation. As Harvey states, every day we give many spatial decisions and many of these depend on our existing spatial knowledge and our familiarity with the spaces. Many however depend on our capacity to understand the 'spatial logic' of a space, either by encoding and retrieving our existing spatial information we obtained from earlier spatial experiences, or by forming analogy and as such transferring the spatial relations from one spatial domain to the other. As Harvey states these decisions may be given by deliberate cognition, in which we think carefully, or automatic cognition, in which we act habitually. Therefore our spatial decisions are formed by the interaction between space and thought (Harvey, 2010, p. 184, 186).

As it is proposed by sociologists, in a reciprocal manner, how we perceive and use space is determined by the socio-cultural environment we are in, and vice versa, the space triggers the socio-culturally formed schemas we have. Therefore while cognition influences how we perceive space, space also influences us cognitively. Therefore, how we use space and how space influences our actions depend on the interaction between culture and cognition. It is suggested in this framework that the relationship between the physical world and the behavioral world is mediated by a number of forms, and especially by geometric forms (Harvey, 2010, p. 187, 188, 198).

Harvey specially proposes at this point that different types of spaces may activate different cognitive modes and may make certain cultural schemas more or less accessible. They might strengthen or weaken certain cultural schemas. For instance, it was found by environmental psychologists that different architectural features of a space can affect cognition differently. Harvey gives the example that when the architectural style of a court house is changed to appear more menacing, the subjects are more likely to think that they will be convicted (Harvey, 2010, p. 187, 198, 199, 200).

The degree of familiarity of a space is also another key factor that affects cognition. It is suggested in this perspective that a common spatial form, such as the prototypical house type for a culture, is easily recalled by the people that belong to that culture as it triggers

automatic cognition. Amorphous and different spatial forms that deviate from the prototypes or cultural/architectural schemas on the other hand, such as a house that is dramatically different in terms of its spatial layout, are thought to require deliberate cognition and are understood harder. Harvey suggests in this framework that if we design spaces that deviate from the common ones, we would help people to override their schemas and discard their automatic cognition. He states that this could help in encouraging "a more deliberate approach to problem solving" as it reduces automaticity. However this statement could also suggest that if we design spaces that are familiar to people, then they would feel less alienated and use the space much easier (Harvey, 2010, p. 187, 198).

Consequently, it is suggested that our material culture and the cultural objects in it that form our living space are interpreted and produced by way of our prior knowledge, which is stored in terms of our cognitive structures, that is our schemas. Therefore in order to understand how our cultural space and the objects in it are interpreted and produced, we should take the guiding cultural schemas as the basic unit of culture in that space and analyze them accordingly. Within this framework, this study will observe in the following chapter, the cognitive role of culture and cultural schemas in the generation of architectural products through an examination of the use of architectural type in the design process.

CHAPTER 3

THE POSITION AND COGNITIVE USE OF CULTURE AND CULTURAL SCHEMAS IN CREATIVITY AND ARCHITECTURAL DESIGN

"Creativity, it has been said, consists largely of re-arranging what we know in order to find out what we do not know." (George F. Kneller, 1965)

In order to understand the cognitive role of prior knowledge, culture and cultural schemas, that of types and precedents in creativity and architectural design, it is essential first to look at creativity and architectural design from a cognitive perspective and then examine the cognitive role of prior knowledge, that of cultural knowledge or domain specific knowledge, therein.

It is observed that the literature on the cognitive role of culture for the field of design brings up two different aspects, which are respectively: 'culture's cognitive role in the interpretation of design products/artifacts' and 'its role in their creative production'. Focusing on the reception and generation of designed cultural artifacts in this fashion, the studies demonstrate that the 'interpretation', the 'production', and the 'designed cultural artifact' are connected over the cognitive use of culture (in the form of cultural attributes, such as cognitive cultural schemas, types and precedents). (Figure 3.1)

In this chapter, within this two partite cognitive role of culture, which is for the interpretation and the production of cultural artifacts, the emphasis will essentially be on the production, rather than the interpretation. Being mindful of this relationship between the interpretation and production that nestles onto the cultural artifact through the cognitive use of culture, this chapter will question 'how we could conceive creativity differently if we consider culture through the use of cultural attributes such as cultural schemas, that of types and precedents'.

Looking for the answers within the literature on creativity, culture, cognition and design, this chapter will try to 're-theorize' the cognitive use of culture in architectural design

and will stress the value of the intersection of the interpretation and the production of architectural products over the common ground of culture.

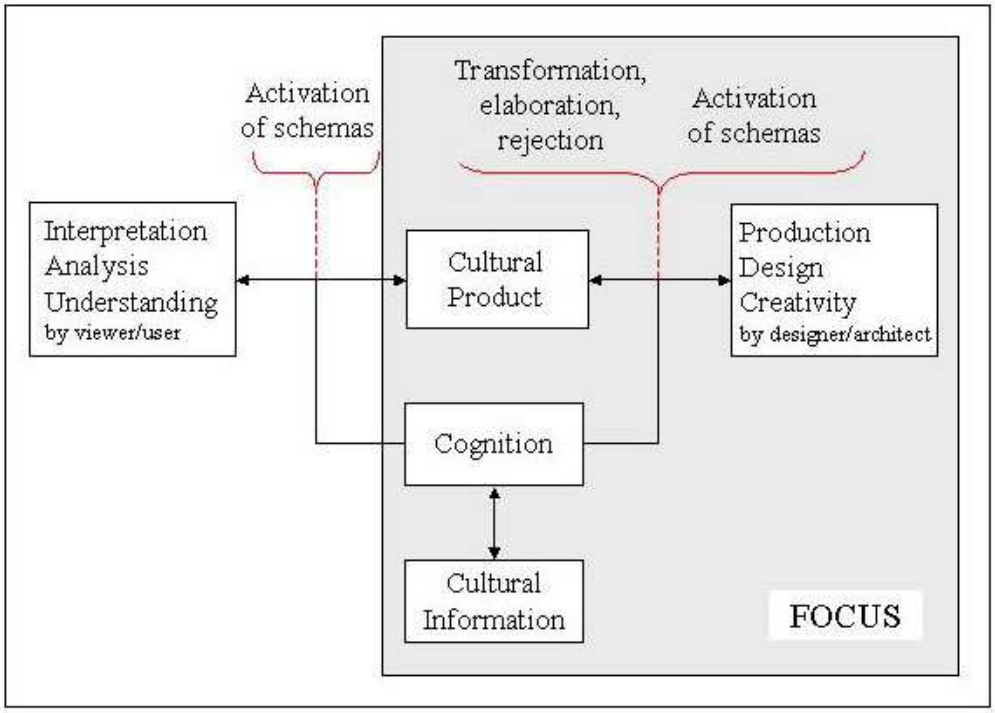

Figure 3.1. The diagram showing the relationship between interpretation and production that nestles onto the cultural artifact through the cognitive use of culture.

3.1. CREATIVITY STUDIES

3.1.1. CREATIVITY: DEFINITIONS AND IMPLICATIONS

Coming etymologically from the Latin *creatus*, which literally means "to have grown", the term creativity can be basically described as a mental process, which includes the production of new concepts or ideas, or the construction of new associations between the already existing concepts or ideas. In a more common understanding, it simply refers to the act of making something new.

In psychological literature more than sixty different definitions of creativity can be found (Taylor, 1988). Among them a well-accepted one is Sternberg and Lubart's, which define creativity as "the ability to produce work that is both *novel* (i.e. original, unexpected)

and *appropriate* (i.e. useful, adaptive concerning task constraints)". As a property of thinking on the other hand, creativity or creative thinking (which is sometimes referred to as divergent or lateral thinking) is defined either as:

1. The ability of getting lots of ideas, especially new and original ideas; or
2. The capacity to make connections – to bring together previously unconnected 'frames of reference'. (Sternberg & Lubart, 1999, p. 3, 4)

Comprising all these aspects in a more thorough way, creativity is defined by Warr and O'Neill as the 'coordination of things into new structures', which are considered 'unusual or new to the mind' and are 'appropriate to the characteristics of a desired solution defined during the problem definition and preparation stage of the creative process' (Warr & O'Neil, 2005, p. 118-127).

Creativity is also associated or used interchangeably with innovation. While the term creativity basically refers to the formation of new ideas, the term innovation refers to the process where the creative ideas are turned into novel and appropriate products or services. Therefore creativity is thought to be the necessary first step for innovation. In arts this shows itself in an evaluation scale. It is assumed that there is a continuum in arts that extends from "interpretation" to "innovation". While the practitioners of craft are associated with the "interpretation" pole of the continuum, the original thinkers, who are thought to express original and new ideas, are associated with the "innovation" pole. This mode of thinking about the original and new however, is open to debate today, in terms of the cognitive characteristics of the process of creativity.

In the past, creativity has been connected diversely with social settings, cognitive processes, personality characteristics, chance or purely with divine inspiration. While it has been thought to be linked with mental illness or genius and was accepted as an inborn and unattainable ability, it was accepted by some others as a trait that can be enhanced by some special techniques. In scholarly literature today, creativity is studied from various different aspects, such as being people, product or process focused, and from different approaches, such as psychology, cognitive science, artificial intelligence, philosophy, history, economics,

design, and business. In the following paragraphs such aspects and approaches of creativity will be summarized.

3.1.2. ASPECTS OF THE STUDY OF CREATIVITY

In the literature of creativity, it is observed that creativity is either taken as a property of people, or of products or processes. Authors who take creativity as a property of people tend to focus on individual differences in people's creativity or on the distinctive characteristics of creative people. Authors who view it as a property of products tend to focus on case studies of creative production or on computer simulations of creative production. Authors who view creativity as a property of cognitive processing tend to focus on analyzing the steps involved in creative thinking or in teaching creative cognitive processing. In the context of this study, creativity will be investigated with a cognitive perspective that emphasizes the cognitive processes active in the creative act.

Secondly creativity is taken either as a personal or a social phenomenon. According to personal view creativity involves producing something new and useful with respect to person doing the creating. According to the social view, creativity involves producing something new and useful with respect to the social or cultural environment. This study will examine creativity with the latter social view.

3.1.3. APPROACHES TO THE STUDY OF CREATIVITY

Creativity was basically studied through five different research paradigms, which are the pragmatic, psychodynamic, psychometric, social personality, and cognitive approaches. In the context of this paper, cognitive approach will be under focus.

3.1.3.1. PRAGMATIC APPROACH

Pragmatic popular approaches were primarily concerned with developing creativity, secondly with understanding it, but not with testing the validity of their ideas about it. As Sternberg and Lubart argue the pragmatic popular approaches became a damaging factor to the study of creativity.

The foremost proponent of this approach was presented as Edward de Bono (1971), with his work on lateral thinking, and others such as, Osborn (1953), Gordon (1961), with his synectic theory of creativity, and recently Adams (1974) and von Oech (1983). For Sternberg and Lubart these approaches lacked any basis in serious psychological theory, as well as serious empirical attempts to validate them (Sternberg & Lubart, 1999).

3.1.3.2. PSYCHODYNAMIC APPROACH

The psychodynamic approach relied almost exclusively on case studies on eminent creators. This methodology has been criticized because of the difficulty of measuring proposed theoretical constructs and the amount of selection and interpretation that can occur in case study. It is stated that although there is nothing a priory wrong with case study methods, the emerging scientific psychology valued controlled, experimental methods (Sternberg & Lubart, 1999).

3.1.3.3. PSYCHOMETRIC APPROACH

This approach marks the interest in creativity research, which started to grow in the 1950's. It was initiated by J. P. Guilford's 1950 APA Presidential Address, which challenged psychologists to pay attention to the neglected attribute that is creativity. Until then creativity was believed as to be something that just doesn't lend itself to scientific study, because it is a spiritual process. It is stated that, in his APA address Guilford proposed that creativity could be studied in everyday subjects and with a psychometric approach, using paper and pencil tasks. One of this was the Unusual Uses Test, in which the examinee thinks of many uses for a common object as possible. In this line, the 'divergent thinking' tasks quickly became the main instruments for measuring creative thinking. The tests were a convenient way of comparing people on a standard 'creativity' scale. A test developed on this basis, namely Torrance Tests of Creative Thinking, included the testing of divergent thinking and problem solving skills. They were scored for fluency (total number of relevant responses), flexibility (number of different categories of relevant responses), originality (the statistical rarity of the responses), and elaboration (amount of detail in the responses). However it is accepted today

that there is no standardized measurement technique for creativity (Sternberg & Lubart, 1999).

3.1.3.4. SOCIAL PERSONALITY APPROACH

Social-personality approach has focused on personality variables, motivational variables, and the socio-cultural environment sources of creativity. Researchers such as Amabile (1983), Barron (1968, 1969), Eysenck (1993), Gough (1979), and MacKinnon (1965) have noted that certain personality traits often characterize creative people. These traits are described to include independence of judgment, self-confidence, and attraction to complexity, aesthetic orientation and risk taking. Within the personality tradition (Maslow, 1968), traits such as boldness, courage, freedom, spontaneity, and self-acceptance are listed as to lead a person to realize his/her full potential. In terms of motivation for creativity researchers have hypothesized the relevance of intrinsic motivation, need for order, need for achievement and the effect of social environment. (Amabile, Crutchfield, Gloan, Barron). Cross-cultural comparisons and anthropological case studies have demonstrated cultural variability in the expression of creativity. The researches showed that cultures differ simply in the amount they value the creative enterprise (Lubart, 1990; Maduro, 1976; Silver, 1981).

3.1.3.5. COGNITIVE APPROACH

The cognitive approach to creativity seeks to understand the mental representations and processes underlying creative thought. With this kind of an attempt, several studies have been made in this research approach with both human subjects and computer simulations of creative thought.

One of the first studies realized in this approach was Graham Wallas' *Art of Thought*, which was published in 1926. Proposing one of the first models of the creative process, this study displayed creativity as a process, which was taking place in 5 stages:

1. Preparation: which consists of 'preliminary analysis of a problem and initial conscious work on the task'.

2. Incubation: which involves ‘active unconscious work on the problem, automatic spreading of activation in memory, associative play, or simply resting mentally’.

3. Intimation: which occurs when the creative person has a 'feeling' that the solution is about to come forward.

4. Illumination: which occurs ‘when a promising idea suddenly becomes consciously available’.

5. Verification: which involves ‘the evaluation, development, refinement and realization of the creative idea’. (Wallas, 1926, p. 82-85)

Wallas saw creativity as the outcome of the evolutionary development of the human being, which enabled him to adapt to his rapidly changing settings much quickly.

Another important scholar in this area was J. P. Guilford, writing in 1950-1980’s. Guilford’s works on creativity drew an important distinction between convergent and divergent thinking, which were thought to be active basically in problem solving or creative production. While convergent thinking referred to finding, or trying to find, a single, correct answer to the problem at hand, divergent thinking referred to the creative production of multiple answers to the problem at hand. With this quality, divergent thinking is used as a synonym for creativity in the field of psychology even today and it is usually linked with fluency, flexibility and originality of mental operations, which are attempted to be measured by psychological tests. Along side divergent thinking, the terms such as flexible thinking or fluid intelligence are also being used in the field recently (Guilford, 1967).

With his seminal work called *The Act of Creation* (1964), Arthur Koestler was another important name in the development of this area. Koestler presented his famous theory of ‘bisociation’, which stated that creativity takes place as a result of the intersection or blending of two (or more) different and unrelated frames of thought (or matrices of thought) into a new frame or matrix of thought. For Koestler this blending occurred by the realization of several cognitive processes, such as abstraction, comparison, categorization, analogies and metaphors. Koestler stated that all forms of creativity took place as varieties of this process of bisociation (Koestler, 1964).

Later in 1990's, Koestler's idea of bisociation was developed and reformulated into another theory of creativity called 'conceptual blending' by Gilles Fauconnier and Mark Turner. This theory, which was issued in detail in the previous chapter, also mentions the effect of analogy and metaphor in the process of creativity.

Again in 1990's, the studies of Finke, Ward and Smith, which were based basically on the study of creative cognition on human subjects, appeared as another important development in the field. In 1992, they have proposed the 'Geneplore model' (combination of generate and explore) to explain the creative process. This model, which will be explained later in detail, was formed from two phases, which were the generative phase and the exploratory phase. In the generative phase, the individual is thought to construct mental representations that are entitled as preinventive structures; and in the exploratory phase, the individual is thought to form creative ideas over those structures. Their research have demonstrated that creativity involves essentially ordinary cognitive processes yielding extraordinary products and the insights developed by the subject depend on his/her use of conventional cognitive processes (such as analogical transfer) applied to knowledge already stored in memory (Sternberg & Lubart, 1999).

These studies have altogether issued the effect of cognition of individuals in the creative process and they have inquired about the mental representations and processes underlying creativity. However it has been observed later that these works more or less lacked the effect of the cultural and social systems in creativity and they focused on the individuals in isolation. With this kind of an awareness, the recent works on creativity argued that besides these cognitive factors, multiple components must converge for creativity to occur. On these terms, psychologist Csikszentmihalyi took a 'systems' approach and highlighted the interaction of the individual, the cultural symbol system (the domain) and the social roles and norms (the field). In the following paragraphs his views will be discussed as to provide insight to the understanding of the creative process where the effect of culture is jointly discussed with its cognitive role over creativity.

3.1.4. CREATIVITY AND CULTURE:

THE EFFECT OF CULTURE AND CULTURAL CONTEXT IN CREATIVITY

As discussed in the previous chapter, culture, in the form of prior knowledge, exists at the very beginning of cognitive experiences that define both the reception and the production of meaning. As DiMaggio states it acts as 'a network of interrelated schema with analogies as the 'ties' that create paths along which generalization and innovation occur' (DiMaggio, 1997, p. 263-287).

As maintained by Csikszentmihalyi, if one wishes to explain why, when and where new ideas or products arise from and become established in a culture, he/she has to take into account the variables external to the creative individual (Csikszentmihalyi, 1999, p. 313). Csikszentmihalyi notes that his twenty-five years of research on creativity, which began by the focus on personality traits and cognitive processes of creative people, gave way to a conclusion that in order to understand creativity one must enlarge the conception of what the process is, moving from the focus on individual to a systemic perspective that includes the social and cultural context in which the 'creative' person operates (Csikszentmihalyi, 1994, p. 135). He states that it is not possible to think about creativity without taking into account the parameters of the cultural symbol system (or domain) in which creative activity takes place, and the social roles and norms (or field) that regulate the given creative activity.

For Csikszentmihalyi, creativity is a process that can be observed only at the intersection where individuals, domains, and fields interact. Described as the systems perspective onto the study of creativity, this view supposes that a triangular relationship exists between the three components of creative process. (Figure 3.2 & 3.3)

3.1.4.1. SYSTEMS VIEW ON CREATIVITY

According to the systems view to creativity, the domain transmits information to the person, the person produces a variation, which may or may not be selected by the field, and the field in turn passes the selected variation to the domain (Csikszentmihalyi, 1994, p. 145).

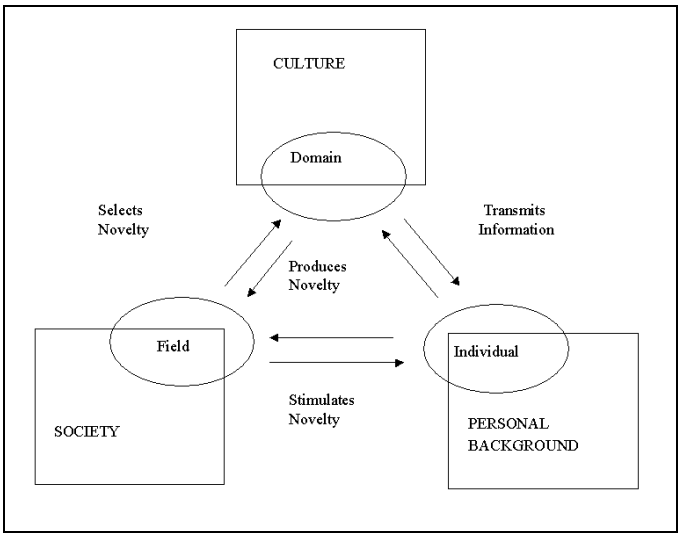

Figure 3.2. Systems View to Creativity (Csikszentmihalyi , 1994, p. 145)

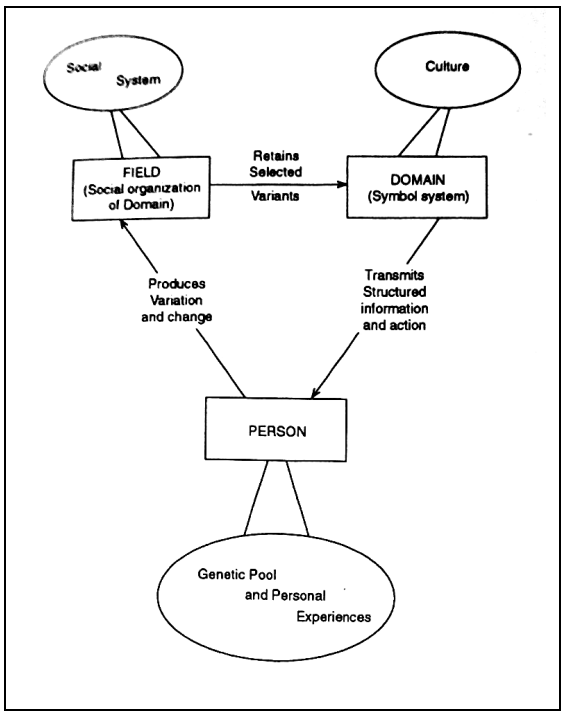

Figure 3.3. Systems View to Creativity (Csikszentmihalyi , 1994, p. 145)

3.1.4.1.1. THE DOMAIN

The domain is defined as ‘any symbolic system that has a set of rules for representing thought and action’ (Csikszentmihalyi, 1994, p. 153). The function of a domain is defined as to preserve desirable performances selected by the field and transmit them to a new generation of people in a form that will be easy to learn. Domain is identified here with culture (or the component of a culture such as religion) and its symbolic system. It stands for the prior knowledge that the culture provides for the creative person.

As maintained by this view, the domain is a necessary component of creativity, as it is impossible to introduce a variation without reference to an existing pattern. ‘New’ is meaningful only in reference to the ‘old’. Thus original thought does not exist in a vacuum and it must operate on a set of already existing objects, rules, representations, or notations. Creativity occurs in this context when a person makes a change in a domain, which will be transmitted through time (Csikszentmihalyi, 1994, p. 314, 315).

3.1.4.1.2. THE FIELD

The field is described as that part of the social system that has the power to determine the structure of the domain. Its major function is defined as to preserve the domain as it is, and its secondary function is described as to help it evolve by a judicious selection of new content. The professions and their organization could be given as an example to the field (Csikszentmihalyi, 1994, p. 151).

3.1.4.1.3. THE PERSON

The creative person is described as the one who has assimilated so well the various moves of the domain that he/she can convince the field that his/her variations are an original extension on previous performances/works. The person who can use the vocabulary of the domain to express possibilities inherent in it, but never expressed before by others, and whose performance the field recognizes is likely to be called as creative (Csikszentmihalyi, 1994, p. 147). The creative person in this basis uses the vocabulary of the domain to express possibilities inherent in it, which are never expressed before by others, and the field

recognizes his/her variations as an original extension on previous performances/works and calls them to be creative (Csikszentmihalyi, 194, p. 147).

In terms of personal characteristics, the person's ability to 'find, define and formulate the problem' is found to be a critical aspect observed in creative people (Csikszentmihalyi, 1994, p. 138). 'Cognitive abilities' such as fluency, flexibility and discovery orientation are found to be necessary to engage successfully in creating novelty. 'Intrinsic motivation', or in other words, working in the domain for the love of it, is also deemed important. However, as Csikszentmihalyi indicates, the most extensively studied and emphasized attribute of creative cognitive style is 'divergent thinking and discovery orientation', which involves creative generation of multiple answers to a set problem.

Nevertheless, it is stated that how the patterns of cognition, personality and motivation develop and in what extend they affect creativity is still not clear (Csikszentmihalyi, 1999, p. 332). Therefore Csikszentmihalyi shows his hesitation towards taking these qualities as certain to describe creativity indicating that these personal characteristics could at best be correlates of creativity, meaning they do not directly tell what creativity is. He points out that behaviors such as rejection of old problems, the search for new solutions, and the emphasis on discovery and novelty may be just a passing phase in humankind's attempt to recognize and describe creativity. In these terms he states that creativity is not an attribute of individuals but of social systems making judgments about individuals; thus to study creativity by focusing on the individual alone would be, in his words, like 'trying to understand how an apple tree produces fruit by looking only at the tree and ignoring the sun and the soil that supports its life' (Csikszentmihalyi, 1994, p. 141, 147).

3.1.4.2. THE EFFECT OF THE CULTURAL CONTEXT IN CREATIVITY

As stated by Csikszentmihalyi, creativity involves a change in a symbolic system, which in turn affects the thoughts and feelings of the members of the culture. In this line, it presumes a community of people who share ways of thinking and acting, who learn from each other and imitate each other's actions. Cultures in this sense are thought as systems of interrelated domains, which are learned and reproduced without change. When a new thing is

brought into their self-reproducing symbolic systems through invention or reformulation, creativity is thought to come into life (Csikszentmihalyi, 1999, p. 316, 317).

As mentioned previously, by acting as 'a network of interrelated schema with analogies as the 'ties' that create paths along which generalization and innovation occur' (DiMaggio, 1997, p. 263-287), culture, in the form of prior knowledge, controls both the reception and the production of meaning for its users. In their article 'Multicultural Muse: Culture, Creativity and Innovation', Westwood and Low also point to this relation between creativity and culture and state that creativity is conceptualized differently across cultures and social structural factors account for differences in creativity and innovation. They draw the conclusion that culture can and does impact on creative and innovative processes and so the relationship should be examined specific to the context they appear. Likewise, the impact of culture in cognitive style and personality, affects the levels of creativity, and so cultures become creative and innovative within the context of their own systems. Cultural factors such as risk taking behavior, uncertainty avoidance, individuality, unconformity, emotional stability, perseverance and persistence affect the level of creativity, which is itself described as taking the risk of constructing new relationships among different domains through actions such as association, synthesis, transformation, analogical transfer and categorical reduction (Westwood & Low, 2003, p. 235-259).

Csikszentmihalyi explains how culture affects the incidence of creativity and the conditions that a culture should have for promoting it as follows (Csikszentmihalyi, 1999, p. 318):

- The quality and type of the storage of cultural information (eg. oral vs. written records) is decisive. The more permanent and accurate the storage, the easier it is to assimilate past knowledge and hence to be well positioned for the next step in innovation.
- The degree of accessibility of information is decisive. The more accessible the information the wider the range of individuals who can participate in the creative processes.

- The degree of differentiation and specialization in a culture (i.e. the number of separate domains such as religion, philosophy and mathematics it contains) is decisive. The more differentiated the domains that the culture contains, the more specialized the information, hence advances should be made more readily.
- The degree of integration of different fields within one culture (i.e. the contents of the various domains being capable of being translated into each others terms) is decisive. The more integrated the culture, the more relevant an advance in one domain will be to the culture as a whole. This may make it more difficult for an innovation in any one domain to be accepted, but once accepted it will be diffused more readily.
- The degree of openness of one culture to other cultures is decisive. The more exposed the culture is to information and knowledge form other cultures, the more likely it is that innovation will arise.

On these terms, the creativity takes place as a special case of cultural evolution for Csikszentmihalyi, where individuals produce variations in domain; the field selects one variation among many, and adds it to the domain; and finally the domain transmits the selected variant to a new generation of individuals (Csikszentmihalyi., 1994, p. 149). Evolution in this context means increasing its complexity over time. Csikszentmihalyi defines two complementary processes to this complexity: First, it means that cultures tend to become differentiated over time; that is they develop increasingly independent and autonomous domains; and second the domains within a culture become increasingly integrated and mutually supporting each other's development.

However, Csikszentmihalyi indicates that creativity does not always support cultural evolution in this sense. It generally contributes to differentiation, but it can easily work against integration. It could break down the exiting harmony between different domains and might risk the complexity of a culture. Regarding this notion, Csikszentmihalyi states that if the evolution of culture is to continue, creative insights will in the future restore the relationship between the currently divergent domains, until new steps in differentiation again break it apart (Csikszentmihalyi., 1999, p. 321).

3.1.5. CREATIVITY AND COGNITION:
COGNITIVE USE OF CULTURE, CULTURAL SCHEMAS AND PRIOR KNOWLEDGE IN CREATIVITY

Observing the effect of culture and cultural symbol systems on creativity, now we can ask how that cultural information is cognitively used in creativity. The research on cognitive studies on creativity has proposed that creativity involves essentially ordinary cognitive processes yielding extraordinary products. It showed that the insights developed by the creative person depend on his/her use of conventional cognitive processes (such as analogical transfer) applied to knowledge already stored in memory. The use of such conventional cognitive processes is said to create the difference and yield extraordinary results (Sternberg & Lubart, 1999).

As mentioned before, one of the models created to explain these cognitive processes active in creativity is the 'Geneplore Model' (meaning generate and explore), which is developed by Finke, Ward and Smith. According to this model, there are two main processing phases in creative thought: the generative phase and the exploratory phase. In the generative phase an individual constructs mental representations referred to as pre-inventive structures, which are promoting creative discovery. The processes that are active in the generative phase include: the *retrieval* of existing structures from memory, the formation of simple *associations* among those structures, the mental *synthesis* of new structures, the *mental transformation* of existing structures into new forms, *analogical transfer* of information from one domain to another, and *categorical reduction*, in which existing constituents are conceptually reduced to more primitive constituents (Ward, Smith & Finke, 1999, p. 192).

In the exploratory phase these properties are used to come up with creative ideas. This phase includes the search for novel or desired attributes in the mental structures, the search for metaphorical implications of the structures, the evaluation of structures from different perspectives or within different contexts, the interpretation of structures as representing possible solutions to problems, and the search for various practical or

conceptual limitations that are suggested by the structures (Ward, Smith & Finke, 1999, p. 192, 193). The preinventive structures, which are produced in the generative stage through processes such as mental synthesis, are used or interpreted in the exploratory stage by examining their properties and implications. After the exploratory stage preinventive structures can be refined or regenerated in the light of insights that might have been occurred (Ward, Smith & Finke, 1999, p. 192, 193).

According to the model the creative cognitive processes occurring in these phases are 'insights' (forming unconscious connections through creative leaps), 'extending from familiar concepts' (in the service of developing new ideas), 'activating recent knowledge' (where creative products are influenced by features of the previous examples, precedents; which may also lead onto design fixation), 'conceptual combination' (synthesis of previously separate concepts), and 'creative imagery'. Creative thinking is described in terms of how these various processes are employed or combined. The authors provide proofs of these cognitive processes by various psychometric experiments.

From this model it is seen that the creative procedure occurs with analogical and combinatory processes applied over 'prior knowledge', which is taken by a 'creative leap' that appears as a sudden surge of a completely new perspective on the situation as previously understood. As Nigel Cross explains, this new perspective does not necessarily happen to be a sudden 'contrary' proposal, but it becomes an appropriate proposal, which includes novel features for a new design product (Cross, 2006, p. 44).

The effect of prior knowledge on creativity is also issued in another study, which is the Synectic Theory of Creativity. Developed in 1960's by William J. Gordon, 'synectic theory' works as an operational model for the conscious use of the preconscious psychological mechanisms present in man's creative activity. It defines the 'creativity' as 'the mental activity in problem stating and problem solving situations that include the coordination of things into new structures to result in artistic or technical inventions' (Gordon, 1976, p. 3, 34).

The term 'synectics' comes from the Greek word *synectikos*, which means "bringing forth together" or "bringing different things into unified connection" (Cave, 1997). Synectic

thinking is defined as the practice of discovering the links that connect seemingly disconnected elements. It is a method of mentally taking things apart and putting them together to provide new insight for all types of problems. It offers a free-thinking state of consciousness, where analogies between perceptions, concepts, or abstractions are inclined to occur repeatedly. It is based mainly on this analogical and disruptive thinking, and on the fusion of opposites. Through analogy or disruption ordinary perceptions are turned into extraordinary ones; 'the familiar is made strange'.

Since 'creativity' is engaged with this form of an undertaking that includes the 'coordination of things into new structures', every creative thought or action is refered in this theory as a form of synectic thinking. 'Creativity' is explained by synectic theory 'methodologically' by providing defined and studied tools to be utilized.

According to synectic theory the creative process takes place in two successive steps:

1. Making the strange familiar; and
2. Making the familiar strange.

The first step is delineated as the projection of the problem situation through 'familiarity'. As stated by Gordon, when faced with something new, with strangeness, like a problem situation faced in design context, the mind attempts to swallow this strangeness by forcing it into an acceptable pattern or changing its private geometry of bias to deal with this strangeness. The mind compares the given strangeness with data previously known and in terms of these data 'converts the strangeness into familiarity' or makes the strange familiar (Gordon, 1976, p. 3, 35).

The second step is described as the generation of new and original solutions, where the 'familiar' is either elaborated, adapted or totally rejected. In this step, in response to the problems that are defined previously through 'familiarity', the mind works this time as to 'make the familiar strange', in new way for arriving into new basic solutions. To make the familiar strange is defined as to distort, invert, or transpose the everyday ways of looking and responding, which make the world a familiar place. It is the conscious attempt to achieve a new look at the same old world. In this process, the familiar (the codified, the set world of the usual or the prior knowledge, which is cognitively kept in the brain in the form of

cognitive schemas) is subjected to new patterns and new laws of operation - it is subjected to 'invention' (Gordon, 1976, p. 36).

This step is delineated by Gordon as the step where creativity takes place. Gordon states that making the familiar strange by distorting or inverting it, is fundamental to 'creativity', as it helps to open up new viewpoints for interpretation and understanding. He asserts that in order to perceive all the implications and possibilities that arise in one problem, the familiarity should be risked for temporary ambiguity and disorder towards the arrival into a new solution. He identifies two synectic operational processes in this process of making the familiar strange, which are the analogy and the metaphor (Gordon, 1976, p. 36, 37).

Synectics makes use of analogies and metaphors to help the thinker analyze problems and form different viewpoints. As mentioned before, analogy includes the drawing of associations, seeking similarities between things that are different and comparing them with elements from different domains or disciplines. There are four types of analogies commonly used in synectic thinking, which are all metaphorical in character:

1. Fantasy analogy: implies thinking of fantastic, way-out and perhaps ideal solutions to a problem that can lead to creative yet workable ideas.
2. Direct analogy: implies thinking of parallel problem situations in real life, faced by people or nature.
3. Personal analogy: implies placing oneself in the role of the problem itself.
4. Symbolic analogy: implies the utilization of objective and impersonal images to describe the problem.

They are utilized in reaching into different solutions from the already known ones and they help to analyze the problem situations under new lights by opening up new viewpoints for their interpretation and understanding. In all these different forms, analogy helps to re-frame the situation 'metaphorically', thinking of one thing in terms of another. The 'metaphorical allusions' created by analogy help in the formation of new connections between different things. Metaphorical thinking becomes the initial act that begins the disruption of the 'familiar'. The new connections, operating onto a foundation of the

‘familiar’, evolve through its alteration. In this process, next to analogy and metaphor, several other operations, which are delineated by synectics, are also used in the disruption and alteration of the familiar, which are as follows (Cave, 1997):

1. Subtraction: includes the removal of certain parts or elements from the existing situation, pattern, schema, type.
2. Addition: includes the extension or expansion of present ideas.
3. Transfer: includes the relocation, adaptation and transposition of the subject into a new situation. It consists of transfer of subject to a different historical, social, geographical setting.
4. Superimposition: includes the overlap, placing over, covering and overlaying of dissimilar or similar images or ideas to produce new images, ideas, and meanings.
5. Change of Scale: includes making the subject bigger or smaller by changing its proportion, relative size, ratios, and dimensions.
6. Substitution: includes the exchange or switch of the existing idea, image, or material with others.
7. Fragmentation: includes the separation, division, split, or dissection of ideas, forms.
8. Isolation: includes setting the object apart, detaching it.
9. Distortion: includes the twist of subject out of its true shape, proportion or meaning.
10. Contradiction: includes contradiction with the subject's original function; contradicting it visually and intellectually; or contradicting with normal procedures, social conventions, rituals.
11. Prevarication: includes the fictionalization, bending of the truth; falsifying and fantasizing about it.
12. Hybridization: includes the cross-fertilization, weddding the subject with an improbable mate.
13. Metamorphosis: includes the transformation, convertion, or transmutation of subject.

14. Symbolization: includes the development of a visual symbol that stands for something other than what the existing idea, subject.

15. Fantasy: includes free fantasizing with the subject for triggering surreal, preposterous, outlandish, bizarre thoughts.

16. Repetition: includes the replication of shapes, colors, forms, images, or ideas; includes the reiteration, or duplication of the subject in some way.

17. Combination: includes bringing similar or dissimilar things together; connecting, arranging, linking, unifying, mixing, merging, rearranging ideas, materials or techniques.

These processes are utilized in reaching into different solutions from the already known ones. Their utilization depends on the disruption of the familiar, or the known patterns of schemas or types, into new, original ideas, into the creative act or innovation.

Therefore, as it is generally believed, the creative act in this sense is not seen in creativity studies essentially as the making of a totally novel proposal, but rather as an act of transformation of the prior knowledge by some tacit methods in various levels. The research has shown that even the most original or novel products that are recognized as unusually creative have not represented complete break with the past but they have built upon the preceding works.

It is agreed today that, for a product to be creative in science, it must be novel, but it should connect with the existing theory or it will be ignored. The past in this sense is embodied in every new conception. The similar thing applies also in the arts. Musical compositions that are seen creative are inclined to be original in the sense of departing to some extent from prevailing norms, but they do not depart totally, otherwise they are not much admired. As it is expressed by Raymond Nickerson, ‘creative thinking moves beyond what has been done slowly, and when it does it is more as a modification of the past than the rejection of it’ (Nickerson, 1999, p. 393).

Thus, novelty is not the only quality to judge creativity. As Nigel Cross explains it, the creative act comes out like building a bridge between problem requirements and the solution proposal (Cross, 2006, p. 44). The creative act in this sense is not observed as the

making of an unexpected ‘contrary’ proposal, but as an act of making of an appropriate proposal, which contains novel features for a new product. This kind of a proposal may or may not be totally unexpected and new. As stated by Amabile and Tighe in this framework, in order to be considered creative, the ‘product or response cannot merely be different for the sake of difference; it must also be appropriate, correct, useful, valuable, or expressive of meaning’ (Nickerson, 1999, p. 393). In these circumstances, according the problem requirements at hand, certain types of creative contributions may be inclined to be greater in amounts of novelty than are others, but the level of novelty they have are not judged to be the only quality to assess their creativity.

On this basis, as maintained by Csikszentmihalyi, the ‘new’ or the ‘novel’ in the creative product is found meaningful only in reference to the ‘old’. The original thought must operate on a set of already existing objects, rules, representations, or notations and it does not exist in a vacuum (Csikszentmihalyi, 1999, p. 314, 315). Here prior positions become parts of creativity. In order to achieve a new position the creator must reassemble their components transcending the preceding positions. As Kubler indicates, for its users, the new demands familiarity with prior positions in order that they may discover the range of invention and the technique of invention appears in two distinct phases, which are the discovery of new positions and their amalgamation with the existing body of knowledge (Kubler, 1995, p. 64). In this sense, we can state that creativity does not take place as a total ‘invention’ with a ‘tabula rasa’ attitude, but rather happens as a kind of transformation, be it small or big. The studies suggest that it occurs not ‘out of nothing’, but rather it inevitably occurs ‘out of something’.

Consequently, this survey shows that in the cognitive study of creativity, the prior knowledge and culture has been implicitly or explicitly taken to be the result of creative processes. Creative work is not portrayed as simply playing out of individual drives, desires, efforts, and interpretations, but it is shown to take place in a context of already existing circumstances, which themselves stand upon and control the process (Feldman, Csikszentmihalyi & Gardner, 1994). In this framework, the individual takes some information provided by the culture and transforms it, and if the change is deemed valuable

by the society, it is included in the domain, thus providing a new starting point for the next generation of creative people.

This interplay between the desire for preserving important features and qualities of experience and the desire to transform experience is thought as the point where creativity takes place. The domains of knowledge and skill in this sense are found as evolving sets of cultural artifacts that reflect past creative activity and they are considered to provide the existing context into which novel possibilities are introduced. Culture in this framework plays a dynamic role in the interpretation and generation of designed artifacts and architecture. Within this framework, this study will observe in the following paragraphs, the cognitive role of culture in the generation of architectural products through an examination of the use of cultural schemas in the architectural design process.

3.2. ARCHITECTURAL DESIGN STUDIES

Architecture could be seen as a cultural system of representation that issues the formation and transfer of meaning through its architectural forms. In this system, both the production and the reflexive interpretation of architectural products are involved in the process of meaning making, which is largely bound to the prior knowledge and the cultural information that the individuals have. As a cultural artifact dealing with the production and reception of meaning in this sense, architectural product sits in between the cognitive reception-and-production of information on the basis of its cultural meaning. The encoding and decoding of its messages that are carried in its forms through architectural representation are thus engaged in a cognitive process of managing information and to the use of cognitive structures and tasks.

In this process the utilization of culture as a net of cognitive schemas function in the production and reception of architectural products. In the following paragraphs, this closely-knit relationship between culture and architecture will be examined through an inquiry about the cognitive role of culture and cultural schemas, that of types and precedents in the interpretation and production of the architectural product.

3.2.1. HISTORY OF DESIGN RESEARCH

Research in the field of design began nearly fifty years ago in 1960s. As summarized by Cross, the subject gained importance firstly by the "Conference of Design Methods" in London in 1962, which was the event that is considered to launch design methodology as a subject of inquiry. After the success of this conference, the Design Research Society was founded and the research area was established firmly. As stated by Cross, the origins of design research in 1960s depended on the application of the new and scientific methods developed to the problems created by the 2nd World War. The development of creativity techniques were also depending on this need and was dated to 1950s (Cross, 2007, p. 1).

At the beginning of 19th century, the theory of 'associationism' have evolved and brought forward a 'mechanistic type of doctrine' in late 1900's that attempted to explain the problem solving behavior through the use of 'law like' relationships that were thought to govern mental processes. In early 1900's, the famous Wurzburg School in Germany opposed the ideas proposed by Associationists and suggested that 'Aufgabe' (that meant 'task' and hence 'determining tendency') was the controlling mechanism in problem solving behavior. In 1920's, the Gestalt Movement in psychology had a very prominent effect on the thinking of visual perception and creativity. Gestalt psychologists rejected the mechanistic doctrine of Associationists and proposed that there were visual schemata overlaid in external visual images during perception that facilitated the perception and organization of the visual information (Rowe, 1987, p. 41-46).

In 1930's behaviorism in psychology took the stage and had a major impact in the studies of problem solving and creativity. Rejecting the 'mentalistic' approaches of the doctrines before itself, behaviorism suggested that human behavior, and also problem solving, can only be explained in nonmentalistic concrete terms by way of observing the measurable patterns of physical behavior. This doctrine dominated the field until the end of 1950's. In the beginning of 1960's however, the thinking of mental processes within problem solving and creativity gained interest again (Rowe, 1987, p. 41-46). The 1960s also brought the development of computer programs for solving problems. The Artificial Intelligence research that was developing in those years started to focus on problem solving and

especially on ill-defined problem solving. It has attempted to develop methods and strategies for solving ill-defined problems and tried to augment them by domain specific knowledge (McDermott, 1982, p. 31).

In those same years, the first books of design and creativity research were published by scholars such as Asimow (1962), Alexander (1964), Archer (1965), Jones (1970), Gordon (1961), and Osborn (1963) and the foundations of the "science of design" was established by Herbert Simon, as the "a body of intellectually tough, analytic, partly formalizable, partly empirical, teachable doctrine about the design process". The design research was "scientised" in this sense (Cross, 2007, p. 1).

However, coming to 1970's, these methodological studies for design were strongly rejected by practitioners and scholars, for the reason that they were limiting the design activity. Contrary to these studies, these people started to prioritize the satisfaction in appropriate solutions. After this period however, the 1980s saw another boost of research in the field. The design journals such as Design Studies or Design Issues started to be published in those years. The 1980s established design as "a coherent discipline of study in its own right, based on the view that design has its own things to know and its own ways of knowing them" (Cross, 2007, p. 2, 3). Starting from these times onwards, the design research is still expanding up until now.

3.2.2. DESIGN COGNITION

The empirical research on "design cognition" has illuminated seminal characteristics of the 'mysterious' creative process of design, beginning from nearly thirty years ago. As explained by Eastman, design cognition refers to the "study of human information processing in design, using different theoretical and empirical paradigms" (Eastman, 2001, 147). In this area, certain research methods have evolved such as: the case studies, which focused on one particular project at a time in which the observers noted the progress and development of the project; the protocol analysis studies, which involve "giving small but realistic design tasks to subjects and monitoring their behavior" (Eastman, 2001, 147) by some protocols such as the 'think aloud' system; and the performance tests, which are conducted under controlled

laboratory conditions. For the analysis of the design activity, the protocol analysis comes to the fore as a fruitful approach, which has illuminated much of the cognitive characteristics of the design process. The major proponents of the area were the scholars such as Eastman (1970), Foz (1973), Akin (1978), Lawson (1979), Schon (1983), Eckersley (1988), Chan (1990), Goldschmidt (1991), Cross (1994), and Suwa (1997) (Cross, 201, p. 1, 2).

3.2.3. DESIGN AS ILL-DEFINED PROBLEM SOLVING

As Cross mentions, in analyzing design cognition, normally the results of problem solving research of cognitive science were used and design processes were tried to be explained using problem solving theory, until lately. However, it was understood that designing was not normal 'problem solving'. On the contrary, design problems were 'ill-defined problems', in which the problem is not always clearly defined and the initial conditions, the operations and the goals of the problem are also loosely defined and subject to redefinition constantly (Cross, 2001, p. 3). As stated by Thomas and Carroll, it was understood that design exists as a type of problem solving where the problem solver sees the problem as if there is some "ill-definedness in the goals, initial conditions or allowable transformations" (Thomas & Carroll, 1979, p. 5-11).

As stated by Eastman, all problems involve the processes of "translating some entity (A), into some other entity (B), which is specified in terms of goals to be achieved (A> B)" (Eastman, 1969, p. 669). In well-defined problems, the initial *problem state* (A), the *operators* to be used to alter the problem state and the *goals* to be achieved (B) are specified. Moreover, the formal language to be used in this process is known before hand, such as the algebraic formulas or symbolic language. The *problem state* (or the knowledge state as it is sometimes called) is defined as "the particular stage in which the problem solver knows a set of things". As summarized by Chan, the various states that the problem solver can achieve are called as *problem spaces*. The various ways of changing one state to the other on the other hand are called as the *operators* (Chan, 1990, p. 61). As suggested by Eastman, the initial *problem space* is defined by "the total number of states generated by applying all permutations of applicable information states", which are created by a series of

transformations. The sum of operations that are working over this problem space is called as the *search strategy*, which is defined as the means that are used to generate the information states towards the attainment of a goal (Eastman, 1969, p. 670). The problems in physical sciences and engineering are considered to be well-defined problems. They include the recoding of the problem into a different symbol system, where the problem is "translated" into algebraic form and then solved by solving the algebra problem (D'Andrade, 1981, p. 188-189).

In ill-defined problems on the other hand, the formal language for describing the problem space, the operators for working on that problem space and the clearly defined goal is missing. The solver of these problems should define these factors himself. The space planning tasks in architecture or engineering, or design tasks, are considered as ill-defined. They lack a well-specified language for their representation; the generative manipulations to be applied in design are not known beforehand; and they generally lack a clear formulation of the goal state.

As explained by Herbert Simon, design is ill-defined in a number of respects. First, there is not a definite criterion to test, evaluate or apply the proposed design. Second, the problem space is not defined in any meaningful way, so that the architect may consider all possible structures or all the possible materials he can use for the design. In this process, the designer works in terms of sub problems, by the help of a retrieval system that continually modifies the problem space *by recalling knowledge from the long-term memory*. Since ill-defined problems of design require a large domain of relevant knowledge for their solutions, the retrieval system that is used to operate on them works as a tool for *the recognition of solution possibilities*. When the design problems are reduced to a series of sub problems in this fashion, they can become solvable as well-defined problems (Simon, 1973, p. 181-201).

D'Andrade argues that in this process, designers' cognitive operations are performed on "mental models" which are analogic representations of the problem. On this basis, the process is basically content based and it is learned by experience and guided discovery. It includes the use of prior knowledge or cultural information and shows how people interact with cultural representations (D'Andrade, 1981, p. 188-189).

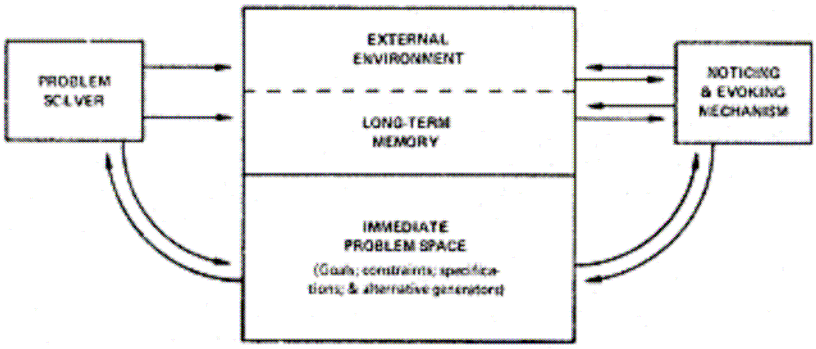

Figure 3.4. The diagram of a system for ill-structured problems. (Simon, 1973)

As summarized by Chan, the problem space in architectural design consists of the following items (Chan, 1990, p. 61):

- *A set of design units* that are defined in the design programme or brief by the client, or determined by the architect during the problem state. They are the physical building components, such as the bathroom or the living room, which are manipulated during the design problem solving.
- *A set of operators* that are a part of designer's knowledge base, which are used to change the knowledge state. They can be arithmetic operations for numerical calculation or some design rules to create a design unit.
- *A set of design constraints* that are defined by the client or the architect himself (in terms of the schemas in his long term memory), such as the limitation of the floor area.
- *A goal* that the architect thinks that it would satisfy all the design constraints.

As a summary of these items, the problem space in architectural design is expressed as such: Problem space= (goal, design unit, operator, constraint) . When the architect knows the design unit, design constraint and the rules to be applied, he can move on to the next design state by applying the rules to satisfy the constraints (Chan, 1990, p. 61).

The research has shown that unlike the normal problem solvers, the designers become *solution focused* in the face of the ill defined design problems, meaning that they do not spend much time in defining the problem but they identify a problem 'frame' and propose a

solution conjecture for it. Other than searching for the optimum solution as in the case of a well-defined problem, they devise a satisfactory solution for the loosely defined design problem (Cross, 2001, p. 3). Schon identifies this 'problem framing' as a seminal step. He states that in order to solve a design problem, the designer should 'frame' the design situation by setting its boundaries, selecting particular things and relations for attention, and imposing on the situation a coherent state that directs further design moves (Schon, 1988, p. 181-190). As Lawson suggests, this results from the education of the architects, in which they are thought basically by examples and practice (Lawson, 1979, p. 59-68).

> "In order to formulate a design problem to be solved, the designer must frame a problematic design situation: set its boundaries, select particular things and relations for attention, and impose on the situation a coherence that guides subsequent moves." (Schon, 1988)

In this process, designers look for matching the problem-solution pair and understand the problem through their solution conjectures. They come up with an early solution to the problems at the outset and become attached to it. Although this is considered to bring 'fixation' to the designer, it is presented as a normal activity in design and not considered always as a bad thing. It is sometimes considered to block the designer from further exploring, but it is also portrayed as a usual cognitive aspect that all the designers do. Another common aspect that is found in designers is the generation of multiple alternative solutions for a design problem. Although it is portrayed by some researchers as the reason for the success of outstanding designers, this is still not clear as it is also shown that even outstanding designers are inclined to get attached to their first solution concepts and attempt to develop that even in the face of obstacles. As Cross states, no clear method or system has been found until today which shows how design develops. It is still accepted that most of the designers are still considered to practice in an ad-hoc and unsystematic way (Cross, 2001, p. 3-17).

In many of the research in the field, the design process is tried to be understood by way of making comparisons between the expert and the novice designers. Although being a tacit and implicit issue, the research has shown that the acquired expertise in design

demonstrates some common features that can be seen via protocol studies and observation in expert designers. The expert designers are found to detect their fixations easier and overcome them by finding other alternatives (Akin & Akin, 1996, p. 341-361). They are found to have richer representations, bigger chunks of domain knowledge, indiscriminate use of inventive strategies, the ability and desire to generate many solution alternatives for a problem (even if it is not needed), non-standard problem composition schemas and strategies of complexity management, through which they think of a design problem first in breadth and then in depth (Akin, 2001, p. 105-125).

3.2.4. SCHEMAS IN DESIGN PROBLEM SOLVING

The representation of domain specific knowledge in design and the construction of a conceptual framework for a design problem can be explained by way of schema theory, which was previously explained in the first chapter (Chan, 1990, p. 60).

It is accepted today that there are a limited number of 'chunks' of information, which a designer can use at any given time. In this limited form of cognitive resources, the problem solving strategies depend on previously solved problems and their problem schemas (Hewett, 2005, p. 320). When people encounter the same group of problems several times, they learn how to solve these problems. When they come up with a stimulus that they think is a similar problem, they retrieve the solution process they devised beforehand and apply it to the problem. The solution process that is gathered as such depends on the problem schemas.

As explained by Vanlehn, a *problem schema* (or an 'abstract schema' as it is sometimes called) (Chen & Mo, 2004, p. 583) is defined as "the collection of knowledge surrounding a familiar problem" (Vanlehn, 1998, p. 545). It is the organized body of knowledge about the properties of a particular type of problem, and the operations that are required to solve it, which is formed as a result of the repeated prior experience with that kind of problem (Hewett, 2005, p. 320). Therefore, the problem schema is considered to have two parts of information, one for describing the problem and one for describing the solution (Vanlehn, 1998, p. 545-547).

The style of problem solving where problem schemas are used is “the schema-driven problem solving” (Vanlehn, 1998, p. 545). In this process, upon the encounter of the problem, a schema is retrieved or invoked from the long-term memory and if it is relevant, a solution is built upon it (Hewett, 2005, p. 320). It basically consists of three steps, which are the ‘selection of the schema’, ‘the adaptation of that schema’, and ‘the execution of its solution process’. As noted by Marshall, this process takes place via analogical reasoning (Marshall, 1995, p. 57). The selection of schema is described as the moment when ‘the schema is popped into the person’s mind’. This process is not totally understood, however it is accepted that when the schema is once triggered it directs the interpretation of the remainder of the problem (Vanlehn, 1998, p. 545-547).

In solving familiar problems the problem schemas are directly used, whereas in solving unfamiliar novel problems, they are first adapted to the problem (Vanlehn, 1998, p. 545). As mentioned earlier, for Bartlett, this process of adaptation that is based on people’s schemas forms the creative insight into a problem (Rowe, 1987, p. 44). The schemas may block the search for new solutions at the first instant when a novel problem is come across, but when this block is eliminated people go up a level in reaching to creative solutions.

People acquire a wide range of familiar problem schemas during their lifetime, which are based on their prior experiences. The empirical research shows that the attainment of schemas increases the speed of acquiring and understanding information for people (Marshall, 1995, p. 57). Problem schemas help people to solve the frequently experienced problems in a faster manner with relative ease. They save them from spending their cognitive resources inefficiently (Hewett, 2005, p. 320).

For Vanlehn, this type of problem solving is mostly used by experts who are working in knowledge rich domains such as architectural design. Since it is assumed that experts have a lot more schemas in their minds than that of novices, they are considered to “perform faster than novices, are more accurate than them, use better strategies, monitor themselves better, have more efficient memories, can recall better” (Vanlehn, 1998, p. 556-569).

3.2.5. CREATIVITY IN DESIGN

Design is basically described as the activity of "creating, constructing or executing, which requires the recognition and definition of a need and the embodiment of the underlying functionality, which must ultimately result in a configurational representation of the product that performs those necessary tasks" (Jansson, Condoor & Brock, 1992, 265). The main concern of design could be described as the 'conception and realization of things'. Usually considered in the context of 'creative endeavors', design refers to the process of originating and developing a plan for a product, structure, system, or component. It normally implies a conscious effort to create something that is both functional and aesthetically pleasing. Encompassing as such mainly the 'arts of planning, inventing, making and doing', design comes to the fore as having its unique ways of conceptualizing and realizing things. As Nigel Cross states, it has its own distinct 'things to know, ways of knowing and ways of finding out about them' (Cross, 2006, p. 1).

The studies that look at creativity from a cognitive perspective by explaining the cognitive processes that are thought to direct the creative process and Csikszentmihalyi's views on creativity that present it as an essentially cultural phenomenon also reflect on the studies about creativity in architectural design and the cognitive use of cultural attributes in it. In line with the studies on creativity, most of the cognitive research made about creativity in architectural design present it as an act of transformation rather than total invention.

As Nigel cross explains it, creative design is not seen essentially as the making of an unexpected contrary proposal as it is generally believed, but it is the making of an appropriate proposal, which contains novel features for a new design product. As mentioned earlier, this proposal may or may not be totally unexpected and new, but it is realized through a 'creative leap', which is taken across the gap between the functional design requirements and the formal design structure of a possible new product. As Cross explains, creative act in design comes out like building a bridge between problem requirements and solution proposal (Cross, 2006, p. 44). For Akin and Akin, this event can take place if the designer can overcome his/her fixation or the frames of reference he/she already has. When those frames

of reference are broken and new frames are created by the designer, the new and alternative creative ideas could be generated (Akin & Akin, 1996, p. 341-361).

Cross defines this 'creative leap' as a sudden surge of a completely new perspective on the situation as previously understood. This new perspective does not necessarily happen to be a sudden 'contrary' proposal, but it becomes an 'apposite' (appropriate) proposal, which includes novel features for a new design product. As Cross indicates, such a proposal may or may not arise as a 'sudden flash of insight', but it constitutes a 'creative leap' across the gap between the functional design requirements and the formal design structure of a potential new product. It occurs like building a bridge between problem requirements and solution proposal (Cross, 2006, p. 44).

3.2.6. COGNITIVE PROCESSESS IN CREATIVE DESIGN

Cognitive scientists and design researchers working in the subject of creativity in design have developed many models that attempt to explain the cognitive processes that are considered to be used during the creative design process. They were based mostly on protocol studies and on the observations of expert designers. Although these studies have scientifically proved many theories about creativity in design, it must still be accepted that the essence of the creative act remains to be elusive and to pinpoint the cognitive operations that take place in creativity is still difficult (Welling, 2007, p. 163).

As explained earlier, for cognitive processes in creativity, Finke et al. proposed the *Geneplore Model* suggesting that there were *exploratory* and *generative* states taking place in the creative act. The Wallas model listed the cognitive processes that took place in creativity as *preparation, incubation, illumination, and verification*. Rosenman and Gero listed them as *combination, mutation, analogy, and first principles* (Rosenman & Gero, 1999, p. 345-364). Later Gero added to this list the element of *emergence*. Welling on the other hand listed them as *application, analogy, combination and abstraction* (Welling, 2007, p. 163). Application is defined as "the adaptive use of existing knowledge in its habitual context" and refers to the "creative adaptation of existing conceptual structures to fit normally occurring variations (Welling, 2007, p. 167). The most common example to it is given as the everyday living

within which we apply the knowledge we have to run our errands. The Law and craftsmanship are also given as the other examples to it. Analogy, which is the second cognitive process Welling identifies, is a well-accepted method for creativity, as has been discussed in the previous parts. Defined extensively in the previous parts, analogy is basically considered as "discovery of the applicability of an existing schema to a new situation" (Welling, 2007, p. 168). The third process, which is combination, is defined by Welling as "the merging of two or more concepts into one new idea" (Welling, 2007, p. 169). It is different than analogy in the sense that a new conceptual structure is formed at the end. This process is also named in the literature as *mental synthesis* or *conceptual blending*. The fourth and the last process described by Welling, which is abstraction, is defined as "the discovery of any structure, regularity, pattern or organization that is present in a number of different perceptions that can be either physical or mental in nature". This concept has many resemblances with the idea of schema development and use in creativity. Welling suggests that the amount of innovation in creative works increases from the application pole towards the abstraction pole and they altogether show that *creativity is basically based on our prior knowledge*.

> "These four operations form an ordinal scale, with innovation increasing from application to abstraction. In the application operation an existing structure suffers minor adaptations in habitual context; in the analogy operation existing a structure is transferred to an innovative context; in the combination operation existing structures are combined to form a new one; and finally in the abstraction operation a new structure is formed defining the relationship between existing structures. However, one should keep in mind that none of the mentioned operations generate entirely new knowledge because the result is always dependent on, or constructed with, previous knowledge." (Welling, 2007, p. 172)

There are also studies about the cognitive processes that are active in design. As summarized by Rowe, in 1950's and 1960's, with the belief that design activity could be understood by way of analyzing the processes that took place within it, the researchers

attempted to explain the creative problem solving process in design by way of characterizing design activity as a set of identifiable stages (Rowe, 1987, p. 47).

The most famous of them is the iconic model of design consisting of the processes of analysis, synthesis and evaluation. Analysis stands for “the exploration of relationships, looking for patterns in the information available, and the classification of objectives”. It is described as “the ordering and structuring of the problem”. Synthesis on the other hand is defined as the “attempt to move forward and create a response to the problem - the generation of solutions”. Lastly, evaluation refers to the critical assessment of suggested solutions against the objectives identified in the analysis phase. As explained by Lawson, in design, these processes do not follow each other in a directional fashion with starting or finishing points, but they co-exist in a complex mental process. The problem and solution emerge together as a reflection on each other (Lawson, 1980, p. 37, 48-49).

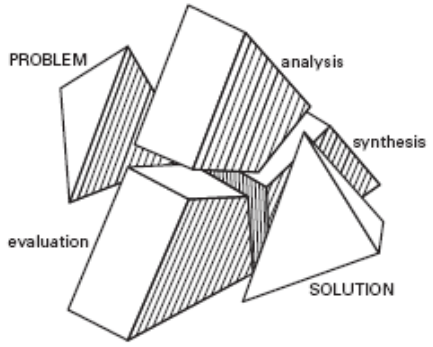

Figure 3.5. A Model of Design Process (Lawson, 1980, p. 49)

Sharing common points with this model, Nigel Cross’ model of the creative act (or the creative leap) in design follows through processes of *combination, mutation, analogy, designing by the first principles*, and the *emergence*. Combination involves combining features from existing designs into a new combination or configuration (Cross, 2006, p. 50). Mutation involves modifying the form of some feature or features of an existing design. Analogy involves thinking in analogues. Designing from first principles assumes designing proceeds by holding onto initial requirements. And lastly, emergence involves a process by which new, previously unrecognized prospect as lying within an existing design.

For Cross, the breadth of the leap could depend on how these same cognitive processes are applied during the creative process. According to how they are used, certain types of creative contributions may be inclined to be greater in amounts of novelty than are others (Cross, 2006, p. 44). This occurs due to the novelty of the target problem that is faced, which does not let predictable analogies, or the use of other processes, to help in solving it. If the target problem is totally novel, it would require a more extensive or different use of these processes to produce a novel end product. In this case the 'creative leap' to reach the solution has to be bigger and the resulting product is much more novel and innovative.

Another model that explains the cognitive processes in design is given by Jansson et al study. According to this study, the initial stage of design, which is the representation of the problem, is a crucial and all-influential stage towards design as it determines the possible solutions and goal attainment strategies for the design process. For Jansson et al., this initial stage is essentially based on what is there, or the prior knowledge and is primarily *schematic*. It shows the effects of categorization and associated cognitive processes on the use of design knowledge. The first representation of the problem is basically guided by a *schematic structure* imposed onto the problem during the early stages of design, where the perception of the problem includes a process of assimilating it in terms of the preexisting structures of knowledge, in other words cognitive schemas. For Jansson et al. the highly variable knowledge domain of design requires this existence of schemas, to organize and hence facilitate the realization of classes of design solutions (Jansson, Condoor & Brock, 1992).

On this basis, Jansson et al state that designers employ prototypes, which are described as the models that best represent the concepts and categories they deal with, and use precedents to initiate the design. The prototypes and precedents are said to serve as cognitive reference points in design for the categories for which they are the models. The designers are considered to analyze existing systems in search for analogies, which they employ as first solution concepts or starting points for their current design problem. The ideas occur on these terms by the recognition of recurrent patterns or analogies among familiar schematic knowledge domains. The synthesis of such associations from numerous

domains initiates novel design and this becomes the starting point of innovation (Jansson, Condoor & Brock, 1992).

This study verifies the early research made on the cognitive processes active in creativity. The processes they mention in the creative process coincide with the processes proposed by the Geneplore model, which were transformation, elaboration and synthesis. In similarity with the processes suggested by this model, Jansson *et al.* determine three processes that are active in architectural design:

1. *Identification*, where designers use prototypes for categorization of design problems and establish problem representations with these prototypes and their associated informational cores;
2. *Synthesis*, where the identification process guides the subsequent reasoning and evaluation processes employed throughout the design process. Synthesis of the prototype occurs as the prototype is adapted and developed to satisfy the requirements of the problem; and
3. *Evaluation*, where designs are assessed by using a prototype and its informational core. Designer become satisfied that a design task is completed when a balance between the evaluation and justification processes occurs. (Jansson, Condoor & Brock, 1992)

These processes are considered to work in succession and in repetitive fashion towards the formation of a finished architectural design. Prior knowledge and cultural attributes, such as types and precedents, are considered to be operated in design through these cognitive processes.

A very thorough model that explains particularly the process of architectural design is summarized in C.S. Chan study. Chan explains that when the architectural designer is working in a problem space to search for solutions, he follows a sequence of cognitive processes that take him to the solution. He summarizes these cognitive processes that take place in design by the cognitive model expressed by the following diagram (Chan, 1990, p. 61):

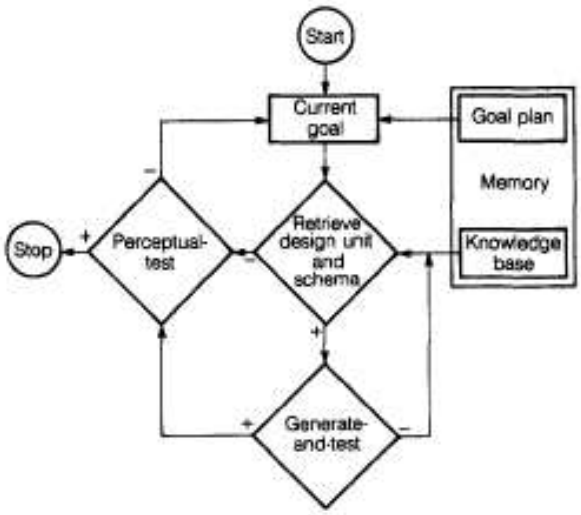

Figure 3.6. A general cognitive model of the design process. (Chan, 1990, p. 61)

According to this diagram, design proceeds by determining the goal, activating the necessary design units, retrieving the schemata that are associated with those units, applying the rules for searching for the solution and then testing that solution. Realizing these steps, the design problem reaches towards the final goal (Chan, 1990, p. 61).

In more detail, the design task is considered to be formed by a sequence of goals. The formation of goals can either be provided by a 'goal plan' that is stored in memory, or by a 'perceptual test'. The goal plan includes a sequence of goals that the designer must follow in order to continue the design task and reach to the final goal. The means of selecting these goals is referred as the 'control strategy'. While trying to reach to a goal, the designer is considered to manipulate a group of design units. In this process, "a package of knowledge about the design unit called a *schema*" that consists of related design constraints and rules for the application of that unit, is retrieved from the knowledge base of the designer from his long-term memory. The designer applies some strategies to these schemata and generates some design solutions, which are then tested as to see if the design has reached its final goal (Chan, 1990, p. 61). Explaining their relationship as such, Chan lists the key components in this process as follows:

1. Architectural knowledge base
2. Design constraints

3. Control strategy
    - Goal plan
    - Perceptual test
4. Search

The architectural knowledge base is considered to be formed by declarative knowledge and procedural knowledge. The declarative knowledge is comprised of the facts that we know and the procedural knowledge includes “the knowledge of how to perform”. In performing a task, the declarative knowledge is considered to be transformed into a procedural form. These two forms of knowledge are considered to be carried in terms of *schemas*. As explained in the previous chapter, schemas work as data structures that are used in representing the ‘generic concepts’ in memory. As mentioned before, a schema is considered to contain both the knowledge itself and the information about how that knowledge will be used (Chan, 1990, p. 62).

As summarized by Chan, in architectural design, the architect has to know both the general components of the building, which are the design units, and also the generic knowledge of what they are and how they are designed. In this process, a group of schemas is considered to be associated with each design unit. The schema of a design unit consists of the information of that design unit and the information of how to use it. Chan states that all the pieces of information that is associated with design units are hierarchically organized and the total of this structure that is formed by this information is called as the knowledge base. Therefore, a rich group of schemas related with a design unit is contained in the knowledge base (Chan, 1990, p. 62).

Among these schemas in the knowledge base of a design unit, there is a group called the “design constraint schemas”, which are an important group of schemas for the development of design. As defined previously, design constraints are the “certain requirements that must be fulfilled in order to design a design unit or a group of design units”. Design constraint schema is considered to be formed by an identifier, which is the name tag of the constraint, the variable, which is the variable of the design unit, the set of rules, which are the rules that determine how to satisfy the constraint (the design knowledge

is considered to be contained in this part), and the value of the variable, which results from the application of the rules, such as the geometric size of the design unit. Design constraints are considered to be necessary to limit the huge problem space of the ill-defined design problems by saving the effort that has to be spent for searching for a solution. (Chan, 1990, p. 61-63)

It is stated that when the problem space in the design is big, the designer comes up with a goal plan, which is defined as "a hierarchical process that controls the order in which a sequence of operations is to be performed" (Chan, 1990, p. 63). As mentioned before, the stage in design problem solving in which the schemas are operated by way of implementing the goals or testing them is called the control strategy. Via this stage, the designer knows and controls if he arrived into his final goal and if it satisfies the situation. (Chan, 1990, p. 63)

As reminded by Chan, problem-solving activity in design could be portrayed as a "search through the problem space, until a state is reached that provides the solution to the problem" (Chan, 1990, p. 64). This whole process is considered to be a search that is taken through the knowledge states that are collected during the search itself. Although there are extensive studies about this search process, it is still accepted that most of the designers are considered to practice in an ad-hoc and unsystematic way (Cross, 2001, p. 3-17).

Nevertheless, Chan states that the *schemas*, which are kept in the long term memory of the architect and which guide the process of the design by working as the design constraints, offer a resource for the solution generation and testing in design problem solving. On this basis, the constraint schemas in design are seen as important tools for design problem solving, even so that the ability to organize and apply them in design is considered to determine the design ability of the architect (Chan, 1990, p. 78).

3.2.7. COGNITIVE USE OF PRIOR KNOWLEDGE AND CULTURAL SCHEMAS IN ARCHITECTURAL DESIGN

3.2.7.1. INTERPRETATION OF THE ARCHITECTURAL PRODUCT

As any other cultural artifact, architecture operates and produced by and within shared cultural meanings through its symbolism. As Stuart Hall states it, these shared

meanings that create our culture find its spatial representation in architecture by way of its symbolic language (Hall, 1997, p. 4-18). Culture and society become integrated with architecture as such, forming spaces where people relate to place and associate with history. The cultural symbolism of architecture both communicates with and establishes its shared public nature in this sense.

As stated by Robinson along the same line, the idea of architecture as a medium for culture implies that architecture works for the underlying structure of cultural communication. The connection between culture and the built form allows architecture to be a significant medium for communication, where the architectural messages are deeply embedded in their cultural context (Robinson, 1989, p. 254-255).

> "The creation of built form, then, expresses a cultural pattern, and architectural forms come to stand for, communicate, and produce cultural expectations. Designers of buildings participate in the process of communicating these ideas. As members of a culture, they create the settings considered to be appropriate for the groups of people and the situations being designed for. Generally, these assumptions about what is appropriate are taken for granted, and the designer simply uses the culturally sanctioned forms and materials. In as much as built forms are manifestations of what a culture deems appropriate, they are mirrors of cultural values and offer an opportunity for questioning the degree to which our cultural aspirations are matched by our cultural achievements." (Robinson, 1989, p. 253)

As mentioned before, studies on cognitive theory suggest that 'cultural ideas', in the form of "shared knowledge, ideas, skills and values, which humans acquire and express in the material systems of artifacts and the built environment" (Lawrence-Zuniga, 1997, p. 49), are directed and reproduced by our cognitive schemas (Johnson, 1987, p. 19). The built environment on the other hand is both directed by these schemas and also signifies the encoding of them, through which the members of one culture translate from it specific formal cues resulting in appropriate behavior (Lawrence-Zuniga, 1997, p. 49).

As Donald Norman suggests, architectural pieces can emerge in this sense as cognitive tools for the user, if the user knows how to approach and read it (Norman, 1993, p. 47). In this cognitive 'reading' of architecture, the past knowledge of the individual plays a significant role by way of his/her memory. The comprehension and deciphering of innovative dimensions of architectural production also rests on this past knowledge. In this metaphorical process, the 'new' is understood and experienced in terms of the 'past'.

The cognitive use of culture in terms of the interpretation of architectural products works in this fashion. The architectural artifacts present cognitive tools for the user/viewer, depending on their existing cultural schemas and thus the 'new' in architecture is read by the viewer in connection to his/her prior cultural knowledge (Norman, 1993, p. 47). As shall be observed in the following sections, the functioning of types and precedents in architecture present this kind of a benefit for the user and follow this kind of a route in the perception of architectural products.

3.2.7.2. PRODUCTION OF THE ARCHITECTURAL PRODUCT

As stated by Low and Chambers, designed things are the artifacts of material culture, existing as the expressions of that culture in physical form. Designed environments and landscapes themselves on the other hand are the material culture. The formation of these artifacts is influenced by culture and the cultural principles that shape them is understood as a communication system. On this basis, design offers information about culture and it could be examined as such (Setha & Chambers, 1989, p. 5).

As explained in detail in previous chapter, culture can be used in the meaning of a cognitive structure, which is represented by a set of rules and schemas in the mind that are used as a template for cultural ideas (Setha & Chambers, 1989, p. 6). These cognitive structures that represent culture in the mind exist in the form of prior knowledge, that of types and precedents. The cognitive cultural rules that are perpetuated by 'map' the physical environment by determining the appropriateness and acceptance of the built forms (Setha & Chambers, 1989, p. 87).

As Low and Chambers explain, the idea of 'cultural cognition' in design research states that "there is a culturally generated cognitive structure expressed in the layout of houses and villages" and in the layout of built environment in general. On these terms, understanding this relationship between culture, cognition and environment offers an understanding of the design process and also an understanding of the generative qualities of culture for the built environment (Setha & Chambers, 1989, p. 87, 88).

3.2.7.2.1. PRIOR KNOWLEDGE IN DESIGN

The solution-oriented type of thinking that Cross describes in design, feed much from the prior knowledge of designers. As Oxman states, prior knowledge is accepted today as an important source of knowledge in the creative design process (Oxman, 1994, p. 141-142). Defined as "a particular structured formulation of underlying types such as concepts, prototypes and precedents", prior knowledge in design is accepted as an 'intrinsic ingredient' of the design process (Oxman, 1999, p. 17-28).

As stated by McDermott, since the design is an ill-structured activity and the set of constraints that exist in design problems is often large, those problems can be tractable only when big amounts of domain knowledge can be brought together at each step of the problem (McDermott, 1982, p. 36). Therefore, the ill-defined problems of design require a large base of relevant knowledge for their solutions. Long-term memory and the retrieval system that is used to operate on that memory work as tools for the recognition of solution possibilities from this knowledge (Simon, 1973, p. 181-201). As suggested by Bonnardel and Marmeche, the new ideas are inspired by the old situations that are experienced by the designer, which are carried in terms of this prior knowledge (Bonnardel & Marmache, 2005, p. 422-435). In this sense "designers accommodate the known to the new" and they form the new ideas by integrating it with "what they already know" (Oxman, 1990, p. 23).

As Oxman states on this basis, design exists as "a dynamic process of adaptation and transformation of the knowledge of prior experiences in order to accommodate them to the contingencies of the present" (Oxman, 1990, p. 17-28). Creativity in design appears in this sense as "the sudden interlocking of two previously unrelated, skills or matrices of thought"

(Koestler, 1964, p. 121) and it occurs as a cognitive process that includes the "activation and recombination of previous knowledge elements in a new way in order to generate new properties based on the previous ones" (Bonnardel & Marmache, 2005, p. 422-435). For this reason, the research on creativity in design shows that people rely much on the previous exemplars, precedents and types, even when they are told to be as ingenious and creative as possible. The further move away from these first evoked sources are considered to bring in the more creative and original ideas (Bonnardel & Marmache, 2005, p. 422-435).

As summarized by Suwa, design is considered in this sense as "a kind of apprenticeship in which skills and expertise are acquired after learning basic techniques, assimilating domain specific and general knowledge, and inspecting past good examples" (Suwa, Purcell & Gero, 1998, p. 455). It is accepted today that design ability increases depending on the attainment of a large domain knowledge and vast problem solution strategies that could be applied over this knowledge. On this basis, it is stated by Bonnardel and Marmeche that, if designers or students of design are supported with more and more databases that consist of inter domain or intra domain sources, they would be more successful in producing creative designs (Bonnardel & Marmache, 2005, p. 422-435). As also suggested by Malhotra et. al., the designers produce better results if they are mentally cued by resources of previous designs, which are showing the design elements and how they are combined (Malhotraa, Thomas, Carroll & Millera, 1980, p. 119-140).

3.2.7.2.2. TYPES OF PRIOR KNOWLEDGE

The research suggests that there are basically two forms of prior knowledge, which are used and required in design. They are the declarative (or the domain-specific) knowledge and the procedural knowledge. As explained before, the declarative knowledge is described as the general knowledge about the 'things' or 'objects' in the world and it basically forms the 'facts' that we know. The procedural knowledge on the other hand, involves the mechanisms that are used in the computation of the domain specific knowledge (Goel, 2001, p. 221-241). As mentioned previously, in performing a task, the declarative knowledge is considered to be transformed into a procedural form (Chan, 1990, p. 62). As Purcell and

Gero states, these forms of prior knowledge are attained either through exposure to the everyday, incidental experiences or they are attained as a result of the intentional learning, where the domain specific experiences, instances and the operators that are used for their transformation are transferred to subjects by way of schooling (Purcell & Gero, 1991, p. 82).

Moreover, as explained in detail in previous chapter, like all kinds of mental models/schemas, the prior knowledge (that is itself carried in the form of these models/schemas) is either personal or cultural. If it exists solely on account of the particular, idiosyncratic experiences of the person who carries them, it becomes solely personal in nature. However, if it is shaped by the phenomena that are shared by the society, it becomes cultural in nature. Architectural types for example exist as a cultural form of prior knowledge.

3.2.7.2.3. PRIOR KNOWLEDGE AND COGNITIVE SCHEMAS IN DESIGN

Categorization (or generalization as Oxman calls it) has a seminal role in the storage and retrieval of the prior knowledge within our memories. It is used for accessing and classifying prior knowledge by way of abstracting the specific characteristics and leaving the most distinguishing features out (Oxman, 1990, p. 17-28). As explained in the first chapter, categorization regulates the information we take into our brain and stores them in terms of knowledge structures, such as our schemas. As all sources of information therefore, our prior knowledge in design is also stored and carried in terms of our cognitive *schemas*. These schemas are considered to contain both the knowledge itself (declarative knowledge) and the information about how that knowledge will be used (procedural knowledge) (Chan, 1990, p. 62). Carrying the generic information about the design world, they provide the most efficient and most frequently used information processing method that has the easiest access. As explained in detail in the previous chapter, they consist of the information about objects, their parts and the relationship between those parts (Purcell & Gero, 1991, p. 83).

As Oxman explains, for a designer, the structuring of knowledge in terms of schemas is as important as its attainment, for making use of it (Oxman, 2001, p. 277). Defining schemas in design as “the formal constructs for capturing, acquiring and representing types

of knowledge structures in design", Oxman states that schemas form the conceptual knowledge in design, which is structured in terms of conventions such as typologies, rules, precedents, or other domain representation conventions (Oxman, 2004, p. 70). Therefore, as also stated by Lawson in this sense, the prior knowledge in architecture and design, whether it is attained via experience or intentional learning, is carried by schemas such as types or precedents (Lawson, 2004, p. 443).

On the basis of this research, it is accepted today that the studies about the use of cognitive schemas and the theory of 'creative cognition' have led to a better understanding of the design process (Oxman, 2001, p. 278). For Oxman the human ability to transform knowledge into representational structures, such as schemas brings about the ability "to make novel modifications and changes in those representations" (Oxman, 1996, p. 332). Oxman states on this basis that searching through the schemas of our prior knowledge in order to find a relevant schema for our cause is a part of the creative process (Oxman, 1990, p. 17-28). Design creativity is seen in this sense as "the ability to innovatively re-represent the schema or the particular structural content of the externalized representation (Oxman, 1996, p. 333).

> "In the development of explicit representations of form, humans are able to transform implicit knowledge to explicit representational structure. This appears to enable novelty through modification and change which transcend, contradict, or depart from the generic representation." (Oxman, 1996, p. 332)

As stated previously, design requires a certain level of maturity to be practiced well, because of the fact that expertise in design depends on gathering design knowledge and experience in the form of schemas. For experienced architects or designers, the schemas of precedents or types not just carry the visual information and geometry, but all the concepts related to that schema, such as the materials, uses, organization principles, or the important examples of that schema (Lawson, 2004, p. 443). Therefore, as Purcell et al states, the schemas of expert designers are greater in detail, in number and in the number of information they carry (Purcell & Gero, 1991, p. 83). These schemas are used by expert designers, and also non-expert designers of course, to *recognize* design situations and to apply to them the relevant *gambits* they developed beforehand (Lawson, 2004, p. 443).

Therefore, the precedents or types in design, which are stored by designer in terms of cognitive schemas, are used in the process of design to *recognize* the design situation, just like the chess masters recognize the board situation in a game of chess. For the designer, these schemas connect the design problem to the solution by offering solution examples derived from a pool of precedents and by providing the gambits that are developed previously to solve these problems. They both guide in the formation of the product and also in the implementation of the process to form it in this sense.

The gambits that are used on the prior knowledge of design, are referred as the 'repertoire of tricks' or possible ways that the architect uses to solve the recognizable problems. They are techniques of creation and transformation of forms and they differ from one designer to the other (Lawson, 2004, p. 448).

> "Put simply, designers are recognizing architectural or design ideas for which they have schemata to which are attached symbolic descriptions. Provided the recipient of the information knows these schemata the symbolic descriptions are very compact compared with the formal or geometrical characteristics." (Lawson, 2004, p. 450)

The process of recognition quickens the design response as it saves time from deeper analysis and enables the designer to devise a solution by using a standard gambit. An expert who is recognizing by way of his big pool of precedents and types and who is using his gambits to solve problems, is also needed to create something new and original that would "add something new to the pool of precedents" that the other designers would also use from. At this point, the expert designers use their 'guiding principles', which are defined as the "sets of values and priorities which on the one hand guide the project and on the other hand are informed and refined by projects" (Lawson, 2004, p. 448). Differing from one designer to the other, they can be different forms of emphasis, such as 'ecological design' or 'technology'.

As Lawson states, studying the designs of architects may reveal openly the precedents or types that they have used in their designs. As suggested by Goldschmidt, these precedents or types are used in design as 'references' or as 'points of departure' (Goldschmidt, 1998, p.

258-270). Lawson study suggests that, for the designer, the educational period develops a knowledge and understanding of design solutions, or as it is called, 'the pool of precedents' or the 'domain specific knowledge'. As the designer becomes more experienced, he perceives the drawings by schemata that conceptually organize the precedent (Lawson, 2004, p. 451). Expert designers accumulate a vast pool of precedents and prior knowledge, which are stored as to have 'affordances' (the ability to afford another function different than its originally intended function) that may be used at different design projects. This proves the fact that designers accumulate knowledge specifically about solutions rather than about problems (Lawson, 2004, p. 456). On this basis, Lawson identifies five stages that the designer has to go through towards expertise, which are as follows:

1. The development of a growing pool of precedents.
2. Acquisition of the design domain schemata.
3. The identification of some guiding principles, which develop in time to further filter the continued acquisition of the precedent".
4. Developing the ability to recognize situations with little or no analysis".
5. Building a 'repertoire of tricks' or design gambits, which are integrated in to the schemata used to recognize the problem situations". (Lawson, 2004, p. 456-457)

Therefore, as Lawson states, designers need to study a substantial body of precedents and types in order to develop schemata, which allow them to "recognize underlying structures in design situations" that enable them to "employ and adapt gambits" (Lawson, 2004, p. 456-457).

3.2.7.2.4. TYPES OF DOMAIN SPECIFIC PRIOR KNOWLEDGE IN ARCHITECTURAL DESIGN

Oxman classifies the prior knowledge used in architectural design into two, which are the types and the precedents.[7] For Oxman types and precedents differ in the form of reasoning that they require from the designer, which are listed respectively as 'refinement'

[7] This dissertation focuses mostly on the first form of prior knowledge used in design according to Oxman's classification, which is the use of type (or the generic schema) that is processed by refinement in typological design, both in the theoretical parts and in the analysis of the case study on the Aga Khan dwellings.

and ‘adaptation’. Used as two different cognitive styles of design, these two techniques are associated respectively with typological (model based) generic design and with precedent-based (case-based) adaptive design (Oxman, 1992, p. 117). In the following paragraphs, these differences will tried to be explained.

3.2.7.2.4.1. TYPES

For Oxman, the process of typification, or the formation of types, is also the product of the process of categorization or generalization. Oxman defines typification as “the abstraction and classification of salient aspects of precedents in terms of both situations and solutions”. One of the most significant implementations of it is considered as the formal typification, where the process forms the classes of formal types out of some known precedents. The typification works in the understanding of the design problem where the designer tries to fit the problem into a similar solution type in his memory. On this basis Oxman goes even so far by saying that “design knowledge is the knowledge of typification through abstraction” (Oxman, 1990, p. 17-28).

> “We assume that all design experience undergoes processes of typification in order to create indices for the storage, and ultimately for the retrieval, of design episodes; and that the way in which this occurs is a function of the form of classification and existing structure of the designer's memory.” (Oxman, 1990, p. 24)

Typology exists in this sense as a type of categorization and indexing for design. For Oxman typological knowledge is ‘a set of generic representations which are associated with specific problem types” (Oxman, 2001, p. 278). Types, in this sense, are the ‘conventionalized knowledge structures’ that exist as a significant source of knowledge representation for the cognitive studies of design (Oxman, 2004, p. 70).

Oxman portrays generic and typological knowledge as the distinctive forms of domain knowledge in architecture, which is acquired by the designers by way of personal experience (Oxman, 1996, p. 332). It contains the body of prior knowledge that enables the designer ‘to evoke generic representations, or to extract generic schema from specific

images". It consists of both the finding of the 'generic representational schema' and also the knowledge of the strategies of using this schema (Oxman, 2001, p. 280). In this sense, Oxman characterizes types as the formalizations of a high level of design knowledge that are encoded in generic forms. They are described as the general solution schemas, which act as the sources of generic knowledge manipulated in design (Oxman, 1990, p. 2-8).

Oxman states that new designs are based upon prior design experiences and knowledge that are abstracted, categorized and encoded in memory in the form of types. Due to the abstract formation of types, many new and different designs could be generated from the recalled solution types. As Oxman states it, types in this sense are "capable of diverse design solutions from one generic typological source". In this process, the cognitive process of analogical thinking plays a seminal role (Oxman, 1990, p. 17-28).

As mentioned before, the cognitive schemas that carry the typological knowledge in the brain are used both for the representation of that typological knowledge and also for their processing (reasoning) towards the formation of the generic design (Oxman, 2001, p. 278). The reasoning or the processing type that is used during the use of types in design is called by Oxman as 'refinement'.

For Oxman, 'typological refinement' is a characteristic thinking process used in typological design. The form of creativity in design thinking that is demonstrated by the formal processing of typological knowledge on the other hand is called by Oxman as the 'typological emergence'. Oxman exemplifies this notion with a diagram presenting the type use in chair design through the process of typological emergence (Figure 3.7). (Oxman, 2001, p. 278)

As Oxman explains, in refinement, the initial state of a generalized schema is successively transformed into a specified design. This initial state is considered to be a 'high-level, generic description of a class of designs' and it basically refers to the architectural 'type'. Oxman states that this underlying schema is a form of generic knowledge in which a representation has been generalized from past experiences and is generic in the sense that it contains only the most prominent attributes of the class of designs, as in the case of type. In this argument, although not naming it clearly, Oxman comes up to identify the architectural

type with the cognitive schema and describes its use in design by the process of refinement. She states that the design that is using refinement on the generic schema of type is defined as the generic or the typological design. Describing refinement as a 'transformational process of sequential particularization', which transforms the schematic state to a specific state as a top down process, she gives the example of Durand's use of type in design studies while exemplifying the use of 'design knowledge as a repertoire of basic generic representations' in architectural design and theory (Oxman & Oxman, 1992, p. 119).

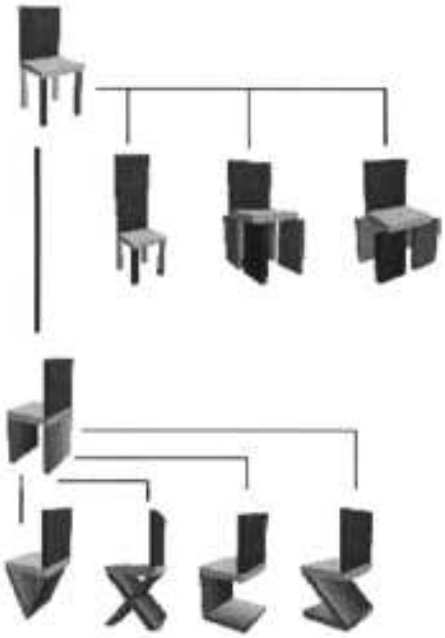

Figure 3.7. Drawing showing the creative transformation of a type through typological emergence. (Oxman, 2001, p. 279)

Oxman develops a model that shows the cognitive processing of generic or typological design that consists of the relation between the design issue (problem specification), design concept (solution type) and design form (resultant form). In more detail, the design issue is defined as "a point related to the design task which is deliberated by the designer". It includes the constraints that are defined by the programme or the designer. The design concept is defined as "the formulation of a design idea in relation to an issue". It

is described as a form of ‘ideation’ developed for the design task at hand. And design form is described as “the specific design artifact, which materializes the solution principle” (Oxman, 1994, p. 141-146). For Oxman, the design process evolves by first deriving a solution class (type), then the first form of generic representation of this class (level 1, which is the first modification of type), and then lasty the realized solution form (Oxman, 2001, p. 284). The diagrams below describe the refinement process in typological design.

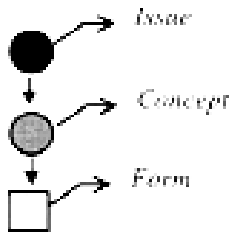

Figure 3.8. Diagram showing the design thinking steps. (Oxman, 2001, p. 284)

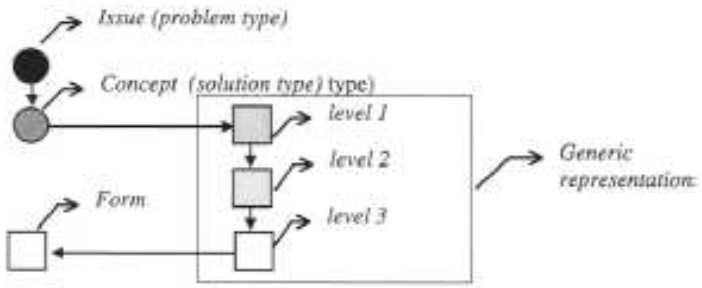

Figure 3.9. Diagram showing the design thinking steps in generic or typological design (Oxman, 2001, p. 285)

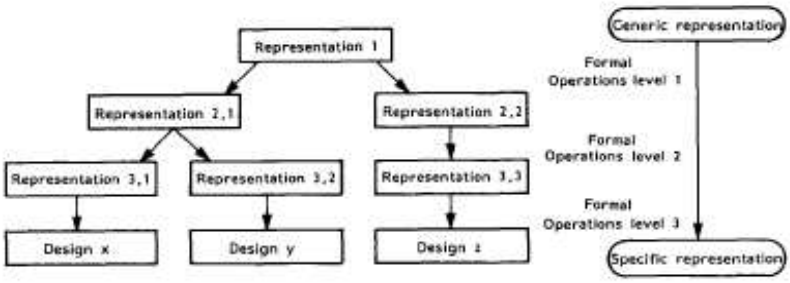

Figure 3.10. The Diagram showing the refinement of a generic schema or type in design (typological design). (Oxman, 1992, p. 122)

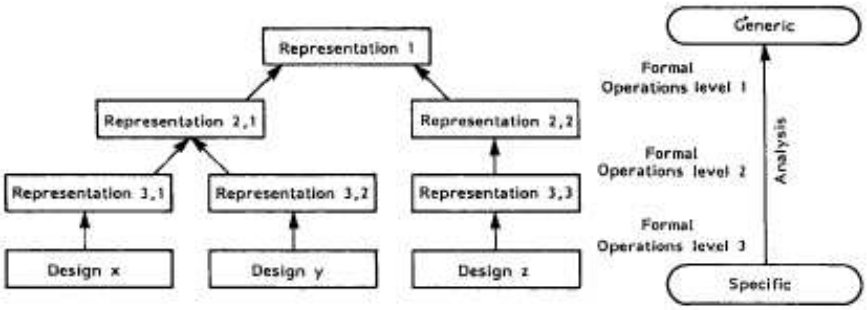

Figure 3.11. The Diagram showing refinement to a generic schema or type in analysis (typological analysis). (Oxman, 1992, p. 123)

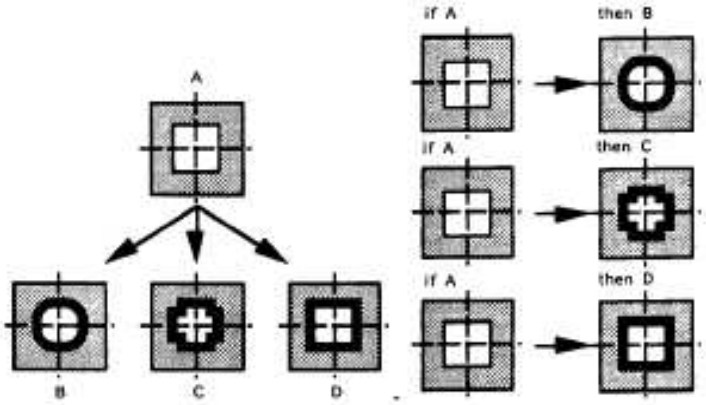

Figure 3.12. The Diagram showing an exemplary refinement process. (Oxman, 1992, p. 123)

As Oxman states, in design, types could either be *refined*, by making successive transformations over them to create a new design (*appropriation*), or could be *adapted*, by making modifications (in terms of forms or functions) and refinement over type to reach to a new design (*analogy*). As third option, when the existing types are not suitable for the situation, totally new types could be *generated*, by way of making use of the existing knowledge (*innovation*) (Oxman, 1990, p. 17-28). In this process, the source of transformations, modifications or the generation is the design constraints.

3.2.7.2.4.2. PRECEDENTS

The other important form of domain knowledge in architecture is the design precedent knowledge. It is portrayed as an important group of design knowledge that the

designers can reprocess in new design situations (Oxman, 1996, p. 332). In creative design, it is generally accepted that designers use cases or the knowledge of relevant prior designs to solve the current problems at hand (Akin, 2008, p. 2). In searching for design ideas, they browse between multiple precedents for making relevant connections and this browsing is considered to allow the appearance of new and unanticipated ideas (Oxman, 1994, p. 141, 142).

Precedent is defined as "the design case knowledge, which includes the particular conceptual contribution to design, which makes a case memorable as a precedent" (Oxman, 1994, p. 141, 142). They are the "specific designs or buildings, which are exemplary in some sense so that what architects and students glean from these examples, can support their own designs" (Akin, 2008, p. 3). They are basically considered as the past solutions to particular design problems. They differ from types in terms of being specified design representations, rather than being abstract schemas (Oxman, 2001, p. 284).

People are considered to learn from precedents through examining, analyzing and abstracting the information contained in them. For Akin, the conceptual abstractions attained from the precedents bridge between the conceptual and the physical design environment (Akin, 2008). As stated before, solving problems in design requires "problem solving skills and strategies" and "the body of knowledge" that can support the application of these skills to problems (Akin, 2008). Precedents are considered to demonstrate both the processes and the products within themselves. In this framework, the knowledge of design precedents, and the concepts that are acquired and constructed via them, is portrayed by the researchers of architectural education as one of the most significant source of knowledge in design education (Oxman, 2004, p. 71).

The process of selecting relevant ideas from prior designs to be used in current design problems is called as precedent based (or case based) design. In precedent based design, the precedents act 'as a vocabulary of design ideas' on the basis of a group of design problems (Oxman, 2001, p. 284). The use of design precedent knowledge in design is portrayed as an example of case based reasoning and the process that is used to transform this form of knowledge in design is considered by Oxman as 'adaptation'.

As explained earlier, case-based reasoning refers to the utilization of previous experiences and examples to understand and solve new problems. As explained by Kolodner, in case based reasoning, the reasoner remembers a previous situation that resembles the existing one and utilizes that to solve the new problem. In this process, the reasoner may adapt the old solutions to meet the new demands and solve new problems (problem solving case based reasoning like designers do), or may use previous cases to explain, interpret and critique a current case (interpretive case based reasoning like lawyers do) (Kolodner, 1992, p. 3-4).

In design, problem solving case based reasoning type is used extensively. In this process, the case is remembered and its solution is adapted to the new problem (Kolodner, 1992, p. 5-6). As Kolodner suggests, this type of case based reasoning provides an entire solution for the design problem and the pieces that do not fit are later adapted to it. Although the adaptation needed to fit the solution might be big, this method is still preferable as it saves the designer from starting from scratch. It makes the design easier as it enables the design problem solver to avoid dealing with many constraints and saves him from decomposing the problem into many parts that are hard to deal with (Kolodner, 1992, p. 5-9).

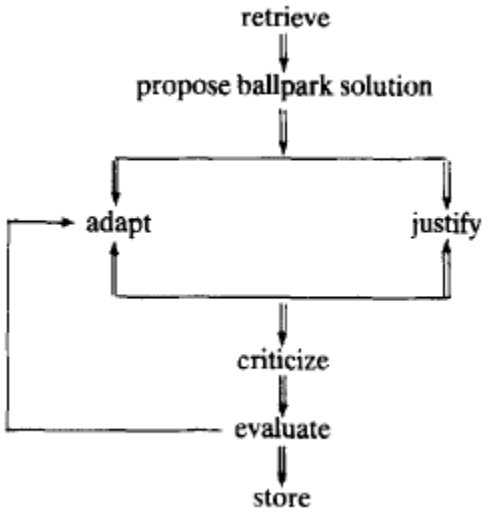

Figure 3.13. Case based reasoning cycle (Kolodner, 1992, p. 22)

Case base reasoning is considered to proceed in four steps (Kolodner, 1992, p. 5-6):

1. The storing of the experiences or precedents.
2. Recalling the old experiences from the memory (indexing the problem) that are closest to the new situation and interpreting the new situation in terms of these old experiences via comparison or contrast.
3. Adaptation of the old experiences to "fix up an old solution to meet the demands of the new situation" (Kolodner, 1992, p. 5).
4. Evaluation and repair of the outcomes.

The process of adaptation on the other hand is described by Oxman as a means of "fitting the old solution to a new one, or evolving a new design by modifying an existing solution representation". It is considered to involve the re-use (through modification) of the prior existing representational content of a design solution (Oxman, 1996, p. 334). Oxman explains that the precedents, which are stored in the form of cognitive schemas in the brain, are processed by adaptation towards new solutions (Oxman, 2001, p. 269-295).

For Oxman, the precedent based design evolves within a tripartite representational schema, which again includes the issue, concept, and form components. These three components are realized as to form the 'design story'. The concept of design story is defined by Oxman as "an annotation of the conceptual design content, which characterizes the uniqueness of a specific design precedent". For Oxman, a precedent is formed by the combination of several such stories (Oxman, 1994, p. 141-146). (Figure 3.14)

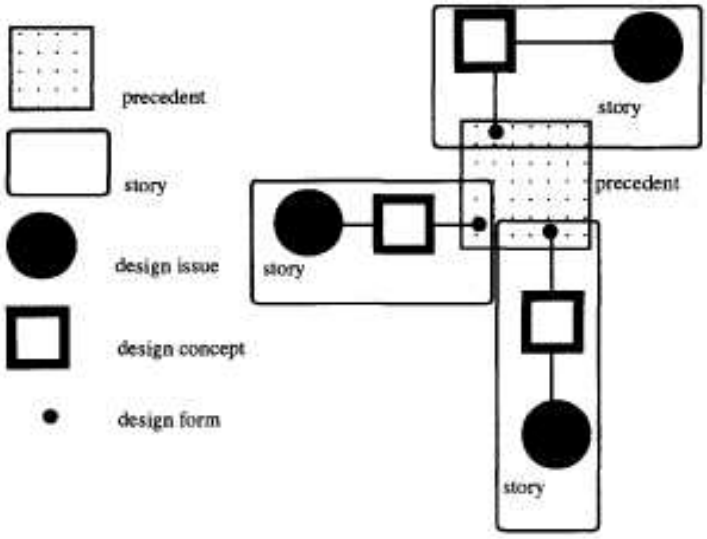

Figure 3.14. Diagram showing the several stories combined within one precedent. (Oxman, 1994, p. 145)

3.2.7.2.5. PRIOR KNOWLEDGE IN DESIGN EDUCATION

The research on prior knowledge had its impacts on design education as well. In 1969, Laxton has proposed a design learning model that proceeds firstly by the accumulation of experience and the reservoir knowledge, secondly the ability to generate ideas and thirdly the skill of critically evaluating these ideas in order to interpret and transform them in new contexts. He suggested that design education in schools should contain principally the domain specific knowledge of precedents, since children cannot be expected to be creative unless they accumulate a 'reservoir of knowledge'. He stated that the ability to generate new ideas depends primarily on the reservoir to be well filled (Laxton, 1969). As Lawson states, this model of design education depended primarily to prior knowledge and experience rather than a generation of new ideas by way of a *tabula rasa* attitude, which is itself the design education technique of 20th century that values first and foremost originality (Lawson, 2004, p. 454).

In a more recent study, Akin describes the method of education that emphasizes the teaching of the precedents as "case based instruction" (Akin, 2008). Based on precedent analysis, this form of education is thought to teach students the principles and strategies of

the architectural domain through cases. The students are thought to learn the design heuristics from the precedents that they have studied. This approach is also criticized on the basis that it limited the creative capacity of students. However, no concrete evidence could be suggested as to show the validity of this claim (Akin, 2008).

As well known, studio based approach is the most widely used education technique in schools of design. What this technique tries to do is to simulate the professional architectural office environment and to realize the steps of the design process, such as the *esquisse* stage or the jury system, that are experienced in an office (Oxman, 1999, p. 105-106). As Oxman states, this approach is based on an experience based learning, where the student is making designs under the guidance of the tutor (Oxman, 2004, p. 110). In design education given as such, students are not given a didactic education with the knowledge of principles to be applied to problems but an experiential education that is based on the hands on problem solving experience by design problems (Akin, 2008, p. 2).

For Oxman, this system should be methodologically developed as to allow the student to acquire the domain knowledge of design, in terms of cognitive schemas such as precedents and types, and the strategies of design thinking that could be used to manipulate them such as analogy, refinement or adaptation (Oxman, 2004, p. 110). On this basis, Oxman states that design education should consist of (Oxman, 2001, p. 280):

1. Cognitive structures: The acquisition of the cognitive ability to represent design knowledge through basic schemas of design thinking, such as the knowledge structures called types and precedents, and,
2. Cognitive strategies: The acquisition of the processing techniques over these representations of design knowledge (that of schemas such as types and precedents) in order to manipulate them towards creative solutions, by way of techniques such as refinement and adaptation, or typological or analogical thinking.

Therefore two components are deemed necessary for design education: the domain knowledge (or vocabulary) that should be learned by students via surveying the prior examples and types, and the processes or strategies to be used in design that should be

developed via hands on design exercises and experiences (Oxman, 2004, p. 65). An education that provides these two components would educate the student to develop the ability of the 'designerly way of thinking' (Oxman, 2001, p. 280).

> "It is our hypothesis that learning in design is the acquisition of the cognitive ability to manipulate the representations of design knowledge, to acquire basic schema in design thinking, to understand knowledge structures and to be able to manipulate characteristic strategies of design thinking such as generic and typological design, adaptive design, analogical thinking and creative exploration. That is, the cognitive attributes of design cognition and learning can become the content of design education." (Oxman, 2004, p. 110)

These studies show that the prior knowledge of individuals and different knowledge sources they use in design have an inevitable effect in the production of new architectural products. They are also attempts of answering how we could conceive creativity differently when we consider culture through the use of cultural attributes such as cognitive schemas, that of types and precedents. They suggest that creativity in architectural design is not the 'creation of something out of nothing', but it originates from familiar forms and methods of production. Creative production in architecture could be viewed on these terms as the activity where something new is produced through the recombination and transformation of existing cultural practices or forms, within the constraint of the cultural domain they are in. It can be described as finding new connections between related or unrelated items for arriving at new solutions. Like Toma Maldonado suggests, this process is based on a knowledge of past solutions applied to related problems and on these terms, creativity in architectural design becomes a process of adapting forms derived from past needs or from past aesthetic ideologies to the needs of the present (as cited in Vidler, 1996, p. 261).

3.2.7.3. THREE LEVELS TO PRIOR KNOWLEDGE IN ARCHITECTURAL DESIGN: APPROPRITATION, ANALOGY AND INNOVATION

When the cognitive processes that lead to creative design are observed we see a comparatively similar track that gives way to a scale extending from the most routine to the most novel. In such a scale of creative production, the techniques of appropriation, analogy, and innovation demonstrate different phases of creative manipulation of cognitive inputs in architectural design, which produce works that extend from the most familiar to the most original. In terms of the cognitive processes that lead their way, they follow a similar track that differentiates according to the transformation of the cognitive input, but as mentioned before, although developing by way of the same processes, in the scale of creative contribution, the novelty amount rises in the pole of innovation. In the following paragraphs these processes will tried to be demonstrated by way of architectural examples.

3.2.2.1.1. APPROPRIATION

Appropriation is defined as 'the act of taking possession of or assigning purpose to properties or ideas' ("Appropriation", 2012). In arts, the term appropriation denotes 'the use of borrowed elements in the creation of new work'. The borrowed elements can contain images or forms from art history or from popular culture, or materials from non-art contexts. Ever since the 1980s the term refers to the artistic technique of 'quoting the work of another artist to create a new work'. This new work might or might not modify the original.

Postmodernist 'appropriation' was observed in art in early 1980's, where works by earlier artists were taken up and 'recontextualized' by the contemporary artists as new artworks. This was initiated by a preoccupation with the past, which emerged at late 1970's when the belief in the ever-lasting existence of innovation had grown disheartened and 'originality', in the modernist sense of 'making it new', stopped to be the goal. On this basis, parody, pastiche and the ironic recycling of earlier forms of art flourished (Poynor, 2003, p. 78, 93). Pastiche, (defined as a literary, artistic, or musical work that closely and usually deliberately imitates the style of a previous work), has appeared as a postmodern technique to exaggerate meaning, suggest multiple points of access and make itself open to interpretation.

It worked on cultural memory and tried to connect past with present (Hoesterey, 2001, p. 1). Pastiche or appropriation was exhibited most clearly in important monuments of postmodern architecture in the 1960's as a response to the functionalist approach of modernism. The return to the archive of classical forms (eg: Revivalist neoclassical architecture) was promoted in this sense with the desire to reintroduce architectural meaning to communicate to the public and be context-sensitive. It was thought that this would bring back historical continuity to architecture (Hoesterey, 2001, p. 32, 33).

In terms of creativity and cognition, it can be stated that as the past forms used in appropriation are not undergone any formal transformation and not transformed according to different creative associations, they are not made formally new. They are lifted exactly from their past contexts and used for different purposes with their same forms in different contexts. By this way, the design uses *familiarity* in its most direct form in order to establish an easy communication with the viewer. It perpetuates historical forms with an aim to communicate over familiarity. As such, through borrowing and resituating forms from different historical periods in a contemporary context, for which they were never intended, those forms become the dually coded signs of a new sign system. A *change of meaning* occurs in the application of those visual ideas from the past with specific purposes in new contexts (Poynor, 2003, p. 76). The design formed like this implies that its reality is always mediated. As Taylor suggests, it gathers a web of signifiers and becomes the matrix that forms its own medium of reality. This medium is created by the all-encompassing structures of signification and the real is formed here by a play of signs, which is grounded in design itself. In other words, the design starts to reference design (Taylor, 1995). The viewer in this context, performs a reading of the design as a text, to decipher its multi coded meanings, which interrelate spatial, social, historical, psychological, cultural, and other symbolic codes (Hoesterey, 2001, p. 32, 33).

If art is taken as 'the conscious search for the creation of the new expression of reality', appropriation chooses not to bring in the new by artistic means. It tires to create immediate effects on the viewer by the use of the familiar. It tries to use the sentimental stimuli to produce these immediate effects. In terms of design, *it consciously lacks the*

creative transformation of the familiar towards the new. However when the end product is taken into consideration, the design still becomes new. This happens because of the new context that those past forms are getting integrated into. The analogy made to past forms, which are brought within contexts and purposes different than they were intended for originally, opens up new meanings for the end product. The contextual difference and the difference of their purpose form a dual coding for the product, which gives its new, changed meaning. It carries signs from the past consciously to a new context. Within this new context it is dually coded as a sign system and it becomes new. This becomes the creative inception that it gathers in itself. Its creative contribution lies in the act of selecting the past forms to form the design as an art piece and displaying it in a new artistic context.

Figure. 3.15. Charles Moore's Piazza d'Italia, New Orleans [8]

[8] Image retrieved from: http://www.idehist.uu.se/distans/ilmh/pm/moore-piazzaditalia.htm

Figure 3.16. Charles Moore's Piazza d'Italia, New Orleans[9]

Charles Moore's Piazza d'Italia in New Orleans (1975-80) is one of the monuments of postmodern appropriation in architecture. This structure appears as a pastiche of images and forms taken from the history of architecture. Its mood being ironic, it was intended as a celebration of city's Italian heritage in a series of historical signs gathered in a public place. An Italian corso is attempted to be staged in the piazza, with columns with Corinthian capitals made out of stainless steel, and a pergola modeled entrance with white metal tubes trying to configure the space as a Greek temple. In its design, Moore used the forms of classical antiquity in bright colors, stainless steel and neon lights. Formally he does not transform the elements. But he keeps them as they are, in a recognizable state. Adding colors from popular culture, he makes a collage of these elements, which he does not mold into a consistent unity, but leave them revealed to talk for themselves. As Taylor suggests, the work seems to be suspended in this sense between quotation marks that have been erased. In this fashion, Moore's structure appears a complex sign that becomes a sign of other signs gathered from history (Taylor, 1995).

[9] Image retrieved from: http://www.idehist.uu.se/distans/ilmh/pm/moore-piazzaditalia.htm

3.2.2.1.2. ANALOGY

As explained in the previous chapter, analogy works by allowing people to form an analogical mapping (or structure mapping) between two domains that carry along the relationship between the components in the source domain to be applied to the target domain (D'Andrade, 1989, p. 820), where the set of transition rules are carried to the target domain and a new (generative) mental model is built in the target domain to enable people to understand how things work in the new domain and behave accordingly in real life situations (Collins & Gentner, 1987, p. 242-248). It is the mental operation that makes connections between relations in two sets of objects, the source and the target, which is often, though not necessarily, a similarity (Thagard, 2005, p. 229). As Gentner et. al describe, it basically consists of dealing with a new situation by adapting a similar familiar situation (Gentner, Holyoak & Kokinov, 2001, p. 200, 201).

As discussed before, in terms of creativity and cognition, analogical reasoning exists as a central process of human mind whereby humans solve novel problems (Gentner, Holyoak & Kokinov, 2001, p. 162). It involves drawing parallels between novel problems and problems that have been solved in the past and allow us to use a familiar situation as a model for making inferences about an unfamiliar situation. It provides a basis of intelligent transfer of knowledge, by using prior knowledge in new situations, in order to achieve goals that guide the process along relevant directions (Pinker, 1999, p. 23, 43, 358). As mentioned before it proceeds in four stages, which are the retrieval, mapping and adaptation stages that operate on the analogs:

1. You face a target problem to be solved.
2. You remember a similar source problem for which a solution is known. (Retrieving from memory)
3. You compare the source and target problems, putting their relevant components in correspondence with each other. (Mapping the source and target analogues to each other)
4. You adapt the source problem to produce a solution to the target problem. (Adaptation) (Thagard, 2005, p. 80)

As explained in the previous chapter, analogy works for the utilization of our models/schemas and for going over schemas to understand and reason about novel situations (Derfer, 1995). Through decontextualization, or "the deleting of the differences between the analogs while preserving their commonalities", analogical reasoning provides general problem solving schemas that are applicable across a wide range of domains, the addition of new instances to memory, the new understandings of old instances and for the construction of novel analogies (Gentner, Holyoak & Kokinov, 2001, p. 83, 208).

Novel analogies themselves are important for the act of creativity by enabling people to go over their schemas that initiate those analogies (Shore, 1996, p. 353, 354). This feature of analogy becomes the source for creative cognition and plays a role in the generation of new concepts in science, problem solving, decision-making, perception, memory, creativity, design, emotion, explanation and communication (Gentner, Holyoak & Kokinov, 2001, p. 83, 208). Shore explains this process as follows:

> "Though many simple analogy problems are sufficiently empirically motivated to appear to be simple discovery procedures, higher level analogical, metonymic, and metaphorical cognition are important aspects of human creativity. Thus the very same cognitive processes that underlie conventional analogy have the potential to undermine the very conventions they are supposed to reinforce." (Shore, 1996, p. 363, 366)

As discussed previously, the elaboration onto analogy that is called 'conceptual blending' is also a very seminal cognitive process for creativity. Working by aligning two inputs and then projecting selectively from them to form a third structure, which is the blend, conceptual blending produces integrated action or thought without the loss of conceptual access to the initial input spaces. By this way it can lead to novel, creative integrated action and can be used to provide inferences and novel conceptualizations for further thinking (Gentner, Holyoak & Kokinov, 2001, p. 265). It becomes the cognitive process working over analogy that leads to creative cognition in this sense (Gentner, Holyoak & Kokinov, 2001, p. 256). We can observe this process of conceptual blending also in the use and transformation

of architectural types and precedents in architectural design, as we will observe in the following sections.

Consequently, analogical reasoning is often in charge when people are engaged in creative acts. It works by making connections between the problems that are dealt with and the problems that were solved previously. It makes possible to gain insight into potential solutions by way of getting inspiration from existing solutions in similar or different domains. Moreover, the analogical processes applied over acquired or prior knowledge have a determining effect on the creative act. By making several different associations between different sources of knowledge, which are used for forming new solutions, it acts as a productive factor of the creative process. In this sense, analogy is observed as a seminal process that guides creativity as an act of transformation (Thagard, 2005, p. 90).

For these reasons, analogy plays a significant role in areas such as problem solving, decision-making, and creative design. In design, analogy basically works by the utilization of prior examples, that of types or precedents, to inspire new designs or solutions. The analogical associations that are formed cognitively by the designer become crucial for new design solutions to appear. Based on the development of new points of view and new relationships that govern the experience of the design problem, analogy becomes an initial and important step that guides design (Thagard, 2005, p. 83, 90).

Verifying this statement, the research on the subject shows that designers often build their concepts on images or ideas that they have observed or experienced earlier. Designers are observed to retrieve these images or ideas directly from their long-term memory (Linsey, Claus, Claus, Wood & Markman, 2007, p. 3). As Casakin and Goldschmidt study shows, visual analogies that are build up by architects seriously enhance problem solving ability in architectural design both in expert and novice architects (with a difference between them that visual analogies have a greater impact on novices than on experts) (Casakin & Goldschmidt, 1999, p. 153-175).

As explained by Ashok Goel, in creative design, the knowledge that is required to be used in solving a problem is not generally available in a directly applicable form for the problem. So therefore, in any case, some of the required knowledge needs to be transferred

from other knowledge sources or domains via analogical transfer (Goel, 1997, p. 63). Along this line, creativity in design extends on a changing scale and it can come about at various levels. This level of creativity relies upon "the extent of problem and solution reformulation" and "the transfer of knowledge from different knowledge sources to the design problem" (Goel, 1997, p. 63). This mode of design formation however, may not work in all design cases, in which the target problem is fully novel and no previous solutions will be relevant. As Thagard mentions, in these rare cases, the analogies will only mislead (Thagard, 2005, p. 83).

As explained by Goel, analogical transfer happens in different ways. One of them is the transfer where the content of knowledge that is transferred consists of design elements, such as components and relations between components. Another consists of the transfer of the knowledge of criteria and methods for the evaluation of the new solution for the problem. In addition to these, yet another way of transfer might also take place where the strategic knowledge or design strategy can be transferred instead of domain knowledge. As Goel explains, the analogical transfer can also take place within domains or cross-domains, where the domains (such as architecture or engineering) involve different objects, relations, and processes within them (Goel, 1997, p. 63, 63). When the domain specific knowledge of two different domains, such as architecture and chemistry overlaps, then *specific transfer* takes place. When no domain specific knowledge is transferred but a style of thinking or strategy of problem solving is transferred, then *general transfer* takes place (Vanlehn, 1998, p. 556).

In this framework, analogical design 'involves reminding and transfer of knowledge about one design situation to another, where the transfer can occur in the service of any design task in the new situation" (Goel, 1997, p. 63). The analogical transfer on the other hand "requires the use of generic abstractions, where the abstractions typically express the structure of relationships between generic types of objects and processes" (Goel, 1997, p. 63).

The generic abstractions are described as the abstractions about the "relational structure among objects and processes", and not merely the "abstractions over features of objects". As Goel explains, for the discipline of design, these abstractions can be exemplified

by the “the structure of geometric, topological, temporal, causal, and functional relations among design elements” and the analogical design consists of the transfer of these generic design abstractions from one design problem to another, such as the relations among the elements of the design problem or strategy. Using design types and prototypes is an example for generic abstractions used in analogy based creative design (Goel, 1997, p. 64).

Italian architect Aldo Rossi’s designs could be given as an example to the analogical approach in architectural design. Rossi uses the “logical-formal operation” of analogy as a design method and employs analogy to retrieve the “archaic, unexpressed, and practically unexpressible” (Nesbitt, 1996, p. 346). His choice of using and referring to traditional building types and historic architectonical elements, which are distilled basically from the city, is the characteristic of this method.

Rossi takes type as the source analog for different design problems he is commissioned with and uses the ‘familiarity’ provided by ‘type’ as the first step in his designs towards new innovative solutions. He also uses the familiarity created by type to provide the viewer/user a visual-formal link that would be the foundation onto which his new and original designs would be appreciated. He makes analogy to certain ideal/elementary forms with an aim to awaken ‘cultural memory’ in the viewer and uses ‘type’ to form analogical connections between the present and the past (Colquhoun, 1996, p. 248).

Rossi transcends the initial meanings provided by ‘type’ towards new meanings by means of exploiting metaphorical allusions. He brings in new analogical associations over type by using it for different functions and in different formal alterations. He uses different programs for similar forms and types, and changes the meaning of fixed forms and types by loading them unaccustomed functions. This way, while the use of type brings a visual familiarity at first by connecting to cultural memory, its alteration in its accepted function empties and changes the meaning in it (Rossi, 1996, p. 346, 349). This way Rossi makes ‘architectural metaphors’ through making analogy to past forms. He uses analogy and metaphor for opening up new meanings in his design through known ones (Rossi, 1985, p. 10).

Figure 3.17. Aldo Rossi's *Teatro del Mondo* (Venice, Italy, 1979) (Rossi, 1985)

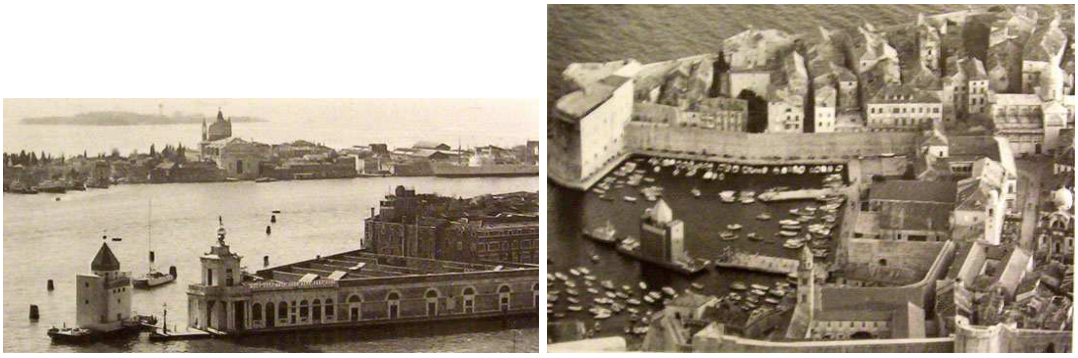

Figure 3.18. Aldo Rossi's *Teatro del Mondo* (Venice, Italy, 1979) (Rossi, 1985)

In *Teatro del Mondo* (Venice, Italy, 1979) for instance, Rossi uses a common building type from the cityscape and relates it to the structure to the tradition of floating building. He makes the type recognizable, but he also makes formal alterations that emphasize its conscious usage and abstraction. Through the recognizability of the type, he makes a conceptual connection with 'cultural memory'. He uses the 'familiar' structural type of the floating building both as a design initiative and also as a formal/visual element of affinity for the user/viewer. However, through its present context and function, through its

idiosyncratic usage, and through its formal alterations, he makes a metaphorical link between the past and present and initiates a disruption of the original, familiar state of ‘type’. The resulting design makes reference to the type but in a new way (Colquhoun, 1996, p. 221).

3.2.2.1.3. INNOVATION

If the target problem the designer faces is fully novel and no previous solutions are relevant, then the predictable analogies to develop the solution would only mislead. At this point, the creative thinking undertaken for the solution of the problem would require a further leap. This leap could be taken through more complex analogies or different methods, or it could develop as a totally unusual incident. But the result would be something that is ‘more’ novel or new. This is the case when we talk about innovation. Although developing through the same processes, in the scale of creative contribution, innovation exists on top of appropriation and analogy.

The dictionary definition of innovate is to introduce new things or methods into established practice. While innovation is the application or exploitation of an idea, invention can be considered as the process of discovering or creating that novel idea. The classic definitions of innovation include ‘the introduction of something new’, ‘a new idea, method, or device’, ‘the process of making improvements by introducing something new’ or ‘the successful exploitation of new ideas’. In brief, innovation is typically understood as the *introduction* of something *new* and *useful* (“Innovation”, 2012).

Innovation entails acting on the creative ideas to make some specific and concrete difference in the domain in which it occurs. However, for it to occur, something more than the generation of a creative idea or insight is required: the insight must be put into action to practice. In this sense creativity is seen as the basis for innovation, and innovation is described as the successful implementation of creative ideas. Although by many authors the term 'innovation' is used interchangeably with 'creativity' when discussing individual and organizational creative activity, innovation is the concrete form of the creative act. It is the introduction of novel and appropriate things, where appropriateness is important as much as

novelty. In architectural design, the building, which is the end product of the creative act, could be characterized as an innovation in the light of these definitions.

In architecture, innovation comes to life as a thought out response to changes in circumstances. It may occur to respond to the opportunities offered by new materials, to build for extreme environments, or for different functions and different technologies (Brookes & Poole, 2004, p. 1). One such example is the Crystal Palace, in London, England, designed by English architect Joseph Paxton to house the Great Exhibition of 1851. In its design Paxton responded to the opportunity of using a new building material, namely wrought iron. It became one of the first large span buildings designed by using an iron frame. Spreading over 18 acres, the building consisted of panels of glass set within iron frames. In the design Paxton adapted two main attributes of the Industrial Revolution to architecture: mass production (in the manufactured glass panels and iron frames) and the use of iron rather than traditional masonry (stones or brick). He had experimented with glass and iron to provide strength, durability, simplicity of construction and speed and managed to erect this vast building in less than six months.

This instance exemplifies the production of an innovation formed as a response to a real need in environment (large span) and the opportunity of a new material (iron). It is seen from the literature about the building that Paxton made use of creative cognitive processes such as *retrieval* (when he thought about the glass houses he used to build when he was a gardener), the mental *synthesis* of new structures (when the thought to build crystal palace as a large scale model of those glass houses), and the *mental transformation* of existing structures into new forms (when he experimented with the larger span he can cover with iron). Altogether the problem Paxton faced became a novel one that required a novel answer and a major leap from the existing creative practice, which he was able to give.

Figure 3.19. Joseph Paxton's Crystal Palace.[10]

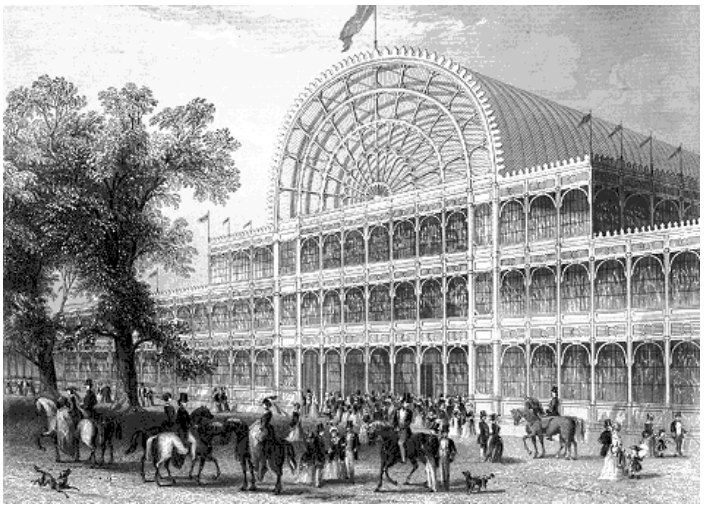

Figure 3.20. Joseph Paxton's Crystal Palace[11]

These examples suggest that creativity essentially originates from basic cognitive processes such as analogy, which may situate the design in a scale from the most routine to the most novel. As Nigel Cross depicts it, creative design does not have to be totally novel. It does not exist essentially as the making of an unexpected 'contrary' proposal, but it exists as the making of an *appropriate* proposal that embodies *novel* features. The aim in that is to cross the gap between the functional design requirements and the formal design structure (Cross, 2006, p. 44). In this respect, *appropriation*, *analogy*, and *innovation* belong to

[10] Image retrieved from Great Buildings Online: http://www.greatbuildings.com/buildings/Crystal_Palace.html
[11] Image retrieved from Great Buildings Online: http://www.greatbuildings.com/buildings/Crystal_Palace.html

different phases of creative manipulation. In terms of creative contributions they make they extend from the most familiar to the most novel. However, they initiate from the same track within the creative process, which differentiates according to further phases they take through the use of different cognitive processes. While appropriation starts by analogy to past forms and stays there by using them in a direct manner; design made by analogy starts from the same point and transforms them through other analogical associations that make them new. Innovation on the other hand moves to the farthest point on this same track by taking a bigger creative leap compared to the other two.

Consequently, the studies and examples that are examined here may show how we could conceive creativity differently in design when we consider it as an act of transformation from prior knowledge. They suggest that creativity is not the 'creation of something out of nothing', but it originates from familiar forms and methods of production. Creative production in architecture could be viewed in these terms as the activity where something new is produced through the recombination and transformation of existing cultural practices or forms through processes such as analogy and blending, within the constraint of the cultural domain they are in. We can observe these processes in design through the use and transformation of cultural attributes such as architectural types and precedents (Gentner, Holyoak & Kokinov, 2001, p. 256, 260, 261). In this framework, the following chapter will examine the cognitive use of architectural type as a form of cultural schema in architectural design.

CHAPTER 4

ARCHITECTURAL TYPE AS A CULTURAL SCHEMA AND ITS COGNTIVE USE IN ARCHITECTURAL DESIGN

> *"Architecture, however – the world of objects created by architecture – is not only described by types, it is also produced through them. If this notion can be accepted, it can be understood why and how the architect identifies his work with a precise type. He is initially trapped by the type because it is the way he knows. Later he can act on it; he can destroy it, transform it, respect it. But he starts from the type. The design process is a way of bringing the elements of a typology- the idea of a formal structure- into the precise state that characterizes the single work." (Rafael Moneo, 1978, p. 23)*

The observation of the initiative role of 'type' in architectural design offers insights about the nature of architectural creativity and the cognitive role of culture in it. Viewing type as a cultural attribute that is used cognitively in design depends necessarily on cognitive assumptions made on culture in general and the nature of design and creativity. Therefore a discussion about the use of type in design requires primarily a cognitive framework that looks at the role of cultural impacts on the nature of architectural design and creativity.

In this framework, the attempt of finding about the position and cognitive use of type in architectural design covers basically two aims. The first aim, which is the understanding of the relationship of type with culture and cultural schemas, necessitates studying from the scholarly literature, how culture works and what the positions of cognitive schemas are in its operation. The second aim, which is the understanding of type's cognitive use in architectural design, necessitates learning the effect of cognition in creativity and the cognitive use of cultural information in the creative act. In line with these aims, the previous sections issued the relationship of culture and cultural schemas with cognition and the cognitive use of culture and cultural schemas in creativity and architectural design. The discussions in those previous sections, which were broadly on culture, cognition, creativity and architectural design, were comparatively studied in this context in order to form the perspective to look at the position and cognitive use of type in architectural design.

Along this line, this chapter will view the utilization of type as a cultural attribute and examine its cognitive role in the design process in the light of these three networks. It will look at type not as a mechanistic phenomenon in its own sake, but as a form of *human cognitive attribute* that is active both in the perception and the production of phenomena; and will view it as a phenomenon onto which the cognitive, cultural and innovational aspects of architectural production are intermingled.

4.1. TYPE AND TYPOLOGY: DEFINITIONS AND IMPLICATIONS

The etymological root of type is Greek *typos* that meant blow, impression or model. In dictionary type is defined as "the general character or structure held in common by a number of people or things, which are considered as a group or class" ("Type", 2012). Typology on the other hand is defined as 'the study or the systematic classification of types that have characteristics or traits in common' ("Typology", 2012). It is portrayed as the method and the activity of studying types and revealing their generic characteristics.

What is implied both in the etymology and the dictionary definition of type is a quality of abstractness that unites, defines and represents a larger group. As stated by James Tice, although each artifact is an exclusive phenomenon in space and time, it can share features with other artifacts that make it belong to a bigger grouping. This grouping is what is basically called as the type (Tice, 1993, p. 162). Type is both embedded in the units of this group as an abstract structure, or the outline, and it also represents it on this commonality.

As Julia Robinson indicates types can be considered as the categories that we use to define the world around us. They are the idealized forms with generally agreed upon names that stand for a set of concrete objects. They are characterized by concepts and physical elements that are associated with each idealized form and name. According to this use, any group of objects that possesses a mental image and name is a type. The type name creates an idealized physical object and a coherent set of characteristic elements, and equally, the object of a given type consistently calls up the type name (Robinson, 1994, p. 180).

In architectural theory, type is defined both as an *abstract conceptual form*, and as a *cognitive facility*, which functions as the *context for systemic action based on categorization*

(Habraken, 1985, p. 40). In the article 'On Typology', Rafael Moneo combines these two traits and defines type as

> "…the concept which describes a group of objects characterized by the same formal structure. It is neither a *definite* spatial diagram not the average of a serial list. It is fundamentally based on the *possibility of grouping objects* by certain inherent structural similarities. It might even be said that type means *thinking in groups*." (Moneo, 1978, p. 23)

An important emphasis implied in this definition is the abstract characteristic of type, which is used to act as the *structural common denominator* of a larger group (Argan, 1996, p. 246). Through this abstractness, it both becomes *embedded in the units of the group as a conceptual structure*, and it also *represents* them on this commonality.

As stated by Petruccioli, the birth of the architectural type results from the presence of this commonality that exists between a group of buildings. Type appears in this framework as a result of a process of elimination that leaves only the common elements that belong to this group. For Petruccioli, this process of elimination leaves type only as a schema and makes it a collective product in this sense that is shared both by the architects and the community they serve to. Petruccioli explains this process as follows:

> "The birth of a type is conditioned by the fact that a series of buildings share an obvious functional and formal analogy among themselves. In the process of comparing or selectively superimposing individual forms for the determination of type, the identifying characteristics of specific buildings are eliminated and only the common elements remain which then appear in the whole series. Type is depicted as a *scheme* deduced through a process of distillation from a group of formal variants to a basic form or common scheme." (Petruciolli, 1998, p. 11)

Emphasizing this abstract schematic quality, Quatremere de Quincy, who is one of the first theoreticians who worked on architectural type, uses even the term 'schema' while explaining the term. Defining type as "the idea of an element which should itself serve as a rule for the model" (Argan, 1996, p. 240), Quatremere states that type is neither a concrete

image of something that can be copied or imitated directly, nor it is a definite form, but it is a schema or the outline of a form (Argan, 1996, p. 244). Quatremere refers to type as an ideal *schema*, which acts as the abstract structure used for spatial articulation (as cited in Argan, 1996, p. 244). For Quatremere, type is set to contain the most ideal form of relationships for the required basic demands in spatial articulation, which are to be used recurrently in different forms and shapes through time. As Argan indicates, architectural type appears in this sense as a 'schema of spatial articulation', which has been shaped as a 'response to a totality of practical and ideological demands' (Argan, 1996, p. 246). It appears as a 'common root form' reduced from complex formal variants.

Defined as the study or the systematic classification of types, typology is considered as a useful tool that works by using the abstract quality of types in the analysis and the design of the physical environments. Referring to the study of artifacts based on their formal structure and related cultural meanings, typology is portrayed basically as the "systematic collective representation of reality that allows one to make a diagnosis and relate the need for action and the instrument available" (Assi, 2003, p. 1).

In the process of analysis, it acts as a helpful tool as it enables us to make comparisons and allows us to read, understand and then learn from the physical environment (Tice, 1993, p. 162). As stated by Amole, it is useful as an analytical tool as it provides insight into the thought processes of the architect and enables us to understand the architect's intentions and therefore the design process (Amole, 2007, p. 86). In the process of design on the other hand, it offers a 'conceptual frame of reference', which can be used to deal with the specific design problem at hand and to generate form (Tice, 1993, p. 162). For these reasons, typological studies made in the field of architectural design, use typology either as a basis for analyzing, classifying and describing buildings and cities (analytical typology) or as a basis for designing buildings (generative typology) (Leupen, Grafe & Konig, 1997, p. 134). As stated by Tice, it is used in architecture both as "a useful analytical tool and a conceptual frame of reference with which to generate form" (Tice, 1993, p. 162).

4.2. THE HISTORY OF TYPE STUDIES: THE APPROACH AND CRITIQUE TOWARDS THE USE OF TYPE IN ARCHITECTURAL DESIGN

The studies about type in architecture basically result from the initial desire to understand the creative process in architectural design and the need to formulate ways to guide its process (Bingol, 2007, p. 25-29). Under the command of this same desire, type was used in architecture with various different meanings at various different times. As stated by Anthony Vidler, the major aim in these studies has been the attempt of reconciling the polarity between the precedent and innovation on a rational basis represented by type (Vidler, 2002, p. 288).

As explained by Tice, the initiation of modern typology, and along with it the emergence of type as a term in itself, dates back to 18th century and has its theoretical roots in the French Enlightenment. Growing out of a 'rational critique of the perceived decadence of the late baroque and rococo' (Tice, 1993, p. 162), type and typology were first used to reach for the origins and guiding principles of architectural design, to defy the rupture in the historical continuity and to solve the detachment in the building process between the client and the designer (Assi, 2003, p. 2).

As explained by Vidler, starting from the middle of 18th century, the Enlightenment generated two dominant typologies, which have basically served to legitimize the production of architecture by offering reasonable sources and techniques (Vidler, 2002, p. 288). Approaching the subject from different angles, these two typologies were named respectively as the formal approach (or the theory of ideal types), which studied type as a phenomenon in itself, and the functional approach (or the mechanistic theory), which studied type as a tool to be used in architecture (Assi, 2003, p. 2).

Including these two typologies, Vidler basically defines three different periods that can be evaluated separately in terms of their different typology understandings up until today. Called respectively as the first, second and third typologies, these periods differ in terms of the references they take in order to legitimize the production of architectural design.

The first typology, which is also called as the formal approach (or the *theory of ideal types)* as stated above, represents the first form of typological studies in the Enlightenment

period of mid 18th century where architecture was thought basically with reference nature. The famous theorists of this period are considered as Marc-Antoine Laugier and Quatremere de Quincy (Vidler, 2002, p. 288).

The second typology, which is also called as the functional approach (or the *mechanistic theory)* as stated above, represents the second form of typological studies in the Enlightenment, where architecture was basically thought in terms of machine production logic and in terms of need and use; very differently than that of the first one. The studies made at this period are considered to have a serious effect on the architectural theories of Modernism at the end of 19th century and the beginning of 20th century. The famous theorist of this period is considered as Jean-Nicolas-Louis Durand (Vidler, 2002, p. 288).

And lastly third typology is considered to cover the studies of type and typology at the second half of 20th century, in which architecture was thought basically with reference to the traditional city (Vidler, 2002, p. 288). In this period, typological studies were used as an effective critique of and as a tactic against modernism beginning from the 1960's onward (Tice, 1993, p. 162). The famous theorists and practitioners of this period are considered to be the 'Neo Rationalists', who were a group of architects working with the same ideal of reviving the long lost historical continuity in the cities, such as Aldo Rossi or Carlo Aymonino (Vidler, 2002, p. 288).

4.2.1. FIRST TYPOLOGY

It is stated that the alienation that was felt as a result of the evolving civilization brought by the Industrial Revolution, has stimulated a search for a stable truth or essence in various fields in mid 18th century, which would provide the people with the stability they required. In architecture, this search for the essence was carrying the meaning of discovering the main principles of architectural design and resulted in the search for the origin of architecture. The emergence of type theory in architecture results from this kind of a search (Bingol, 2007, p. 25-29).

In this atmosphere, the theorists of the first typology saw 'nature' as a source and solution for this search. They saw architecture as an imitator of the order of nature and in this

sense they determined ‘nature’ as their main reference in architectural design (Bingol, 2007, p. 25-29). As mentioned by Vidler, they tried to return architecture to its natural origins and stressed the existence of a priori suitable forms in nature as a guiding principle in architecture (Vidler, 2002, p. 288). Developing a naturalist approach in architecture, which was formed under the effect of the positivist natural sciences of the Enlightenment, they basically attempted to put forward a legitimate theory of creativity in architecture (Bingol, 2007, p. 25-29). The leading exponents of this theory were Marc-Antoine Laugier (1713-1769) and Quatremere de Quincy (1755-1849), whose views on type will be studied below.

4.2.1.1. MARC-ANTOINE LAUGIER

The search for origin or a first model for architecture is considered to be an attempt that paved the way for the studies on type. For Vidler, the theorist who first opened the way for this kind of a thinking, which initiated the theory on type, was Laugier. Although not using the term type himself, Laugier is considered to be the antecedent of type studies (Bingol, 2007, p. 25-29).

Marc-Antoine Laugier (1713-1769), who was a Jesuit priest and an architectural theorist himself, tried to return architecture to its natural origins, in the form of a model of primitive shelter. As stated by Vidler, Laugier‘s theory was significant for the fact that he attempted to reveal the origin of architecture in the form of a physical structure, in order to show the main principles that would guide architectural design (Vidler, 1977, p. 95). Laugier’s primitive or rustic hut, which he first described in his famous *Essay on Architecture* published in 1753 and re-edited in 1755 with an addition of his famous, illustration of the primitive hut, is the result of this search for origin for architecture. He proposed his primitive hut as the origin or the beginning of architecture that would guide architectural design by showing its main principles (Bingol, 2007, p. 25-29). Vidler explains this search as follows:

> “The search for the origins of architecture was for the enlightenment architect tantamount to the discovery of the true principles of his art. Like Newton in science, like Locke in philosophy, like Rousseau in anthropology, the

> architect-philosopher looked at the beginnings of shelter as the first mark or type of habitation, the root and thereby the simple natural principle of all architecture. The Abbe Laugier established this principle in his model of the hut, and in clearly stating that his "model" of shelter was in fact a "principle" he made equally clear the metaphoric, paradigmatic qualities of his artificial construct." (Vidler, 1977, p. 95)

For Vidler, Laugier proposed the primitive hut not simply as a historical explanation of the derivation of the orders but as a guiding principle for architecture (Vidler, 2002, p. 288). It is pictured more than a physical structure that is created by nature, but as a conceptual model that would guide architectural design. In this sense, primitive hut acts as the first model, or the archetype for Laugier (Curtis, 1996, p. 26).

With the primitive hut, Laugier also strengthens the idea that architecture is the reflection or the imitator of nature. He combines it with the perfect geometry understanding of nature, which Newton accepted as the main principle of physics (Bingol, 2007, p. 25-29). As stated by Vidler, seeing architecture as imitative of the primary order of Nature itself, Laugier connected 'the primitive rusticity of the hut to an ideal of perfect geometry, revealed by Newton as the guiding principle of Physics" (Vidler, 2002, p. 289). He portrayed the four trees, which are standing in a perfect square, as the types of the first columns,; the branches that extend flawlessly horizontal, as in the forms of beams; and the boughs that cover their top by forming the roof as a triangle, as the type of a pediment" (Vidler, 2002, p. 289). In his Essay on Architecture, Laugier describes these features himself as such:

> "The small rustic hut is the model upon which all the wonders of architecture have been conceived; in drawing nearer in practice to the simplicities of this first model essential faults are avoided and true perfection is attained. The pieces of wood raised vertically give us the idea of coulumns. The horizontal pieces that surmount them give us the idea of entablatures. Finally, the inclined pieces that form the roof give us the idea of pediments. This all the masters of the art have recognized." (as quoted in Vidler, 2002, p. 288-289)

Figure 4.1. Laugier's primitive hut (Vidler, 1977, p. 99)

4.2.1.2. QUATREMÈRE DE QUINCY

As accepted by the scholars in the field, the term type was first used in architectural theory by Antoine-Chrysostome Quatremère de Quincy (1755-1849) at the end of 18th century. Quatremère, who was an architectural theorist and an influential writer on art, is still the most referenced theorist for the subject and his definition of type is still the main reference point for type discussions today (Bingol, 2007, p. 30-35).

Quatremère develops his theory of type in an atmosphere where the Enlightenment was showing its effects on the urge for functionality in architecture. By the middle of 18th century, the idea that architecture is a mimetic art that imitates nature started to see oppositions and an early rationalistic view that puts forward function over form started to emerge. Quatremère developed his theory of imitation in such an atmosphere to defend mimesis and the imitative nature of architecture (Forty, 2000, p. 304-306).

Quatremère states that architecture imitates nature metaphorically and therefore is flexible and open to change. He argues that, with its primary elements, endless number of combinations could be produced in architecture. For Quatremère mimesis does not reproduce the image in this sense, but the essence or the principle. For him, imitation in architecture is valuable in this sense (Bingol, 2007, p. 30-35).

For explaining the reference that architecture takes from nature, Quatremère uses the idea of type. He suggests that type is not an image to be copied or imitated, but is a defining principle behind the image or form. It suggests a principle, which cannot be further reduced (Amole, 2007, p. 78). At this point, Quatremère differentiates between the model and the type. For Quatremère, model is a thing that is copied exactly. Type on the other hand, is not imitated and copied as a model, but it is an abstract schema that enables the production of different structures that does not look like each other. In model, everything is defined at the forefront, but in type everything is indefinite (Bingol, 2007, p. 30-35). Type has a structure that is open to change. As suggested by Lavin, type is not a static architectural element, but it is an operative principle of creation for Quatremère (Lavin, 1992, p. 88). Quatremère explains this difference between type and model as such:

> "The word 'type' represents not so much the image of a thing to be copied or perfectly imitated as the idea of an element that must itself serve as a rule for the model….The model understood in terms of the practical execution of art, is an object that must be repeated such as it is; type on the contrary, is an object according to which one can conceive works that do not resemble one another at all. Everything is precise and given in the model; everything is more or less vogue in the type. Thus we see that the imitation of types involves nothing that feelings or spirit cannot recognize." (as quoted in Rossi, 1988, p. 40)

As Vidler explains, Quatremère also opposed the ones who would mechanistically imitate the type by turning it into a literal "model". For Quatremère, confounding the idea of type as imaginative model was "denaturing the whole of architecture". For Quatremère, the ones who were "constraining themselves to the "servile imitation" of what they considered

true principles of construction (exemplified in the hut)", "ruled out "the sentiment and spirit of imitation" (Vidler, 1977, p. 104). Therefore, Quatremère also opposed the idea of the primitive hut that is proposed by Laugier as the origin of architecture. He emphasized that type is not an entity such as the primitive hut. The hut is a model and a source of imitation, but type is an indefinite, abstract schema and a source of creation (Bingol, 2007, p. 30-35).

Quatremère's concept of type also depended on the fact "that all existing forms have antecedents and that it is possible to find and explain their common generic sources" (Amole, 2007, p. 78). He denies the idea of *ex nihilio* in arts in this sense and suggests that the artistic creation can only exist within the limits that were defined by existing types or forms (Madrazo, 1995). Suggesting that every thing has a past and nothing comes from nothing, he mentions that "type" is a source in this sense, which is deeply rooted in culture and history; and is the result of a long tradition (Demiri, 1983). Quatremère explains this characteristic as such:

> ""In every country, the orderly art of building was born from a pre-existing seed. Everything must have an antecedent; nothing whatsoever comes from nothing, and this cannot but apply to all human inventions. We observe also how all inventions, in spite of subsequent changes, have conserved their elementary principle in a manner that is always visible, and always evident to feeling and reason. This elementary principle is like a sort of nucleus around which are assembled, and with which are consequently coordinated, all the developments and the variations of form to which the object was susceptible. Thus did a thousand things of all sorts reach us; and in order to understand their reasons, one of the principal occupations of science and philosophy is to search for their origin and primitive cause. This is what ought to be called type in architecture as in every other area of human invention and institution."
> (Quatremère De Quincy, 1998, p. 619)

As Rafael Moneo explains in this framework, for Quatremère, type was a tool to reconstruct the links of architecture with the past by forming a kind of "metaphorical connection" with the time when man first confronted the need to produce an architectural

product that would house the needed function by its devised form. For Moneo, type was "reinforcing through its continuity the permanence of the first moment in which the connection between the form and the nature of the object was understood and the concept of type was formulated" in this sense (Moneo, 1978, p. 28). This understanding of type is held very commonly today in the architectural field and supported by architects like Aldo Rossi or Carlo Aymonino.

4.2.2. SECOND TYPOLOGY

In 19th century the concept of type takes a very different form than that of Quatremère's. The approach becomes for the favor of models or examples that could be replicated. The concept of 'program' gains a significant importance in architectural field and this makes the concept of 'composition' to rise in importance. Composition becomes a mechanism that brings together the form and program, or the form and function, and becomes a very important issue for the architecture of the era (Moneo, 1978, p. 591). The issue was to develop practical guidelines and rules that would answer to the physical needs of the modern world. For this reason the knowledge about the traditional buildings and the functional principles and needs of the modern world were brought together to form a new classification system (Bingol, 2007, p. 30-35).

In this period, a classification understanding that were grouping phenomena under different types, according to their functional and structural characteristics, were being used by natural sciences such as zoology and botany. This has also affected architecture. In architecture, two different typological classification methods were developed as such. The first was the functional typology, in which the buildings were grouped according to their functions, such as hospital, churches etc; and the other was the formal typology, in which the buildings were grouped according to their morphological characteristics, such as buildings with courtyards or central plans etc (Bingol, 2007, p. 30-35). The functional typology can be seen in the works of Blondel and Pevsner, whereas the formal typology can be seen in the works of Durand, who will be studied altogether below.

4.2.2.1. J.F. BLONDEL AND NIKOLAUS PEVSNER

In the middle of 18th century, the architectural theorist and educator J.F. Blondel, has developed his *Cours d'Architecture* by a typological classification he developed according to the functions of the buildings he studied, such as religious or residential buildings. Although not using the term *type* himself, but using the term *genre* instead, the functional typology that he initiated became the most common and widely used technique for analyzing and classifying buildings up until today (Bingol, 2007, p. 30-35). However it is noted that this approach also has its limitations. As Amole explains, the major limitation is that it is unable to explain why specific functions are housed in very different kinds of buildings in different societies (Amole, 2007, p. 77).

Nevertheless, in 20th century this kind of a functional typology was used to classify buildings notably by Nikolaus Bernhard Leon Pevsner (1902-1983), who was a historian of art and architecture himself (Bingol, 2007, p. 30-35). In his famous book *A History of Building Types*, which was dated to 1976, Pevsner classified and illustrated buildings according to their functions such as schools, churches and offices (Pevsner, 1976).

4.2.2.2. JEAN NICOLAS LOUIS DURAND

Like Blondel, J.N.L. Durand (1760-1834) also names the elements in his typological studies as *genres* (Bingol, 2007, p. 37). Being an architect and an architectural educator himself, Durand describes his typological studies as a method for architectural education. Considered as the first example of typo-morphological studies in the architectural field, the method of Durand made him an important figure in Neoclassicism. His design system that made use of easy modular elements is also considered to inspire the modern industrialized building design and its elements.

As Vidler states, emerging as a result of the Industrial Revolution, Durand's approach on type integrated architecture to the world of machine production, discovering the essential nature of building to dwell in the artificial world of engines. Also called as the mechanistic approach on type, this technique stressed the productive capacity of type and saw architecture basically as a matter of technique (Vidler, 2002, p. 288, 290; Vidler, 1997, p. 93-100).

Also called as the *typo-morphological approach*, Durand's technique is considered to be a seminal method for the analysis and classification of architectural works especially in terms of the spatial and morphological characteristics of buildings (Petrucciolli, 1998). As explained by Micha Bandini, this approach usually functions by a process of deducing the type to its most basic elements (Bandini, 1984). Called as the reductionist process, it works by distilling the basic and common morphological characteristics of buildings from a bigger group of characteristics, by eliminating the particular qualities and preserving all other elements that form the unity of the series (Leupen, Grafe & Konig, 1997, p. 138; Argan, 1958). As explained by Amole, this process may generate the typological diagram, or the *generic type*, "which suggests the basic design principles of the group of buildings as well as the basic heuristics used by the architects in designing" (Amole, 2007, p. 78).

In this fashion, Durand tried to distill architecture to its basic components for understanding the logic behind their relationship, in order to achieve the idea of composition in there. As stated by Sergio Villari in this sense, Durand conceived the study of architecture as based on the systematic analysis of its parts (Villari, 1990, p. 33). For Durand, the architect's task was to put the architectural elements (columns, pillars, vaults, arches etc.) in order, according to their forms, proportions, materials and functions. In the arrangement of these elements the main criteria were material and use. As Moneo suggests, for Durand, the architect was to combine these elements by way of composition as to generate more complex entities such as a building, within which those elements are assembled with an inner logic (Moneo, 1978, p. 29).

In his book *Precis*, Durand describes this method in detail and lists the phases it consists as follows (Bingol, 2007, p. 37):

1. the description of the elements
2. the production of the methods that would be used to bring together the elements to form the building, and,
3. the analysis of construction types

In this process, Durand classifies buildings firstly morphologically and then functionally. He devises the methods of compiling different architectural forms without

taking into consideration of their functions; and then forms techniques to suit those forms according to the needed programs (Forty, 2000, p. 304). For Moneo, Durand's idea of composition in this sense is directly related with the needs and the program. The criteria for composition therefore are basically determined by the economy and convenience (Moneo, 1978, p. 28).

For the application of composition Durand determines two tools, which are determined as the grid and the axis. By these two tools, the program is applied to the composition, which is itself formed by the basic elements (Bingol, 2007, p. 39-40). For Moneo, in Durand's idea of type, the quantification dominates the qualification in this sense. The integral relationship between type and form is destroyed and type is turned into a compositional tool devoid of its connotations (Moneo, 1978, p. 28).

> "Both mechanisms are essentially contrary to Quatremere's idea of type as based on elemental and primitive forms. Quantification is now posed against qualification: on the grid and with the axis, programs- buildings- could be flexible as well as desirable. The square grid ended the idea of architecture as it had been elaborated in the Renaissance and used until the end of the eighteenth century; the old definition of type, the original reason for form in architecture, was transformed by Durand into a method of composition based on a generic geometry of axis superimposed on the grid. The connection between type and form disappeared." (Moneo, 1978, p. 29)

As stated by Moneo, for Durand, the aim of architecture was obviously not the imitation of nature or the experience of the artistic satisfaction, but it was the 'composition' and the 'order'. For this reason, he rejected the effect of the past and the connection of architecture to nature and his approach developed in this line as an unhistorical and self-referential take on architecture. In this manner, Durand inevitably saw the Classical Orders as despotic and considered them only as elements of decoration (Bingol, 2007, p. 37).

For Vidler, Durand's technique of distillation of architecture to its basic components "was a direct and logical outcome of the rational classification of the Enlightenment"; however, his development of *rules* for their combination was also breaking with the 18th

century theory of character (Vidler, 1977, p. 107). In this manner, Durand created a significant shift in the thinking and production of architecture, by bringing the prioritization of rationality and functionality, or in other words "quantification against qualification", in architecture. As Perez Gomez suggests, he initiated "functionalization" in architectural theory and reduced architecture to a rational theory (Perez Gomez, 1998, p. 466).

> "This assumption, whose implication is no less than the algebraization or "functionalization" of architectural theory as a whole, the reduction of architecture to a rational theory, began to gain ascendancy toward the middle of the seventeenth century culminating in the theories of Jacques-Nicolas-Louis-Durand and his critics." (Perez Gomez, 1998, p. 466)

It is suggested in this fashion that Durand's thoughts on type both opened the way of eclecticism in architecture and also became an antecedent for the later Modern Movement by prioritizing function over form. His understanding of architecture in a manner of mass production and in a technical way paved the way for the development of the later Modern Movement (Bingol, 2007, p. 39-40).

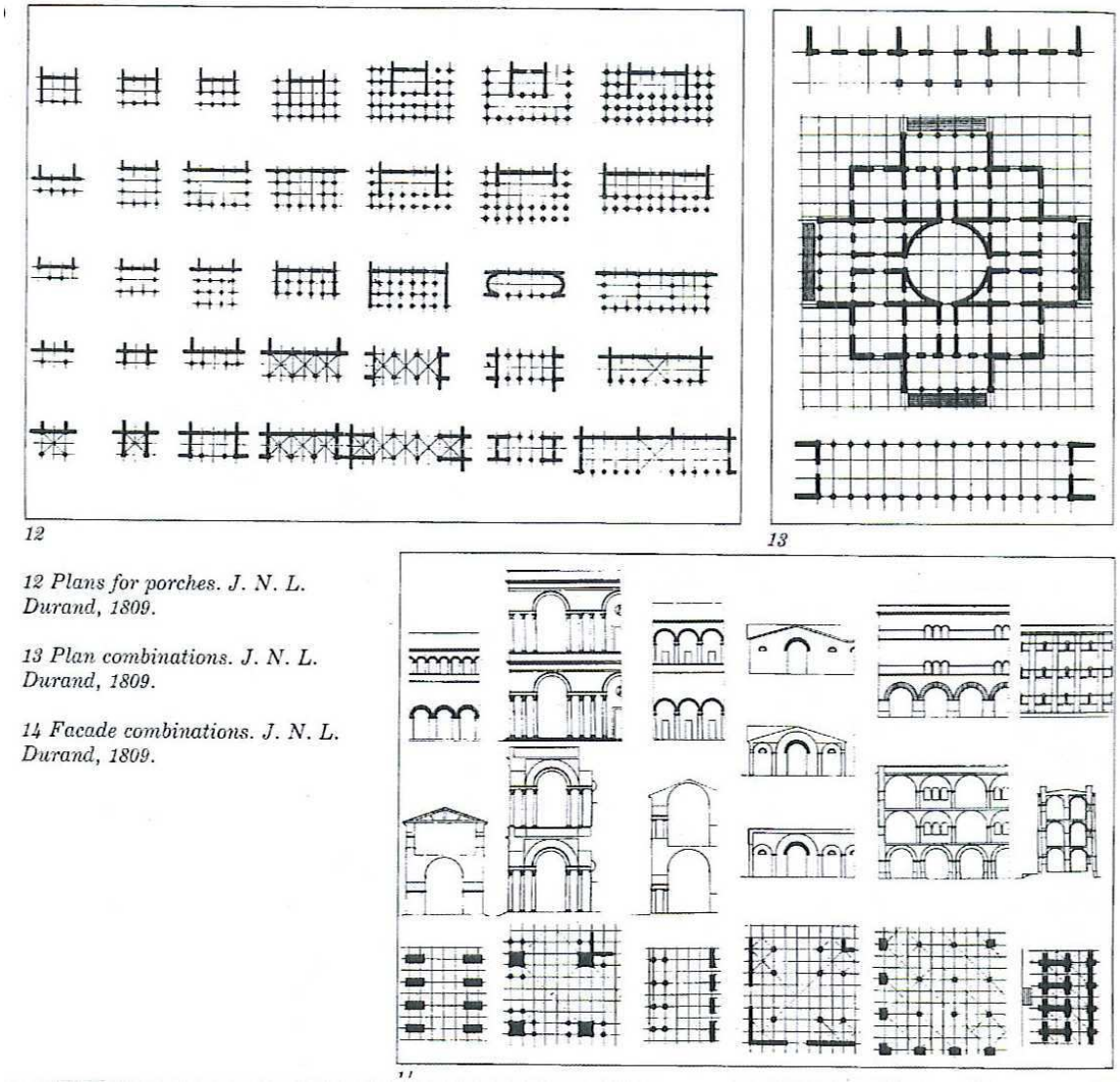

Figure 4.2. Durand's Drawings (Moneo, 1978, p. 30)

4.2.3. THIRD TYPOLOGY

At the beginning of the 20th century, the theorists of Modern Movement took a *tabula rasa* attitude in design and denied everything with the past, the tradition and therefore with the types. For them, type was limiting the creative capacity of the architect and holding him from creating the new looks that were thought to represent the modern era (Bingol, 2007, p.

74).[12] The process of modernization, which was experienced roughly after the Industrial Revolution, has brought the mass housing projects and the high-rise high-density settlements with their standardized plain looks, especially after the 1st World War. This has created an unpleasant environment in the cities and caused dissatisfaction within the population (Bingol, 2007, p. 74).

As summarized by Eman Assi, following these developments, the interest in urban fabric as an object of study and a tool in design methodology began to come forward toward the end of the nineteenth century and the beginning of 20th century. It flourished in the 1930s, revitalized in the 1950s and opened to vigorous international debate in the mid 1960s, which extended through the 70s (Assi, 2003, p. 2).

In such an atmosphere, three schools in Europe began to generate theories for understanding the built environment and the relation between its components. As explained by Assi, all of these schools were focused on the use of history and typology, but with some basic differences in their methods of using types. Differentiated between the descriptive, analytical, critical and generative methods of using types, these schools were basically describing, analyzing and criticizing the existing historical cities and were thinking of ways for generating new types that would be added to it. These schools were the Urban Morphology Research Group of the University of Birmingham, which was inspired by M. R. G Conzen, the Italian School that was founded by Saverio Muratori, and the school of Versailles in France (Assi, 2003, p. 2).

M. R. G. Conzen had formed a typological analysis approach by studying the small medieval towns of England. The Urban Morphology Research Group of the University of Birmingham followed his approach in order to solve the classification problems for the conservation of the built environment. They were not involved with the design of the environments (Assi, 2003, p. 3).

The Italian School founded by Muratori attempted form a new design approach in order to solve the crisis they observed in the environment that is thought to be created by the Modern Movement. As summarized by Assi, their method was based on the critical reading

[12] However, it is accepted today that the Modernists also created their own types along the way.

of the existing built environment, on the constant maintenance of the physical settings and on developing a design process that is able to set up links with history and memory. Their aim in using the typo-morphological approach was to form a new design approach by which they would make use of history. Muratori was characterizing this approach as 'Storia Operativa', or operational history (Assi, 2003, p. 2-3).

The French school of Versailles was using the typo- morphological approach for solving the dialectic of urban form and social action; and the dialectic of modern and non modern. As noted by Assi, their concern for the social component was characteristic (Assi, 2003, p. 3).

As stated by Assi, these three schools used typo-morphology to think about the built environment within the historical context of the city. They used typo-morphology to learn from the existing built environment, to describe it and to theorize about its production. In this manner they offered new ways for the use of type in design theory (Assi, 2003, p. 3).

The use of types in design also had their effects in architectural education in the USA. One of the examples of such an attempt is given by the so-called 'Texas Rangers', who are a group of architects teaching in University of Texas School of Architecture from 1951 to 1958. Formed by Colin Rowe, John Hejduk, Robert Slutzky, Werner Seligmann, Lee Hirsche, Bernhard Hoesli, Lee Hodgden, and John Shaw, they developed a curriculum that used types and conceptual prototypes as tools for the generative process in design. Their basic aim in that curriculum was to put forward the development of the architectural space against the emphasis for the shaping of the mass of the building at the forefront (Ozsel Akipek & Kozikoglu, 2007, p. 173-177).

From 1960s onward, type theory has come to the fore in architectural theory as a technique and as an operational critique of Modernism (Tice, 1993, p. 162). Especially in Italy, type discussions gained very much importance and effectively developed by a group called *Tendenza* or Neorationalists, as it is called by the American and English critics. Anthony Vidler names this phase of type discussions as the Third Typology (Vidler, 2002, p. 291). With an aim to bring in the discussion of history against the perceived oppression of

Modernism, type was used by Neo-rationalists as a rational tool to reintroduce the fading historical associations to architecture and the city (Frampton, 1997, p. 294).

The third typology as Vidler calls it, is much more 'architectural' in terms of its reference. As Vidler states, in the first two typologies, the reference for architecture was outside of itself, respectively in nature and in industry or the mass production. However in this third typology, the reference was directly architecture itself (Vidler, 2002, p. 291). Vidler explains this as follows:

> "In the first two typologies, architecture, made by man, was being compared and legitimized by another "nature" outside itself. In the third typology, as exemplified in the work of New Rationalists, however, there is no such attempt of validation. Columns, houses, and urban spaces, while linked in an unbreakable chain of continuity, refer only to their own nature as architectural elements, and their geometries are neither naturalistic nor technical but essentially architectural." (Vidler, 2002, p. 291)

Among the names of this Movement were architects such as Aldo Rossi, Carlo Aymonino, Massimo Scolari, Vittorio Gregotti and Giorgio Grassi. The important characteristics in their theories were continuity, tradition, collective attitude, architecture of the city, typology and morphology. Their antecedents were names such as Ernesto Rogers and Saverio Muratori. In this circle, Aldo Rossi's works are especially worthy of note. At the end of 1960's, Rossi used types as vehicles that carry the collective values of the people, which would form the long lost continuity in the cities. (Bingol, 2007, p. 74, 78) For Rossi, city was the most important reference for architecture. He attempted to use types that he attained from the city in a creative fashion as a way to form continuity with the existing historical texture of the city (Frampton, 1997, p. 294). Using Quatremere's idea of type, he developed his 'analogical architecture' as based on the idea of re-forming the continuity in the cities by using types.

In the context of this study, the theory of type that is developed by Quatremere de Quatremere holds a seminal value. However, the theoretical argumentation developed by the

three modes of theory, namely the three typologies, will be made use of as to gather the initial information about the cognitive use of type in architectural design and its relationship with cultural schemas.

4.2.4. CRITIQUE TO THE USE OF TYPE AND TYPOLOGY IN ARCHITECTURAL DESIGN

The approach that puts forward the use of type and typology in architectural design and education has found wide acceptance in the field. However its methods and solutions has also seen much criticism. As explained by James Tice, the criticism was subjected with the belief that "typology tends to impose a static vision on phenomena that are essentially fluid" (Tice, 1993, p. 162). It argued that the use of types in design retarded invention, short-circuited objective search and resting on obsolete solutions. Questioning this so-called 'scientific and progressive critique', Tice argues that it results from basically two discredited notions, which depend on the nature of science and history (Tice, 1993, p. 162).

As Tice states, the first notion is positivism that likens architecture to physical sciences and suggests that architecture lies outside the cultural continuum and therefore we should have a *tabula rasa* attitude in it in order to achieve objectivity and 'write new facts on the clean slate'. However, as Tice rightly argues, even if we attempt this kind of a cultural lobotomy, we can never escape 'the tissue of our beliefs and experience' and we cannot limit the facts that we use to those that are quantifiable (Tice, 1993, p. 162).

The second notion on the other hand is historical determinism that demands architecture to be in sync with Time in order to maintain its authenticity. However, as Tice argues, we cannot be exactly in an attempt of following time as such, because we cannot know the course of history for sure and cannot accurately project its future (Tice, 1993, p. 162).

Exemplifying the discussion that the critical positions brought into architectural education, Tice tells about his experience as a professor at the Housing Studio of Graduate School of Architecture, Planning and Historic Preservation (GSAPP) at Columbia University. There were two opposing views about the benefits and limits of typological based design in

the studio. One of them stated that students “were saved from `reinventing the wheel` and their energies are better spent on the development and refinement of well-proven housing types”. The other however argued that “type solutions intruded a rigid framework into the design process, which stifled innovation and invention and that stereotypes could not be shaken even though site or program imperatives required it” (Tice, 1993, p. 165).

Tice states that when the typology based education was discontinued and turned into the standard education technique that ‘emphasized individual invention and unique solutions’, the general quality and variety of housing options did not increase and students were inclined to use the ‘well known and limited types’ (‘the high rise slab with double loaded corridor or apartment flats stacked one above the other’) that are available to students by direct experience. The results became “extravagant in size and naïve to the economic and aesthetic advantages of repetition inherent in housing design”. Moreover, the attempts of students in creating sculptural effects resulted in “monumental object buildings that denied the context and the possibilities for making urban space” (Tice, 1993, p. 165).

The results of the education at the Housing Studio of Columbia University gives us a good picture in terms of showing the potentials and limits of using type and typology in design and design education. Following Tice’s questions about the use of type and typology in housing design and education, we can ask a few relevant questions about the use of type and typology generally in design:

- When the types are eliminated from the design process, are the stereotypes also eliminated or do they interfere much easier as they are not intentionally and consciously studied? (Tice, 1993, p. 165)
- “Is it wise to remain innocent of the ‘collective wisdom’ embodied in”…the traditional types…“if alternative design methods fail to yield the sophistication and subtlety demonstrated by these easily referenced types?” (Tice, 1993, p. 165), and,
- To whom is the architecture addressed: “the gallery voyeur in search of a new folly or the ordinary citizen in search of a better living environment?” (Tice, 1993, p. 165)

4.3. KINDS OF TYPE

In the architectural literature mainly three kinds of types are defined: *basic types* (which are also referred as material types, building types, functional types or models), *classificatory types* (which are also referred as conceptual types or organizational typologies), and *imaginal types* (which are also referred as elemental types or ideal types). In architectural design, basic types represent characteristics that seem to provide for the uses, needs, or customs in the problem at hand; conceptual types arrange the distribution of uses; and imaginal types represent prototypes for solving particular classes of problems, such as a prototypical example for the problem of 'entry' (Rowe, 1999, p. 365).

As Tesar states, basic types are defined as to what people ordinarily and commonly use when referring to buildings. They normally carry the socially constructed, functional name of the buildings and spaces we occupy or observe in the world, such as the house, school or hospital. They also denote the physical form of those buildings in these terms (Tesar, 1991, p. 170, 171). These kind of types represent a way of understanding architecture as sets of generalized, common, identifiable and recognizable physical objects, which are cognitively schematized with basic forms, as the common house or apartment form that is specific to context.

Therefore, as also stated by Robinson, basic types are commonly used in architectural terms to denote the normative physical forms of built environments. They delimit the design context as such, by being the basic categories with the common images of buildings or spaces like factories, schools, stores or hospitals. Over them they also have superordinate categories, such as educational, recreational, commercial or residential; or subordinate categories, such as high-rise, low-rise, mid-rise, or for hospitals for instance, full-time care or children's. For this reason, basic types also distinguish the place where professionals and users meet over the shared image of what is usually built (Robinson, 1994, p. 185).

The second kind of types in architecture, which are the classificatory (or conceptual) types, are basically the classification systems and typologies that represent the professional attempt to make distinctions and clarify relationships between places. They are the intellectual constructs used for description and explanation, which refer to the concept of

type as a means of analysis; as famous theorist Durand did. They are used for understanding and comparing existing buildings, for understanding changes, for demarcating between objects, for defining boundary conditions (single-family, multi-family housing), for designing future buildings or for applying an ideal type to a real circumstance (Franck & Schneekloth, 1994, p. 17-21).

The third kind of types, which are described as the imaginal types, basically include the archetypes and ideal types that mainly exist within our minds. They are made up of cognitively constructed places, such as utopia, American Dream or Dante's "Inferno" and they influence beliefs and actions about material places as such. Types, in this form of understanding, were extensively studied by the famous scholar Quatremere de Quincy (Robinson, 1994, p. 181).

As Schneekloth and Franck state (1994), these types act as the categories that we use to understand and define the world around us. The intersection of basic (material), classificatory (conceptual) and imaginal (elementary) types embodies our knowledge of the world, and therefore we *know* through them. According to the theories of categorization of objects and ideas; and the theory of prototypes and basic level categories, which are discussed in the previous chapter, there is a close connection between types and cognitive categories in terms of how they are cognitively embodied within our minds. The basic level category defined by Eleanor Rosch for example, which is the natural category that identifies the level on which people mainly interact with a thing and understand it in similar ways with each other, shows definite similarities with the basic (or material) types in architecture (Tesar, 1991, p. 170, 171). Like that of natural categories, basic types have a cognitive power over us that feed from their elemental characteristics.

As Robinson explains, this power or authority of use of basic architectural types derives basically from two sources: firstly they are shared within a given cultural context (thus they are handy and applicable) and secondly they encompass multiple modes of further categorization that can lead to further development and novelty. Through these qualities that derive from the mode of categorization, basic types become both powerful design tools as they gather in themselves many needed information as densely packed for the initiation of

design and also become the point where professionals and users who share a culture can meet in (Robinson, 1994, p. 185).

With these qualities, basic types simultaneously represent: a set of architectural attributes that can be described, a set of rules for construction and for organization of space, a set of behaviors and defined roles that take place within it; and a set of qualities it should exhibit (Robinson, 1994, p. 183). By this way they become handy and inevitable in design as 'they immediately give boundaries to the problem at hand by prescribing ways to think about and address it'. In this manner, they become both the initial answer and the further question for design as they both form limits to thinking and provide reference points for further exploration.

4.4. TYPE AS A FORM OF CULTURAL SCHEMA

The comparative survey with cultural schemas demonstrates a correlation that exists between the notions of architectural type and cultural schema. The survey shows that same definitions and working rules apply for both of the phenomena and the theoretical studies that examine their nature, use and production all evidence to this correlation existing in the cognitive level.

As explained in detail in the first chapter, schema is defined as the abstract conceptual structure, which represents our knowledge of objects, situations, events, actions and sequences of action (Wertsch, 1985, p. 154). It is described as the mental framework that we use to organize our knowledge (D'Andrade, 1992, p. 28) or as a hypothesized data structure that represent the knowledge stored in memory. Formed by way of categorization, schema is presumed to serve as 'scaffolding' for organizing experience by controlling the encoding, storage and retrieval of information (Bruning, Schraw, Norby & Ronning, 2004, p. 22, 23). It is considered to operate both in the meaningful and effortless reception of information and also in the analysis and placement of it. Therefore its most significant function is considered to be offering organization to *new experience* by way of utilizing the prior knowledge (Augustinos & Walker, 1995, p. 43, 51, 110). It basically shows the effect of prior knowledge in understanding the incoming information and in creating new ones (Bruning,

Schraw, Norby & Ronning, 2004, p. 6, 22, 23).

As discussed before, type is also portrayed as 'the abstract structural common denominator' behind spatial articulation. It is defined as the 'abstraction' that should to be worked out (Argan, 1996, p. 246). This emphasis on the abstract schematic structure of type that functions as the initial common denominator or the preliminary structure behind spatial articulation gives the first hints of its correlation with the notion of 'schema'. Being a form of 'thinking in groups', type exists as the formal, functional or structural schema, which consists of 'abstract system of relationships'. As mentioned before, it exists not just as a unique formal spatial diagram, but as an outline that expresses and provides the possibilities of several complex forms of potential results.

Like a schema, type also exists as a specific manifestation of the cognitive process of categorization. As Tesar indicates, it appears as a consequence of the need for the cognitive economy of our nervous system of limited capacity to reduce the 'information processing effort' spent in the reception of new information and production of the novel ones (Tesar, 1991, p. 166). As mentioned in the previous chapter, the process of typification, or the formation of types, works in the categorization and indexing for design, which is used for the understanding of the design problem by fitting the problem into a similar solution type in the memory. As the other cognitive structures formed by categorization, types therefore are used for the storage and therefore for the retrieval of design episodes, as Oxman states (Oxman, 1990, p. 24).

The connection between types and schemas are portrayed very explicitly in several definitions of type made by different theoreticians. As stated before, in his definition of type, Quatremere de Quincy refers to type as the 'schema' or the outline of a form ("type is not a definite form but a 'schema' or the outline of a form") and characterizes it as the 'schema of spatial articulation' (Argan, 1996, p. 244, 245). For Quatremere, like a schema, type acts as the abstract structure that is set to contain the most ideal form of relationships for spatial articulation, which are developed for the required basic demands to be used recurrently in different forms and shapes through time.

Likewise Quatremere, Habraken also notes on the schematic quality of type by

defining type as an implicit, abstract ‘schema’, which is possessed conventionally as a shared knowledge. Habraken states that type gives permission to a range of variations for the reason that it is the abstract basic schema behind spatial articulation (Habraken, 1985, p. 25). The adaptability of type therefore appears as a seminal characteristic that results from its schematic quality. On account of this schematic adaptability, Wittkower states that in architectural design, type adapts to the specific spatial and temporal features of different contexts and programs while conserving its significant characteristics. He demonstrates this generic schematic characteristic of typology in analyzing Renaissance architect Palladio’s villa designs (Wittkower, 1971).

Therefore, the design theoretical research also shows that, type exists as a general solution schema, which acts as a source of generic knowledge manipulated in design (Oxman, 1990, p. 2-8). As explained before, it contains the body of prior knowledge that allows the designer “to extract ‘generic schema’ from specific images”. It consists of both the finding of the ‘generic representational schema’ and also the knowledge of the strategies of using this schema (Oxman, 2001, p. 280). On account of these statements, a classified comparison yet could be proposed based on the commonalities of types with schemas:

1. Like schemas, types are also ‘theory driven structures’:

Just as schemas, types also sort out new data to enable the brain to connect new information to the prior design knowledge. They provide both the context of meaning, its organization and its internal representation. This way they offer organization to ‘new experience’ by way of utilizing the prior design knowledge.

2. Like schemas, types are also subject to automatic cognition rather than deliberate cognition:

Just as schemas, between the two types cognition that are used for organizing information, which are the automatic and deliberate cognition, types act in and control automatic cognition in a routine and mechanical way by facilitating the understanding of things in a short time. This way they do not require in depth processing and the spare cognitive capacity left is used efficiently for more time consuming tasks.

3. Like schemas, types are also energy saving devices:

Just as schemas, types reduce the amount of cognitive effort spent for processing information as they save us from paying attention to every detail. They act as short-cuts by the use of heuristics during the processing of information. By enabling us using our limited cognitive capacity efficiently, they basically provide a cognitive economy for us in our information processing.

4. Like schemas, types also facilitate memory:

Just in schemas, a good stimulus match to a type facilitates the overall recall of information. Therefore the type consistent material is easier to encode and retrieve from memory and it takes less time to process it. This way type consistent material is also better recalled than type inconsistent material.

5. Like schemas, types are also evaluative and affective structures:

Just like schemas, types provide a context for meaning making and interpretation of architectural products, and as such they affect the evaluation and interpretation of our architectural experiences.

6. Like schemas, types are also hierarchically organized:

Just like schemas, types are also stored in different levels of abstraction. They have the most concrete forms as in the case of prototypes, and the more general ones, as in the case of formal diagrams.

7. Like schemas, types are also social in origin:

As explained previously, schemas are not just internal mental templates but they are "shared meaning systems that are shaped by cultural, historical, and political factors". Just as schemas, types are also formed as the cumulative sedimentation of the architectural culture of a society. They are attained in time from direct and indirect experience of the social environment. People collect a number of repertoire of types from the built environment, and store them as cognitive schemas in their minds.

8. Like schemas, types are also stable and resistant to change:

Just like schemas, the common architectural types for a society are hard to change. As in schemas, small inconsistencies are generally tolerated and cause minor adaptations, but only big contradictions can change the types for good.

9. Like schemas, types also define the existence of a relation between components:

An architectural type carries with it the rule that determines the connection of its parts. As a schema, it carries the information of how its parts relate to each other and to the whole.

10. Like schemas, types are also both structures and processes:

Just as schemas, types both carry a representational structure and the knowledge of how to procede with that structure.

11. Like schemas, types also have a range of 'slot values':

When there is a near match between a type and incoming information, where some of the slots (information pieces about that type) are not filled in, the type fills in that information by itself by 'default values'. For example if we see a classic, historical cruciform church from the front, we assume that it has an apse behind without having the need to see the back, since the church type that is activated fills in that information for us.

12. Like schemas, types also are not fixed structures:

Although types generalize the architectural experience from the past and organize their regularities, they are not fixed and rigid structures. Just as schemas, they are transformable and can have adaptations according to the design problem at hand.

13. Like schemas, types are also reinforced by prototypes:

Just like schemas, types are exemplified and provided a rich source of content by way of prototypes.

These statements show us the similarity between cognitive schemas and types. However, they do not show exactly why types should be seen as 'cultural schemas'. In order to explain this, we should remember the theories on cognition and culture that were explained in the first chapter.

As explained previously, the theories of cognition that talk about the function of culture, namely situated and distributed cognition and the theory of prototypes by Eleanor Rosch, all state that culture and cognition affect and constitute each other reciprocally (Nisbett, Peng, Choi & Norenzayan, 2001, p. 291). They propose that cognition is contextualized, that is defined by social context, cultural artifacts, physical spaces, tasks, and language (Oyserman, Sorensen & Reber, 2009, p. 217) and it develops by the interaction of the individual with his/her cultural environment (Nisbett & Norenzayan, 2002, p. 10-11). It is emphasized that cognition and culture act together in shaping the behavior of people and they are essentially unique to each social context (Raza, Kausar & Paul, 2006, p. 140). Therefore, they are proposed as mirror images in many ways.

On this basis, it is also proposed by these theories that culture is the sum of 'mental representations' *(*conventional mental models/schemas), their 'public expressions' (instituted models) and the 'resultant behaviors' in certain contexts (Medin, Unsworth & Hirschfield, 2007, p. 618). The mental representations of a culture on the other hand are thought to be formed basically by our 'cultural schemas' (or conventional mental models). It is argued that culture is carried by these schemas, which are blended into different physical manifestations, disseminated within societies, shared widely across societies, and internalized differently in human minds (D'Andrade, 2001, p. 256). As defined earlier, these cultural schemas are the cognitive schemas that are communicated frequently, distributed throughout the society, and thus have mental versions in most of the members of the society (Sperber, 1996, p. 33). Therefore, while the 'public expressions' of a culture (or the 'instituted models') represent the 'culture in ground', cultural schemas (or 'conventional mental models') represent the 'culture in mind' (Shore, 1996, p. 44, 52).

Earlier we have shown that types work very similarly with that of cognitive schemas. Now on top of that we can propose in the light of the above theories that, in terms of the architectural culture of a society, types exist as the cultural schemas of the society they belong to. They carry the mental representations of the architectural culture of a society within themselves. Just as cultural schemas, they are also blended into different architectural manifestations, disseminated and shared within societies, and internalized in human minds.

As indicated by Robinson, they gather their meaning and power essentially from being embedded in culture (Robinson, 1989, p. 256). They both carry the seeds of culture within themselves and also transfer it to continue their existence through time. As such, they communicate meaning to the members of a socio-cultural group by way of material culture and cultural objects (Robinson, 1989, p. 273). As Shore describes, they exist as nonlinguistic cultural schemas of a society, by working as the visual image models of a culture (Shore, 1996, p. 56-65).

Hence, as a cultural schema, type appears in two forms, which are 'in there' in our minds and 'out there' in the environment. In the environment, it exists as the externalized version of the type that is transferred from the minds as physical cultural objects or the products of material culture. In this form, it both works for its viewers as a facilitator of perception and also as a further strengthener of the schematic structure of type by cognitive means. Within our minds on the other hand, it exists both 'as a form of representation' and as a 'cognitive process' as the schema. As a cognitive process, it uses the mental representation of type for the processes of 'perception' and 'creative production'. Practically the same as a schema, it both organizes the *perception* of information and also influences the 'creative production' by being an initial representation of the problem. Thus it acts both as "the pattern of action and as well as the pattern for action".

In perception, the process of 'recognition' that type provides facilitates the understanding of new knowledge, since the new knowledge is always obtained as the metaphoric extension of existing knowledge. As suggested by cognitive theory, the perception process is controlled by previously established patterns of cognitive representation structures, such as 'schemas'. As in the case of schema, where the new information is fit into the understandable and recognizable familiar form of schema and understood and accepted as such, type also works this way in the matching and familiarization of new information. It exists as the preliminary way to know and the frame of reference for the understanding and initial processing of new visual, formal and spatial information. Thus typification that is provided by type, which is provided through the process of categorization, prepares the context, the basis, where new information is gathered and made sense of (Tesar, 1991, p.

167). Just as cognitive schemas help us to communicate over shared images and ideas due to the recall of prior cultural knowledge, types in these terms function over the shared visual and formal information, which live within the social body as shared knowledge gathered by common experience (Habraken, 1985, p. 25). As Tesar states, types hold the promise to reunite the world of social meaning and the world of architecture in this sense by depending on the 'sharing of images' (Tesar, 1991, p. 165). On these terms types could be considered to cognitively represent culture in architecture.

In production or design of cultural objects, type exists as a visual, spatial or formal schema, which organizes and structures the processing of information by being the first structure from (or onto) which new designs could be generated. It exists as the fountainhead of new solutions in this fashion. The literature on creativity and architectural design that utilizes cognitive approach also supports this view. Type both exists as the initial thinking structure and as the initial phase in creativity. The creative end product that is produced by type becomes a component of culture in which it is produced, either as a transformed, elaborated or rejective one. The cognitive function of type in interpretation (perception) and production (design) of cultural objects will be further discussed in the following sections.

Therefore, in terms of its being the abstract spatial and formal structure, which is produced naturally through time by the culture it comes from as a form of prior knowledge and as well as its structure, abstractness, its double-leveled operation that becomes both the pattern of action as well as the pattern for action, its formation through categorization and its use in cognitive economy, it could be argued that the 'type' exists as a form of 'cognitive schema' based on culture.

4.5. THE COGNITIVE USE OF TYPE IN THE INTERPRETATION AND PERCEPTION OF THE ARCHITECTURAL PRODUCT

For perception, type exists as the initial frame of reference, or the preliminary way to know, which controls the acceptance and initial processing of new visual and spatial information (Tesar, 1991, p. 168). Carrying within itself the function and form as connected to each other, type connects the visual image of the building with its function and this way

provides for the user/viewer the message that he/she can use in the perception or the interpretation of the architectural product.

As Tesar states, type acts in this sense as the 'natural context of architectural experience' in the perception of information, where the mind compares and matches the new information into the existing schematic structure of type in order to recognize and understand it with the least information processing effort (Tesar, 1991, p. 166). This way, the new 'strange' information is digested with the help of type into the 'familiar'. As stated by Alan Colquhoun, type becomes in this sense, the context with which the new work is understood (Colquhoun, 1996, p. 248). It stands for the familiar cognitive structure or the 'familiarity' that is used in the reception and perception of problems to arrive into new solutions later through the creative process. Type's familiarity becomes the ground to position oneself before stepping onto a new, unknown ground (Tesar, 1991, p. 168, 174).

Synectic theory of creativity refers to this process as 'making the strange familiar'. As discussed previously, synectic theory describes this initial phase as the projection of the 'perceived' problem situation through 'familiarity', which is realized before the generation of new solutions through the elaboration, adaptation or rejection of familiarity by the second process of 'making the familiar strange'. According to the theory, this first phase is operated when faced with something new, with strangeness, likewise a problem situation faced in design context. Here with an attempt to 'digest' the strangeness by driving it into an acceptable pattern, the mind compares the given strangeness with data previously known and converts the strangeness into familiarity (Gordon, 1976, p. 3, 35). This process is very similar to the use of type during the reception and perception of information that preceded the creative process. As an initial mental structure, type acts as the 'familiarity' that is attributed to the perception of problems to be used and transformed later in the creative process to come up with new solutions.

4.6. THE COGNITIVE USE OF TYPE IN CREATIVITY AND THE DESIGN OF THE ARCHITECTURAL PRODUCT

Describing architectural problems as ill-defined, that is having no definite means and ends, Peter Rowe states that tackling with these kinds of problems requires some initial insight, exercise of some provisional set of rules, inferences, or in other words, the use of heuristic reasoning. Rowe states that design is often guided by heuristic reasoning involving solution images, analogies or form giving rules, which define partially the 'end' or the solution of the problem. Such heuristics, by the asset of the a priori knowledge that is integrated, provide a framework for problem-solving behavior. Rowe lists the use of types and typologies as a form of this kind of heuristics (Rowe, 1999, p. 362). Used as a form of heuristics in design by allowing designers to apply the knowledge of the past solutions to recent architectural problems, types enable the designer to reach multiple solutions out of its singular but abstract structure. As stated by Rowe in this sense, type represents "one and the many" for architectural design (Rowe, 1987, p. 85, 190).

As it was discussed previously, the understanding of new things becomes possible by way of constructing analogy from the things we already know; or by 'mapping' them, onto our prior knowledge (Du Gay & Hall, 1997, p. 10, 14, 18). In other words, what we perceive, what we already know and their relationship determine our thinking. Du Gay et al. state that this mode of thinking that initiates through an analogy from what we already know, such as types, is also what organizes the act of design. The area of free choice in the act of design gets affected by a number of factors, one of which is the types or the precedents (Colquhoun, 1967, p. 43-50). As accepted by many scholars, design begins by the thinking of past solutions and stands upon prior knowledge in this sense. As Toma Maldonado suggests, it takes place as a form of adaptation:

> "the area of pure intuition must be based on a knowledge of past solutions applied to related problems and creation is a process of adapting forms derived either from past needs or from past aesthetic ideologies to the needs of the present." (Colquhoun, 1996, p. 248)

As mentioned earlier, acting as the 'natural context of architectural experience' in the perception of information (Tesar, 1991, p. 166), architectural type exists in this process as the preliminary 'way to know' that functions as the initial mental structure guiding the thoughts and therefore the design (Argan, 1996, p. 244). Its 'familiarity' is used for representing the problem at hand and becomes the ground to position oneself before passing onto the unknown ground of design (Tesar, 1991, p. 168, 174).

As a form of prior knowledge, type acts in design as the source analog in the initial conceptualization of the problem. It helps to deal with the new target problem by providing the comprehension of that problem in familiar terms and by offering a solution through its adaptation. As in analogical alignment, the target problem is mapped in this process with the relevant type (or precedent), which is retrieved from memory; it is then adapted or transformed through further analogical associations by a process that resembles the act of conceptual blending. The resulting structure becomes a new thing.

Therefore, in the creative process, the preliminary structure of type acts as the initial framework where variation and change could later take action. For the designer, type provides a conceptual frame of reference with which to address the design problem at hand and to generate form (Tice, 1993, p. 162). As mentioned previously, type acts in design as a visual, spatial or formal schema, which organizes and structures the processing of information by being the first structure from (or onto) which new designs could be generated. As a mental structure used in the beginning of the creative process, it becomes both the means and the initiator in architectural design. Containing the most ideal form of relationships developed for basic demands, type provides the possibilities of several complex forms of potential results and exists as the fountainhead of new solutions in this fashion.

As explained in the previous chapter, a large base of prior (domain) knowledge is required for solving the ill-structured design problems with their large sets of design constraints (Oxman, 1990, p. 23). As stated by Jansson *et al.*, the inherent schematic representation of type is required for this highly variable knowledge domain of design to organize and facilitate the realization of classes of design solutions. As discussed previously, the initial stage of design, which is the representation of the problem, is based essentially on

prior knowledge (Jansson, Condoor & Brock, 1992, p. 257-271). It is accepted that types are used by designers at this point as a form of this prior knowledge for architecture and design (Lawson, 2004, p. 443). The designers are thought to use types as first solution concepts or starting points for their current design problems. They are thought to analyze the familiar schematic knowledge domains in search for analogies and use the associations formed by these analogies for making a synthesis for the problem at hand. This synthesis is considered to initiate novel design and type is thought to serve here as the 'cognitive reference point', or the 'source analog', for the current design problem to turn into novel solutions (Jansson, Condoor & Brock, 1992, p. 257-271). As argued similarly by Lawson, types are used in this process to recognize the design situation, to connect the design problem to the solution, and to provide the gambits that are developed previously to solve these problems (Lawson, 2004, p. 456-457).

This process takes place in the form of schema driven problem solving. As explained earlier, in schema driven problem solving, upon the encounter of the problem, a schema (or type in this context) is retrieved or invoked from the long-term memory and if it is relevant, a solution is built upon it. While using types in design, this process takes place by the 'selection of type', 'the adaptation of that type', and 'the execution of its solution process' (Hewett, 2005, p. 320).

These same steps are named differently by different scholars. Jansson *et al.* for example, lists them as 'identification' (where designers use types or prototypes for the categorization of design problems and for establishing problem representations), 'synthesis' (where the type or the prototype is adapted and developed to satisfy the requirements of the problem), and 'evaluation' *(*where designs are assessed by using a type, or prototype) (Jansson, Condoor & Brock, 1992). Oxman on the other hand names this whole process as 'refinement', which is a form of analogical reasoning or conceptual blending (Marshall, 1995, p. 57).

Therefore, in this 'creative process', through the acts like thinking metaphorically or drawing new associations through analogy, mind is thought set out to form new relationships and new structures over the preliminary structure of type. Its familiar structure is 'made

strange' as to include new relationships and new structures over it. It is either become accepted, elaborated, transformed or completely rejected. As Tesar puts it briefly, it becomes the 'garde' to be 'avant' of (Tesar, 1991, p. 166).

As discussed earlier, synectic theory explains this creative process in two successive steps, which are 'making the strange familiar', and 'making the familiar strange'. The first step was delineated as the projection of the problem situation through 'familiarity', and the second step was described as the generation of new and original solutions, where the 'familiar' is either elaborated, adapted or totally rejected (Gordon, 1976, p. 3). As discussed earlier, synectic theory describes the process of "making the familiar strange" as to distort, invert, or transpose the everyday ways of looking and responding, which make the world a familiar place, by means of viewing the problems in a new way for arriving into new solutions. In this process, the familiar (the codified, the set world of the usual) is subjected to new patterns and new laws of operation and this way it is subjected to 'invention' (Gordon, 1976, p. 36).

The creative utilization of type towards reaching innovative solutions in architectural design follows this kind of a route. In the first process of "making the strange familiar", which was described as thinking in terms of prior knowledge, types act as the 'source analogs' getting mapped to the target problem; and in the latter process of "making the familiar strange", type is adapted and transformed according to the problem through further analogical associations and metaphorical allusions to form a new conceptual blend (Gordon, 1976, p. 35).

In this process there is a double use of analogy. While the first use brings forth type as a source analog, the second use transforms it towards new, innovative solutions by way of providing various different perspectives to view it and forming new connections between the existing form of type and certain other things. This way the design still references type but it makes it in a new way.[13] In this process, what is essential about type is taken and then it is

[13] However, this is not always the case for all kinds of use of type in design. For instance, in the revivalist appropriation (or direct use) of type, this creative component seems to be lacking. The use of type as appropriated in design, appears in a direct visual-formal copy as to lack the creative transformation of it towards a new interpretation. In its appropriation, only the first form of analogy is performed. Its creative contribution

changed, elaborated, or transformed formally and spatially to reach a new end product.

This way the 'familiar' pattern of type is 'disrupted' and 'made strange', as to arrive into innovative solutions and new, original ideas. The familiar form of type is either used and elaborated, or altered and completely rejected in this process, but it essentially exists as the first step in the creative act. As the first step of creativity, it exists as the preliminary schema or the first structure from (or onto) which new designs could be generated through the creative acts of metaphor or analogy. The further move from type through these processes extends towards innovative solutions.

Therefore, in design process, type is used as the initial familiar structure, which becomes either accepted, elaborated and transformed or completely rejected. Its familiar pattern could be transformed as to include new patterns and laws of operation or it may act as a tool for the first thinking structure and representation of the problem in the beginning of design or could be rejected all together. As suggested by Rafael Moneo, the 'type' 'traps' the designer in this sense, by its primary schematic presence and acts as the frame within which change operates. It could be 'acted' on later, could be destroyed and transformed, but it inherently exists in the beginning of the design process as the first step in the creative act (Moneo, 1978, p. 23, 27). Moneo explains this initiative and transformatory usage of type as follows:

> "The type can be thought of as the frame within which change operates…In this continuous process of transformation, the architect can extrapolate the type, changing its use; he can distort the type by means of a transformation of scale; he can overlap different types to produce new ones. He can use formal quotations of a known type in a different context, as well as create new types by a radical change in the techniques already employed." (Moneo, 1978, p. 27)

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becomes limited only in the decision of type's selection and context of use. It does not bring in the new further by artistic means, but gives it a change of meaning through the different context it puts type into. However in analogical use of type in design, what is essential about type is taken and then it is changed, elaborated, or transformed formally and spatially to reach a new end product.

In his famous article “Designing: rules, types and worlds”, Donald Schon similarly argues that types guide the designer by offering the design rules and methods for him.[14] For Schon, the designer ‘knows’ through these rules, types and worlds. Describing his concept of type neither as a general category, such as ‘church’, nor a particular instance, such as “Richardson’s Trinity Church”, but as a particular that functions in a general way, or as a general category that have the ‘fullness’ of a particular, Schon states that types have the ‘fullness’ by having the richness of imagery, ideas and commonplaces associated with them. Schon states that because of their fullness, types can guide designing and generate new designs. Quoting from Rudolf Arnheim, he describes types as the ‘generic abstractions’’, which are characteristic of productive thinking. Schon states on this basis, that types can act as references in design. By recalling a type, a designer can foresee how a possible design solution can match with the problem situation. In this process, the type both transforms the situation and also gets transformed by the uniqueness of the situation (Schon, 1988, p. 181-183). Schon explains this process as follows:

> “In a designer's dialogue with a situation, types can function both to transform the situation and to be transformed by it. A design situation, seen as unique, both invites and resists the importation of a type. The transaction between familiar type and unique design situation is a metaphorical process, a form of seeing- and doing-as, in which a designer both transforms a design situation and enriches the repertoire of types available to him for further design.” (Schon, 1988, p. 183)

For Schon, likewise the exemplars or precedents, the rules of design reasoning are determined by types. Resembling this quality with the use of precedents in Law, Schon states

[14]The types that Schon refers to are a little more general. They are listed as the functional building types, references (which are the particular buildings), spatial gestalts (which are the particular, coherent figures), and experiential archetypes (which are the images, of experiences objects or settings in the built environment, such as a cave or a meandering path). Schon also states that the design worlds that the designer lives within are also influencing design. Design worlds are described by Schon as the conceptual environments that entered into and inhabited by the designers when designing, such as a particular configuration of things, relations and qualities. They are described by Schon as the *holding environments* for design knowledge. The objects of a design world are described as the things to think with (Schon, 1988, p. 182-183).

that the ability of the designer to apply the rules correctly, which are the derivative constructs used for constituting types, depends in his familiarity with the type he uses.

> "We believe that, in a sense closely related to the exemplars, precedents, images and concrete universals….the rules employed in design reasoning are derived from types. As rules of law are derived from judicial precedents, in Vickers's account, so design rules are derived from types, and may be subjected to test and criticism by reference to them. Moreover, a designer's ability to apply a rule correctly depends on familiarity with an underlying type, by reference to which the designer judges whether the rule 'fits the case' and fills the inevitable gap between the relatively abstract rule and the concrete context of its application." (Schon, 1988, p. 183)

Reminding us that the building types that are codified by Vitruvius has shaped the designing and building in the West for hundreds of years, Schon further states that the rules that form types are not dormant in this sense, but are 'malleable'. Hence, a type changes when it does not fully match with the environment it is put into, and the rules that form it collapse by setting it free for transformation and creativity (Schon, 1988, p. 184). As accepted by many scholars, type offers an effective tool for creativity in design by way of this malleability for change. Due to its abstract formation, many new and different designs could be generated from the recalled type. As Oxman states it, type in this sense is "capable of diverse design solutions from one generic typological source" (Oxman, 1990, p. 17-28). It acts as an effective instrument for change, which takes place as a form of transformation from the familiar, known structure of type. In this sense, the ability to change and transform can be stated as the most crucial characteristic of type, which makes it a seminal phenomenon for creativity in design. Arguing in a similar fashion, James Tice explains this as follows:

> "…typological studies offer an effective framework for change, and that change, to be recognized as such, must be shown as a transformation from some known state. The ability to conceive transformation within types and even between types is obviously essential if the interpretative nature of

analysis and the dynamics of the design process are to be fully engaged. (Tice, 1993, p. 163-164)

Comprising all the above characteristics of types, Schon lists the functions of types in design reasoning as follows:

1. Types are used to provide the necessary information for the application of design rules and supply the intermediate premises of design reasoning. In this sense, types are the holding environments for the contextual knowledge that can be 'read of them'.
2. Types guide the selection of rules to be taken as relevant.
3. Types are used to make the design situation coherent. They frame it so that the designer can reason about it.
4. Types are sources of leading ideas. They are used to generate sequences of design experiments.
5. Types provide bases for challenging and correcting rules.
6. Types are the cognitive short cuts for design thinking. Such as the chess masters who can recognize the board patterns and know the needed move for that pattern, type enables the designer to short-cut the design thinking by recognizing the design situation and the needed move for it. They are used to *recognize* the design move needed for the design situation in this sense. (Schon, 1988, p. 188)

Consequently, it could be inferred from this literature that the study of types in design has apparently a seminal value for forming the design repertoires of architects and helping them to enhance their ability of recognizing the design situations and using short-cuts for design thinking (Schon, 1988, p. 189). As it was shown, types can be used in this sense as effective tools in design both for the perception (and representation) of problems and also for the creative production of their solutions. In the beginning of the design process, they operate as the 'schemas' of thought that initiate design thinking. As such they become the cognitive tools to be used in the perception of the problems. They become the ingredients of thought as such for the new connections that would later be formed. In the later creative process, they become the first structures or the contexts onto which new ideas are developed. They can be adapted, contradicted, transformed or altogether rejected towards new and original solutions.

In any case, they become the first phase of creativity in architectural production and, just as cognitive schemas, they become both the patterns *of* action and the patterns *for* action in architectural design.

In consequence, operating both in the perception of existing information and the production of the new ones, types exist as 'cognitive schemas' in architectural design that represent and operate onto 'familiarity' based on 'culture'. They exist as the initial spatial and formal schemas produced naturally through time by the culture they come from. In this sense finding out about the cognitive role of types as cultural attributes in design also gives information about the cognitive role of culture in architectural design and creativity. Representing the cognitive employment of the culturally familiar (or the prior knowledge) in design, they appear as the architectural phenomena onto which the cognitive, cultural and innovational aspects of architectural production are intermingled. In this framework types can be considered as the cultural schemas that connect convention to innovation in architectural design.

4.7. THE SOCIAL ROLE OF TYPE: CULTURAL CONTINUITY IN ARCHITECTURE: THE POSSIBILITY OF CONVENTION

As architectural artifacts are structured by layers of cultural signification and as the architectural forms and their content have a historical representational value, the interest in type in architecture appears as a search for 'meaning', since type establishes continuity with cultural memory in architecture (Argan, 1996, p. 240). As testified by Colquhoun, typology works as a condition of architectural meaning through its ties with culture (Colquhoun, 1996, p. 248).

As discussed in the second chapter, culture is defined as 'the system of shared knowledge, ideas, skills, beliefs, customs, behaviors and values, which humans acquire to cope with their world, to transmit from generation to generation by learning and express in the material systems of artifacts and the built environment' (Lechte, 2003, p. 49). Within this definition the 'shared, taken for granted knowledge' appears as the most crucial characteristic of culture, which determines its function within society. As indicated previously, it becomes

through these ‘shared meanings and shared maps of knowledge’ that culture enables people to ‘make sense’ of things around them; let them communicate and formulate ideas. It is suggested that people are able to communicate the way they do as they share the same conceptual maps, which let them interpret the world in similar ways. On the basis of these shared sets of conceptual maps, concepts, images, and ideas, or the same ‘cultural codes’, members of the same culture think and feel about the world and understand it in similar ways (Hall, 1997, p. 4, 18).

As Stuart Hall suggests, we give things meaning by the frameworks of interpretation that we bring to them. As discussed earlier, these frameworks of interpretation are formed basically by our prior knowledge. Therefore, the understanding or interpretation of ‘new things’ becomes possible by way of constructing analogy or extension from the things we already know, and by representing them, or by ‘mapping’ them, onto what we already know. As du Gay et al. state this kind of a cultural model is described as what organizes the act of design, or the production of the cultural object. For du Gay et al., an object is constituted as a ‘cultural object’ by way of constructing a meaning for it or bringing it into meaning. In other words, the object becomes ‘cultural’ because of the meaning that is attributed, or given to it by the viewer/receptor/interpreter. Shared meanings make the object ‘cultural’ (Du Gay & Hall, 1997, 10, 14, 18).

As mentioned in the above definition, culture is involved in this process through the production and exchange of these shared meanings. The shared meanings on the other hand are essentially and reciprocally organized through the means of expression of culture, such as the material culture or the above-mentioned cultural objects, which form the symbolic domain of social life (Hall, 1997, p. 2, 3).

As any other cultural object, architecture operates, and produced by and within shared cultural meanings through its symbolism. As Hall states it, the shared meanings that create our culture find its spatial representation in architecture by way of its symbolic language. Its cultural symbolism both communicates with and establishes its shared public nature.

As a cultural object that has its formation and transfer of meaning through its forms, architectural product sits in between the cognitive reception-and-production framework on

the basis of its cultural meaning. The encoding and decoding of its messages is tied to the cognitive process of managing information and to the use of cognitive structures and tasks such as cognitive schemas or categorization. In this process the utilization of culture as a shared net of cognitive schemas function in the connection of the production and reception of architectural products.

As mentioned before, studies on cognitive theory suggest that 'cultural ideas', in the form of 'shared knowledge, ideas, skills and values, which humans acquire and express in the material systems of artifacts and the built environment' (Lawrence-Zuniga, 1997, p. 49), are directed and reproduced by cognitive schemas (Johnson, 1987, p. 19). As DiMaggio states culture here acts as 'a network of interrelated schema with analogies as the 'ties' that create paths along which generalization and innovation occur'. This interaction of shared cognitive schemas determines our understanding of culture.

Likewise, the built environment is both directed by cultural schemas and also signifies the encoding of them, through which the members of one culture translate from it specific formal cues resulting in appropriate behavior (Lawrence-Zuniga, 1997, p. 49). What we can deduce from the research on the cognitive use of culture in terms of the interpretation of architectural products then is that architectural artifacts present cognitive tools for the user/viewer, depending on the existing cultural schemas (Norman, 1993, p. 47). The 'new' in architecture could only be read by the viewer on these terms in connection to his/her prior cultural knowledge.

As Bonta indicates interpretation of an architectural work by the viewer/user cannot be isolated neither from the context of ideas within which they were proposed nor from the position of the interpreters. Interpreting an architectural object thus requires recognizing a set of characteristics, which can also appear in other works of architecture, such as typological features or previously known qualities (Bonta, 1979, p. 24). This feature requires the presence of 'familiarity' that must be observed by the viewer. As stated by Tesar this familiarity is required for the building to pass the threshold of relevance for the viewer. If its form appears too remote, it would go unnoticed as it would require an unreasonable

information processing effort, which is pointlessly effortful for the visual or formal acceptance of architectural works (Tesar, 1991).

It must be accepted that, even though it has expressive qualities, the work of architecture cannot be taken as a work of art. Architecture belongs to the daily life, where its acceptance and use should be effortless and easy. As Tesar indicates, being the facilitator of everyday life, it exists as the useful framework that belongs to the ordinary experience, where there is rarely any occasion for the conscious effort to be spent in its interpretation (Tesar, 1991, p. 169). Brought into being for the public, architecture acquires its value from its appropriateness, distinctiveness, and receptiveness to functional and contextual requirements of the program and gathers its essence from the values of society and layers of cultural ideas. In these terms, architecture lives as an expression of culture and as a public art.

Consequently, as cognitive schemas help us to communicate over shared images and ideas due to the recall of prior cultural knowledge, types also function over the shared visual and formal information, which live within the social body as shared knowledge gathered by common experience (Habraken, 1985, p. 25). As Robinson states, the architectural type "links the act of perceiving and categorization with the act of recreating and designing" on the basis of culture (Robinson, 1989, p. 256). Type both carries the seeds of culture within it and also transfers it to continue its existence through time. As indicated by Robinson, the power of type comes directly from its connection with culture.

> "Built form as artifact not only expresses the ideas held by a culture but also communicates and perpetuates them. Insofar as there are different kinds of buildings and building types in a culture, architecture can be used to indicate that there are different kinds of places – places for which different kinds of behavior may be expected, behavior settings…The power of the building type as a subject of analysis thus derives from its embeddedness in culture. Unlike the style, which is understood only by the formally educated, building types communicates meaning to all societal members." (Robinson, 1989, p. 273)

Therefore, identifying the meanings conveyed by architectural types allows the "productive building upon or modifying of existing cultural values by means of architecture"

(Robinson, 1989, p. 273). As Tesar states, in this sense types hold the promise to reunite the world of social meaning and the world of architecture in a way that depends on the 'sharing of images' (Tesar, 1991, p. 165).

In his book *Complicity and Conviction*, Willliam Hubbard offers a new way to think about architectural production in terms of its relation to continuity, novelty and credibility. He discusses architecture through an analogy made by law and its use of precedents. Finding commonalities between architecture and law, Hubbard gives the processes of jurisdiction as a model for the way out of the vicious circle architecture faces about continuity, credibility, acceptance and the use of conventions. As he states what the law provides for architecture is work that reflects and respond to change yet gives an impression of continuity (Hubbard, 1989, p. 91).

Hubbard explains that the reason of the use of precedents in law results firstly from the fact that public needed law that had enough believability so that they could accept it, and secondly the judges who made the law needed a system that would let them have self-esteem. The judges made their opinions reasonable by showing how they submitted to the wisdom of their predecessors, and they made their opinions convincing by showing how they exceeded their predecessors (Hubbard, 1989, p. 121, 125).

In this process the judge saw his task not as one of formulating a single, free-standing decision but rather as building a new link in a chain, linking his decision to those that came before. Here, the judge accepts that his work will be taken seriously by public and appear convincing, if the realm of decisions is kept intact, adhering to decisions contained in earlier cases. He understands that what would keep his profession and his work strong and credible would not be the assertion of his 'self' but the preservation of the realm through which he is given worth.

Hubbard gives six stratagems that can be used to characterize what judges do in citing and rereading past cases. Originally they are described by the literary critic Harold Bloom for the purpose of rereading the past works (in his case poems) in a way to make the new work appear greater.

1. Swerving: the new work follows the old work up to a certain point, thus establishes comparability, but then swerves away from the old. The new work makes us see the old work as misguided from the point of the swerve onward.

2. Completion: the older work is seen as incomplete, as not having followed ideas out to their logical end. The new work is seen as completing the old work, developing the full implication of the ideas to a more tough-minded version.

3. Focusing: the new work is presented as such that it shows how the predecessors' work is unfocused, general and not specific. The new work addresses specific concerns and it is more definitive.

4. Self-limitation: the new creator sells us on the idea that, by deliberately limiting his development of the ideas, he has cut away the superfluous, allowing the essential to show through with greater clarity.

5. Refilling: the new creator sells a reinterpretation of the import of the whole past work. He empties out the 'core' of the older work and refills it with a new import.

6. Becoming the essence: the predecessor is seen as an elaboration of the new work; it spins out the implications of the essential ideas that the new work makes manifest. (Hubbard, 1989, p. 121)

Hubbard finds this position quite comparable with the position of architects. Although architects feel a pressure upon themselves to innovate, their ability to handle the conventions of 'good architecture', which are tested in time, appears as the only basis they have for demanding esteem and to be taken seriously. For public needs a 'scrim of conventions' that could maintain the complicity of architecture. This determines public's esteem for architects. Hubbard states that any architect who understands how fragile this relationship is would look at conventions and the use of precedents seriously. For conventions act as procedures to show how to do credible work, especially for those at the bottom of the field. Overall, they maintain overall quality of architecture (Hubbard, 1989, p. 131).

Hubbard talks about six points in laws, which are especially relevant for architecture:

1. When a judge renders his decision, he does so in terms of legal categories. He couches his decision in generalities. Similarly, the forms of an individual building

should not be addressed only to that specific place. Rather the forms ought to be generalized from the particulars of that situation in such a way that we could imagine ways in which those forms could be used in some other situation. Forms should be with slippage to enable complicity.

2. By couching in generalities, a legal decision comes to be stated as a legal principle. Each principle is made up of accumulated import of applicable cases. However there is no primary statement upon which all conclusions depend. They allow rereading to take place. Similarly, the logic of the arrangement of forms ought to make sense to us, but that logic should not be based on an unquestionable premise. It must be sensible but self referential.

3. When a decision is rendered it is recorded in an archive without a comment. Avoiding comment ensures the wideness of potential cases. Similarly, architects should not explain why they did what they did explicitly to enable further interpretations.

4. The practice of distinguishing is made necessary by the requirement that a judge cite precedents. Similarly, an architect's buildings should call other buildings to mind. A chain that depends on convention should be read.

5. The citations that count in a legal decision are those that invoke real cases and actual decisions with judicial intent. Similarly, the selection of the cases in architecture should be relevant, comparable, sensible, and should evoke resonant analogies for the viewer also.

6. In each ruling judge presents his 'reasons for deciding'. He states what reasoning he used, and he uses this as a safe guard. Similarly, the architect must be able to deflect skepticism about why his buildings are the way they are by showing that he knows the rules of good building, and can give a set of conventions as examples without contradiction. (Hubbard, 1989, p. 135-157)

These six ways are proposed by Hubbard as techniques to produce the feeling of conviction that comes when a building brings out and supports our complicity. Although their applicability may not be totally possible, what they propose essentially, that is the

acceptance of the value of types, precedents and conventions as ways to give credibility to architecture, is rightfully required.

Nevertheless it must also be accepted that creative endeavors are also an undeniable part of the architectural practice. As stated previously by Csikszentmihalyi, creativity is thought to take place in a symbolic system, which presumes a community of people who share ways of thinking and acting. Cultures in this sense are thought as systems of interrelated domains, which are learned and reproduced in continuity. Thus, when a new thing, be it architectural or scientific, is brought into their self-reproducing symbolic systems through invention or reformulation, creativity is thought to come into life (Csikszentmihalyi, 1999, p. 316, 317).

For Csikszentmihalyi, this appears as a special case of cultural evolution, where the complexity of culture is increased over time (Csikszentmihalyi, 1994, p. 149). However, this might also mean that cultures tend to become differentiated over time by creativity; that is they develop as increasingly independent and autonomous domains. On these terms, it is seen that creativity does not always support cultural integrity and, as it generally contributes to differentiation, it can easily work against integration. It could break down the exiting harmony between different domains in this sense and might risk the complexity of a culture. Here, Csikszentmihalyi argues that if the evolution of culture is to continue, creative insights should restore the relationship between the currently divergent domains, until new steps in differentiation again break it apart (Csikszentmihalyi, 1999, p. 321). It is noted on this basis that the integration between domains of culture should be maintained in order to provide a productive and meaningful experience for the members of a culture.

It is acknowledged today that in architecture, this integrity and the concern for communication could be maintained if the design of the buildings can develop in harmony with the existing cultural environment. As Tesar notes, the maintenance of this meaningful communication is very important for architecture, since architecture is an inclusive social and public art, rather than an exclusive fine art with its accompanying freedom to explore and to express the subjective, personal, and private subject matter. On these terms, it has a responsibility to manifest our shared values publicly in material form and to provide us a

shared frame of reference to experience our environment (Tesar, 2010). Therefore, as Peter Collins also indicates, an architect's urge towards self-expression and originality should not override this communication and the sense of duty towards the environment and the past (Collins, 1971, p. 27), and what is more, the search for rationality in buildings and in the physical environment should not destroy the existing cultural continuity in the environment, since, as stated by Assi:

> "Rationality does not necessarily demands using a logic dissociated from existing conditions. Change in built form need not take place as dissociated from the existing conditions. It could happen in the nature of the context. Interventions can be knit more successfully knit into the flow of history." (Assi, 2003, p. 3)

On these terms, architecture possesses both the capacity and the task of providing a meaningful communication in the environment by way of respecting the cultural levels shared by the society. Knitting urban patterns and creating cultural landscapes, it holds the ability of both expressing and reinforcing the values of the society and the layers of cultural ideas. Being a public art in this sense, it carries the responsibility of providing a cultural communication within society and offering a meeting point between the interpretation and the production of the architectural products, by way of the proper use of cultural information.

In the light of the theories examined in the previous chapters, it could be argued that in architecture, this connection between the 'interpretation' (perception, understanding or reception), the 'production' (design), and the 'architectural product' could be provided by the cognitive use of cultural schemas, such as types and precedents. This intersection of the interpretation and production of architectural products over the shared frames of reference could be provided by the cognitive function of cultural knowledge that is in continuity within the society. Those shared forms provided by culture produce a meeting point for the interpretation and production of architectural works, which results from the familiarity of recognizable forms. The value of this intersection is important leaning on the fact that architecture is a public art that shapes the shared human environment and in fact, it is through

this intersection that architecture becomes a public art, which is given the responsibility of forming our built world.

On this basis, the use of types in architectural design could be an effective tool to learn from the architecture of a culture and to form a cultural continuity therein. Types act in this sense as the cognitive tools that can create a richer architectural language by forming a connection with the past or with the existing cultural environment (Assi, 2003, p. 5). As Tesar notes, they offer cultural continuity and sustainability in this sense by keeping the degree of change from getting out of hand (Tesar, 2010). By way of building on the existing types, an architect can respond to his environment with sensitivity and can provide a sense of continuity between the past, present and the future (Assi, 2003, p. 3). As suggested by Assi, this kind of an approach can maintain "a creative process of regeneration of diversity within the context of the communication and unity of the community" (Assi, 2003, p. 5). Therefore, the use of types in design is of seminal value for architecture and is a way to form an "an alternative to the current fascination with novelty as the primary design strategy" (Tice, 1993, p. 162).

These subjects will all together be observed in the next chapter by way of a case study, which will include the Aga Khan Award winning dwelling projects in Turkey. This case study would be a viable ground to examine these processes as the projects present a fertile ground to discuss the possibility of creativity out of the known with their attempts to communicate with an existing culture and cultural substance while contributing to it. It would provide the opportunity to observe the utilization of type, the motivation behind it, its relationship with culture, its cognitive function and its position in architectural creativity. The cases will be examined in the light of the cultural and cognitive theories over type and creativity. With an aim to find out the motivation, the objective and the possibility that lie in the use of traditional types in architectural design, the creative contribution in them will tried to be identified and described as to answer what kind of a creativity they possess.

CHAPTER 5

CASE STUDY ON THE AGA KHAN AWARD WINNING DWELLING PROJECTS IN TURKEY (1970-2008)

> *"Is it wise to remain innocent of the 'collective wisdom' embodied in traditional housing form if alternative design methods fail to yield the sophistication and subtlety demonstrated by these easily referenced types?" (James Tice, 1993, p. 165)*

In order to observe and exemplify the theoretical propositions gathered from the survey of the literature on culture, cognition and creativity, a case study is conducted on the Aga Khan Award for Architecture winning dwelling projects in Turkey. This case study is used as the exemplar ground to test the theoretical inferences developed in the previous sections with an aim to find out the possibility that lie in the use of traditional types in architectural design.

As the Aga Khan Award Program for Architecture initially possesses a sensitivity for the development of innovative yet culturally sensitive architectural responses that communicate with and try to understand the existing cultural substance while contributing to it, the projects selected from its cycles present a fertile ground to observe the relationship between creativity and cultural schemas, that of types and precedents. Moreover, as the projects selected and nominated to Aga Khan Award cycles use the familiarity provided by types or precedents as the initial step towards new solutions and as they use culture by adding to it by way of a culturally sensitive creativity, the Aga Khan Award winning projects provide a viable ground to observe the theoretical inferences about types in architectural design and to identify the creative contribution in them as to answer what kind of a creativity they possess.

As explained in the first chapter, with an aim to observe the buildings physically, to reach to relevant resources, and to be acquainted with the culture they were produced into, the cases were selected from the Aga Khan Award winning projects from my native country

Turkey. After that, to be able to provide the cases a common ground, the projects were selected as to have one functional type, which is dwelling.

As mentioned earlier, the choice of dwelling as the selected functional type had its practical and theoretical justifications. First, dwelling is accepted by scholars as the most appropriate ground for typological studies as it "lends itself notably well to typological analysis" (Tice, 1993, p. 162). Second, unlike the other building types that have changed radically in time with new technologies and new program requirements, the basic problem of dwelling has changed very little over time and thus there is a general housing framework that stays pertinent even today. As James Tice explains,

> "The continuity of fundamental human needs and basic dwelling themes, such as the need for privacy and community, access to light and air, proximity to nature, has given rise to distinct housing types in diverse cultures that constitute a general housing framework that remains relevant even today". (Tice, 1993, p. 162)

Third, dwelling carries an inevitable connection with the culture it comes from (Setha & Chambers, 1989, p. 3). As it is accepted by several social scientists, designers and planners, the layout of houses and villages carry a culturally generated cognitive structure expressed through them. For this reason, understanding the formation of the dwellings offers an understanding of the generative qualities of culture of the built environment and also an understanding of the design process (Setha & Chambers, 1989, p. 87-88). Therefore, for conducting a typological study with an aim to analyze the use of types in architectural products as expressions of cultural schemas, selecting dwelling as the functional common ground of cases appears as a justifiable choice.

The four dwelling projects from Turkey that won Aga Khan Award for Architecture, which are respectively Ertegun Residence (1973) and Nail Cakirhan House (1971) in the province of the city of Mugla, and Gurel Summer Residence (1971) and B2 House (2001) in the province of the city of Canakkale were examined according to case study research criteria to reveal their methodologies of using cultural attributes in their designs. The cases are studied both as examples of different design methods and also as physical demonstrations

that completed all their phases. The connections that are devised from the theoretical study are observed and exemplified through their documented work and typological analyses. The evaluation criteria of the Awards to assess the projects, their archival material, and reports about the projects were helpful to analyze the selected projects. The study collected contextual, archival and on site information about the selected Aga Khan Award winning dwelling projects in the context of Turkey.

In this framework, this chapter will firstly talk about Aga Khan Award for Architecture and its history and mission, secondly it will give a brief information about the architectural context in Turkey, mainly after the 1920's up to the present time, thirdly it will give a brief information about the traditional "Turkish house", and lastly it will go into to the analysis and assessment of cases, which will study respectively for each case, the architect of the building, the physical context of the building and the typological analyses of the dwelling types of the context, the general characteristics of the building, and the typological analysis and assessment of the use of the reference type/s within the building.

5.1. AGA KHAN AWARD FOR ARCHITECTURE

The initiation of Aga Khan Awards for Architecture coincides with a cultural search, which was surfaced in the Islamic world mainly after the de-colonialization of an important number of Muslim countries in late 1970's. With the need felt for constructing a cultural identity and the fear of loosing the genuine cultural assets under the influence of Western Modernism, there happened to be an emphasis on the cultural and traditional values in Islamic countries.

The foundation of Aga Khan Awards for Architecture (AKAA) was realized in those years and in such an atmosphere. With similar needs with that of Islamic countries, but with a Western organization constructed in the West, Aga Khan Foundation initiated the Aga Khan Awards for Architecture (AKAA) with an aim to search for the 'innovative' yet 'culturally sensitive' architecture that would represent the Islamic world. Comprising a very systematic award mechanism and evaluation system that gathers internationally well-known scholars

and practitioners within the selection and evaluation teams, Aga Khan Awards became one of the most prominent architecture awards in the world today.

The Aga Khan Award for Architecture (AKAA) was established by Aga Khan IV[15] in 1977, "to identify and encourage building concepts that successfully address the needs and aspirations of Muslim societies". It is initiated to "recognize examples of architectural excellence throughout the Muslim world in contemporary design, social housing, community improvement and development, restoration, re-use and area conservation as well as the environment and landscape design" (Aga Khan Awards For Architecture, 1998). Since its foundation, it has become the most significant award mechanism and institution about the architecture of the Muslim world.

Since 1988, Aga Khan Award for Architecture (AKAA) works as a part of The Aga Khan Trust for Culture (AKTC), which is founded in 1988 as a private and philanthropic foundation registered in Geneva, Switzerland (Erdogdu Erkarslan, 1999, p. 34). AKTC is a part of the Aga Khan Development Network (AKDN), which is a family of institutions founded by Aga Khan IV that organizes and finances the activities of the Aga Khan Community related with the economy, health, culture and education of the Muslim world in order to "improve the welfare and prospects of people in countries in the developing world, particularly in Asia and Africa" (Aga Khan Development Network, 2007a). It is stated that AKDN institutions work under the guidance of three fundamental principles, which are (Aga Khan Development Network, 2007a):

- A "dedication to self-sustaining development that can contribute to long-term economic advancement and social harmony";
- A "commitment to the vigorous participation of local communities in all development efforts"; and
- A "shared responsibility for positive change".

[15] Prince Karim Aga Khan IV (born on 13 December 1936), is the 49th and present Imam of the Shia Imami Nizari Ismaili Muslims. He holds the title of Aga Khan since 11 July 1957, following his grandfather, Sultan Mahomed Shah Aga Khan. He is in charge of the interpretation of the faith on behalf of his followers and as the office of the Imamate requires, he works for the development of the quality of the lives of his followers and to improve the quality of the environment where they live ("His Royal Highness the Aga Khan", 2009; "AgaKhan", 2011).

AKTC is an agency that coordinates the cultural activities of the Aga Khan Development Network (AKDN) and works for the "the physical, social, cultural and economic revitalization of communities in the Muslim world" (Aga Khan Development Network, 2007c). It contains the Aga Khan Award for Architecture, the Aga Khan Historic Cities Programme, the Music Initiative in Central Asia, the on-line resource ArchNet and the Aga Khan Program for Islamic Architecture at Harvard University and the Massachusetts Institute of Technology. In order to emphasize the vitality of built environments for the Muslim world, AKTC has developed programmes that encourage (Aga Khan Development Network, 2007c):

- "The pursuit of excellence in contemporary architecture and related fields";
- "The conservation and creative re-use of historic buildings and public spaces, which facilitate social, economic, and cultural development";
- "The strengthening of education for architectural practice, planning, and conservation"; and
- "The international exchange of ideas to enhance understanding of the intimate connection between culture and built environments in the history and culture of Islamic civilisations and in contemporary Muslim societies".

Through the efforts of the educational programs at Harvard and MIT, AKTC and Aga Khan Awards Program have gained a very extensive digital archive, that is the ArchNet Digital Library, which comprises all the scanned Award project documents, jury reports, photographs, and publications, which are collected from the vast archives of AKTC in Geneva Switzerland and made available to the public via Internet. The archives of AKTC in Geneva still exist today as the largest physical source of contemporary and historical Muslim architecture throughout the world (Erdogdu Erkarslan, 1999, p. 27).

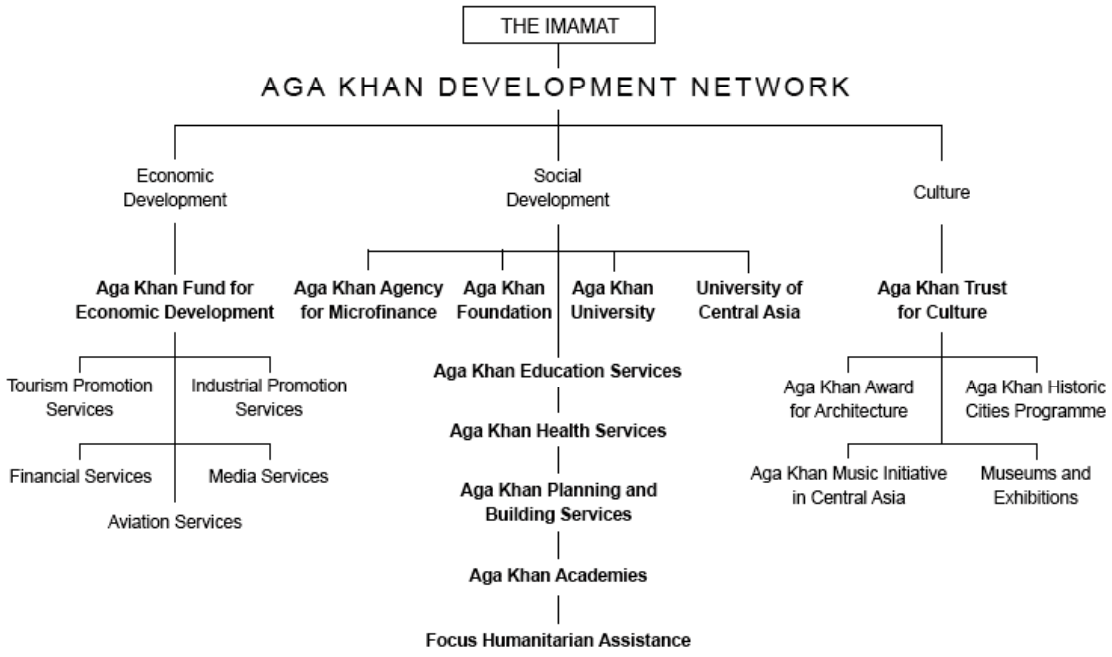

Figure 5.1. Aga Khan Development Network Organization Chart[16]

Aga Khan Awards for Architecture (AKAA), takes place in three-year cycles and has a monetary award, with prizes summing up to US$ 500,000. It selects projects that "not only exhibit architectural excellence but also improve the overall quality of life". It recognizes all types of building projects that influence today's built environment, from modest, small-scale projects to sizable complexes and encourages all forms of planning practices on the urban and regional scales, "such as infrastructure and transportation undertakings; development in rural landscapes; housing initiatives; industrial facilities and workplaces; educational and health campuses; new towns, urban conservation and the re-use of brown field sites" (Aga Khan Awards for Architecture, 2010). It rewards not only architects, but also recognizes municipalities, builders, clients, master craftsmen and engineers who took an important place in the realization of a project. Altogether, it acknowledges the projects, teams, and

[16] Image retrieved from Aga Khan Development Website: http://www.akdn.org/about_akdn_chart.asp

stakeholders as well as buildings and people (Aga Khan Awards for Architecture, 2010). The eligibility criteria of the Awards changes from cycle to cycle but the recent criteria are as follows (Erdogdu Erkarslan, 1999, p. 37):

- The projects must have been completed for at least one year and at most five years before the year the award cycle begins. They should be in use for at least one year.
- Preferably the projects should be built in a Muslim world, or for a Muslim community living abroad, or inspired by the Islamic heritage (Erdogdu Erkarslan, 1999, p.37).
- The projects that are realized by the members of the Award Steering Committee, Master Jury or staff, AKTC administration or staff, or the projects that are commissioned by Aga Khan himself cannot be considered for evaluation (Erdogdu Erkarslan, 1999, p.37).

The Award organization has four vital components, which are as follows:

1. Steering Committee:

Steering Committee is formed by a group of internationally well-known professionals who are selected anew in each three-year cycles. Although not defined strictly, the committee is formed by generally six or seven individuals, who are chaired by Aga Khan IV himself. They govern the whole awards process by establishing the eligibility criteria for the award cycle, providing thematic direction to the awards with regards to the current concerns, making plans for the future of the award, assigning the members of the master jury, and supporting the award process by organizing activities such as seminars, field visits, the award ceremony, publications and exhibitions. The Steering Committee can be called as the brain of the award cycle, which organizes all the activities of that cycle as well as making preparations for the next cycle (Erdogdu Erkarslan, 1999, p.37).

2. Master Jury:

The master jury that is selected by the Steering Committee in each cycle evaluates the nominations made to the awards and selects the award winning projects. The members of the master jury make a preliminary selection out of the numerous projects that are nominated for

the awards. They send those projects that are selected in the first elimination to the Technical Reviewers for attaining a detailed on site evaluation. After receiving the reports of the Technical Reviewers, they convene again to make their final selection (Erdogdu Erkarslan, 1999, p.38).

3. Technical Reviewers:

Technical Reviewers are formed by a team that consists of one technical expert and one photographer. They make an evaluation at the sites of the projects ,which are selected by the Master Jury, for a period of one week and prepare a report, whose format is determined by the awards previously (Erdogdu Erkarslan, 1999, p.38).

4. Nomination Program:

All interested people can send their nominated projects to the awards by filling out an online form to the Award Office. Along side this, there is also a parallel "nomination program" conducted by the Award Office, which "draws on the suggestions provided by a network of dedicated contacts that includes architects, professionals, scholars and others who are familiar with current architectural developments in Muslim societies". As declared by the Award Office, the architects of projects registered through the nomination programme are given "an Award documentation package", which includes "the standardized presentation requirements". According to these requirements the architects are asked to submit photographs, slides, architectural drawings, and also asked to complete a detailed questionnaire regarding to the "use, cost, environmental and climatic factors, construction materials, building schedule, structural integrity and ongoing maintenance, and, more importantly, design concepts and each project's significance within its own context" (Aga Khan Development Network, 2007b).

Up to the present time there were eleven cycles in the Awards – respectively in 1980, 1983, 1986, 1989, 1992, 1995, 1998, 2001, 2004, 2007, and lastly in 2010. For each Award cycle a publication has been prepared that includes all the reports and details of the selected projects, as well as the essays of the Aga Khan scholars. Altogether, since the Award was launched 34 years ago, 105 projects have been awarded and over 7,500 building projects have been documented (Aga Khan Awards For Architecture, 2010).

Along side the regular Aga Khan Awards for Architecture, the Award Program also gives the Chairman's Award, in honor of the lifetime achievement and accomplishments of individuals that are not included in the jurisdiction of the Master Jury. Until now, it has been given four times, first to Egyptian architect and urban planner Hassan Fathy in 1980, second to Iraqi architect and educator Rifat Chadirji in 1986, third to Sri Lankan architect Geoffrey Bawa in 2001, and fourth to French-born art historian and archeologist Oleg Grabar in 2010.

As the motive of the award is initially a response given to the need of a culturally sensitive creativity, which communicate with and try to understand the existing cultural substance while contributing to it, the projects selected to Aga Khan Award cycles value the cultural and traditional architectural characteristics of their contexts and use the familiarity provided by types or precedents inherited in the area. As a reaction to the vanishing genuine cultural assets possessed by Islamic countries under the influence of Western Modernism, Aga Khan Award brings an emphasis on the cultural and traditional values in contemporary Islamic architecture with the need felt for continuing and/or constructing their cultural identity. On this basis, it values the creative employment of the cultural matter, by way of using types and precedents in the creation of architectural products.

5.2. BRIEF INFORMATION ABOUT THE ARCHITECTURAL CONTEXT IN TURKEY

In order to provide a picture of the context into which the cases were built, the following paragraphs will give a brief summary of the architectural context in Turkey. ‘Architecture in Turkey’ or ‘Turkish architecture’ basically refers to the architectural context and works that are shaped in the setting of the Turkish Republic that was founded in 1923, after the fall of the Ottoman Empire. The architectural practices in Turkey have been shaped by the contradictions, dilemmas and problems that were experienced in the history of the Turkish Republic and by the architectural movements that reflect them. Among these factors the most prominent one was the dilemma between the East and the West and the accompanying dichotomies between the modern and the traditional, or the international and the national. These dichotomies were very influential in the formation of the architectural

movements of the Republic. Although these movements did not have sharp beginnings and endings and even though they have coexisted at times with one another, it is still possible to make a brief summary of the architectural developments in Turkey by way of examining it in specific periods (Sozen, 1984, p. 43-85).

In the first years of the Republic in 1920's, the architectural scene was inevitably under the effect of the Ottoman style, although there was a harsh rejection of the Ottoman past in the Republic. Developing by the influence of the constant search for a cultural identity and the nationalist movement that was active in the late years of Ottoman Empire, a new architectural movement was formed in 1920's by the name of the 'First Nationalist Architectural Movement'. Also called as the Ottoman Revivalism or the Neo-Ottoman style, this movement was attempting to form a Turkish national architectural style, although it was frequently using elements and decorations that were used in Ottoman buildings. The effects of this movement remained limited mostly to the government buildings and the most prominent names of the period were the architects Vedat Tek and Mimar Kemalettin (Architect Kemalettin) (Aslanapa, 2004, p. 554).

In 1930's and 1940's, the Ottoman Revivalist style slowly lost its appeal due to its forms and images reminiscent of the Ottoman Empire. It left its place to an architectural approach that was prioritizing the rational-functional attitude, which emphasized function as the prime bearer of forms and used forms that had simple and straightforward appearances. This has created a Westernized architectural approach in 1930's, which was under the influence of Modernism or the International Style. In these years, due to the construction of Ankara as the capital of the new Republic, there had been the need for a large amount of professionals to work for the construction of the new city. For this reason, several important architects and planners had been invited from Europe (mostly from Germany, Austria, France and Sweden) to design and build the new city. These important architects and planners, such as Clemens Holzmeister, Ernst Egli, Martin Elsaesser, Hermann Jansen and Bruno Taut, have shaped the built environment of the Republic and influenced the architecture of the period (Sozen, 1984, p. 43-85).

In 1940's and 1950's, a second nationalist approach was observed in architecture by the name of the ''Second Nationalist Architectural Movement', which was developed mostly under the effect of the nationalist movements appearing in the World during those years. It attempted to create a Turkish architecture that was combining modern architectural forms with the traditional forms of the Turkish civil architecture. Concentrating mostly on the examination of the traditional Turkish civil architecture, it held a rather regionalistic approach that was mainly under the guidance of Modern Architecture. In this period, the importance given to the construction of religious buildings and mosques has decreased and other building types, such as schools or hospitals, started to be built extensively. The most prominent names of this period were Sedad Hakki Eldem and Emin Onat (Sozen, 1984, p. 43-85).

In 1950's, Turkish architectural scene was not dominated by a specific and clear-cut architectural approach as in the previous periods. After the Second World War, by Turkey's getting closer to the Western World, Turkish architectural circles started to nourish themselves from foreign publications and produced buildings under their effect. On this basis, the architectural scene got occupied by a pluralism, although the influence of Modern Architecture was still prevailing. In those years, socio-cultural problems that were related with urbanization started to be seen. As Ozkan summarizes, in the context of the vast urbanization that took place from the 1950's onwards, the built environment became mostly under the control of the people who were not architects. The buildings that were produced were mostly either the 'speculative profit-driven developers housing' or the 'squatter settlements' at the outskirts of the cities, which were produced directly by the people themselves who migrated to cities from small villages and towns (these structures are also called as '*gecekondus'* in Turkish) (Ozkan, 2005, p. 1-4). Among the other important developments in this period were the establishment of the Chamber of Architects of Turkey in 1954 and the foundation of Middle East Technical University School of Architecture[17] in 1956, as the first architecture school that was outside Istanbul.

[17] Middle East Technical University School of Architecture (in Ankara) was the first alternative to the schools of architecture in Istanbul. It was founded in 1956 by Thomas B. A. Godfrey (a professor in the Pennsylvania

As contrary to 1950's, 1960's became a period when the significance given to rationalism had decreased. Architects developed a growing interest in social issues and they searched for a new architectural vocabulary outside the dominant canons of International Style. This has also influenced the architectural education. The empiric and positivistic architectural approaches developed in British and American universities started to influence both the educational programs and the architectural practice. As a result of these, an anti-international style attitude displayed itself and regionalism came as a savior as the reflection of a more socially conscious architecture (Yucel, 2005, p. 125-155). It demarcated an architecture that reflected the particularities of the region in which it was located. It did not reject modernism but it rejected internationalism and basically appeared as a call for contextualism, accepting both the physical context (site, climate, materials), the sociocultural context (related to both style and function), and the formal concerns (Serageldin, 1996, p. 12-20).

The years between 1960's and 1980's witnessed the growth of industry and business, the emergence of a pluralistic world view and an establishment of an urban way of life. As Yucel summarizes, pluralism appeared as the only common denominator of the architecture of the period, both in theory and practice (Yucel, 2005, p. 125-155). Beginning from 1970's, post-modern instances of pluralism have increased, which were formed mostly under the effect of foreign architectural sources. Turkish Architecture was affected badly from the fast and disorganized growth of society in these times, which was brought about by the social and economical disturbance in the country (Sozen, 1984, p. 43-85).

In 1980's, the problem of squatter housing, which developed uncontrollably in 1960's and 1970's, reached to its peak. As a response to this situation, poor quality and cheap apartment buildings were built more extensively and have dominated the settings of the cities (Sozen, 1984, p. 43-85). As throughout the world, 1980's were the years in which the effects of globalization were felt extensively in Turkey. As explained by Korkmaz, at those times, Turkish architecture was defined by a 'commodity aesthetics', which was inclined to an easy

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Faculty of Fine Arts at the time) in the American model and started education under the light of Western Modernism. It attempted to give the students an "evaluative, critical, de-localised and broad outlook to enable them to look at tradition without any prejudice". (Pamir, 1986, p. 131-152.)

to grasp sensory and seductive popular aesthetics, or in other words, to kitsch. Architecture was reduced to decoration based on the play of appearances and architects worked for the client pleasure and the free market economy (Korkmaz, 2005, p. 1-10).

Starting from 1990's and coming to this day, globalization intensified its influence on the Turkish architectural scene mostly by way of Internet and Turkish architecture started to experience even more pluralistic architectural experiments. This pluralism and commodity aesthetics has eventually created a feeling of unease on everyone and this time there was a destination for the Far East aesthetics and minimalism (Korkmaz, 2005, p. 1-10). Nevertheless, the dominant effect was still a pluralism under the effect of globalism. In this setting, contemporary Turkish Architecture inevitably did not develop a common stylistic tendency and the Turkish architectural context came under the effect of an international homogenization under globalization. Nevertheless, there are also a number of promising examples in the current setting, among which the Aga Khan Winning projects are examples.

The education in the schools of architecture by and large reflects these periodical developments. However the effect of Modern Architecture was always prevailing. Starting from 1930's, architectural education in Turkey became more and more under the effect of the rational and functionalist attitude of Modern Movement. The other developments worked basically as side ingredients next to it (Pamir, 1986, p. 131-152). As a reflection of it, for contemporary architects, who were the products of an education based on Modernist attitudes, the mainstream ideology in architecture developed along the lines of international movements. They aspired for an architecture that reflects progress and rationality until recently. In education, in line of the *tabula rasa* attitude of Modernism, the use of traditional types and precedents in architectural design was not a supported way to go in general. Although regionalism and the importance given to the context that the buildings were to be in were important considerations, the attitude of 'creativity out of nothing' persisted in most cases (Balamir & Erzen, 1996). As a reflection of it, the use of traditional types and precedents in architectural design was seen as something that should be approached with great care and hesitation, especially in highly educated circles of the Turkish architectural scene.

5.3. BRIEF INFORMATION ABOUT THE TRADITIONAL TURKISH HOUSE

In Anatolia, different regional characteristics, traditions, materials and climatic conditions have created different and distinguishable dwelling forms and structures. Nevertheless, it is still possible to observe a commonality and integrity between the dwellings in different regions in Anatolia that can be gathered under the title of the 'Turkish House'. The common life patterns of Anatolian people, their way of life and daily actions as well as the structure of society, had a formative affect in the formation of a common sense of dwelling. The fusion of architectural traditions, the culture, the religion of Islam, the position of family in the society, the daily habits of life and the tradition have created common living patterns and dwelling characteristics. On this basis, the traditional housing settlements in Anatolia show commonalities in terms of their planning principles and spatial organization.

The common and most frequently observed characteristics of Turkish houses can be listed as their practicality, functionality, harmony with the environmental conditions, planning from the inside out, using local materials and tools, simplicity in the solution, structure and appearance, priority of flexibility and functional solutions in planning, planning according to the human scale, and specific relationship between the inside and the outside that gradually connects the public, semi private and private zones (Sozen, 1970).

The houses are generally either one or two storied. When they are one storied, the ground floor is heightened a bit to avoid the dampness and noise of the street. The ground floor is usually built out of stone and is blind to the outside to protect the visual access to the house. It is generally used as a service area that contains the barn or the cellar. The kitchen could also be there, if it is not in the courtyard. The second floor is open to the street via the projecting bay windows. It contains the main living spaces, such as the rooms and the *sofa*. *Sofa* (or the *hayat*) is the area that faces the doors of the rooms and used as the main living space and the circulation area. The dwellings are oriented towards the semi private courtyard and its garden, which is the most frequently used space of the house. To protect the privacy of the house, the courtyard is enclosed with high walls (Kucukerman, 1988).

The room is the most important and basic element in a traditional Turkish house in terms of the spatial arrangement. The number of rooms is determined by the number of the families living in the house and the total income. Generally one of the rooms, which face the street, is made larger and more ornamented than the others and this room is called as the main room (*basoda* in Turkish).

The other important element of the Turkish House is the *sofa*. Getting different names in different regions, such as *hayat, ayazlik* or *sergah*, *sofa* is the space between the rooms that functions as the main living space and the circulation area. The location of the sofa determines the organization of the plan.

The courtyard is the third important element of the Turkish house. It is the liveliest place of the house with its garden, oven, well, fountain or pool. It is a semi private zone that is enclosed with high walls and connected to the street with a single or a double leaf door.

The plan schemes and materials of the dwellings differentiate according to different regions of Anatolia. There are seven geographical regions in Anatolia and the following groups of different house forms and schemes could be observed in those different regions:

- The stone architecture of Southeastern Anatolia region.
- The wooden beamed stone architecture of Eastern Anatolia region.
- The timber framed architecture of Eastern Black Sea region.
- Timber framed wooden architecture of Marmara region.
- The cubical, flat roofed stone architecture of Aegean and Mediterranean regions.
- Stone and adobe brick architecture of Central Anatolia.
- Adobe filled wooden architecture (with ground floor made out of stone) of Central Anatolia and Western part of Central Anatolia. This last group is considered as the most frequent representative of the Turkish house, which has a wider application area than that of the rest.

For Sedad Hakki Eldem, who was a prominent scholar who first studied the Turkish house (Uysal, 2004), the 'Turkish house' was the "house type, which was located within the borders of the Ottoman Empire, in the Anatolian and Rumelian regions, that existed with its own peculiar characteristics for a period of five hundred years" (Eldem, 1954, p. 11). It was

used as a generic term by Eldem, for the timber framed house with its standardized plans and architectural elements, such as the sofa, the rooms (called *oda* in Turkish), the staircases and the passageways; among which the sofa was the most characteristic element (Bozdogan, 1987, p. 44).

Figure 5.2. An example of a timber framed 'traditional Turkish house' in Safranbolu, Turkey.[18]

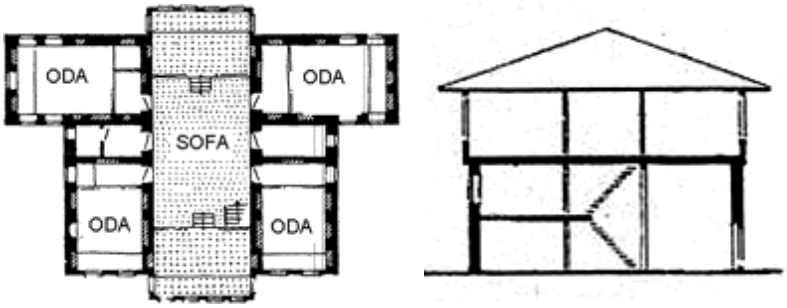

Figure 5.3. Model Turkish House, plan (left) and section (right). (Eldem, 1954, p. 12)

Based onto a survey of a large number of traditional Turkish houses, Eldem devised an abstract typological remodeling of the 'Turkish house', based basically on the plan types. These plan types, which were categorized by him with regard to different planimetric organizations of the sofa, were mainly comprised of four basic kinds: namely, the plan type without a sofa, the plan type with an outer sofa, the plan type with an inner sofa, and lastly the plan type with a central or an oval sofa (Eldem, 1954, p. 12, 24).

[18] Image retrieved from Safranbolu Municipality website: http://www.safranbolu-bld.gov.tr/portal/

Figure 5.4. The Plan type without the sofa (left) and the Plan Type with an Outer Sofa (right). (Eldem, 1954)

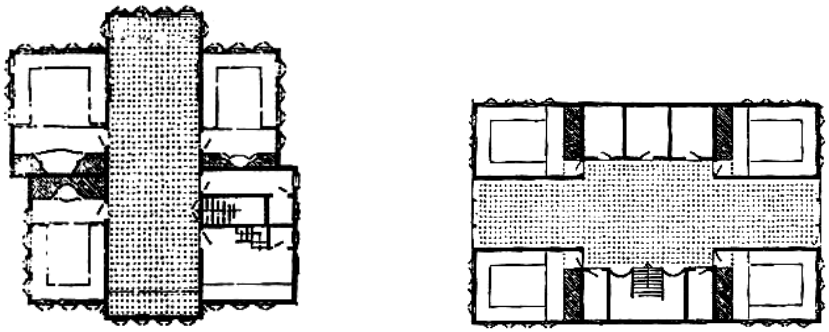

Figure 5.5. The Plan Type with an Inner Sofa (left) and the Plan Type with a Central Sofa (right). (Eldem, 1954)

These types are applied and adapted according to the climate, the land, the available materials and the cultural properties. They create different formations depending on the different conditions of the places that they interact with. The types of the same context share the same compositional principles, which form the architectural language of the context. As Aran states, these traditional types of the context (the dwelling patterns or the cultural schemas) are held in the minds of the local craftsman in a schematic level and they carry the form and the idea of the traditional local dwellings (Aran, 2000, p. 48). They exist as cultural phenomena in terms of their formation and transfer from one craftsman to the other and they are the abstract representatives of the morphological rules that define and form the traditional settlements and dwellings in concrete form (Alexander, 1979).

> "It is possible to see the language that imparts the rules of action for a skillful indigenous builder, in Hubka's words, "as a highly abstracted architectural grammar or schemata" that are embedded in his mind. These schemata in the mind of the native builder systematize habitual building solutions or typical reactions before new solutions….The language or schema structure practiced by indigenous builders should not be conceived of as sensible representations of buildings, or figurative images of building elements or fragments. As Hubka says, it is to be understood as "ideas far beyond representation" or forms "symbolizing fundamental ideas in culture" ". (Aran, 2000, p. 48)

In application, these types show both replication and differentiation due to the unique quality of each site and context. This creates endless possibilities and uniqueness in their application (Aran, 2000, p. 120). As in the case of cultural schemas, they both form a harmonious and unified surrounding and also are able to avoid monotony due to their many different variations. Therefore the places created with traditional types achieve to look harmonious without being monotonous. As Aran states, this happens because of the fact that the indigenous builders do not copy but adaptively and creatively replicate the schemas or the types. They create the repetition and differentiation that is seen in nature and in this fashion they provide an endless formal and spatial diversity (Aran, 2000, p. 48). In the following analysis of the cases, we will observe these characteristics in the reference contexts of the cases.

5.4. ANALYSIS OF CASES

In the light of the information discussed above, the case study involved the collection of archival evidences and on-site contextual information about the four dwelling projects, which are basically in two different geographical regions. In the archive study that took place before the on-site field survey, a comprehensive set of documents are collected about the dwellings from the Aga Khan Award for Architecture archives that were kept and publicized in digital format via the ArchNet Digital Library. They contained all the documents about the dwellings, which are submitted to the Award Program by their architects, and all the reports

and data that were prepared and collected by the juries and the technical reviewers. They basically involved the jury reports, architect's reports, client's reports, technical review reports, nomination forms, drawings, photographs, plans and articles written about them.

The thoroughness and availability of these project documents were a great opportunity for the analysis of the projects. Additionally, the reports written by the architects themselves about their projects (architect's reports) were very helpful in terms of providing the sources in which the projects, their characteristics and methods of design are described and narrated from the first hand. With the help of these sources, the buildings could be studied both as examples of explicit methods and also as physical demonstrations of architects' intentions. Furthermore, as the projects were already assessed according to their success and level of creativity by the evaluation criteria of the juries, the case study had a solid basis in terms of the selection of the projects and the assessment of their level of creativity.

After collecting the documents about the dwellings as such, an on-site field survey is arranged for traveling to the sites of the projects. The two of the projects, which are Gurel Summer Residence and B2 Residence, were in Marmara Region, respectively in Dalyan village and Buyukhusun village, within the province of the city of Canakkale. The other two, which are Ertegun House and Nail Cakırhan House, were in Ege Region, respectively in the town of Bodrum and in the town of Akyaka, within the province of the city of Mugla. Therefore the field survey basically required traveling to two different geographic regions, Ege and Marmara Regions on the Western coast of Turkey.

Figure 5.6. Locations of the Aga Khan Award Winning Dwellings in Turkey

Within the survey, the dwellings themselves and the traditional contexts that they were built into or referring to were photographed and typologically analyzed in order to find the types that the dwellings were referring to. In the order of realization, first the dwellings themselves were visited and photographed, and if possible, the residents of the dwellings were interviewed. Secondly, the traditional contexts that they were built into or referring to were visited and photographed, and these contexts were analyzed in order to find the traditional dwelling types used within there, thirdly the specific references given to the traditional context by the architects of the Aga Khan dwellings were detected, and fourthly the municipalities of the cities and towns of the dwellings were visited in order to obtain the master plans of those villages and towns and to talk to the responsible people about the dwellings. As a result of this survey, a comparison was made between the original traditional types of the contexts and the Aga Khan winning dwelling projects in order to detect how those types were manipulated in the course of their design.

Evidently, typological analysis was used in this study, as it would provide “insight into the architect’s thought processes” and the traditional architectural contexts they refer to.

As mentioned earlier, typological analysis is thought to allow us to understand “not only the buildings, but also the way architects think and how they design” (Amole, 2007, p. 86). The typological characteristics used in design are thought to “represent the features that architects manipulate during the design process” and for this reason typological analysis is thought to demonstrate “the intentions of the architect and the gambits used in the design process” (Amole, 2007, p. 86). It is also presented as a method that helps to “identify and recognize the regional and cultural influences in the design of buildings” (Amole, 2007, p. 77) and “allows the researcher to understand and learn from culture” (Assi, 2003, p. 1). In this framework, typological analysis is used in this study in order to find out which types/cultural schemas were referred to in the selected dwellings and how they were manipulated as related to the specifities of the cultural context they were in.

In the analysis section of the buildings, the buildings are analyzed morphologically, so as to reveal their formal and spatial characteristics, and typologically so as to reveal the remnants of the traditional types that are used in their design and how they are used, manipulated or transformed in design. It demonstrated the gambits or the ways by which architects manipulated the traditional types of the context.

The data used in this typo-morphological analysis were the architectural drawings of the dwellings. As Oxman states, the architectural drawings, which are the symbolic representations of designs, can be viewed as the externalized forms of the cognitive behaviors of their designers. In this framework, as Oxman also accepts, the analysis of the archival material about designs could be used for the analysis and interpretation of the design process in place of direct observations and a recorded protocol (Oxman & Oxman, 1992, p. 117). In this fashion, the architectural drawings were analyzed in this study by graphically studying them to reveal their most basic and most specific characteristics.

In this framework, this analysis section will talk about first the architects of the buildings, second the physical contexts of the buildings and the typological analysis of the dwelling types of those contexts, third the general characteristics of the buildings and the typological analysis of the use of reference types in the buildings in order to find out how

they were manipulated and used in their design, and last an evaluation of the creative contribution in the transformation of the traditional types in the buildings.

5.4.1. CASE 1: ERTEGUN HOUSE (1973)

Ertegun House, designed by Turgut Cansever and built in 1973, won the Aga Khan Award for Architecture in the first award cycle in 1980. In the following paragraphs the building will be analyzed in terms of its architect, its context, its general characteristics and the use of types.

5.4.1.1. ARCHITECT OF THE BUILDING: TURGUT CANSEVER

Turgut Cansever (born in Antalya, Turkey in 1920 - died in Istanbul, Turkey in 2009) was a Turkish architect who practiced architecture in Turkey since 1946. He graduated from Istanbul State Academy of Fine Arts (IDGSA) with a degree in Architecture in 1946. He took his PhD in Art History from Istanbul University Faculty of Letters in 1949 with his thesis entitled as “The Column Capitals in Ottoman and Seljukid Architecture” and became an Associate Professor in 1960 with his thesis entitled as “The Problems of Modern Architecture”.

His first architectural experience was the restoration of Sadullah Pasa Waterside Residence in 1949. After that he founded his architectural office in 1951with his partner Abdurrahman Hanci. Between 1959-1960, he worked as the Head of the Department of the Planning Organization of the Marmara Region, as a founding member and in 1961 served as the chair of the Department of Planning of the Municipality of Istanbul. Between 1974-75 he chaired the World Bank Istanbul Metropolitan Planning Project; between 1974-76 he worked as a member of the Turkish Delegation of the European Council; between 1975-80 he worked as a consultant in Istanbul Municipality on the areas of metropolitan planning, new settlements, urban centers and protection and in 1979 he worked with the same purpose for Ankara Municipality. In 1983 he was a member of the Aga Khan Award for Architecure Master Jury with Charles Moore, Roland Simounet, James Stirling, P. W. Sudi, Rifat Chadirji, Habib Fida-Ali, Mubeccel Kıray and Ismaïl Serageldin.

In the 1980 award cycle of the Aga Khan Awards for Architecture, Cansever won two Aga Khan Awards at the same time, respectively for the Ertegun House in Bodrum dated to 1973 and Turkish Historical Society Building in Ankara dated to 1967. In 1992, he took his third Aga Khan Award for the Demir Holiday Village in Bodrum, which was a hotel complex dated to 1987. Until now, Cansever is the only architect in the world who has been given the Aga Khan Award for Architecure for three times.

Along side Aga Khan Awards for Architecture, Cansever also took the Chamber of Architects of Turkey Grand Award (Architect Sinan Award) in 1992 and The Ministry of Culture and Tourism Culture and Arts Grand Award in 2005. Besides his architectural works, Cansever also published several articles and books, among which the 'Architect Sinan' and 'Architecture and City in Islam' are important ones.

The architectural approach of Cansever was fed by a deep Islamic mysticism. In his own words, he believed that:

> "A work of art is a projection of the cosmological perception of 'being'. The decision the artist makes is determined by his conception of being and the hierarchy of its forces. So Art is a discipline which is within the realm of ethics." ("Turgut Cansever Biography", 2009)

In the light of this philosophy, Cansever approached to modern architecture by emphasizing the significance of environmental, historical and cultural values. He contemplated on how the Turkish cultural past and traditional architecture could be adapted to the contemporary world and architecture. On this basis, he developed a personal architectural approach, which continuously searched for the regional expression in architecture (Urey, 2010). He always prioritized the use of local materials, local construction techniques and local types in this sense and saw the regional/traditional types as the materializations of the local living styles. By stating that form was inevitably bound to its time and its place (Tanyeli, 1991, p. 83-89), he always prioritized the respect to natural and cultural environment in his works. All in all, as Evyapan states, Cansever accomplished to reach to a synthesis between the regional and the international in his works by way of reconciling the permanent architectural values with the tradition in terms of spatial and

temporal qualities (Aslanoglu Evyapan, 1991, p. 92). Some of the buildings and works of Cansever can be as listed follows:

- Turkish Historical Society Building, Ankara (Aga Khan Award for Architecture 1980)
- Ahmet Ertegun House, Bodrum (Aga Khan Award for Architecture 1980)
- Demir Holiday Village (Aga Khan Award for Architecture 1992)
- Istanbul Beyazid Square Urban Design, İstanbul, 1959.
- Anadolu Klubu Hotel, Büyükada-İstanbul, 1951.
- Diyarbakir College, Diyarbakir, 1958.

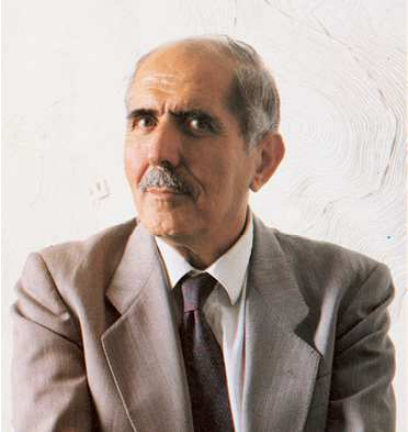

Figure 5.7. Turgut Cansever[19]

5.4.1.2. THE REFERENCE CONTEXT: GENERAL CHARACTERISTICS AND THE TYPOLOGICAL ANALYSIS OF THE DWELLING TYPES

5.4.1.2.1. GENERAL CHARACTERISTICS OF THE CONTEXT

Ertegun House is located at the town of Bodrum, in the Bodrum Peninsula of the province of the city of Mugla. It communicates with and makes reference to traditional Bodrum and Bodrum houses. The town of Bodrum and the city of Mugla is in the Aegean Region of Turkey. Aegean region is on the coast of the Aegean Sea, which is an extension of

[19] Image retrieved from Chamber of Architects of Turkey website: www.mo.org.tr

the Mediterranean Sea, on the western side of Turkey. The region is covered by the mountains that lie in the east-west axis towards the Aegean Sea and by the plains between them. The vegetation is not dense and it consists of mainly maquis on the lower sections and the evergreen pine forests on the higher sections.

Aegean region is under the effect of the Mediterranean climate in general. In Mediterranean climate, summers are hot and dry and winters are warm and rainy. The average summer temperatures are between 28-30 °C and the average winter temperatures are between 8-10 °C. Snow and frost is rarely seen and the rain is most intense on wintertime and most scarce in summer time. Intensive solar radiation is seen during summer (Aran, 2000, p. 92).

Although Bodrum peninsula is a land covered by the Aegean Sea from three sides, it is under the affect of Mediterranean continental climate, rather than Mediterranean marine climate. In this climate, there is a bigger temperature difference between day and night than in Mediterranean marine climate. The relative humidity fluctuates and the dominant winds blow from the west and southwest. Intensive solar radiation is seen during summer and temperatures are generally above freezing point in wintertime. The average rainfall is low and intensifies on wintertime, while the summers are hot and dry (Aran, 2000, p. 92).

The town of Bodrum encircles a secluded and charming crescent-shaped harbor at the Aegean Sea, on the southwestern coast of Turkey, facing the Greek island of Kos. At the back, it is surrounded by two hills, the Belen and Tirmar, which rise to a height of over 600 m's. The vegetation in the area consists mostly the lemon, tangerine, and olive trees, which are suitable for the mild climate and lime rich soil of the land.

Bodrum is the site of the ancient port of Halicarnassus and an important fourth-century B.C. mausoleum. It also contains an attractive fifteenth-century crusader castle of St. Peter, built by the Knights of St. John, which dominates the entrance of the harbor. The traditional Bodrum with its famous cubical white washed houses was actually developed at nineteenth-century as a small fishing, sponge diving and agricultural town. Today, these activities mostly gave way to a strong tourism industry and the town became a very popular and crowded holiday destination in the summer time (Holod & Rastorfer, 1983, p. 133).

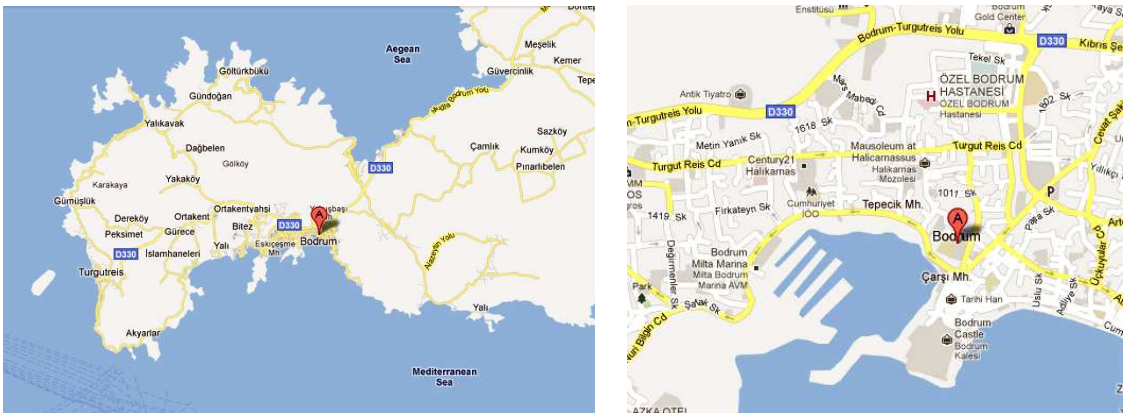

Figure 5.8. Map of Bodrum Peninsula (left) and the town of Bodrum (right)

Figure 5.9. Bodrum harbour (left) and the castle of Bodrum (right)[20]

Figure 5.10. General views of Bodrum harbour[21]

[20] Images retrieved from Bodrum Municipality website: http://bodrum.bel.tr/
[21] Images retrieved from Bodrum Municipality website: http://bodrum.bel.tr/

5.4.1.2.2. DWELLING TYPES

In Bodrum peninsula, the people have settled in the South or East facing slopes of the hills, which are close to fountains (Aran, 2000, p. 18). They have settled onto the slopes of the hills to protect themselves from the threats that were coming from the sea such as a pirate attack. They have built small scaled, cubical detached houses on these slopes.

According to the climatic factors, the settlements are located on the east, south and southeast facing slopes and foothills. The structures are compact, one piece cubical masses. The stone masonry structures have white washed thick walls. The roofs are covered with a special water isolating white earth that is compressed with a cylindrical piece of stone. The window openings are small, rectangular and few in numbers and they have shutters that open towards inside. There is generally a terrace in front of the main door that is covered with a trellis (Aran, 2000, p. 92). The houses are usually embellished with bougainvillea flowers that are overhanging from the high walls of the courtyard.

Most of the houses are in the form of a rectangular prism that contains a long room surrounded by thick white washed masonry walls. The ground floor has no windows. The door to the house is on the second floor and is reached either by a staircase or a bridge (This was made in time as a protection from the threats that were coming from the sea such as a pirate attack). The entrance is usually from the kitchen, near the midpoint of one of the longer sides. The long room is semi divided into two chambers with a bisecting closet in the middle. One side is used as a kitchen, and the other side that is elevated from the kitchen by two or three steps is used as the living and sleeping area. The living and sleeping area has a fireplace with two windows on both sides. The most characteristic features that form the schema or type of the traditional Bodrum House can be listed as follows (Aran, 2000, p. 132):

- Entrance terrace towards landscape
- Hedged courtyard
- Rectangular room with two fireplaces
- Raised wooden floor
- Earthen flat roof

- Bisecting closet
- Filled ground

By applying this schema or type, a family of houses that talk the same language is created in the region. They look harmonious and unified, as well as unique in each example (Aran, 2000, p. 132). These traditional houses are protected today by Law and are most commonly seen in Ortakent (Musgebi), Gumusluk and Kocakaya villages in the Bodrum peninsula. Especially the houses of Ortakent (Musgebi) and Karakaya villages have been the models for the typical Bodrum houses of today.

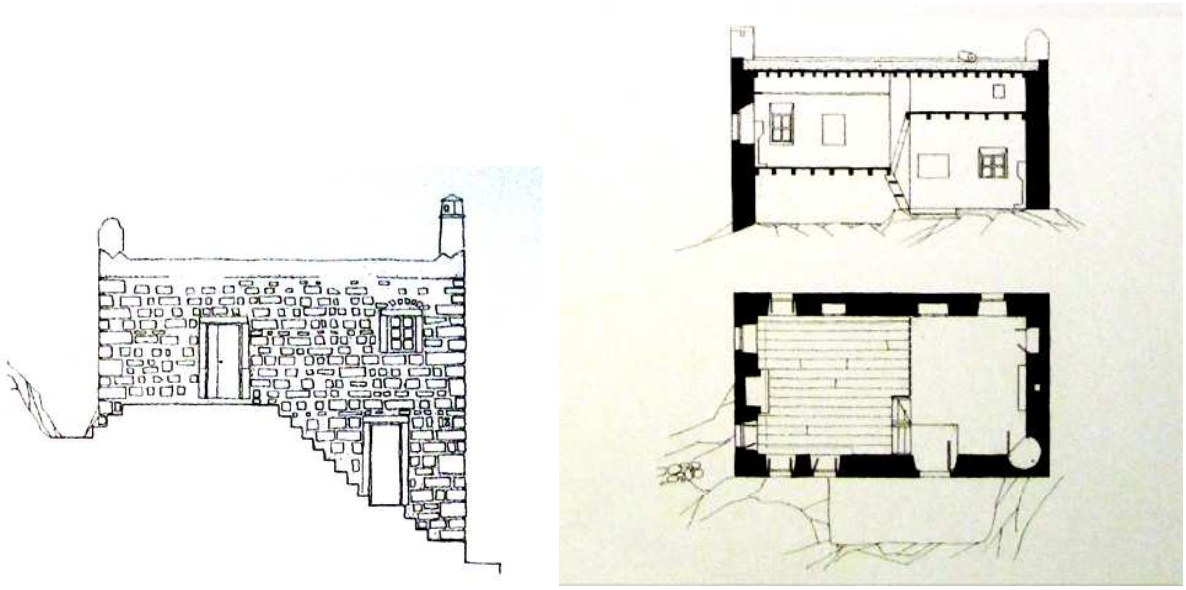

Figure 5.11. Bodrum dwellings – schematic characteristics - Façade, section and plan (Aran, 2000, p. 132)

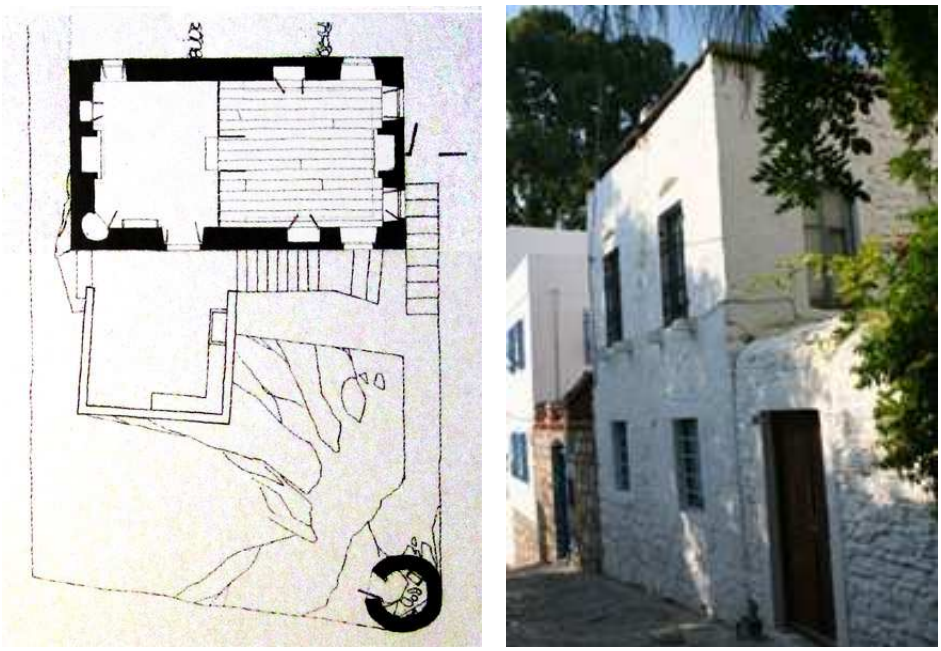

Figure 5.12. Schematic site plan (left) (Aran, 2000, p. 132) and a sample Bodrum dwelling (right) (Photograph by author)

Figure 5.13. A sample Bodrum dwelling (left) and a touristic figurine of a typical Bodrum house (right) (Photographs by author)

5.4.3.3. THE BUILDING: GENERAL CHARACTERISTICS AND THE USE OF THE REFERENCE TYPES

The Ertegun House was awarded in the first cycle (1977-1980) of the Aga Khan Award for Architecture. At that cycle, the members of the Steering Committee were His Highness the Aga Khan, chairman, Nader Ardalan, Sir Hugh Casson, Charles Correa, Hasan Fathy, Professor Oleg Grabar, Professor Dogan Kuban, and Professor William Porter. The members of the Master Jury were Professor Titus Burckhardt, Sherban Cantacuzino, Giancarlo de Carlo, Dr. Mahbub ul-Haq, Mazharul Islam, Professor Abdullah Kuran, Dr. Mona Serageldin, Soedjatmoko, and Kenzo Tange (Holod & Rastorfer, 1983a).

The aim of the Award at that cycle was specifically to “nurture a heightened awareness of Islamic civilization and values and to encourage architecture appropriate to the contemporary era”. The Award criteria was to recognize those projects “which demonstrate architectural excellence at all levels"; which respond to their "social, economic, technical, physical, and environmental challenges"; which nurture “a heightened awareness of the roots and essence of Muslim culture”; and which have the potential to stimulate related developments else-where in the Muslim world” (Aga Khan Awards for Architecture, 1983c, p. 57) The projects needed to show “a creative and socially responsive Islamic architecture”. The jury stated that not all the projects were awarded for architectural excellence, but as “steps in a process of discovery” and “important facets of the ongoing search for an ideal” (Aga Khan Awards for Architecture, 1983c, p. 57).

Ertegun House was awarded in that cycle as it recognized its particular historical context and devised a responsive vocabulary for it. The jury gave a citation to the project for “the imaginative combination and re-use of two 100-year-old seaside houses and for demonstrating that old structures can be transformed into functional as well as beautiful environments without resorting to direct imitation. The different language of the linear addition which joins the two houses at the back stands in harmony with the existing architecture and shows how successfully the new can be integrated with the old. This project is also significant for having encouraged the trend toward conservation in the Bodrum area,

where an important traditional house type is fast disappearing". It was recognized as an exemplary project for "the imaginative conservation of two seaside houses, while demonstrating that new structures can be sympathetically added to the old without resorting to direct imitation" (Holod & Rastorfer, 1983b).

5.4.3.3.1. GENERAL CHARACTERISTICS

A. IDENTIFICATION:

- Project Title : Conversion of an old traditional Bodrum house to a contemporary summer residence.
- Address : Neyzen Tevfik Cad. 94-Box 17, Bodrum, Turkey
- Architect : Turgut Cansever, Istanbul, Turkey
- Carpenter : Cemil Ormanlar, Istanbul, Turkey
- Client : Ahmet and Mica Ertegün, New York, U.S.A.
- Completed : 1973
- Type of Use : private/residential
- Total surface area : 650 m2 to 700 m2.

B. SITE:

The house is located on the north coast of the circular bay of Bodrum and looks towards the south to the harbor. The area is plain. It faces the street and the sea on the front side and sees a large garden at the rear side.

C. PROGRAM:

The building program included the renovation of the original house and the addition of two rooms at the back (the garden side) to expand the living space. It was designed for the Ertegun couple (two people) and their guests.

D. PROJECT OBJECTIVES:

- "To restore and re-use a house which is a fine example of traditional domestic architecture of the Turkish Mediterranean coast",
- "To achieve a high standard of execution using local materials and craftsmen", and
- "To design a house which changes; to give to it the possibility to transform, to be able to open and close according to time and season" (Aga Khan Awards for Architecture, 1980b).

E. PROJECT HISTORY:

Ertegun House was originally one of the traditional Bodrum Houses, which was dated to the 19th century. Being approximately 100 years old at the time of its purchase, it was known as the *Salih Efendi Konak* and used to belong to the local *aga*. In 1971, Ahmet and Mica Ertegun purchased the house with the aim of using it as a summer residence. At that time the house was in a state of ruin and the couple commissioned Turgut Cansever as the architect to renovate it and to add extra spaces (Holod & Rastorfer, 1983b).

The old house is located on the north coast of the circular bay and looks towards the south to the harbor. Originally it was in the form of two buildings joined by a gate. Made up of two double storey wings connected by a single-storey entrance, it was a whitewashed masonry structure made by the typical uncut, heavily mortared stone. Having a linear plan, the house is located between the sea at the front and a large garden at the rear. The two parts of the house are separated by the main gate and the entrance area.

This two-part division of the house is found to be characteristic of the Turkish domestic architecture, which has men's quarters (*selamlik*) on one side that is used for receptions and women's quarters (*haremlik*) on the other side. It is also speculated that the house was originally built by two brothers with an aim to create a separate house for each brother and his family that is connected with a shared entrance in between. Although the house is an example of traditional Bodrum houses with its style and technology, it is easily

observed that it was built according to a higher standard than the neighboring houses (Holod & Rastorfer, 1983a).

F. PROJECT DESCRIPTION:

Ertegün house, originally two buildings connected by a gate, was turned into a summer residence with an addition at the back, which leaves the old structure totally independent. The final plan is formed by four parts, which are the two wings of the house that are stretching along the street; the linear, single storey addition at the back, which is connecting the two wings; and the large garden at the back that is enclosed with masonry walls. The left wing of the house has been turned into a living room at the ground floor and into a large bedroom, bathroom and a study room at the second floor. The right wing has been turned into a dining room and kitchen at the ground floor and into six bedrooms and their bathrooms at the second floor (Aga Khan Awards for Architecture, 1980b).

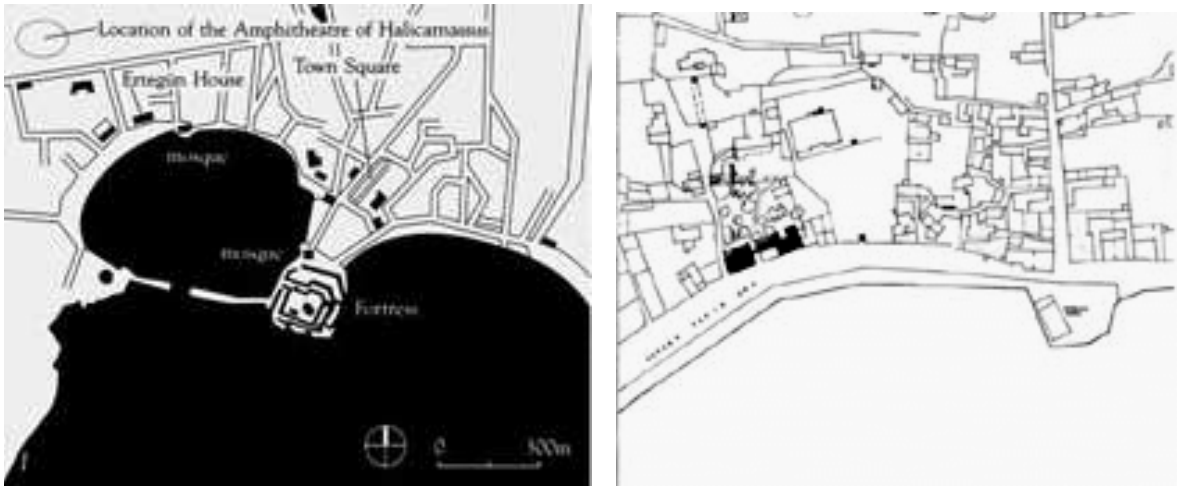

Figure 5.14. Location of Ertegun House. Bodrum, Turkey (Holod & Rastorfer, 1983b)

Figure 5.15. View from the sea (left) and harbor elevation (right) (Holod & Rastorfer, 1983b)

The one storied new addition at the back is clearly distinguishable from the old building by way of its structure. The renovated old building is made of thick masonry piers with small windows and the new addition is made of a concrete frame, with round concrete columns, wood infill walls and a series of large adjustable oak shutters that open freely to the garden at the back, providing light and air to the living and dining rooms. The new addition parallels the old structure and the interior spaces run freely between the new structure and the old. The thick masonry piers that lie between the old building and the new addition are made out of the existing bearing wall at the back of the house by way of cutting through large openings. This has unified the old building and the new addition into a single large space that consists of the large living room on the left and the kitchen and the dining room on the right. At the far right of the house upon the entrance from the gate, there is a two-storied structure, which is bought by Ertegun's separately. It is connected to the new addition and the old house at the corner and contains the library at the ground floor and a bedroom an its bath at the second floor. At the farthest corner of the garden at the back, there is the gardener's house, which is a masonry structure designed by Cansever that consists of three rooms and a laundry. The garden is full of orange, lemon, and pine trees and many flowers (Aga Khan Awards for Architecture, 1980b).

On the second floor, the right wing functions as the guest wing, with its three bedrooms and their baths. The right wing contains the master bedroom, dressing room and two bathrooms. The roofs of the living room and the dining room are used as terraces that are

looking towards the garden at the back. The roof of the two-storied part is again used as a terrace that watches the sea and the harbor. Over the entrance there are raised columns covered by a trellis, which are covered by bougainvillea flowers, as is tradition in the region. There is a small fountain underneath the fruit trees, opposite the dining area (Aga Khan Awards for Architecture, 1980b).

The heating of the house is provided by conical-shaped Ottoman fireplaces in the living and dining rooms and in three of the bedrooms. The cooling is provided by cross ventilation and the north-south orientation of the house, which is the same orientation as in other Bodrum houses. The small openings of the south wall minimize the heat in the summer, and the adjustable oak shutters of the living and dining rooms provide good ventilation.

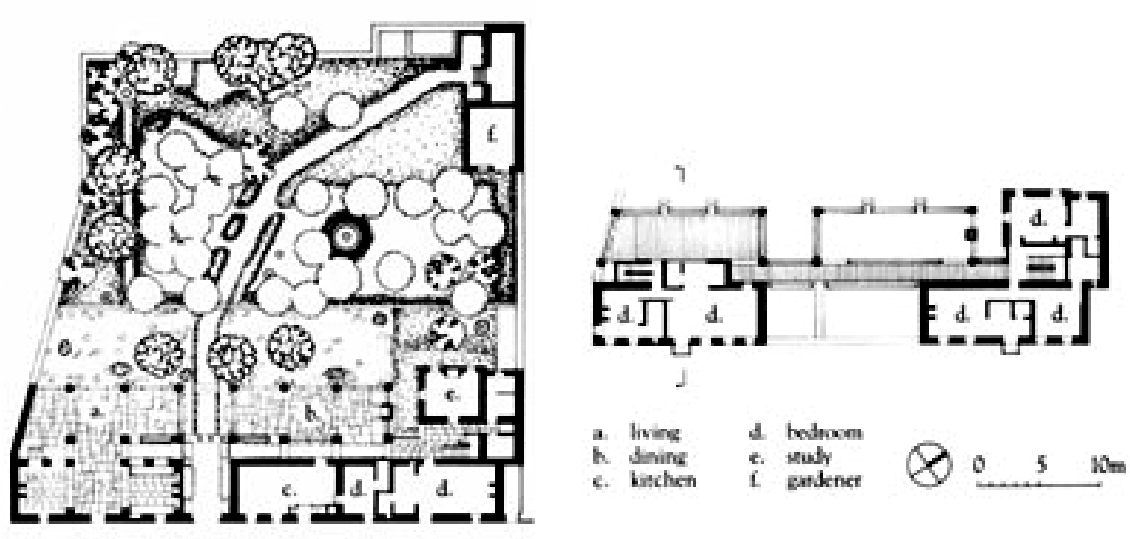

Figure 5.16. Ground floor and second floor plan of house (Holod & Rastorfer, 1983b)

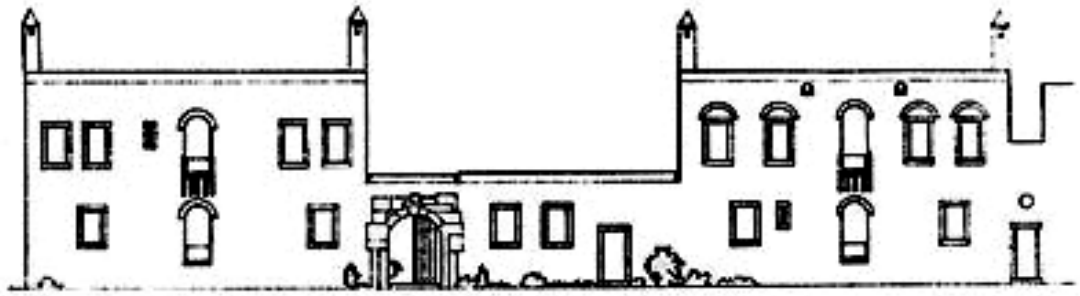

Figure 5.17. Street side elevation (Holod & Rastorfer, 1983b)

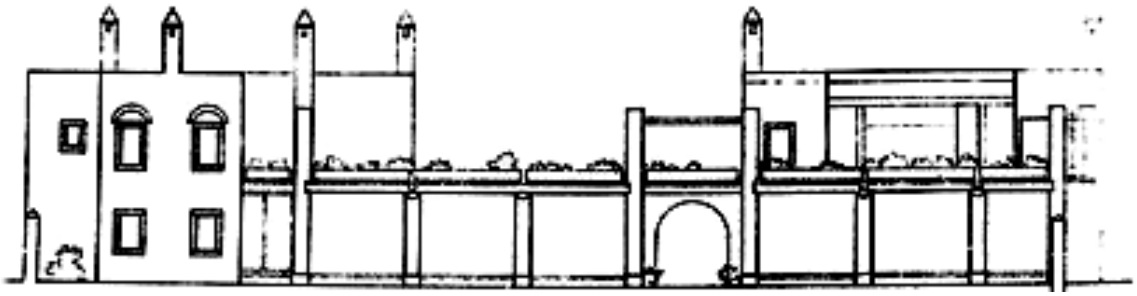

Figure 5.18. Garden elevation (Holod & Rastorfer, 1983b)

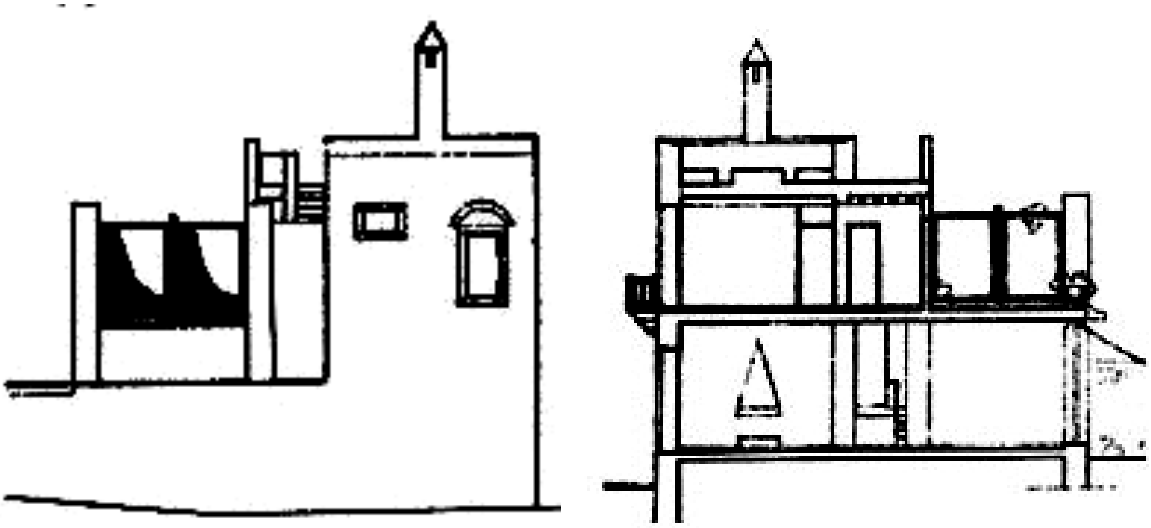

Figure 5.19. East side elevation and transverse section. (Holod & Rastorfer, 1983b)

G. CONSTRUCTION AND STRUCTURAL SYSTEM:

The project was designed in October 1972 and the construction were finalized in October 1973. The walls of the old house are stone masonry while the new addition has a reinforced concrete frame with wood infill. All the floors are reinforced concrete. The construction materials were locally produced in Turkey. The technology is low but the quality of craftsmanship and materials are high (Aga Khan Awards for Architecture, 1980b).

H. MATERIALS:

The materials of the house are consciously juxtaposed by the architect to distinguish the new building from the old. The building material is stone masonry in the old structure and reinforced concrete in the new with wood infill walls. The floors are oak wood in bedrooms, marble in main spaces and bathrooms, and ceramic tiles in the kitchen. The paths of the garden and corridors of the ground floor are covered with locally produced cobblestones and pebbles. The walls are white washed stucco and the living and dining rooms are separated from the garden by oak shutters. Ceilings are made of black pinewood in the bedrooms and white washed stucco in other places. Brick is used to cover terraces. Window, doors, shutters and cupboards are made of Oakwood. Special ceramic tiles that are patterned after traditional Turkish tiles are used as decorative elements in bathrooms, as in traditional Turkish baths. There is a high quality of craftsmanship throughout the house (Aga Khan Awards for Architecture, 1980b).

5.4.3.3.2. DESIGN OF THE BUILDING AND THE USE OF REFERENCE TYPES

Ertegun House was awarded in that cycle as it recognized its particular historical context and devised a responsive vocabulary for it. The jury gave a citation to the project for "the imaginative combination and re-use of two 100-year-old seaside houses and for demonstrating that old structures can be transformed into functional as well as beautiful environments without resorting to direct imitation" (Holod & Rastorfer, 1983b). As mentioned before, the stated objectives of the design, which were "to restore and re-use a house which is a fine example of traditional domestic architecture of the Turkish Mediterranean coast", "to achieve a high standard of execution using local materials and craftsmen", and "to design a house which changes; to give to it the possibility to transform, to be able to open and close according to time and season" (Aga Khan Awards for Architecture, 1980b), have been all accomplished in the final design.

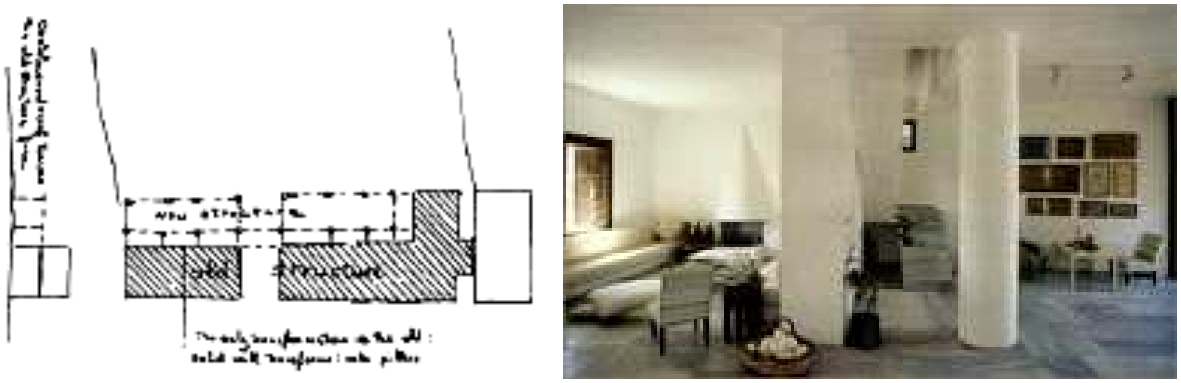

Figure 5.20. The difference between the old and the new structures. (Holod & Rastorfer, 1983b)

The most important design feature of this building is the clear distinction between the old structure and the new addition. The part of the building along the street (the old structure) has been preserved in its original form, while the linear addition at the garden side left the old structure totally independent. As stated in the nomination form, Cansever has totally transformed the use of the interior and exterior spaces in this fashion without changing the unity and ambiance of the historic structure. He consciously distinguished the new from the old by using different construction techniques and materials. As mentioned earlier, the old house was left in its thick stone bearing walls with narrow windows, while the new structure was built in a reinforced concrete frame with its round concrete columns and big openings covered by wooden doors and shutters. The finishing materials were juxtaposed, such as the crafted woodwork versus the simple whitewashed stucco, and the crisp marble floors versus the rough pebble paving. This way, Cansever designed the new structure as parallel to the old one while keeping with the simplicity of spatial organization and the concern for craft. He also continued to make reference to the traditional Bodrum houses in the older street façade, by making a four columned trellis upon the entrance, from which bougainvillea flowers were hanging. Cansever explains this in his own words as follows":

> "All the basic elements Ertegun house architecture are simple, deeply related to great cultural heritage of local population, also necessarily valid in

> universal context. They are economically non-expensive and being the continuation of historical experience." (Cansever, 1980)

Altogether, this different language of the new addition stands in harmony with, but distinct from, the existing architecture (Holod & Rastorfer, 1983b). By avoiding the mere imitation of the old structure this way, Cansever has demonstrated a conscious and respectful approach that combines the traditional and the contemporary (Aga Khan Awards for Architecture, 1980b). He has shown that "new structures can be sympathetically added to the old without resorting to direct imitation" and demonstrated "how successfully the new can be integrated with the old" and how the old can accommodate change (Holod & Rastorfer, 1983b). In Cansever's own words, this integration has been accomplished "by rejecting the wrong belief that historical heritage is an obstacle to the actual needs of our modern societies and proving that the respectful approach to history is the only way to solve superficial contradictions of the historical and actual" (Cansever, 1980).

For him, this has created "the newly restored balance of historical and actual, of static and dynamic" (Cansever, 1980) in the area and become an exemplary structure that encouraged conservation efforts in Bodrum. Cansever explains this process as follows:

> "Although it *(the house)* belongs and has been designed to serve a wealthy family, by conserving its character as one of the houses of Bodrum and establishing strong solid links to the existing historic urban texture and completing it, the Ertegun house has stimulated and the development of the new trend for restoration and conservation of historical Bodrum." (Cansever, 1980)

Therefore, as stated by Holod in this sense, by demonstrating this blend of old and new forms and materials, Ertegun House became a model for the sensitive rehabilitation of derelict structures in Bodrum and more generally in Turkey (Holod & Rastorfer, 1983a).

5.4.3.3.3. ASSESSMENT

Ertegun House displays an exemplary architectural approach by preserving the traditional house in its entirety and building a new structure at its rear in a respectful manner.

Its reference to the traditional type in the new structure is very subtle and far away from imitation or appropriation. As we have examined in the previous chapters, it uses the traditional type by refining it (by the process of refinement) and forms a structure that can be evaluated within the category of the process of 'analogy' (as different from the processes of appropriation or innovation). In terms of Welling's classification of design strategies or gambits that are used in the process of refinement, which are the application, analogy, combination and abstraction, it could be suggested that it makes use of the processes of analogy and combination, as it "discovers the applicability of an existing schema to a new situation" (Welling, 2007, p. 168) (traditional Turkish and Bodrum house types), and "merges two or more concepts into one new idea" (Welling, 2007, p. 169) (modern architectural forms with that of traditional Bodrum house type). In terms of Cross and Gero's classification on the other hand (which contains combination, mutation, analogy, first principles and emergence), it may be suggested that it makes use of the processes of combination and analogy, as it combines two different schemas (modern architectural forms with that of traditional types) by redefining them. In terms of Hubbard's six stratagems (which include swerving, completion, focusing, self-limitation, refilling and becoming the essence), it may be suggested that it makes use of the processes of swerving and refilling, as it "follows the old work up to a certain point, but then swerves away from the old" (by keeping the old house as it is and combining it with a new addition in a new language) and "making a reinterpretation of the import of the whole past work by refilling it with a new import" (by making a reinterpretation of the past forms and spaces by adapting them to modern living). Over all, the project exists as a successful example of the adaptive and sensible use of tradition and traditional types; and it demonstrates a healthy combination of the new and the old in contemporary architecture.

Figure 5.21. Entrance from the outside and the inside.[22]

Figure 5.22. Living room and dining room at the ground floor. [23]

[22] Photographs by Christopher Little for Aga Khan Awards for Architecture, Retrieved from ArchNet Digital Library: http://archnet.org/library/sites/one-site.jsp?site_id=111

[23] Photographs by Christopher Little for Aga Khan Awards for Architecture, Retrieved from ArchNet Digital Library: http://archnet.org/library/sites/one-site.jsp?site_id=111

Figure 5.23. Master Bedroom and roof terrace[24]

Figure 5.24. Newly added living room and the dining room (view from the garden) [25]

5.3.2. CASE 2: NAIL CAKIRHAN HOUSE (1971)

Nail Cakirhan House, designed by Nail Cakirhan himself and built in 1971, won the Aga Khan Award for Architecture in the second award cycle in 1983. In the following paragraphs the building will be analyzed in terms of its architect, its reference context, its general characteristics and the use of types.

[24] Photographs by Christopher Little for Aga Khan Awards for Architecture, Retrieved from ArchNet Digital Library: http://archnet.org/library/sites/one-site.jsp?site_id=111

[25] Photographs by Christopher Little for Aga Khan Awards for Architecture, Retrieved from ArchNet Digital Library: http://archnet.org/library/sites/one-site.jsp?site_id=111

5.4.2.1. ARCHITECT OF THE BUILDING: NAIL CAKIRHAN

Nail Cakirhan (born in Ula, Turkey in 1910 - died in Mugla, Turkey in 1988) was a Turkish journalist, poet and master builder/designer. Having never trained as an architect formally, his first career started as a poet and a journalist.

Cakirhan started writing poetry on his high school years. Due to a poem he wrote in those years, which was thought to be containing some political implications, he was taken into custody but later on released. With this same poem he was noticed by the famous Turkish poet Nazim Hikmet, from whom he had seen professional guidance in the following years. After high school, Cakirhan started his university education in Istanbul University School of Medicine, but later dropped it to enter Istanbul University School of Letters. In these same years, he also worked as a journalist in important newspapers and published a poetry book called "1+1" together with Nazim Hikmet. In 1932, he was again taken into custody on charges of setting up a communist organization together with Nazim Hikmet (Cakirhan, 2005, p. 267-288).

Between the years 1932-1933 he remained in prison. Following his release from prison he directly went to the USSR (Union of Soviet Socialist Republics) and took socialist economy classes there for two and a half years at the Moscow University of Eastern Peoples. He married to a Russian girl there and had a child with her. In 1937, due to the approaching World War, the USSR forced the foreign students to turn back to their countries and Cakirhan had to return to Turkey, without having been able to take his son and wife with him. He was able to see his son after 42 years later. After coming to Turkey, he started working as a journalist again. On 1938, he has met the archeology professor Halet Cambel and got married to her. Due to another political allegation because of his journalism, he was sent to prison again and remained there between 1946-1950. After his release, Cakirhan and his wife have traveled to and lived in Italy, French, Sweden and Austria between the years 1950-51 (Cakirhan, 2005, p. 267-288).

Cakirhan became interested in construction in his forties while accompanying his archeologist wife on her field missions. His first constructional work took place in Karatepe, which was an excavation site that his wife was working together with Professor Bossert. He

built an open-air museum, an excavation house and some other buildings in Karatepe. In 1963, he worked as a contractor in the construction of Turkish Historical Society Building in Ankara, which was the Aga Khan Award winning project of the architect Turgut Cansever. After that he again worked as a contractor in the construction of the German High School in Ankara and built another excavation house for the excavation that his wife undertook in colloboration with the University of Chicago in Ergani (Cakirhan, 2005, p. 267-288).

In 1970, after working over a decade as a constructor and supervisor of projects, Cakirhan and his wife moved to Akyaka, in the province of Mugla, on the advice of doctors due to the deteriorating health of Cakirhan. There Cakirhan has saw that the traditional architecture that he remembered and longed for from his childhood in Mugla was deteriorated due to the new reinforced concrete buildings that were spreading throuhout the country. Being upset of this fact, Cakirhan decided to build a house for himself in the traditional way, in accordance with the traditional architecture of the context, without using reinforced concrete (Cakirhan, 2005, p. 267-288).

He first restored his father's vernacular house in Ula, Mugla, which is 30 km. away from his house in Akyaka, with the help of two traditional local carpenters. By learning the arts and crafts, or rather the characteristics and techniques of traditional Ula houses that way, he set out to build an indigenous house to himself in Akyaka. The house that he built for himself combined the traditional architectural features of the context he was in with the contemporary requirements and was integrated with the environment and nature. After that he received offers to do similar houses first from his friends, then from the villagers and other people and tourism businesses there. He realized over 30 projects in that area. His houses has created and shaped the architecture of the small village of Akyaka and made it a touristic attraction today (Cakirhan, 2005, p. 267-288).

Because of the success and sensitivity of these projects, he was nominated to Aga Khan Awards for Architecture by Turgut Cansever and in 1983 he took the Aga Khan Award for his own house when he was 73 years old. Cakirhan's winning the award without being an architect but being a self-educated master builder, has brought discusssions in architectural circles at the time. Nevertheless, with the money he won from the Awards, Cakirhan has

restored the traditional Inn of Mugla as a Culture Center and built several houses, hotels and holiday villages in Mugla region. His award winning house had been opened as a cultural center in 1988. Cakirhan has died in that same year in Mugla due to colon cancer. Some of the buildings of Cakirhan can be as listed follows:

- Nail Cakirhan House, Akyaka (Aga Khan Award for Architecture 1983)
- Minu Inkaya House, Akyaka
- Suheyla-Ihsan Gurgan House, Akyaka
- Melih Cevdet Anday House, Akyaka
- Saniye-Husametting Guneyman House, Akyaka
- Heike-Thomas Toll-Schmitz House, Akyaka
- Unal Pension, Akyaka
- Orkide Pension, Akyaka
- Perili Kosk Sea-side Restaurant, Akyaka
- Yucelen Hotel, Akyaka
- Letoonya Resort Village, Akyaka
- Montana Resort Village, Akyaka

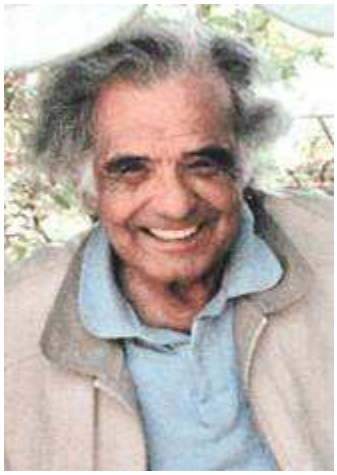

Figure 5.25. Nail Cakirhan (Cakirhan, 2005)

5.4.2.2. THE REFERENCE CONTEXT: GENERAL CHARACTERISTICS AND THE TYPOLOGICAL ANALYSIS OF THE DWELLING TYPES

5.4.2.2.1. GENERAL CHARACTERISTICS OF THE CONTEXT

Nail Cakırhan House in Akyaka gives direct reference to the traditional courtyard houses of the designer's hometown/childhood village of Ula, which is 30 km away from Akyaka. The houses in this part of Mugla province (both in Akyaka and in Ula) show important differences from the houses in Bodrum part due to the cultural, climatic and geological differences. The land is mostly mountainous terrain and the affective climate is Mediterranean marine climate, which is characteristic of its low temperature differences between the night and the day (Aran, 2000, p. 26). The vapor pressure is high in summer and the velocity of wind, which blows from west and southwest, is low. The amount of rainfall depends on the latitude and decreases from north to south. The rainfalls are seen as concentrated in periods of few days in the form of thunderstorms (Aran, 2000, p. 96). The vegetation in the area consists mostly *maquis* shrubs, olive and pine trees.

Ula is a very small town in the province of Mugla that lives on agriculture and stockbreeding. It is on the southern side of the city of Mugla and surrounded by mountains on four sides. It is located in between the gulf of Gokova on the West, town of Marmaris on the south, town of Koycegiz on the east and Mugla city center on the north. Its surface area is 407 m2 and is 600 m's high from the sea level.

Akyaka on the other hand, was a very small seaside village before the settlement of Nail Cakirhan, which basically lived on fishing, agriculture and stockbreeding. It lies on the southwestern coast of the Anatolian peninsula and is located on the valley between the steep rugged mountain of Sakartepe (Kiran) and the valley of Gokova, at the eastern tip of the bay of Gokova (Kerme). It is in midst of a pine forest and overlooks the sea from 150 m away. It has a stunning landscape and a beautiful beach surrounded by pine trees.

After the settlement of Nail Cakirhan in Akyaka in 1970's, the village became a very popular holiday destination and touristic attraction. Now the village basically lives on tourism and reaches to a population of four thousands in the summer time. It is famous with its houses that are built in the model of Cakirhan's house. There is a local physical

development planning law that is active in the region today, which was developed with the help of Cakirhan himself, which necessitates the houses to be built to have the same architectural language with that of Cakirhan's Akyaka/Ula type of houses.

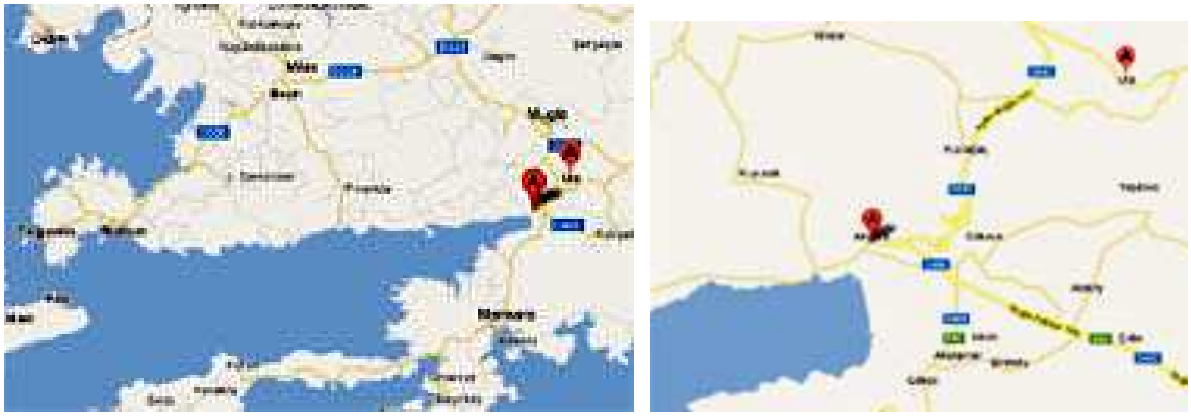

Figure 5.26. Location of Akyaka and Ula in the map.

Figure 5.27. Ula: aerial view[26] (left) and a view from town (right) (Photograph by author)

[26] Image retrieved from Ula Provincial Directorate of National Education website: www.ula.meb.gov.tr

Figure 5.28. Akyaka: aerial view and townscape (bottom)[27]

5.4.2.2.2. DWELLING TYPES

According to the climatic and geographic conditions of the region, the settlements and structures are made to provide effective ventilation, to protect from the intense heat of the summer, and to stand against the rainstorms. The region has a long tradition of highly crafted timber houses. These structures consist of detached, single massed structures with one or two stories, which are generally elevated above their ground floor granaries. They are located within courtyards, as attached to the wall on the northern side of the courtyard, and are well ventilated by way of their sofa that are protected with wide and ornamented projecting eaves (Aran, 2000, 102-104). The courtyards have double leaf doors with inner smaller doors, opening to the street. The sofas in front of the rooms are oriented towards the southeast, generally covered in top but open on the sides and are protected by a trellis in front of them. The main living space of the dwelling, which has one or two rooms and an open or closed sofa, sits on top of the ground floor kitchen, granary and barn, and looks at the courtyard. Except their southwest walls, these dwellings protect themselves with thick, white walls and lock themselves in the courtyard. The window openings are few in number. In the walls of every room, there are at least two and at most four vertically elongated windows that are facing each other in pairs. The exterior facades are made up of thick stone masonry walls plastered with lime mortar. The interiors are made up of wood framed walls filled with

[27] Images retrieved from Akyaka Municipality website: http://www.akyaka.bel.tr/

rubble. The floors of the rooms are covered with wood planks. The roofs are timber framed with tiled ridge-beam/rafters that are sloping to four sides. They are finished with ornamented projecting eaves (Aran, 2000, p. 168). There are basically three types of traditional houses in Ula. Their characteristics, or their schemas, could be summarized as follows[28]:

1. **Type 1:** the oldest type, 180-230 years old.[29]

- One storied
- Single multi-purpose room (approximately 4 m's to 5 m's)
- Large eaves (generally 70-80 cm, rarely 1m and at most 1.2 m's)
- The room/house is set against the courtyard wall
- Southwest facing courtyard
- Ridge-beam/rafter roof
- No windows at the back side (generally)
- A walkway with trellis on the front side (locally called *hayat*) covered with vine
- Entrance doors and windows are on the front side
- A bulging fireplace with two windows or two cupboards on two sides
- No mobile furniture
- Ornamented wooden shelves and wall-cupboards
- A continuous shelf (locally called *serpenc*) running all around and over the windows
- Ornamented and tinted ceiling
- A wall-cupboard with washing facilities inside
- Toilets and kitchen are outside
- Sometimes a granary other than the main room
- High courtyard walls

[28] Classification of types is developed by way of personal observation during the site study and the information attained from the report of Cakirhan himself, in the Aga Khan Khan Award project documents (Cakirhan, 1983).

[29] Information about the ages of the house types attained from the report of Cakirhan himself, in the Aga Khan Khan Award project documents (Cakirhan, 1983).

- Ornamented double winged courtyard door with a smaller inner wing
- White lime washed courtyard and house walls
- Special ornamented chimney

Figure 5.29. Schematic drawings of type 1 house in Ula. Plan (left), rear elevation (middle), side elevation (right) (Drawings by author)

2. **Type 2:** later ones, 130-180 years old.

- One storied
- Two rooms flanking out of a closed small room in between them (locally called *mabeyn*)
- Large eaves (generally 70-80 cm, rarely 1m and at most 1.2 m's)
- The room/house is set against the courtyard wall
- Southwest facing courtyard
- Ridge-beam/rafter roof
- A porch runs all along the front façade (locally called *divanhane* or *haney*) (generally 2 m's, rarely 2.5 m's in width)
- The porch roof is supported by fine ornamented columns and arches.
- A walkway with trellis (locally called *hayat*) covered with vine runs all along the porch or at the side of the porch depending of the entrance to the courtyard.
- A bulging fireplace with two windows or two cupboards on two sides
- No mobile furniture

- Ornamented wooden shelves and wall-cupboards
- A continuous shelf (locally called *serpenc*) running all around and over the windows
- Ornamented and tinted ceiling
- A wall-cupboard with washing facilities inside
- Toilets are outside
- Sometimes a granary other than the main rooms
- High courtyard walls
- Ornamented double winged courtyard door with a smaller inner wing
- White lime washed courtyard and house walls
- Special ornamented chimney

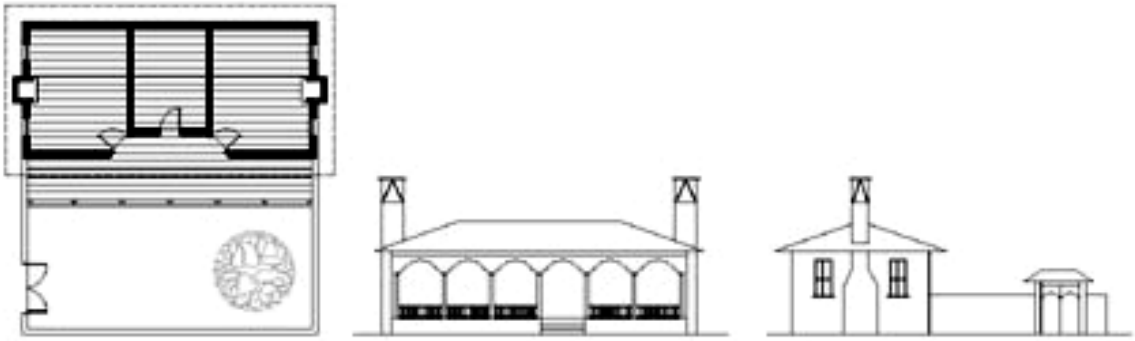

Figure 5.30. Schematic drawings of type 2 house in Ula. Plan (left), front elevation (middle), side elevation (right) (Drawings by author)

3. **Type 3:** the most recent ones, 80-130 years old.

- Two storied
- The ground floor is generally used as the storage, kitchen or the granary
- At the second floor two rooms flanking out of a closed small room in between them (locally called *mabeyn*)
- Southwest facing courtyard
- Ridge-beam/rafter roof

- The access to the second floor is either by a staircase at the outside or at the inside from the *mabeyn*
- A porch runs all along the front façade (locally called *divanhane* or *haney*) (generally 2 m's, rarely 2.5 m's in width)
- The porch or *divanhane* may be turned into a polygonal space (still called as *divanhane*), which is may be either open or closed with a large quantity of windows
- If the porch is open, the porch roof is supported by fine ornamented columns and arches.
- Large eaves (generally 70-80 cm, rarely 1m and at most 1.2 m's)
- The room/house is set against the courtyard wall
- A walkway with trellis (locally called *hayat*) covered with vine runs all along the porch or at the side of the porch depending of the entrance to the courtyard.
- A bulging fireplace with two windows or two cupboards on two sides
- No mobile furniture
- Ornamented wooden shelves and wall-cupboards
- A continuous shelf (locally called *serpenc*) running all around and over the windows
- Ornamented and tinted ceiling
- A wall-cupboard with washing facilities inside
- Toilets are outside
- High courtyard walls
- Ornamented double winged courtyard door with a smaller inner wing
- White lime washed courtyard and house walls
- Special ornamented chimney

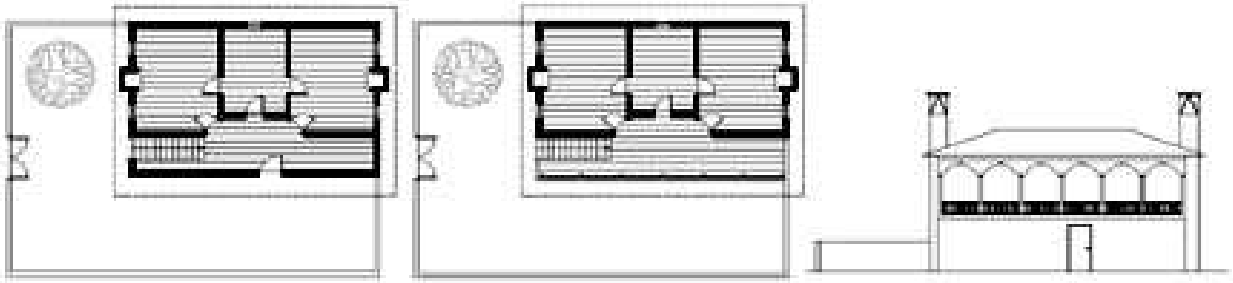

Figure 3.31. House Type 3a. Ground floor plan (left), first floor plan (middle), front elevation (right) (Drawings by author)

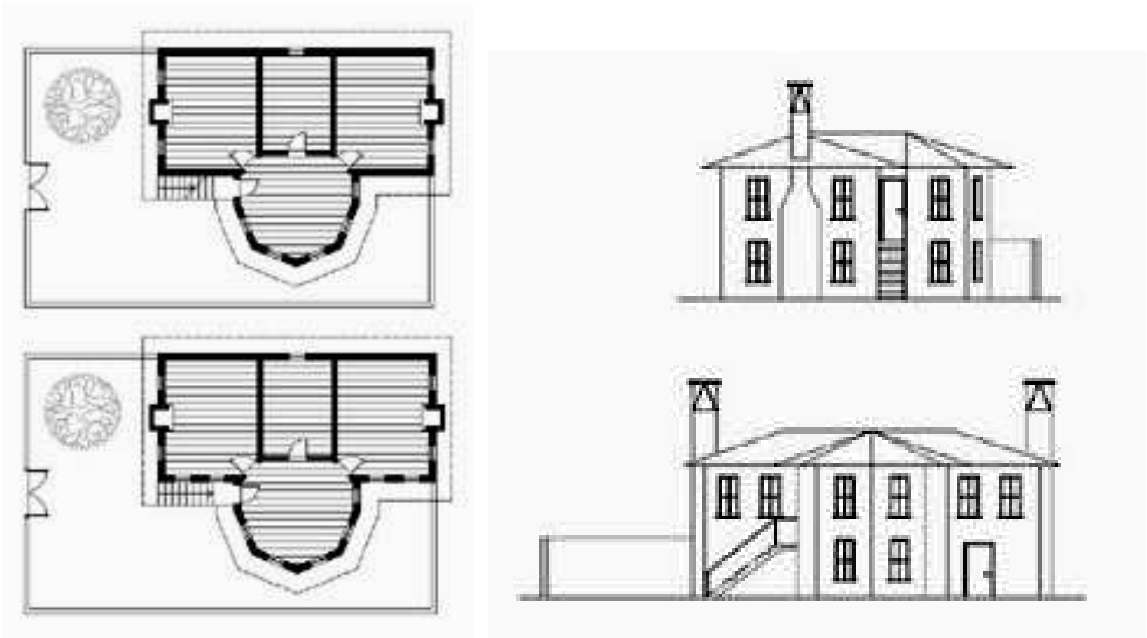

Figure 3.32. House Type 3b. Ground floor plan (upper left), first floor plan (lower left), side elevation (upper right), front elevation (lower right) (Drawings by author)

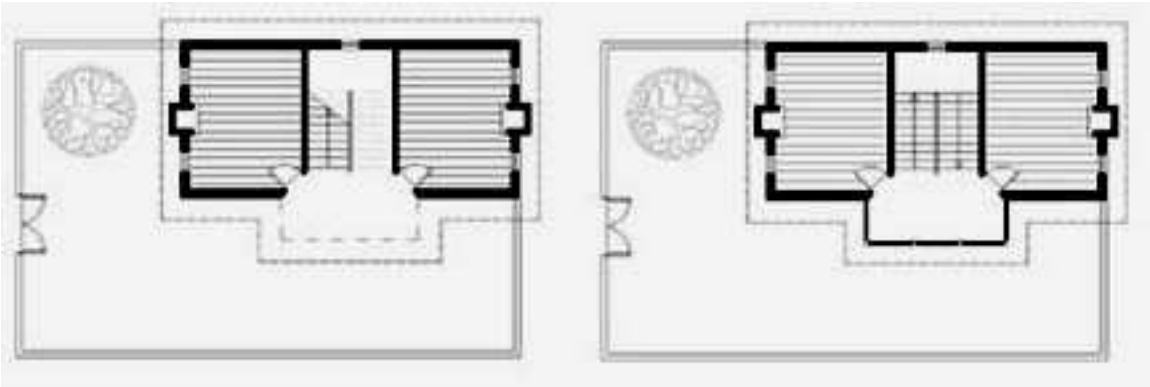

Figure 3.33. House Type 3c. Ground floor plan (left) and first floor plan (right) (Drawings by author)

Figure 3.34. Type 1 (left) and Type 2 houses in Ula (Photographs by author)

Figure 3.35. Type 3 houses in Ula (Photographs by author)

Cakirhan himself states that whatever the size, the type or the age of these dwellings, they all share a main concept that does not change. He summarizes the qualities that form this concept as follows:

- "An intimate, harmonious togetherness, a unison, as it were, with nature, the effort of identification with it, not splitting apart. To be inside and outside simultaneously, embracing nature, but enjoying great privacy at the same time. The lightness, comfort and happiness these houses inspire seem to stem from this symbiosis."
- "In spite of all the intricate - even sophisticated- wood-work, the painstaking care, the ornaments, the tinting, everything is modest, sober, genuine. No false pretensions, no gaudiness. All forms and ornaments matured and filtered through centuries, as though passed through an alembic."
- "These houses seem to be alive, to breathe, as though they had a heart or lungs. The walls, the fire-places, the ceilings, all seem to breathe - never a lack of air, never a feeling of oppression."
- "Each space in these houses is both a piece of the house and also an entity for itself. The rooms are not limited in their use, all functions that are needed can be performed in each of them, they are of multipurpose character: one lives, sits, eats, cooks, sleeps, washes and receives guests in them; beds are made up at night and cleared away in the morning."
- "With their slight walls letting in beams of light, their ceilings, their cupboards and shelves, their doors and windows, their dimensions, their sense of proportions and with everything else that pertains to them, there is nothing in these houses to oppose or contradict you, you never tire of living in them and there is nothing to make you want to break loose, to break out. On the contrary, they fill you with great ease, pleasure and happiness, as they should - for basically every effort in life is directed toward happiness, or at least it should be so." (Cakirhan, 1983)

5.4.2.3. THE BUILDING: GENERAL CHARACTERISTICS AND THE USE OF THE REFERENCE TYPES

Nail Cakirhan Residence was awarded in the second cycle (1981-1983) of the Aga Khan Award for Architecture. The members of the Steering Committee at that cycle were His Highness the Aga Khan, chairman, Professor Mohammed Arkoun, Sherban Cantacuzino, Sir Hugh Casson, Charles Correa, Professor Oleg Grabar, Professor Renata Holod, Hasan Uddin Khan, Professor Dogan Kuban, Mohammed Makiya, KmailKhan Mumtaz, and Professor William Porter. The members of the Master Jury were Dr. Turgut Cansever, Rifat Chadirji, Habib Fida Ali, Professor Mubeccel Kiray, Professor Charles Moore, Professor Parid Wardi bin Sudin, Dr. Ismail Serageldin, Roland Simounet, and James Stirling (Cantacuzino, 1985b).

The Award criteria at that cycle was recognizing projects that demonstrate architectural excellence at all levels; that respond to their social, economic, technical, physical and environmental challenges; that show a catalytic value in the evolution of a new cultural and environmental sensibility, as well as an individual design merit; that use local initiatives and resources creatively; and that meet both the functional and cultural needs of their users and have the potential to stimulate related developments elsewhere in the Muslim world. Along side these, the Award was also considering the context in which the projects were practiced and the processes of design, research and evaluation through which the projects were achieved. The projects that were completed or in use (at least for two years) between 1956 and 1980 were eligible for the Award (Aga Khan Awards for Architecture, 1983b).

Nail Cakirhan House was awarded in that cycle for its “purity and elegance in design and decoration resulting from the direct continuation and reflection of traditional values”. The citation of the jury about the project was as follows:

> “The design goes well beyond the simple reproduction of past models; its ornaments are judicious, sober and genuine. Its extraordinary harmony with nature, and its multi-purpose use and ambience of inner space give it great distinction. This airy and attractive house deserves special attention for its

sensitive revival of craftsmanship and cultural sensitivity as a whole." (Cantacuzino, 1985a)

5.4.2.3.1. GENERAL CHARACTERISTICS

A. IDENTIFICATION:

Project Title	: A traditional weekend house designed by the owner in a sea-side village in Turkey.
Address	: Akyaka, Turkey
Architect/Designer	: Nail Cakirhan, Istanbul, Turkey
Carpenters	: Ali Duru and Cafer Karaca, Mugla, Turkey
Client	: Nail and Halet Cakirhan, Istanbul, Turkey
Completed	: 1971
Type of Use	: private/residential
Total Area	: House (147 m2), caretaker's lodge (48 m2), total built area including eaves (195 m2), and the site area (2,000 m2).

B. SITE

The house is located within the limits of Akyaka village, approximately 500 m away from the cluster of village houses. The site of the house, occupying 2000 m2 land, is on a cliff (approximately 20 m above sea level) overlooking the sea, which is approximately 150 meters to the south. A road at the northern (rear) side of the house connects it with the cluster of village houses. The lot includes tall pine trees and the house is placed within its lower half, as facing toward the south and watching the sea.

C. PROGRAM

The house was designed as a retirement home for Nail Cakirhan and his wife. It was to include two separate areas, one for the Cakirhan's and the other for their guests. The areas would be used for living (themselves), gathering (with friends), and sleeping (themselves and friends). As in traditional Turkish houses, these functions could overlap in the same place or

change according to the time of day. The house was also to include a sheltered outdoor area (to provide additional living space during the warm season), separate bathrooms for Cakirhan's and their guests, a small kitchen and lavatories. Since the Cakirhan's were often away, a small and simple caretaker's lodge was also required in the program.

D. PROJECT OBJECTIVES:

The design objective was to build a "traditional and well-crafted house" in Nail Cakirhan's hometown, which would be "modest, peaceful and reminiscent of his childhood", where he and his wife could rest in their retirement.

E. PROJECT HISTORY:

As Nail Cakirhan states himself, the house does not get its inspiration from the simple architectural tradition of Akyaka village, but refers to his childhood town of Ula, which is a small town with its variety of traditional houses that is 30 km's away from Akyaka. Therefore the project process started with the survey and analysis of the town of Ula. Cakirhan could found only two carpenters in Ula, who were two aged men and the last ones that know the timber house building tradition in the region. He traveled the area together with them and they discussed together in situ what was to be done.

As Cakirhan states the ideas and forms of the house were not formally drawn on paper, but merely sketched and then plotted on the ground as traditional master builders used to work. Cakirhan expresses this process as follows:

> "Programme, project, design built up in the course of time - seeing, feeling, sensing. They are all to be found within the old buildings, the old days, in the mind and in the heart. There has been no architect, no engineer, and no foreman. Thoughts and forms were not put formally on paper but directly onto the ground - like with the old traditional building masters. Work begun by revisiting old streets, old houses, beginning with those of Ali and Cafer usta: rooms, windows, shutters, doors, cupboards, dimensions, forms - all as desired." (Cakirhan, 1983)

The house was built in three stages. First the design was plotted on the site in September 1970. Then foundations, framework, walls and roof were completed in 45 days. Lastly, woodworking and finishing were completed in 24 days in June 1971 and the furnishings were made in 15 days after that (Aga Khan Awards for Architecture, 1983b).

After Cakirhan built his house in Akyaka, it drew very much attention and fondness in the area and in time all the new houses to be built in there started to refer to Cakirhan's house. Even the master development plan of the area was formed under the guidance of Cakirhan after that time, rehabilitating the visual and architectural language of Akyaka by standard rules that directed the new buildings to have their eaves 80-100 cm, windows 70 cm to 120 cm, roofs with special regional chimneys and mission tiles.[30] In that way, Nail Cakırhan House has formed by itself the architectural language of Akyaka.

F. PROJECT DESCRIPTION:

The principal house is located on the lower half of the site and the caretaker's lodge that contains two multi-purpose rooms and services is located next to the entrance, off the main road. A garage and a storeroom were later added nearby. The lot is entered by a large main wooden entrance gate with a semicircular tile-covered superstructure. This gate has double wings and a smaller inner wing on one side, for the daily use of people, as in traditional Ula houses. The house is approached by a 2 m. wide and 50 m. long path that starts at the garden door. The path is built by large local flagstones that were placed directly into the ground without cement. The existing trees were preserved and only new local trees and plants were added. The garden is surrounded on three sides by a traditional masonry wall, which tapers towards the top and is 1.50 m. in height. The southern end of the garden is open to overlook the sea (Aga Khan Awards for Architecture, 1983b).

The southern façade of the house is shielded by an open longitudinal porch, which is called *divanhane* (or *haney*) in the area. It is supported by decorated columns and arches and covered by a wide eave. In summer times, a traditional heightened seat (*ayazlik*) is placed at its western end, where the breeze is strongest. The porch has a carved fence with a double-

[30] Information attained from Akyaka Municipality.

winged door, which connects it to the garden by way of a traditional flight of semicircular steps of local pink stone (Abdulac, 1983).

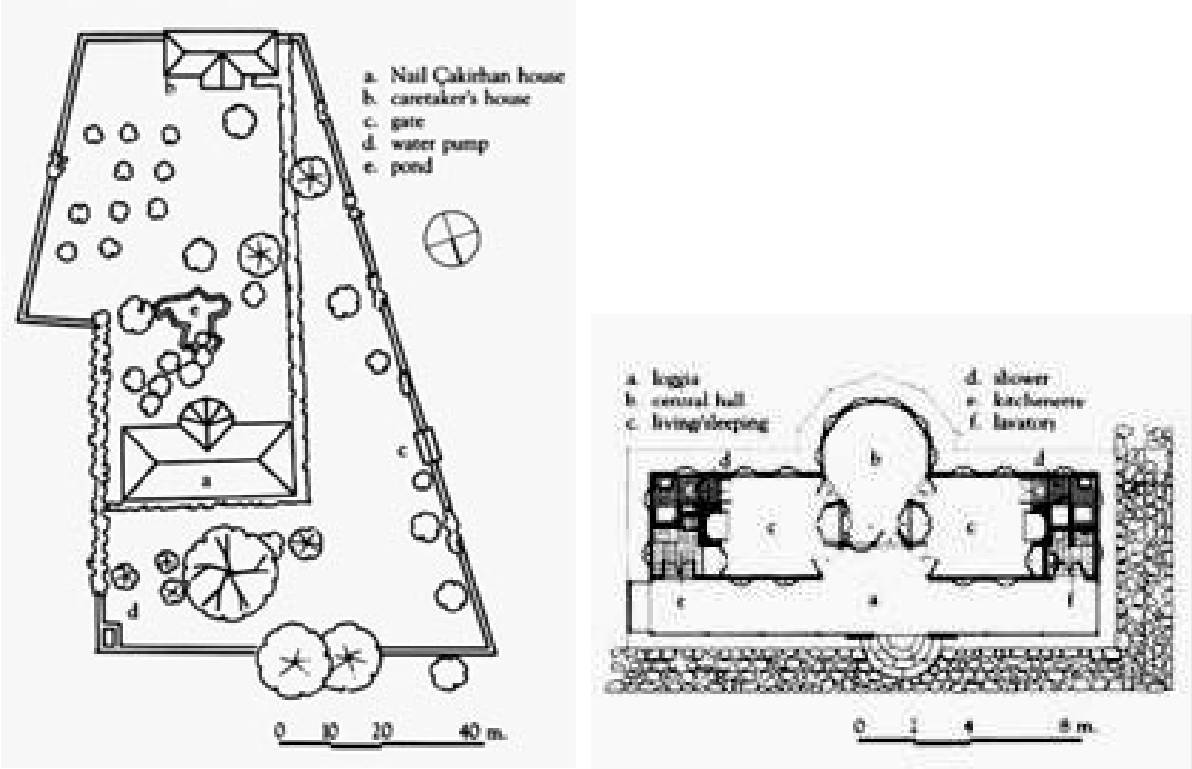

Figure 5.36. Site plan (left) and plan of the house (right) (Abdulac, 1983)

Figure 5.37. Front façade (right) and side façade (left) [31]

[31] Photographs by Samir Abdulac for Aga Khan Awards for Architecture. Retrieved from ArcNet Digital Library website: http://archnet.org/library/sites/one-site.jsp?site_id=236.


Figure 5.38. Front façade (right) and side façade (left) [32]

From the porch (*divanhane*), one enters to the two lateral rooms that are flanking a *mabeyn*. The *mabeyn*, which is the small room that lies in between the rooms in traditional houses, is smaller than the original ones and works a transitionary zone that continues directly into the polygonal central hall, with which it forms a whole. The lateral walls of the mabeyn are in the form of ornamented cupboards of traditional style.

The polygonal central hall is also called as *divanhane* as in traditional houses and is surrounded by six vertical windows with a continuous row of low couches. It exists as the central living and gathering place of the house. The two lateral and identical living/sleeping rooms open up to the porch (outer *divanhane*), as well as to the polygonal central hall (inner *divanhane*) and the *mabeyn*, by way of doors that are cut diagonally across the corners in the old traditional *farisi* way. This arrangement forms the part of the polygon inside, creates a central area on the porch, also allows the door-wings of the lateral rooms to fit into the spaces located at both ends of the cupboards. As Cakirhan himself also mentions, when all doors are opened, the whole house including the porch merge into one single visual and physical unit of space.

[32] Photographs by Samir Abdulac for Aga Khan Awards for Architecture. Retrieved from ArcNet Digital Library website: http://archnet.org/library/sites/one-site.jsp?site_id=236.

Figure 5.39. Interior central hall from inside (left) and from the side room (right) [33]

Figure 5.40. One of the living/sleeping rooms from inside (left) and from the side room (right) [34]

The two lateral rooms each has a fire-place that is flanked by two cupboard doors. One of these doors gives access to the shower room, while the other is used for storing clothing. A kitchenette and a lavatory have been placed on the far ends of the lateral rooms, at either end of the porch, from where they are accessible. The rooms are in traditional multi-purpose spirit of Turkish houses. The beds are only set out at night, leaving the space free for daytime use. The large cupboard opposite the fire-place is used for bedding and extra matresses. The traditional upper shelf (*serpenc*) over the doors and windows continues in all

[33] Photographs by Samir Abdulac for Aga Khan Awards for Architecture. Retrieved from ArcNet Digital Library website: http://archnet.org/library/sites/one-site.jsp?site_id=236.
[34] Photographs by Samir Abdulac for Aga Khan Awards for Architecture. Retrieved from ArcNet Digital Library website: http://archnet.org/library/sites/one-site.jsp?site_id=236.

the rooms and unifies their spaces. There is no mobile furniture in the house, except the tray-stands, bookstands and the braziers. The built in cupboards and shelves present a high level of craftsmanship, as do the windows and the ornamented wooden ceilings.

On the outside, the house is surrounded by wide eaves and covered by a roof that is made of traditional *alaturca* mission tiles. It has chimneys of characteristic local style. There are wooden shutters in all of the windows. The caretaker's lodge, which stands against the garden wall, has also wide eaves and characteristic chimneys. It contains two lateral rooms, an in between space that is turned into a toilet and shower-room, and a porch accessible laterally by two flights of steps. The porch of the caretaker's lodge is also supported by ornamented wooden columns and arches.

As explained in the technical review, the house is thermally insulated by the large air space left beneath the tiled gables of the roof. The hot air is vented through the wooden ceilings. In summer time, the house is protected from the heat by the deep porch and the wide eaves. In winter, the fireplaces are lit and their glowing coals are placed in the brazier in the central hall to heat the entire house.

G. CONSTRUCTION AND STRUCTURAL SYSTEM:

Both the main house and the caretaker's lodge have a traditional timber frame structure with brick infill. The foundations and platform are framed by rubble stonewalls with cement mortar and the raised platform is filled with earth. The roof has simply posts and beams and no truss. The slopes of the roof are formed by wooden planks, which are covered with the round and red *alaturca* tiles of the area. The construction technology was traditional and all materials were locally produced.

H. MATERIALS:

The walls have brick infill and they are covered with lime-plaster and whitewash. The floor is covered by wood planks over a 5 cm. airspace, except in the shower rooms, the kitchenette and the toilet. The ceilings and built-in furniture are also wooden. As mentioned

before, the roof is made out of wood and is covered with the round and red *alaturka* tiles. All the major elements were manufactured on-site and the woodwork was constructed by hand.

5.4.2.3.2. DESIGN OF THE BUILDING AND THE USE OF REFERENCE TYPES

The house was awarded in its cycle because of "its extraordinary harmony with nature, and its multi-purpose use and ambience of inner space". Behind its garden walls and among the trees, it does not reveal itself easily and exists in real harmony with its natural environment. When inside, the house still keeps its relationship with the outside. All the rooms, including the loggia (porch or *divanhane*), blends into a single visual and physical space and as Cakirhan himself states "when inside you feel the way you do in a loggia, in the midst of a flower garden, in the midst of nature".

As Cakirhan states openly, the house takes its inspiration directly from his hometown village Ula. Nevertheless, as the jury also states, it goes much beyond being a "simple reproduction of past models" and displays a respectful interpretation of the traditional Ula houses. It exists as a combination of the house types in Ula with the longitudinal *divanhane* and the polygonal *divanhane*. Cakirhan explains this as follows:

> "This house is the result of direct inspiration from the traditional Ula houses. It is a composition, where the type with the longitudinal porch (*divanhane*) and the one with the polygonal *diyanhane* - are merged." (Cakirhan, 1983)

As in traditional Ula houses, the house contains large eaves, a south facing courtyard, high courtyard walls, ornamented double winged courtyard door with a smaller inner wing, a *divanhane*, a *mabeyn*, a ridge-beam/rafter roof, fine ornamented columns and arches of the porch, fireplaces with cupboards on two sides, built in furniture, ornamented wooden shelves and wall-cupboards, *serpenc* shelves on the walls, ornamented and tinted ceiling, and the characteristic chimney. Just as in the traditional houses, it has intricate and well-crafted ornaments and details. However, unlike the traditional houses, it uses the polygonal *divanhane* form as an extension of the *mabeyn*, reducing the *mabeyn* to a small transition

zone. Moreover, it places the kitchenettes and the toilets at the inside rather than the outside different that the traditional houses.

Figure 5.41. Nail Cakirhan's father's house in Ula. Side view (left) and front view (right) (Photographs by author)

Figure 5.42. A house in Ula (left) and Nail Cakirhan's house (right) (Photographs by author)

As such, the house reevaluates the traditional building techniques, the traditional architectural and ornamental materials of the Turkish house and reconstructs its compact and

multipurpose use of spaces (Aga Khan Awards for Architecture, 1983b). By making such a reuse and interpretation of the traditional house forms and building techniques, it goes beyond the simple reproduction of past forms but combines the traditional Turkish living style with the modern living conditions. As stated in the nomination form, the pure and modest beauty of the design of the house appears in this sense as a direct continuation and reflection of the traditional Turkish behavioral values, but not as the result of an imitation of traditional forms and appearances (Aga Khan Awards for Architecture, 1983b). As Cantacuzino also states, the house succeeds on this basis in reviving the vernacular architecture of the region "not merely at the superficial level of appearances, but by convincingly reintroducing the compact multivalent spatial organization of old Turkish houses" (Cantacuzino, 1985a, p. 159). It also shows the public that the form and construction of such houses continue to make economic sense.

As himself also states, Cakirhan does such a reevaluation of the traditional Turkish house because of his rightful fear and dislike of the modern and monotones concrete architecture sprawling to the country. Seeing them as a "frightening cancerous growth", he chooses "a new spirit in architecture, which is in harmony with the climate, environment, and cultural background of Turkey" (Cantacuzino, 1985a, p. 159). As such he criticizes the unthoughtful imitation of the Western architecture that is not adapted to the needs of the country. Cakirhan himself explains this response to culture as follows:

> "We have a glorious past: a unique cultural heritage, a synthesis of Islamic, Seljuk and Ottoman traditions filtered out, as it were, from within the depths of history. We are as though enthroned upon a unique, rich environment of unparalleled architectural values: monumental caravanserais, khans, bath-houses; renowned unique mosques, small sanctuaries; water-side mansions (*yali's*), lacelike adorning our shores, fine kiosks and large residences (*konak's*), timber-structured houses, large and small, poetic and dream-like as nightingale nests. What else could one ask for? This honeycomb could cater for every single different taste: millions of flavors are there, to be ours. Whether poet, painter, writer, whatever one may be, as artists, as intellectuals

and above all as architects they are there, ready, waiting for us. But no - we turn our backs to it all; we do not even deign to look back. Blocks of concrete, lanes of asphalt are all we think of. Irresponsibility and speculation lurk in the background. At the slightest opposition one is frowned upon as a "reactionary", as being "out of step with our age". A so-called "westernization", which in most cases is not much more than a would-be imitation of the West in its easiest, cheapest, falsest and most vulgar form - which does not even exist in this form in the West - and now spreads all over, from our cities to our towns and in form of cement brick construction even to our villages, like a frightening cancerous growth." (Cakirhan, 1983)

All in all, Nail Cakirhan House exists as a significant contribution to its architectural milieu in terms of its using local materials, providing a low cost of the construction, educating a new generation craftsmen, providing a solution to the architectural problems of its era and creating a new visual sensibility in its region. As such, it also reaches to its stated objectives of design, which were to "build a traditional and well-crafted house" that would be "modest, peaceful and reminiscent of the designer's childhood".

5.4.2.3.3. ASSESSMENT

Nail Cakirhan House demonstrates a significant architectural approach by reviving a lost vernacular approach and adapting it to needs of the contemporary times. In terms of its formal manipulation and use of types, it shows a rather selfless approach and makes a very subtle adaptation of the traditional types. As we have examined in the previous chapters, it uses the traditional type by the process of 'appropriation' (as different from the processes of analogy or innovation), as it applies the traditional type without changing it much from its original state. In terms of Welling's classification of design strategies or gambits that are used in the process of refinement of types, it could be suggested that it makes use of the processes of application and combination, as it "adaptively uses the existing knowledge in its habitual context and creatively adapts the existing conceptual structures to fit normally occurring variations" (Welling, 2007, p. 167) (by slightly adapting the old type in new

situation – for example by using both the polygonal and the longitudinal *divanhane*) and "merges two or more concepts into one new idea". (by making modern adaptations to the old types- for example inner kitchens and toilets) (Welling, 2007, p. 169). In terms of Hubbard's six stratagems (which include swerving, completion, focusing, self-limitation, refilling and becoming the essence), it may be suggested that it makes use of the processes of swerving, as it "follows the old types and slightly swerves away from them". Over all, the project exists as a successful response to the culture it belongs to and appears as a respectful approach to the use of tradition and traditional types.

5.4.3. CASE 3: GUREL SUMMER RESIDENCE (1971)

Gurel Summer Residence, designed by Sedat Gurel himself and built in 1971, won the Aga Khan Award for Architecture in the fourth award cycle in 1989. In the following paragraphs the building will be analyzed in terms of its architect, its reference context, its general characteristics and the use of types.

5.4.2.1. ARCHITECT OF THE BUILDING: SEDAT GUREL

Sedat Gurel (born in Istanbul, Turkey, in 1925– died in Istanbul, Turkey, in 1987) graduated from Istanbul State Academy of Fine Arts in 1950 and traveled in Europe and made professional studies there between 1951-1952. Right after that, in 1953, he became full time faculty in Istanbul Technical University Department of Architecture and remained in this position until his death in 1987. Between 1959-1960 he has worked in the office of I.M.Pei in the USA and participated in researches in Columbia University. In 1961-1962 he participated in courses in Paris Institute of Urbanism (Paris Institute d'Urbanism) and in 1967-71 he has worked as the member and chair of the publication committee of the architecture journal of the Chamber of Architects of Turkey, called '*Mimarlik*'. In 1955-1986 he realized several projects and constructions in Turkey and abroad, published several articles and took several awards. He participated in 22 countrywide architectural competitions and was involved in the realization of four city plans in Turkey. He died in Istanbul in 1987 without seeing that he won the Aga Khan Award in 1989 with his Gurel

Summer House, by which he was nominated before his death. After his death his wife Guzin Gurel has established the Sedat-Guzin Gurel Foundation of Art and Science in 1990, which organizes activities to foster creativity in architecture and music in Turkey (Celik, 2008, p. 69).

In his lifetime, Sedat Gurel did not realize many projects; however the projects he gave life to are sufficient to tell about his architectural approach. Gurel basically tried to search for the 'rational' solution in architecture and his approach was formed on this basis as a reasonable one that emphasized minimalism and simplicity. While he was combining the modernist principles with that of regional values, he was attempting to create a style free architecture that put forward what was 'needed' (Celik, 2008, p. 1-10). Some of the realized projects of Gurel can be listed as follows:

- Gurel Summer Residence, Canakkale
- Penthouse in Cihangir, Istanbul
- Besiktas Shopping Mall, Istanbul
- House in Feneryolu, Istanbul

Figure 5.43. Sedat Gurel (Celik, 2008)

5.4.2.2. THE REFERENCE CONTEXT: GENERAL CHARACTERISTICS AND THE TYPOLOGICAL ANALYSIS OF THE DWELLING TYPES

5.4.2.2.1. GENERAL CHARACTERISTICS OF THE CONTEXT

Gurel Summer Residence is located on the west coast of Turkey, in the vicinity of the village of Dalyan (3-4 km's away from the village center), within the town of Ezine, in the province of the city of Canakkale. The city of Canakkale, as well as the town of Ezine and the village of Dalyan are geographically located in the Marmara Region of Turkey, which is the area that lies on the northern side of the Aegean Sea. In terms of topography, the land is rather plain and has the lowest average height among the geographical regions of Turkey. Mainly dominated with plains, the most important geographical formation of the region is the two straits, respectively Dardanel and Istanbul straits, which connect the Sea of Marmara with the Aegean Sea and the Black Sea. The vegetation mostly consists of *maquis* shrubs in the lower sections and forests in the upper parts, mainly on the mountains. The coastal areas on the Western and Northwestern parts are covered with pine and olive trees.

Marmara Region is a transition zone between the Mediterranean climate (warm), the Black Sea climate (cold) and continental climate, but it is predominantly under the affect of the Mediterranean climate. The weather is pleasantly hot, windy, with little rain in summer and mild in winter (Diba, 1983). The drought of summer is less than the Mediterranean region, due to the affect of the Black sea climate and snow is rarely seen in winter. In summer (July-August), the highest daily temperature is 35° C, decreasing to 24° C at its lowest. In winter the lowest daily temperature is -5° C. In July the highest temperature of the water rises up to 25° C. In winter and in spring, rain falls in large quantities. The main wind blows from the north, but the one from the south and the sea is equally important and strong (Diba, 1983).

The village of Dalyan, which is the vicinity of the Gurel Summer Residence, is a very small village in the Aegean coastline, whose center is a little retracted from the seaside. It faces the island of Bozcaada (the ancient *Tenedos*) and is located in a historically rich area, having in its close vicinity several archaeological areas such as Alexandria-Troas, Assos, and Efes, where the remains of settlements and the ruins of temples, theatres, baths and

necropolises date back to the 4th century B.C (Diba, 1983). It basically lives on agriculture, stockbreeding, fishing and olive oil manufacturing.

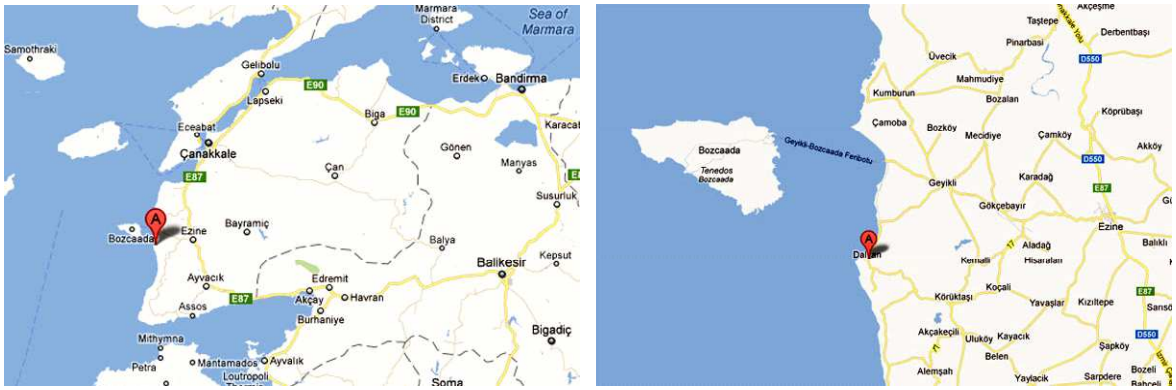

Figure 5.44. Location of the village of Dalyan in the map

Figure 5.45. View of Dalyan village from the sea (left)[35], view from a street of Dalyan village (right) (Photograph by author)

Figure 5.46. Views from the streets of Dalyan village (left and right) (Photographs by author)

[35] Image retrieved from Canakkale Municipality website: http://www.canakkale.bel.tr/

5.4.2.2.2. DWELLING TYPES

The vernacular architecture of Marmara region and Canakkale province carries the similar characteristics with that of the Aegean region. Although many different variations occur, it could conceptually be considered as Mediterranean. The houses are usually white washed, cube-shaped, stone masonry structures, with their flat or sloped timber roofs covered with earth, stone or tiles. The room is still the most important component of the house and the principle of design that could be called as 'cellularity', which refers to "the independence of each room composing the house plan", could be considered as the basic expression (Diba, 1983). The houses are provided with a great deal of inbuilt elements, such as alcoves, cupboards, shelves and niches (Al-Radi, 1994, p. 81-85). All in all, they are in harmony with their natural environment and they are unpretentious with their spontaneity and subordination to human scale. Today most of these characteristics continue to exist in small villages, but contemporary houses are mostly built by using bricks, due to the difficulty of working with stone (Diba, 1983).

Dalyan village, which is the reference context of Gurel Summer Residence, also demonstrate these characteristics. The most characteristic features that form the schema or type of the traditional houses of Dalyan village can be listed as follows:

- Stone or adobe brick masonry structural system (today mostly brick is used rather than these)
- Gable or hipped roof that is made of timber and covered by *alaturka* roof tiles
- Mostly one floor, rarely two floors
- A courtyard encircling the house and the side structures
- A secondary service structure other than the house in the courtyard, which is used as the barn, storage or the granary
- Several other structures in the courtyard, such as the heart (oven) and the toilet, which are scattered loosely around.
- The windows are close to square in shape (usually 1m to 1m in size) and they usually look both to the courtyard and to the street.

- Courtyard walls are not very high and their doors are plain.
- The walls are white lime washed.
- The eaves are formed by special ornamental brick plankings
- The chimneys are characteristic and have a baked clay pottery above them that function as the mouth of the chimney
- Built in furniture in the house

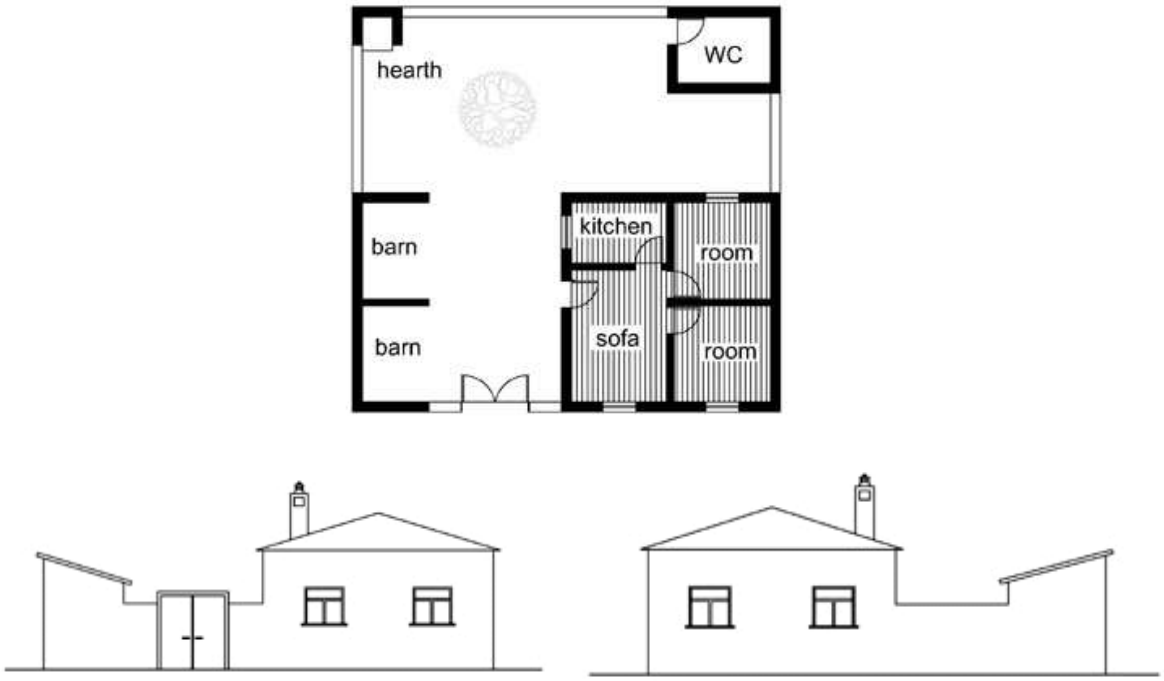

Figure 5.47. Plan of the house within courtyard (top), Entrance façade (left), Side façade on the right of the entrance (right) (Drawings by author)

Figure 5.48. Two houses from Dalyan village (upper left and right), an oven in the courtyard (lower left) and an example of eave decoration (lower right) (Photographs by author)

5.4.2.3. THE BUILDING: GENERAL CHARACTERISTICS AND THE USE OF THE REFERENCE TYPES

Gurel Summer Residence was awarded in the fourth cycle (1987-1989) of the Aga Khan Award for Architecture. The members of the Steering Committee at that cycle were His Highness The Aga Khan, Selma al-Radi, Mohammad Arkoun, Hasan-Uddin Khan, John de Monchaux, Charles Moore, and Ismaïl Serageldin. The members of the Master Jury were Esin Atil, Rasem Badran, Geoffrey Bawa, Charles Correa, Kamran Diba, Oleg Grabar, Saad Eddin Ibrahim, Hasan Poerbo, and William Porter.

The Award criteria at that cycle emphasized a special awareness on conservation and preservation efforts, social and community development and as usual a search for excellence in architecture and architectural quality (Steele, 1994, p. 29). Gurel Summer Residence was awarded in that cycle on the basis of its architectural excellence. It was recognized as “a

work of art in which nature and humanism occupy the first place". The citation of the jury about the project was as follows:

> "Through a sensitive, intelligent and unpretentious approach, this summer residence constitutes an architectural dialogue where landscape and building are of equal importance. The functions of living have been divided into component parts, each of which is self-contained, and both house and garden are positioned with careful thought, on a beautiful site overlooking the Aegean seashore. These principles of juxtaposing spaces, economy of means, and simplicity of local construction can be a model for a range of uses and a variety of places. This residence is indeed a work of an in which nature and humanism occupy the first place." (Aga Khan Awards for Architecture, 1994, p. 36).

5.4.2.3.1. GENERAL CHARACTERISTICS

A. IDENTIFICATION:

Project Title	: Gurel Summer Residence; a complex of holiday houses for a big family
Address	: Dalyan Village Road, no. 67, Ezine, Canakkale, Turkey
Architect/Designer	: Sedat Gurel, Istanbul, Turkey
Craftsman/Carpenters	: Mehmet Toktas, Canakkale, Turkey
Client	: Guzin Gurel, Istanbul, Turkey
Completed	: 1971
Type of Use	: private/residential
Site area	: 1000 m2
Total floor area	:125.5 m2

B. SITE:

The site is situated 3-4 km's away from the Dalyan village, on the outer edge of the developing seaside summer residential area (Aga Khan Awards for Architecture, 1989b). It is

located on the Aegean Coastline, facing Bozcaada Island (Antique *Tenedos*), at a small distance south of the Dardanelles Strait. The site is on a rocky cliff, which steeply slopes down (15m) to the beach and is planted with numerous pine, olive and oak trees. It has two natural terraces looking towards the sea that have big rocks placed among the trees. The rocky slope that is shaded by the trees reaches to a sandy beach, which is 10-15 m's in width. The site lolls against a road on the northeast that leads to the neighboring Dalyan village. The close vicinity of the site is scattered with other summerhouses overlooking the sea, which are also hidden under the dense pine, olive and oak trees (Diba, 1989).

C. PROGRAM:

As stated in the technical review, in order to accommodate the family and friends, the program required the creation of a group of small units on a single plot, in the form of separate spaces, in an attempt to allow the division of daily activities and the preservation of privacy while still enabling socialization in the common spaces. While doing this, particular attention had to be given to the materials and construction methods of the region, so as to build as economically as possible and to form an architecture that was appropriate to the site, the climate and the nature (Diba, 1989). The preservation of nature as far as possible was another important requirement in this sense. At the conception state the house was intended for the usage of 11 people, who would be Sedat and Guzin Gurel (2), Sedat Gurel's parents (2), Guzin Gurel's sister and her family (5), and the guests (2). These requirements brought the conception of several sleeping and living units grouped around different courtyards. Since the climate allowed outdoor living, the small courtyards would be designed as open air living areas (Diba, 1989).

D. PROJECT OBJECTIVES:

The general objective of the project was "to create within a small vacation house a place to bring together the members and friends of the family while allowing them to have privacy and solitude" (Diba, 1989). In more detail, the Gurel's wanted:

- “To benefit from the holiday season by relaxing and studying in a calm, agreeable environment also suitable for entertaining relatives and friends”.
- “To find in nature the right complement to urban life, the psychological complement, the spiritual and mental equilibrium needed for the accomplishment of one's being and personality.”
- “To experience the beauty of the natural site all along the Aegean coast.”
- “To connect with the members of the family in the region.”
- “To be close to the historical and archaeological sites in the region.”
- “To approach the project of building the house in an economical manner”. (Diba, 1989)

E. PROJECT HISTORY:

Gurel Summer Residence was built by the late architect Sedal Gurel for his family and friends. Normally residing in Istanbul, Sedat and Guzin Gurel wanted a vacation house that they can gather the family together, rest and enjoy in a place that have a beautiful climate and nature. Sedat Gurel’s family was originally from Canakkale, therefore the couple had made numerous visits to the area for the past 10 years. They bought the land in 1968 and after that Sedat Gurel studied the region in detail in terms of its climate, ecological characteristics, construction techniques, residential architecture and local materials (Diba, 1989). Following this study, the design of the house was completed in 1969 and the construction began in September of that year. It was completed in July 1971 and the house came into use straight away. Since its realization it was used in summertime by the members and friends of Gurel Family. Since 1986 the house is still used in the summer by Mrs. Gurel, her sister and family, and several friends. Mr. Sedat Gurel's parents being deceased, the room, which had been theirs is now used by close friends of the family (Diba, 1989).

F. PROJECT DESCRIPTION:

The residence is a small housing compound that is formed by seven, small, one-storied, whitewashed units that are traditionally constructed in brick masonry, with timber

ceilings and *alaturca* tile roofs. These units are located linearly on a land of 1000 m2 and are enclosed within a high stone courtyard wall at their back that forms their boundary with the road behind. They are informally arranged along the crest of the rocky site, among the pine, olive and oak trees. Two of the units are for living with their kitchens and four of them are for sleeping with their bathrooms. The seventh unit is a common service unit (for garage and maintenance), which is adjacent to the parking space near the courtyard wall, at the left end of the site. The units are arranged in such a way that there are two open-air courtyards between them that are used as open air living rooms. At the left end of the linear arrangement of the units, near the entrance and the service unit, there is an open space for two cars, which is carefully separated from the living areas in terms of its layout (Diba, 1989).

The units 1 and 2 were designed as the quarters of Sedat and Guzin Gurel. Unit 1 consists of a sleeping area, sanitary facilities, a wardrobe and a private outdoor sitting area, whereas unit 2 is used as the living room that consists of a sitting area, a dining space, a kitchen, a sea-front balcony and a basic open courtyard. Unit 3 is used as the guest room for two people and consists of two superimposed beds, sanitary facilities and a wardrobe. Unit 4 was designed for the late parents of Sedat Gurel and consists of a sleeping area, sanitary facilities and a wardrobe. Since their death, this unit serves also as the guest room. Units 5 and 6 were designed as the quarters of Guzin Gurel's sister and her family of five. Unit 5 consists of four sleeping spaces, sanitary facilities and wardrobes, whereas unit 6 is used as the living room that consists a sitting area, a dining space and kitchen, a front balcony and an open courtyard at the back. Unit seven is the service unit that consists of sanitary facilities, three small spaces for the general maintenance of the residence and for the automobiles.

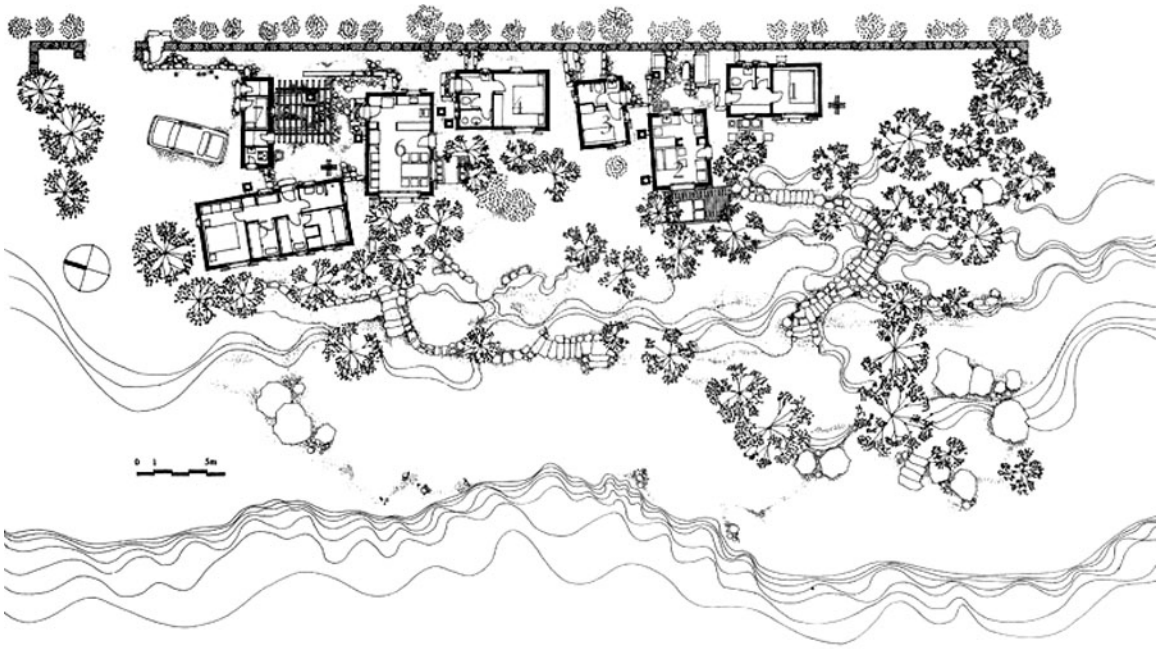

Figure 5.49. Plan of the complex (Al-Radi, 1994)

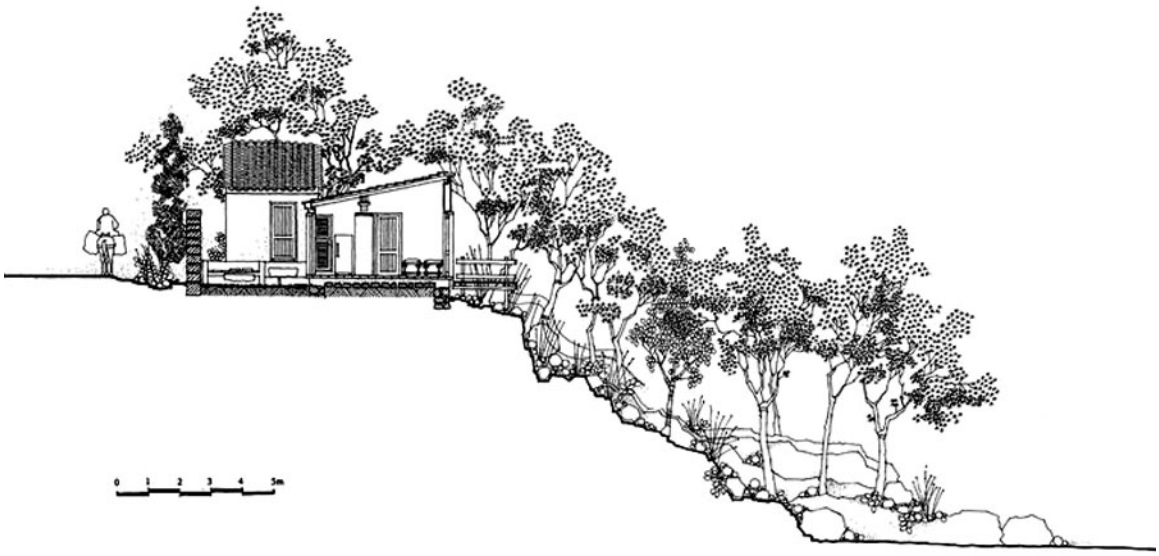

Figure 5.50. Section of the complex (Al-Radi, 1994)

Figure 5.51. An old picture showing the house from the outside (left), view of the units from the car park (right)[36]

Figure 5.52. View of the units from the entrance (left), view of units 4, 5, and 6 from the beach (right) [37]

[36] Photographs by Reha Gunay for Aga Khan Awards for Architecture. Retrieved from ArchNet Digital Library website: http://archnet.org/library/sites/one-site.jsp?site_id=798.
[37] Photographs by Reha Gunay for Aga Khan Awards for Architecture. Retrieved from ArchNet Digital Library website: http://archnet.org/library/sites/one-site.jsp?site_id=798.

Figure 5.53. Courtyard between units 1, 2 and 3; view from unit 1 (left), view from unit 3 (right) [38]

Figure 5.54. Courtyard between units 5, 6 and 7; view from unit 6 (left), view from the courtyard wall (right) [39]

[38] Photographs by Reha Gunay for Aga Khan Awards for Architecture. Retrieved from ArchNet Digital Library website: http://archnet.org/library/sites/one-site.jsp?site_id=798.
[39] Photographs by Reha Gunay for Aga Khan Awards for Architecture. Retrieved from ArchNet Digital Library website: http://archnet.org/library/sites/one-site.jsp?site_id=798.

Figure 5.55. View of units 1 and 2 from the beach (left), view to the beach (right) [40]

Figure 5.56. Interior of unit 2; dining room (left), kitchen (right) [41]

Figure 5.57. Interior of unit 1 (left), inerior of guest room - unit 3 (right) [42]

[40] Photographs by Reha Gunay for Aga Khan Awards for Architecture. Retrieved from ArchNet Digital Library website: http://archnet.org/library/sites/one-site.jsp?site_id=798.
[41] Photographs by Reha Gunay for Aga Khan Awards for Architecture. Retrieved from ArchNet Digital Library website: http://archnet.org/library/sites/one-site.jsp?site_id=798.

These units are designed in groups so as to ensure privacy, functionality and self-sufficiency, although still allowing the flexibility and continuous flow between the spaces. Unit 1 and 2, which are the quarters of Sedat and Guzin Gurel, are placed as a group at the most isolated part of the site and enjoy privacy and independence. They have an outdoor gathering area in front of them facing the sea and they are connected to the beach by a natural stairway. Unit 3, which is the guest room, faces unit 1 and 2 as it is intended for the usage of Mr. and Mrs. Gurel's guests. It acts semi-independently as a group in itself and together with unit 1 and 2 it forms a small courtyard at the back, which acts as a small gathering place for these units with its hearth. Unit 4, which is the parents' room, acts as the heart of the arrangement, since it was considered as the physical and spiritual bond between the units. It has an outdoor gathering area in front of it, which has a natural terrace facing the sea and intended to gather all the occupants of the residence. For the dining activities, this unit uses the facilities of either unit 2 or unit 6. Unit 5 and 6, which are the quarters of the family of Guzin Gurel's sister, form another independent group that enjoys privacy and independence. It has a private open courtyard at its back, which is enclosed from four sides by units 5, 6, 7 and the courtyard wall (Diba, 1989).

Besides the open courtyards and the balconies, the site also offers various different sitting areas and vistas among the trees and the rocks, which are provided with small carpets, cushions and wooden chairs (Diba, 1989). The site is left with its original vegetation of pine, olive and oak trees among the rocks and the footpaths and courtyards are paved with pebbles picked from the beach. The beach is reached via natural stone stairways, which are built into the rocks. The high wall of the courtyard protects the house, delimits and isolates the road behind, and also contributes to the spatial boundaries of the complex by providing an orientation for the circulation between the units and by delimiting the courtyards of each of the various groups (Aga Khan Awards for Architecture, 1989b).

The interior spaces of the units are very modest and in minimum necessary dimensions that regard the human scale. They are decorated with simple and elegant niches

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[42] Photographs by Reha Gunay for Aga Khan Awards for Architecture. Retrieved from ArchNet Digital Library website: http://archnet.org/library/sites/one-site.jsp?site_id=798.

that look as the integral parts of the units and with light furniture (Aga Khan Awards for Architecture, 1989b).

The maintenance costs of the residence are very low. Since it is used mainly in summer, no heating system was installed and if needed fireplaces provide heat to the house. There is no cooling system and the wind blowing from the sea is effectively used in this respect. The maintenance of the structures basically consists of the whitewash paint of the units made once every two years and the paint and varnish of the woodwork made once every seven years (Diba, 1989).

G. CONSTRUCTION AND STRUCTURAL SYSTEM:

A simple traditional construction system was used for the structures, with brick as the loadbearing building material for the walls and wood for the roof. The construction technology was local, simple and appropriate, and it was very well known to the inhabitants and the craftsmen of the region and the nearby village. The major building parts were fabricated on-site, except the woodwork, which was produced at the local carpenter's workshop. The costs were below average for traditional contemporary constructions (Diba, 1989).

H. MATERIALS:

The materials were the simplest and cheapest ones, which were available locally in the area. Foundations were made of locally available stones; walls were made of brick in the traditional way and painted roughly with white lime wash; floors were covered with terra-cotta tiles; ceilings were made of timber; roofs were covered with traditional clay *alaturca* tiles; and windows and doors were made of timber and windows were protected by wooden shutters (Diba, 1989).

5.4.2.3.2. DESIGN OF THE BUILDING AND THE USE OF REFERENCE TYPES

Gurel Summer Residence carries a significant design value in terms of the architectural dialogue it establishes with the natural and the cultural environment of its context. It respects the context of its site and blends into it both naturally and culturally. As stated in the technical review, its main qualities are formed along this line, which could be summarized as its formal simplicity, its authenticity and its great respect to the ecology and the local traditions of the context (Diba, 1989).

The formal, organizational and constructional characteristics of the residence are formed as a result of the observations made by Sedat Gurel during his frequent visits to the region. Before developing his design, Gurel extensively studied the region's (and especially the nearby village’s) geography, climate, traditions, materials and the construction methods (Gurel, 1989).

At the outset, the nature was integrated in the design as an essential element. The natural landscape of the site was totally conserved and the existing characteristics of the site, such as the locations of the rocks and trees, the view of the sea and the sky, and the direction of the wind, dictated the location of the small units and the gathering places in between them (Aga Khan Awards for Architecture, 1989b). Following the profile of the terrain, the units were irregularly inserted between the trees and the rocks and the resulting design captured a diversity of scenic angles from many vantage points. Altogether, the units formed a spatial unity among them and they achieved a perfect harmony with nature by way of their scale, texture, form and color (Al-Radi, 1994, p. 81-85).

Subsequently, the cultural and architectural characteristics of the region were echoed in the complex and the design developed as a successful and contemporary interpretation of the local domestic architectural types, by using traditional forms, construction techniques, planning ideas, details and materials. With the attempt of remaining faithful to the architectural forms of the village nearby, Gurel followed the traditional dwelling schemas and designed the complex in the form of small independent units enclosed within a courtyard wall. Referencing the traditional courtyard houses of the nearby Dalyan village as such, he

designed the complex as a small scale traditional village, allowing the occupants to unite in the open or closed spaces of the complex in the same spirit as in a traditional village (Aga Khan Awards for Architecture, 1989b).

As in traditional houses of Dalyan village, the units of the residence are one storied, surrounded by a courtyard wall that ensures privacy, scattered loosely around the courtyard, have rough rendered and white washed load-bearing walls that are made of brick, sloped roofs that are made of timber and covered by *alaturka* roof tiles, open air hearts in the courtyard, square windows looking in the courtyard, characteristic chimneys with baked clay pottery on top of them, and built in niches and furniture.

Figure 5.58. A house from the village of Dalyan (left) (Photograph by author) and Gurel Summer Residence (right)[43]

As such the residence looks like a "natural extension" of the nearby village and as a part of the texture of the neighborhood (Diba, 1989). Blending into its surrounding this way, it is in perfect harmony both with the cultural and the natural characteristics of its context. As a modern architectural example, it demonstrates a very successful interpretation of the settlement patterns and formal schemas of the region, without the easy imitation of the traditional forms; a conscious utilization of the traditional materials, techniques and

[43] Photograph by Reha Gunay for Aga Khan Awards for Architecture. Retrieved from ArchNet Digital Library website: http://archnet.org/library/sites/one-site.jsp?site_id=798.

craftsmanship; and a respectful creation of the simplicity of the Anatolian dwellings by using contemporary rational solutions (Aga Khan Awards for Architecture, 1989b).

5.4.2.3.3. ASSESSMENT

Gurel Summer Residence exists as a remarkable architectural product by its respectful interpretation of the traditional architectural forms and settlement patterns. In terms of its formal manipulation and use of types, it shows a very subtle adaptation that is far away from direct imitation. As examined in the previous chapters, it uses the traditional type by the process of 'analogy' (as different from the processes of appropriation or innovation), as it applies the traditional type to a new situation by adapting it formally and functionally. In terms of Welling's classification of design strategies or gambits that are used in the process of refinement of types, it could be suggested that it makes use of the processes of analogy and combination, as it "merges two or more concepts into one new idea" (by making modern adaptations to the traditional types- for example inner toilets) (Welling, 2007, p. 169). In terms of Hubbard's six stratagems (which include swerving, completion, focusing, self-limitation, refilling and becoming the essence), it may be suggested that it makes use of the processes of swerving, as it "follows the old types and slightly swerves away from them". Over all, the project demonstrates a sensitive and unpretentious approach, which can be a model for the conscious use of tradition in architectural design.

5.3.4. CASE 4: B2 HOUSE (2001)

B2 House, designed by Han Tumertekin and built in 2001, won the Aga Khan Award for Architecture in the ninth award cycle in 2004. In the following paragraphs the building will be analyzed in terms of its architect, its reference context, its general characteristics and the use of types.

5.4.2.1. ARCHITECT OF THE BUILDING: HAN TUMERTEKIN

Han Tümertekin (born in Istanbul, Turkey in 1958) is a practicing architect based in Istanbul. He took his B.Arch degree from Istanbul Technical University in 1982 and his

M.Arch degree from the University of Istanbul in 1988, with his thesis entitled as “Historic Preservation and Recent Application Examples in Istanbul”. Between 1982-1983, he worked in Paris in the architectural studios of Ahmet Gulgonen, and of Bernstein, Chempetier, Vidal. From 1986 onwards, he works in his own office Mimarlar Tasarim Danismanlik Ltd in Istanbul. His built works include residential, commercial, and institutional projects mainly in Turkey, and also in the Netherlands, Japan, Canada, the United Kingdom, and France. Tumertekin also teaches architecture since 1992. In 1998 he thought architectural design in Uludag University and from 1996 onwards he conducts a design studios in Yildiz Technical University and Bilgi University in Istanbul. In 2005, he worked as a design critic at Harvard Graduate School of Design for a semester and currently, he lectures at universities and cultural institutions throughout the world, most recently at the Technical University of Delft, at the 6th mAAN International Conference in Tokyo "Our Modern - Re-appropriating Asia's Urban Heritage", and in Zagreb at the International Symposium on Architecture "Dani Orisa", as well as at Harvard.

Tumertekin’s works have been widely published in international architectural journals, including *Domus*, *Abitare*, and *AV*, and in the *World Atlas of Contemporary Architecture*. His recent projects were exhibited in the 2006 Venice Biennale and he was awarded the National Architecture Award of Chamber of Architects of Turkey in 1998 and 2000 and received the Tepe Centre Architectural Award in 2000. A monograph of his recent work was published by Harvard University Press in 2006. He received the Aga Khan Award for Architecture in 2004 for his B2 House, in Canakkale, Turkey and became a master jury member of the 2007 cycle of Aga Khan Awards.

Tumertekin’s design understanding could be summarized as a form of “transgression of context”. As stated by Hashim Sarkis in his explanatory text of Tumertekin’s architecture, his works “transgress contextual arguments while maintaining an active interest in the conditions of practice and construction in Turkey”. He treats his project sites incisively, neither celebrating their idiosyncrasies expressionistically nor ignoring them. He first marks the sites and then erases them, and this way he proposes “new contexts by carefully transgressing the original context”. He continues this surgical approach in the interiors as

well and treats most of his buildings as empty shells. The idea of removal or subtraction appears as central to Tumertekin's design approach in this sense and he creates modern yet subtle buildings that mark their sites in this fashion (Sarkis, 2007, p. 8-9). Some of the works of Tumertekin can be listed as follows:

- SM House (2006)
- Aytek House (2004)
- Shibuya Frienship Memorial (2003)
- B2 House (2001)
- Optimum Housing (2000)
- 2000 Istanbul Olympic Games Olympic Site and Sports Facilities (1998)
- Çatalhöyük Museum ve Visitor Center (1998)
- ATK Housing (1998)
- Anadoluhisarı Çital House (1994)
- Kandilli Çital House (1994)
- Taksim Art Gallery (1991)
- Otiyat Holiday Village (1988)
- Umar House (1987)

Figure 5.59. Han Tumertekin[44]

[44]Image retrieved from Aga Khan Award for Architecture website: http://78.136.16.169/members/Han%20Tumertekin.html

5.4.2.2. THE REFERENCE CONTEXT: GENERAL CHARACTERISTICS AND THE TYPOLOGICAL ANALYSIS OF THE DWELLING TYPES

5.4.2.2.1. GENERAL CHARACTERISTICS OF THE CONTEXT

B2 house is located in the Buyukhusun village, within the borders of the town of Ayvacik (13 km's away from it), in the province of the city of Canakkale (83 km's away from it). As the previous house Gurel Summer Residence, it is geographically located in the Marmara Region of Turkey and carries its climatic properties.[45] Predominantly under the affect of the Mediterranean climate, its weather is pleasantly hot, windy, with little rain in summer and mild in winter. In summer (July-August), the highest daily temperature is 35° C, decreasing to 24° C at its lowest. In winter the lowest daily temperature is -5° C. In winter and in spring, rain falls in large quantities. The main wind blows from the north, but the one from the south and the sea is equally important and strong (Al-Hiyari, 2004). The vegetation mostly consists of pine and olive trees.

Buyukhusun village is a very small settlement close to the Aegean Sea, which is located on the foothills of the mountain Ida, facing the island of *Lesbos*. It is not on the seaside, but watches the sea from up high, from a distance. The village is formed by a cluster of stone houses that stretch down the rocky mountainside, housing a tightly knit community of around 450 people (Baker, 2004, p. 105-107). The houses are simple rectangular masses built from the local granite (andezite) and volcanic stone, laid in interlocking layers. The narrow streets of the village are also covered with stone and the houses that face them are adjacent in their courtyard walls, forming strict boundaries. The village people basically live on agriculture, stockbreeding and olive oil manufacturing.

[45] For detailed properties, please refer to the information written on the "General Characteristics of the Context" of Gurel Summer Residence.

Figure 5.60. Location of Buyukhusun village on the map

Figure 5.61. Buyukhusun village from the foot of the hill (left) and the top of the hill (right) (Photographs by author)

Figure 5.62. Street views from Buyukhusun village (Photographs by author)

5.4.2.2.2. DWELLING TYPES

As it is told, in the past, before the First World War, the houses were made by the Albanian stonemasons coming to the region in wintertime. After the war however, they stopped coming to the region, but the types survived their existence and are built even today in their traditional forms. The main building material of houses, which is the andesite stone, is attained directly from the village, which is on top of a rocky hill. The timber used in the houses on the other hand is brought from the Ida Mountains.

The main and most generally used dwelling type in the village is the two-storied house type with its central sofa. But in addition to that, rarely two other types are also seen in the region, which are the house type without the sofa and the house type with the front sofa (Karahan, 1985). The most characteristic features that form the schema or the type of the traditional Buyukhusun house can be listed as follows:

- Stone masonry structural system (Stone is used in its natural state without applying plaster on top of it)
- Gable or hipped roof that is made of timber and covered by *alaturka* roof tiles (before 1950's the roofs were flat and covered with earth)
- Mostly two floors
- The basic unit of the house is the room, which is square shaped and generally 4 to 4 m's or 5 to 5 m's.
- The floors, the beams, rafters, posts, and the staircases inside the house are made out of timber.
- The walls are 70-100 cm's thick in the ground floor and 50-70 cm's thick in the first floor. The thickness difference between the floors is used as a tooth inside, on top of which, respectively the main timber beam, the secondary timber rafters and the wooden floor boards are placed.
- The main timber beam is carried by a timber post, which is located at the center of the rooms. (After 1950's this timber post is no longer used).
- The house is embedded in the slope of the mountainside, looks towards the south.

- Ground floor is used as the barn or the storage, the living space is the first floor
- A courtyard encircling the house and the side structures
- A secondary structure other than the house in the courtyard, which is one storied and used as the space for storage, kitchen, guest house or the room for the old people, who can not climb stairs anymore.
- Several other structures in the courtyard, such as the heart (oven) and the toilet (the toilet could be made as a protrusion out of the courtyard wall to the street).
- Courtyard walls are high and their doors are plain.
- The living floor (first floor) is reached by an open staircase adjacent to the house.
- In the houses with central sofa, the staircase to the second floor is generally from the sofa inside. In the houses without the sofa and with front side sofas, the staircase is at the outside.
- One of the rooms, or all of them, has a hearth/fireplace in it.
- The windows are rectangular in shape and they look mainly towards the south.
- The windows have wide niches on the inside and wooden shutters or grates on the outside.
- The walls are not plastered, they are left as naked stone.
- The eaves are very narrow.
- Built in furniture in the house, such as the continuous shelves in walls of the rooms, diwans and built in cupboards.

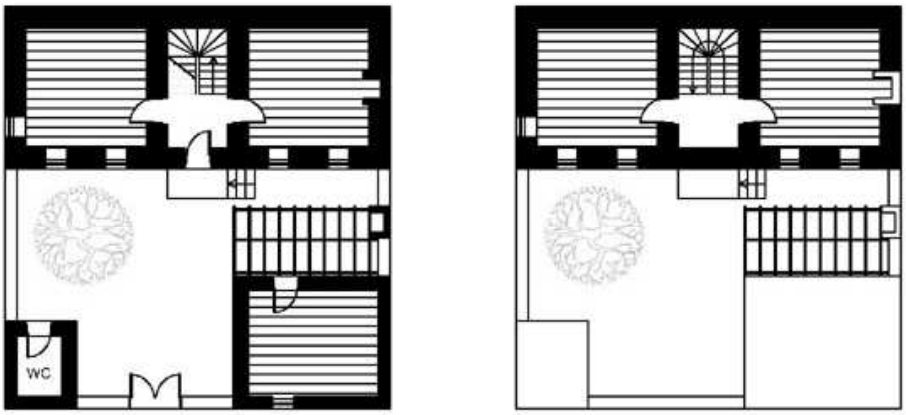

Figure 5.63. House type 1: ground floor plan (left) and first floor plan (right) (Drawings by author)

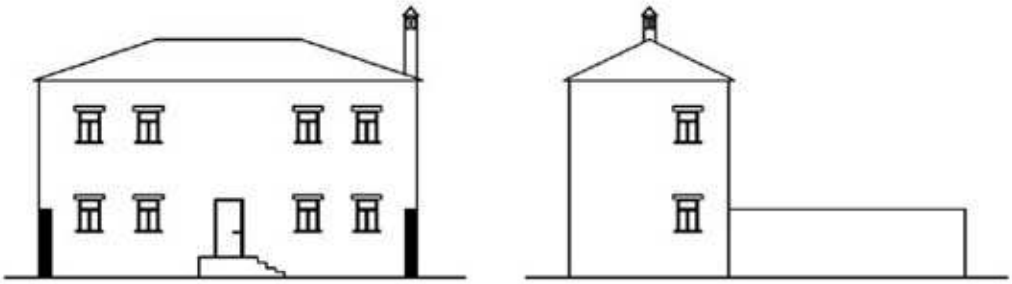

Figure 5.64. House type 1: Front side elevation (left) and left side elevation (right) (Drawings by author)

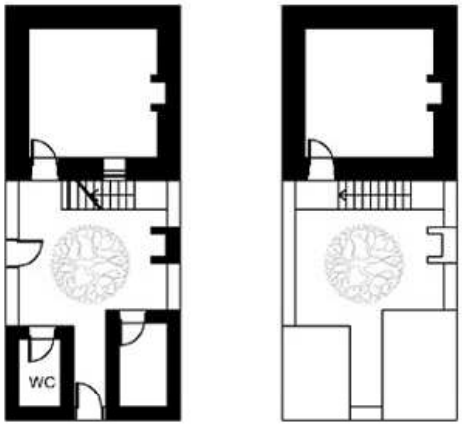

Figure 5.65. House type 2: ground floor plan (left) and first floor plan (right) (Drawings by author)

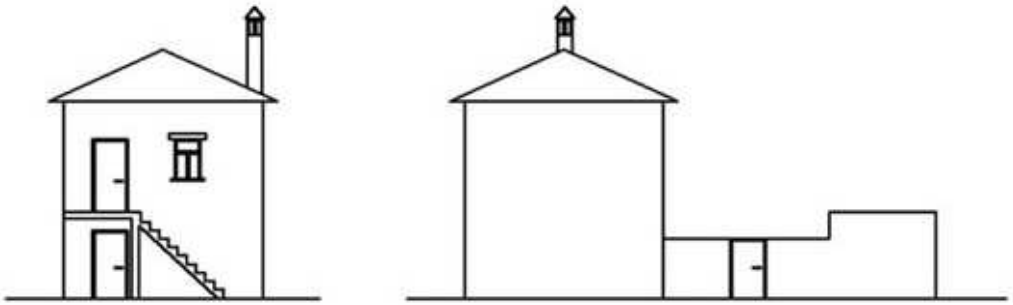

Figure 5.66. House type 2: Front side elevation (left) and left side elevation (right) (Drawings by author)

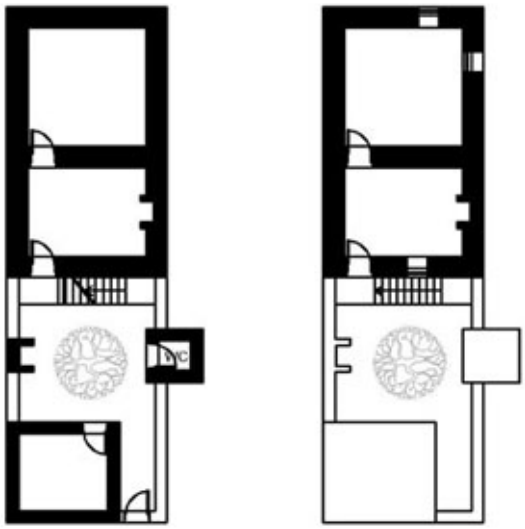

Figure 5.67. House type 3: ground floor plan (left) and first floor plan (right) (Drawings by author)

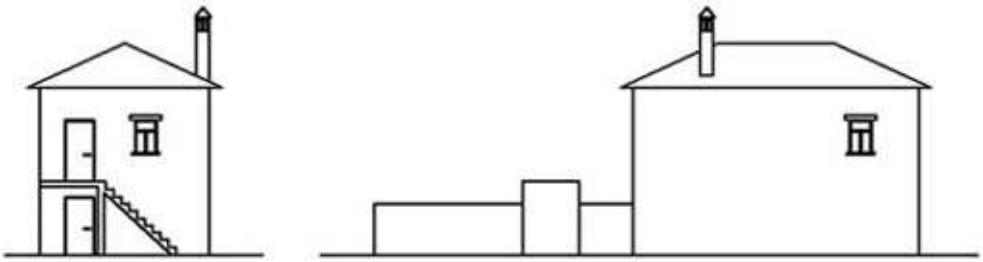

Figure 5.68. House type 3: Front side elevation (left) and right side elevation (right) (Drawings by author)

Figure 5.69. Houses from Buyukhusun (Photographs by author)

5.4.2.3. THE BUILDING: GENERAL CHARACTERISTICS AND THE USE OF THE REFERENCE TYPES

B2 house was awarded in the ninth cycle (2001-2004) of the Aga Khan Award for Architecture. The members of the Steering Committee at that cycle were His Highness the Aga Khan, Chairman, Akram Abu Hamdan, Director General, Charles Correa, Abdou Filali-Ansary, Jacques Herzog, Glenn Lowry, Mohsen Mostafavi, Babar Khan Mumtaz, and Peter Rowe. The members of the Master Jury were Ghada Amer, Hanif Kara, Rahul Mehrotra,

Farshid Moussavi, Modjtaba Sadria, Reinhard Schulze, Elías Torres Tur, Billie Tsien, and Jafar Tukan.

At that cycle, the Award was characterized by "a commitment to pluralism and tolerance, with a focus on recognizing architectural achievements that demonstrate the highest international standards of excellence in building". There was an emphasis on "innovative types of architecture emerging throughout the Muslim world – projects that may be large-scale or modest in scope and that demonstrate new directions for architecture, planning and landscaping both urban and rural contexts". The Award criteria at that cycle were "contributing to established ways of doing things or extending boundaries in the field, making intelligent use of available resources and materials and responding sensitively to the environment, and showing social and ethical responsibility with respect to individual and community self-determination". To be eligible for the awards, the projects must have been completed during the twelve-year period from 1991 and 2002 and in use at least one full year (Baker, 2004, p. 5-6).

B2 house was awarded in that cycle as it "embodies a sense of perfection and well-being. It represents a progressive approach in acknowledging the history of its place, the surrounding houses and landscape, to form a new and unique creation that is, at the same time, an integral part of its community. The house stands apart – beautifully shaped and elegantly dressed – but in the future additional houses may embrace and adopt it, fully integrating it into a wider landscape." The jury gave a citation to the project as it "conveys a maximum amount of dignity, achieved with a minimum of means. It celebrates the act of contemplation, looking towards the distant horizon with openness and clarity. It incorporates a wealth of architectural knowledge but at the same time expresses the individuality of the architect's aspirations. When filled with life and activity, the house becomes a place of special significance and reference in the community, embracing all those whom it welcomes as visitors or passers-by. When empty, it continues to command the respect it so much deserves" (Baker, 2004, p. 105).

5.4.2.3.1. GENERAL CHARACTERISTICS

A. IDENTIFICATION:

Project Title	: A weekend house for two brothers
Address	: Buyukhusun Village, Ayvacik, Turkey
Architect/Designer	: Han Tumertekin
Project Architect	: Eylem Erdinç
Assistant Architects	: Hakan Sengün, Hayriye Sözen and Ahmet Önder.
Consultant	: Gülsün Parlar, Turkey, structural engineer.
Contractor	: Ziya Ildiz, Turkey, Project Coordinator
Craftsman	: Enver Akan, Turkey, master builder.
Client	: Selman and Suha Bilal
Completed	: 2001
Type of Use	: private/residential
Total Area	: Site area: 400m2; Ground floor area: 60 m2, total floor area: 120 m2.

B. SITE:

B2 House is located on the edges of Buyukhusun, just outside the southeast boundary of the village. Lying at the lower southeastern end of the village, it cannot be read as a part of the fabric of the village. The pure rectangular mass of the house sits on an open terraced site, which is 400 square meters in size (Baker, 2004, p. 105-107). Its shape is a triangle, with its apex pointing towards the west and it slopes 7 meters from north to south and 1.3 meters from west to east. The slope differences are solved by terracing. The site offers a beautiful panoramic view of the landscape, extending from east to west, seeing the valleys, mountains and the sea. The village cannot be seen from the site, since a high retaining wall is built at the northern end of the site, which hides the view of the village. The entry of the house is from the small road at the west of the site (Al-Hiyari, 2004).

C. PROGRAM:

The house was designed for two Turkish brothers, Selman and Suha Bilal, as a place of retreat to spend their holidays, away from their busy lives in Istanbul. They wanted the house to be not far away from Istanbul, where they reside, yet to be in an unspoiled area where they could find beauty, tranquility and seclusion (Al-Hiyari, 2004). In this fashion, the most important concern of the owners was to be close to nature and they wanted the house as a place for watching the environment. The other important concern for them was to limit the scale of the house in order to reduce the construction costs "while achieving a simple, practical structure that would not demand much maintenance". Along this line, the programme developed as a very basic one and everything that was included became in the realm of necessity, making the house rather small (Baker, 2004, p. 105-107). The functional requirements included a main living space shared by the owners, one shared bathroom, a kitchenette, two separate bedrooms with private bathrooms, laundry and storage spaces, and outdoor seating areas within a maintenance-free garden (Al-Hiyari, 2004).

D. PROJECT OBJECTIVES:

The objective of the project was to develop "an architectural response to the idea of two contemporary urbanites seeking refuge amidst nature in close proximity to a village". As Han Tumertekin himself explains, the house was thought "as a shelter for two 'nomads', whose relationship to place is transitory, and who seek privacy in the openness of spectacular landscapes" (Al-Hiyari, 2004).

E. PROJECT HISTORY:

Selman and Suha Bilal, who are the co-owners of a major garment manufacturing company in Turkey, wanted to build a weekend house for themselves and approached the architect Han Tumertekin, with whom they already worked with previously in the design of another building for themselves, which is called house B. The project was commissioned in 1999, design was completed on October 1999, the construction was finished on April 2001 and the house was occupied on June 2001.

During the preliminary stages of the design, the owners and the architects were concerned about the reaction of the villagers to the design of the house. However, the villagers, who are quite accepting of newcomers, approached the design quite positively and the design was approved by the village *muhtar* (administrator) before construction. Upon its completion, the house was admired by the villagers and seen as an object of curiosity. Today there are more than 20 houses in the village that belong to outsiders and their presence is seen as a positive influence on the economy and land value of the village (Baker, 2004, p. 105-107).

F. PROJECT DESCRIPTION:

The pure rectangular mass of the house sits on an open terraced site, which drops 7 meters from north to south and 1.3 meters from west to east. On the east-west direction, the site is divided into two flat plateaus (with a difference of 1.3 metres between them), forming a long rectangular terrace, on which the house is placed. On the north-south direction, the 7 meters drop is used to embed the house within, by creating a triangular terrace to the back of the house, which is used as a garden. The house is located at the southern boundary of the site, 2 meters above the public road below, and placed closer to the western edge, making the eastern side of the house larger (Baker, 2004, p. 105-107).

The house is rather small. The ground floor houses a large living room with its kitchenette and the upper floor houses the two bedrooms, which are separated by a double sided closet with sliding doors to the rooms on either side. The two rooms are connected on the southern façade by a continuous balcony. The two floors are connected on the northern side by an external staircase, made of wood and steel, which lies on the upper terrace, 3 meters away from the house, with a deck that connects it to the main structure. The space under this deck is designed as an outdoor living room with its fireplace, bench and semi-external kitchenette. This external staircase makes possible both the maximum and uninterrupted use of the inner spaces by way of keeping their purity and also integrates the users much more into the nature and the surroundings. Being the only link between the

floors, it immerses its users within nature and extends their relationship with it above the level of the detached process of watching the landscape (Baker, 2004, p. 105-107).

The integration with nature and the purity of the interior spaces are also fostered by semi-external spaces that are located within a 1.2 meters deep utility wall, which lines up the north façade and resides in between the two frosted-glass sliding doors opening to the living room and the reed-panel doors that cover the two main openings to the house. These spaces include the bathrooms, a laundry area, storage, a kitchenette and a fireplace that opens onto an outdoor living room sheltered beneath the stair deck (Baker, 2004, p. 105-107).

The mass of the building is formed by a tripartite composition that includes the two 1.2 meters wide structural concrete members and the 3.6 meters wide stonewall that is framed by them. This composition, which is visible on the eastern and western facades of the building, also continues on the roof, echoing the stone walls of the side façades. The resulting structure looks as if a continuous uninterrupted surface of concrete envelops and defines the totality of the mass (Al-Hiyari, 2004).

Windows of the house are placed mainly on the south façade watching a spectacular panoramic view of the landscape. This façade has a system of folding panels that run its entire length and width, which is made of stacked reed with aluminum frames. The northern façade is blind and closed to the dominant northeasterly wind. All the architectural elements of the house have a contemporary simplistic look and the house openly expresses its structure, materials and its construction process. Every material is used as bare and unadorned and this makes the maintenance of the house quite easy and low cost. The only material that needs maintenance is the reed panels of the windows and doors, which must be replaced annually. Overall, the house has a clear modern look (Baker, 2004, p. 105-107).

The garden that is formed by the two terraces is covered randomly by large flat pebbles, among which the flora of the area is allowed to grow. Five fruit trees were planted at visually important points and the garden became an easily maintained and used space, which looks as “a quasi-organized version of the surrounding landscape” (Al-Hiyari, 2004).

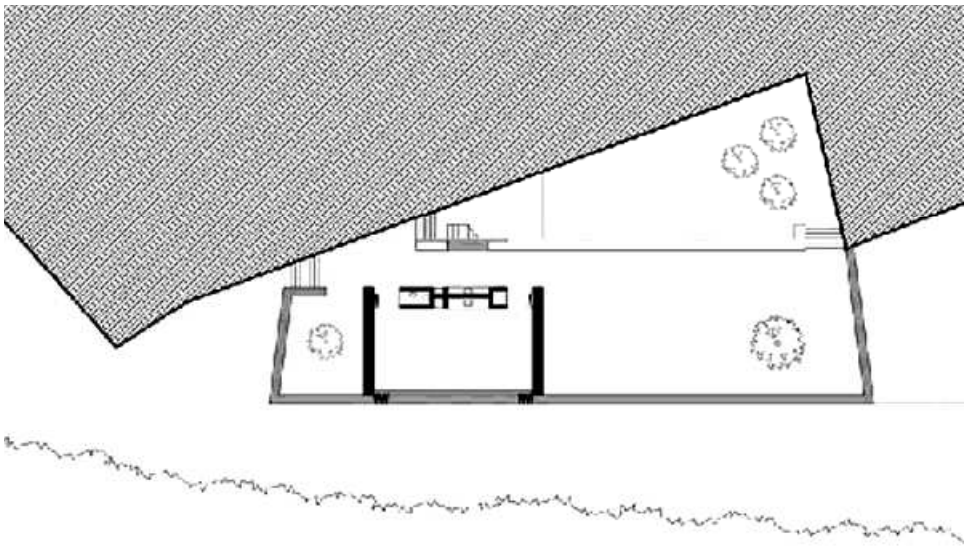

Figure 5.70. Ground floor (Baker, 2004)

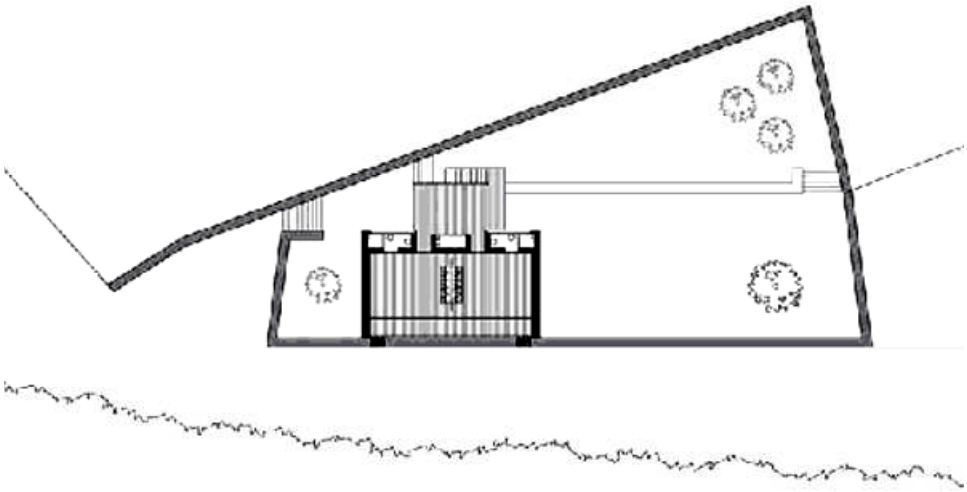

Figure 5.71. First floor (Baker, 2004)

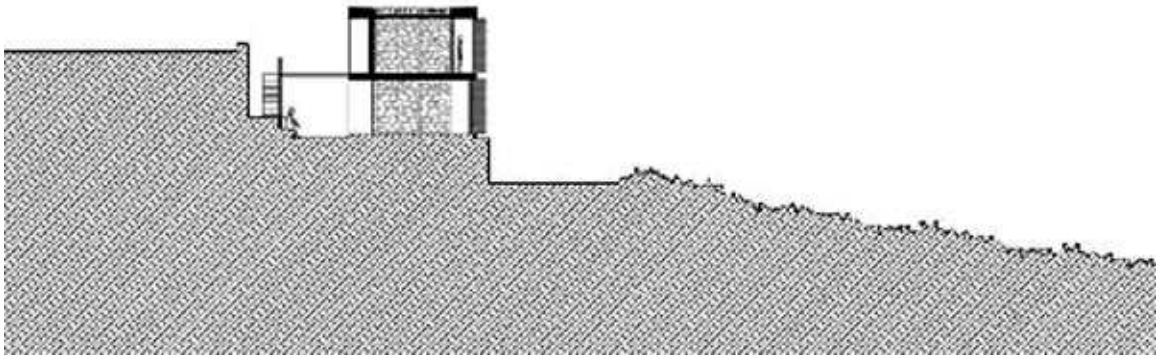

Figure 5.72. Section (Baker, 2004)

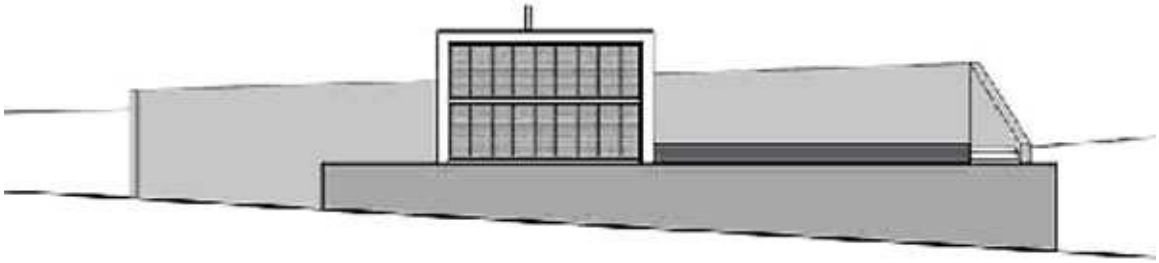

Figure 5.73. Front elevation (Baker, 2004)

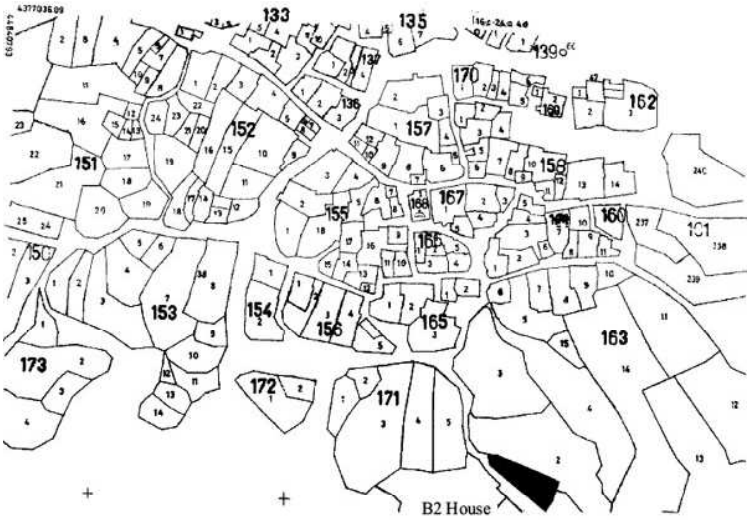

Figure 5.74. The location of B2 house within the village. (Al-Hiyari, 2004)

Figure 5.75. General view of the house within context[46]

Figure 5.76. General view (left) and front view (right) from below[47]

[46] Photograph by Cemal Emden for Aga Khan Awards for Architecture. Retrieved from ArchNet Digital Library website: http://archnet.org/library/sites/one-site.jsp?site_id=8224

Figure 5.77. Front façade: when shutters are open (left) and closed (right) [48]

Figure 5.78. Rear façade[49]

[47] Photographs by Cemal Emden for Aga Khan Awards for Architecture. Retrieved from ArchNet Digital Library website: http://archnet.org/library/sites/one-site.jsp?site_id=8224
[48] Photographs by Cemal Emden for Aga Khan Awards for Architecture. Retrieved from ArchNet Digital Library website: http://archnet.org/library/sites/one-site.jsp?site_id=8224
[49] Photographs by Cemal Emden for Aga Khan Awards for Architecture. Retrieved from ArchNet Digital Library website: http://archnet.org/library/sites/one-site.jsp?site_id=8224

Figure 5.79. Side views: entrance side (left) and north side (right) [50]

Figure 5.80. View from southwest (left), the view of Aegean sea from the house (right) [51]

[50] Photographs by Cemal Emden for Aga Khan Awards for Architecture. Retrieved from ArchNet Digital Library website: http://archnet.org/library/sites/one-site.jsp?site_id=8224

[51] Photographs by Cemal Emden for Aga Khan Awards for Architecture. Retrieved from ArchNet Digital Library website: http://archnet.org/library/sites/one-site.jsp?site_id=8224

Figure 5.81. Living area and kitchen (left) and view from the living area (right) [52]

Figure 5.82. Entry on ground floor (left) and sleeping room on the east side (right) [53]

G. CONSTRUCTION AND STRUCTURAL SYSTEM:

The house has a rather simple structure that was designed with local technology in mind. Since the area is subject to earthquakes, the house was designed as a rigid, monolithic structural box with shear walls that are able to withstand seismic forces. It has four reinforced concrete columns at the corners of the building and a reinforced concrete shear wall on the northern side, which is also the utility wall. Altogether the house rests on a 30-centimetre raft foundation placed on the bedrock below. The slabs are two way flat slabs with no beams.

[52] Photographs by Cemal Emden for Aga Khan Awards for Architecture. Retrieved from ArchNet Digital Library website: http://archnet.org/library/sites/one-site.jsp?site_id=8224

[53] Photographs by Cemal Emden for Aga Khan Awards for Architecture. Retrieved from ArchNet Digital Library website: http://archnet.org/library/sites/one-site.jsp?site_id=8224

There is a single inverted beam that connects the two side columns to the south of the structure to form a continuous frame on the southern façade. The 3.4 meters long stonewalls on the sides are non-load bearing. The house was mainly built by local technology and materials. The architect designed the building consciously so as to be easily constructed by local builders. The building of the concrete structure required heavy supervision, whereas the execution of the stonework required less control (Al-Hiyari, 2004).

H. MATERIALS:

The main materials of the house are concrete and stone. The reinforced concrete structure frames the stone wall, which is stacked in a highly textured organic manner without using cement mortar. Throughout the building, there is a recurring theme where man-made structures frame a natural material, such as concrete framing the stone, or aluminum framing the reed of the shutters (Baker, 2004, p. 105-107).

The house expresses its structure and materials openly without concealing anything. As it is stated by the architect, the flooring of the house is the only example in which one material is used to cover another. The ground floor is covered with terrazzo poured in situ and the upper level is covered with wood. These materials are thought as an extension of the close exterior of each level: the terrazzo was thought as a polished version of the garden and terraces, which are covered with flat pebbles and the wood was thought as an extension of the external stair and wooden deck (Baker, 2004, p. 105-107).

The technology and materials of the house are mainly local. As it is stated, only the glazing system used on the southern façade and for the sliding doors was brought from Istanbul and installed by the manufacturer (Baker, 2004, p. 105-107).

5.4.2.3.2. DESIGN OF THE BUILDING AND THE USE OF REFERENCE TYPES

B2 house is designed as a pure rectangular mass that combines the characteristic elements of the village house type with a clear and simplistic modern architectural language.

Looking modern and distinct from the traditional houses of the village it is in, it still respects and integrates itself with those houses through its use of traditional local materials and building techniques. The local architectural characteristics and materials of the area are merged in its design with contemporary architectural elements with an absolute simplicity (Baker, 2004, p. 105-107). With these qualities, the house is described by its architect Han Tumertekin as a structure that is "locally made but not native to the place" (Tumertekin, 2004).

One of the major characteristics of the design of the house is its relationship with nature. Nature or open space is a key ingredient in the design of the house, which is integrated with domestic features. With the external staircase, which is the only link between the floors; the semi-external service spaces, such as the lavatory or bathrooms, within the utility wall; and the large windows that cover whole of the southern façade, the house lives with nature and open space. Having been designed for the contemplation of nature, it goes beyond the level of just watching it from the window as a view, but living within it (Al-Hiyari, 2004).

Another important characteristic of the design is its 'framing'. There is a recurrent pattern in the design, where manmade structures 'frame' the natural materials: the house framing the landscape, the concrete walls framing the stonewalls, and the aluminum shutter frames framing the reed (Al-Hiyari, 2004). By this way, it could be argued that the house frames the natural and the traditional characteristics within its contemporary architectural language.

The house refers to the architectural qualities of Buyukhusun village in many ways: It uses the local materials of stone and wood, it is oriented towards the south and its windows are placed mainly on the south façade, its north façade is almost blind to resist the northeastern wind, it is shaped according to the local practice of terracing (it is embedded in the slope of the mountainside to deal with the sloping topography), it has an external staircase, its service spaces are in a semi-exterior area, it is of similar scale with that of traditional houses, it is two storied and has two rooms which are in similar dimensions with the rooms of the traditional houses; it adheres to purely essential functions; and its materials,

such as the stones of the walls, are expressed openly and left as bare and unsheathed as in traditional houses.

Of these common characteristics, the most striking feature is the use of stone as an infill material for the sidewalls and the landscaping of the roof. By using stone dominantly as framed by concrete, the house refers to the village and visually integrates itself into its adjacent fabric. As stated in the Technical Review, by using stone, the house attempts “to bridge the architectural gap between itself and the village through the visual continuity of textures, colors and scale”. It creates an ambivalent relationship, where there is a constant flux between association and disassociation and it displays a “clear autonomy” that is “counteracted by its attempt to establish a dialogue with its built surroundings” (Al-Hiyari, 2004).

In contrast to the traditional houses in the village, which are enclosed within courtyard walls to ensure privacy, B2 house has no courtyard or garden walls that define its boundaries, but it is merged into the surrounding landscape and its limits are expanded towards the horizon. It proves its individuality one more time with this difference and it is described as a monument on a pedestal on these terms with its “silent grandeur and noble simplicity”. Overall, the house studies and redefines the traditional architectural notions about property, privacy, domesticity, identity and space with innovative results (Baker, 2004, p. 105-107).

Figure 5.83. A view from Buyukhusun village (left) and B2 house (right) (Photographs by author)

5.4.2.3.3. ASSESSMENT

B2 House possesses a significant architectural value in terms of demonstrating how a contemporary architectural work can exist as distinct but harmonious in a traditional setting. In terms of its reference and use of types, it shows a rather transformative and innovative approach that makes a very subtle reference to the traditional types of the context. As we have examined in the previous chapters, its use of traditional type could be identified by the process of 'innovation' (as different from the processes of analogy or appropriation), since it introduces a novel but still connotative object that responds to the opportunities of new materials and spatial understandings of our era while still allying itself with the traditional types. In terms of Welling's classification of design strategies or gambits that are used in the process of refinement of types, it could be suggested that it makes use of the processes of analogy, combination and abstraction, as it "discovers the applicability of an existing schema to a new situation" (Welling, 2007, p. 168) (by referring to the design and living patterns of the village houses), "merges two or more concepts into one new idea" (Welling, 2007, p. 169) (by integrating traditional references within a contemporary language); and "discovers

any structure, regularity, pattern or organization that is present in a number of different perceptions that can be either physical or mental in nature" (Welling, 2007, p. 169) (by presenting a totally novel architectural piece to the context). In terms of Hubbard's six stratagems (which include swerving, completion, focusing, self-limitation, refilling and becoming the essence), it may be suggested that it makes use of the process of refilling, as it reinterprets the whole past work. Over all, the project creates a very novel yet respectful interpretation of the traditional characteristics and types of the context.

This limited survey demonstrates various architectural experiences where culture, in the form of architectural types, is integrated within architectural design one way or another. By using type as an initial cultural schema and benefiting from its cognitive role both in the perception and the production of their designs, they show us how types could be used creatively in architectural design and that the creative act can benefit from types in reaching towards noble and innovative solutions. By demonstrating the generative role of type within architectural design and presenting the possibilities that could arise out of convention, they show us that the creative act could be an adaptive, transformatory process that values continuity in architecture. This way, they offer, in James Tice's words, "an alternative to the current fascination with novelty as the primary design strategy" (Tice, 1993, 162) and show us that the creative work is not simply playing out of individual drives, desires, efforts, and interpretations, but it takes place in a context of already existing circumstances, which themselves stand upon and control the process (Feldman, Csikszentmihalyi & Gardner, 1994).

CHAPTER 6

CONCLUSION

"To understand the question of type is to understand the nature of the architectural object today. It is a question that cannot be avoided. The architectural object can no longer be considered as a single, isolate event because it is bounded by the world that surrounds it as well as by its history. It extends life to other objects by virtue of its specific architectural condition, thereby establishing a chain of related events in which it is possible to find common formal structures."(Rafael Moneo, 1978, p. 44)

6.1. ARCHITECTURAL TYPE AS A CULTURAL SCHEMA AND ITS COGNTIVE USE IN ARCHITECTURAL DESIGN: THE POSSIBILITY OF CONVENTION

This dissertation has investigated the relationship between the cognitive concept of cultural schemas and the architectural concept of types, and subsequently looked at the cognitive use of types in the course of architectural design. It has argued that architectural types exist and function as cultural schemas in architectural design and on that basis they have a seminal cognitive value in terms of the appearance of creativity in architectural design. By observing architectural types as essential attributes of culture and examining their culturally formed schematic position and cognitive use in architectural design, it has attempted to question 'how we could conceive creativity differently if we consider culture through the use of cultural attributes such as architectural types'. Having such an attempt, the purpose of the investigation developed as to find out the possibility that lie in the use of cultural information in architectural design. Observing the cultural, cognitive and creative aspects of the concept of type on this basis, the study set out to 're-theorize' its position and cognitive use in the course of architectural design. In order to observe and analyze how types were creatively used in architectural design, it conducted a case study on the Aga Khan Award for Architecture winning dwellings in Turkey.

With the purpose as such, the dissertation has basically pondered into the theoretical research on four key areas, which were broadly on 'culture', 'cognition', 'architectural

design and creativity', and 'architectural type'. On this account, in the first theoretical chapter (the second chapter), the dissertation studied the position and use of culture and cultural schemas in cognition. Examining the concept of culture in detail, it analyzed the position of culture in cognition from two different angles, which respectively focused on 'cognition from a cultural perspective' and 'culture from a cognitive perspective'. The theoretical research on this area showed that culture and cognition have a mutual and formative interdependence among themselves, which means that cognition develops under the guidance of the culture that the individual is in, while alternatively culture itself is carried, transferred and expressed via the cognitions of the individuals. Culture is seen on these terms both as an effect and a manifestation of human cognitive abilities and cognition in turn is thought to occur in a cultural context by using the tools offered by culture, such as words, concepts, beliefs or buildings (Sperber & Hirschfield, 199, p. 117). Therefore, culture is accepted as the sum of mental representations, their public expressions and resultant behaviors in certain contexts, which are always in a continuous interaction with each other (Medin, Unsworth & Hirschfield, 2007, p. 618). It is thought to act through the interaction of 'shared cognitive structures and supra-individual cultural phenomena', such as material culture, media messages, or conversation, which trigger those structures to a certain degree (DiMaggio, 1997, p. 264).

The research in this area also showed that the cognitive storage and transfer of culture, as well as all our other forms of knowledge, are realized via our representational structures within our minds, such as our cognitive schemas. It suggested that cultural ideas in the form of 'shared knowledge, ideas, skills and values, which humans acquire and express in the material systems of artifacts and the built environment' (Lawrence-Zuniga, 1997, p. 49), are stored, transferred and reproduced by our cognitive schemas (Johnson, 1987, p. 19), which are the cognitive templates that order both the personal, particular knowledge of the individuals and also the collective cultural knowledge within individuals by storing the common attributes of the group of people who share common values and beliefs. It is stated that neither the personal cognitive schemas of individuals, nor their collective cognitive schemas, which are specifically called as cultural schemas, exist as isolated phenomena

within the individual, but they exist as part of a social-cultural process, which is both public and private (Mcvee, Dunsmore & Gavelek, 2005, p. 532, 533). The cultural schemas specifically, which are the subset of the bigger set of cognitive schemas, are thought to be transmitted to the members of a culture through enculturation, which refers to transfer of knowledge via the interaction with the culture. On this basis, schemas are thought to form the necessary linkage between culture and mental structure, and cultural schemas are specifically found to be the empirical analogues of culture in the mind, although not in a simple sense (Shore, 1996, p. 44).

Along this line, it was shown that culture in the mind is a heterogeneous collection of cultural schemas, which are thought to be formed by the interaction of 'instituted models' and the 'cultural-conventional mental models', referring respectively to the external and public expressions of culture, or in other words material culture, such as buildings, pottery or tools; and the cognitive constructs of culture 'in the mind', such as our cognitive structures. These two components are found to represent the 'culture in ground' and the 'culture in mind', which are always in constant interaction (Shore, 1996, p. 44, 52). Culture in this sense is described as to exist as "a network of interrelated schema" and to live in the interaction between these two models. This view of culture is seen as the best and most beneficial way for describing it, as it gives the opportunity to portray it both as a mental ('in the mind') phenomenon and as a concrete ('in the world') phenomenon.

Therefore, the research revealed that culture is physically expressed via its public expressions (such as the elements of the material culture) while also being cognitively reinforced by them. It acknowledged that the cultural environment signifies the encoding of its cultural schemas while the members of the culture translate from it specific formal cues resulting in appropriate behavior (Lawrence-Zuniga, 1997, p. 49). It stated that the public expressions of culture in the ground, such as architecture, and its mental representations in our minds, such as cognitive cultural schemas, have a constant and formative interaction among themselves, where the mental representations express and form the public expressions of culture (such as designed artifacts) and the public expressions in turn affect and form those mental representations of culture in individual cognitions (Sparke, 2004, p. 4). On these

terms, the interaction of these shared cultural cognitive schemas in our minds is thought to determine our understanding of culture in the ground.

These theoretical findings on the cognitive position and use of culture and cognitive schemas became the basis to evaluate the relationship of cultural schemas with architectural types and to assess the function of architectural types in cognition and creativity. In this framework, with the attempt of providing the theoretical foundation for the understanding of the cognitive use of types in architectural design, in the second theoretical chapter (the third chapter), the dissertation investigated the position and cognitive use of culture, cultural schemas and prior knowledge in creativity and architectural design. Examining respectively the concepts of creativity and architectural design in detail, it looked at the effect of culture and cultural context in creativity and architectural design and focused on the cognitive use of culture, cultural schemas and prior knowledge in these areas. The research demonstrated that the knowledge about the use of cognitive schemas and prior knowledge, as well as the theory of creative cognition, are important subjects that lead to a better understanding of the design process (Oxman, 2001, p. 278).

The research in the area of creativity showed that the creative act involves essentially the ordinary cognitive processes yielding extraordinary products and insights, developed by the creative subject depending on his/her use of conventional cognitive processes (such as application, analogy, combination and abstraction) that are applied to knowledge already stored in memory (Sternberg & Lubart, 1999). Creativity is thought to happen in this context by the coordination of learned or known information into new structures, which are considered both novel and also appropriate to the conditions of the desired solution. What these studies suggest is that creativity always happens over an amount of prior knowledge and that the leap taken over this prior knowledge becomes definitive in terms of the novelty of the new creation.

Similarly, the cognitive research on architectural design also revealed that creativity in architectural design appears as an act of transformation rather than total invention, which is realized through a ‘creative leap’ taken across the gap between the functional design requirements and the formal design structure of a possible new product. The creative act in

architectural design in this sense is not seen essentially as the making of a totally novel, unexpected and 'contrary' proposal, but rather as an act of transformation of the prior knowledge by some tacit methods in various levels and as an act of making of an appropriate proposal, which contains novel features for a new product (Cross, 2006, p. 44). The research portrayed creativity in architectural design as a process of adapting prior knowledge, where what is perceived, what is already known and their relationship determine the course of design. It showed that even the most original or novel products that are recognized as unusually creative have not represented complete break with the past but they have built upon the preceding works.

The research on design cognition explained how this process of creative design takes place cognitively. Trying to explain the subject at first with the results of problem solving research of cognitive science, the researchers have later reached to a conclusion that designing was not a normal 'problem solving' activity, but it was an 'ill-defined' problem solving activity, where the problem is not always clearly defined and the initial conditions, the operations and the goals of the problem are loosely defined and subject to redefinition constantly (Cross, 2001, p. 3). They have found that the set of constraints that exist in design problems is often large and the creation of the solution requires some framing activity for limiting and defining the boundaries of the large solution framework of the design.

For this reason, ill-defined problems of design were seen to require a large base of relevant domain knowledge for their solutions in order to reduce them to a series of sub problems and make them tractable and solvable as well-defined problems (Simon, 1973, p. 181-201). On this basis, it was shown that people/designers rely much on their prior knowledge in design, such as previous exemplars, precedents and types, even when they are told to be as ingenious and creative as possible. The retrieval system that is used to operate on this prior knowledge is thought to work as a tool for the understanding of the problem and the recognition of solution possibilities (Bonnardel & Marmache, 2005, p. 422-435).

Along this line, it was found that the designers employ their domain specific prior knowledge, which is carried in the form of types, prototypes or precedents, as cognitive reference points to initiate design. They are found to use these sources of information, which

are stored cognitively in terms of cognitive/cultural schemas, for recognizing the design situations and for connecting the design problems to their solutions. Since prior knowledge, (in the form of types, prototypes or precedents) offer various solution examples to the designers and provide them the gambits that are developed previously to solve similar problems, the designers are found to employ them as first solution concepts or starting points for their current design problem. It was shown that designers go over the initial foundations offered by this bunch of prior knowledge by way of using various cognitive processes, such as application, analogy, combination or abstraction, which create a refinement over them or a synthesis of various associations. The use of such processes over prior knowledge, types or precedents, is thought to initiate novel design by becoming the starting point of creativity in architectural design (Jansson, Condoor & Brock, 1992).

On the basis of this research, it is accepted today that prior knowledge is an important source of knowledge in creative design and cognitive structures that carry this knowledge, in the form of types or precedents, are found to be active in the appearance of creativity in architectural design. In this sense, the research acknowledges that creativity in design does not occur as 'creation of something out of nothing', but it is thought to originate essentially from something, such as cultural schemas, that of types or precedents (Oxman, 1994, p. 141, 142).

In this framework, in the third theoretical chapter (the fourth chapter), the dissertation investigated in detail the concept of type, its relationship with cultural schemas and its cognitive use in architectural design. Examining firstly the concept of type, its theoretical evolution and kinds, it subsequently looked at its relationship with cultural schemas, its cognitive use in the interpretation and (especially) in the production of the architectural product and its social role in terms of cultural continuity.

Initially, the comparative survey on cognitive-cultural schemas and types demonstrated a correlation that existed between these two notions. The survey showed that same definitions and working rules applied for both of the phenomena and the theoretical studies that examined their nature, use and production all evidenced to this correlation existing in the cognitive level. On the basis of being the abstract mental structures that both

become active in the reception and production of information, type and schema was found to act identically in cognitive terms. Just like a schema, type was described as the mental framework that we use to organize and represent our knowledge stored in memory and defined as an abstract conceptual form and as a cognitive facility, which functions as the context for systemic action based on categorization (Habraken, 1985, p. 40). It was found to control the perception of architectural information by being the preliminary framework of understanding and to influence the creative production by being the initial representation of the design problem. Therefore, the design theoretical research showed that, type exists as a general solution schema, which acts as a source of generic knowledge manipulated in design (Oxman, 1990, p. 2-8). It was found to contain the body of prior knowledge that allows the designer both to extract a generic schema from specific images and also provide the strategies of using this schema (Oxman, 2001, p. 280).

Underlining type's semblance with cognitive-cultural schemas even more, the studies showed that types gather their meaning and power essentially from being embedded in culture (Robinson, 1989, p. 256). It was shown that, just like the cultural schemas, types both carry the seeds of culture within themselves, in terms of the mental representations of the architectural culture of the society, and also transfer it to continue their existence through time, by way of its realizations. As the carriers of the seeds of culture, they are thought to appear as blended into different architectural manifestations, communicate meaning to the members of a socio-cultural group, disseminated and shared within societies, and internalized in human minds. As such they were seen to exist as parts of the nonlinguistic cultural schemas of a society, by working as the visual image models of the culture they belong to (Shore, 1996, p. 56-65).

Consequently, in terms of their being the abstract prior knowledge structures, which are produced naturally through time by the culture they come from and in terms of their structure, abstractness, double-leveled operation that become both the pattern of action as well as the pattern for action, their formation through categorization and their use in cognitive economy, it was argued in this dissertation that types exist as forms of cognitive schema based on culture.

The second part of the research on type, which was examining its cognitive use in architectural design, was built on top of this framework. Showing that type was an important source of prior knowledge for design, the research demonstrated that types act as the cognitive reference points or the solution schemas in design that initiated it by way of offering the recognition of design situations and the inspiration of design strategies that connect those situations to their solutions. On these terms, the research revealed that type exists as a form of human cognitive attribute that is active both in the interpretation and the production of the architectural artifacts.

In terms of the interpretation and perception of the users, the research showed that type's familiarity produces a context that facilitates the understanding and the usage of the architectural product. In terms of the interpretation and perception of the designer on the other hand, it showed that type facilitates the perception and reception of the design problem by way of acting as the 'natural context of architectural experience', where the designer's mind compares and matches the new information into the existing schematic structure of type in order to recognize and understand it with the least information processing effort (Tesar, 1991, p. 166). Used in the preliminary conceptualization of the design problem, type is thought to exist in this sense as the initial frame of reference or the source analog for the problem and to become the ground to position oneself before passing onto the unknown ground of design (Tesar, 1991, p. 168, 174).

Therefore, the research revealed that, in terms of the production or the design of the architectural product, type is used respectively to recognize the design situation, to connect the design problem to the solution, and to provide the gambits that are developed previously to solve these problems (Lawson, 2004, p. 456-457). It is thought to become the first structure, or the abstract structural common denominator, from (or onto) which new designs could be generated through various creative manipulations, such as analogy or metaphor (Tice, 1993, p. 163-164). Its preliminary structure is thought to act as the initial framework where variation and change could later take action and its familiar structure is thought to be 'made strange' in the course of design as to include new relationships and new structures over it.

On this basis, type is thought to exist as the basic mental structure or the 'schema' of thought in architectural design, which acts as the primary 'way to know' that initiates the design process. Likewise a schema, it is thought act as the first key conception, which is adapted, contradicted or transformed towards new and original solutions in the course of design. It is conceived as a preliminary schema, which is either accepted, or elaborated, transformed and completely rejected in the course of design. It is acted on later; it is either destroyed or transformed, but it exists inherently in the beginning of design thinking (Moneo, 1978, p. 23). As Tesar puts it briefly, it acts as the 'garde' to be 'avant' of (Tesar, 1991, p. 169).

On these terms, it was argued in this dissertation that, by enabling the transformation of its known state, type allows for creative production in architectural design and works as a generative conceptual tool that enhances creativity. It exists as a phenomenon onto which the cognitive, cultural and creative aspects of architectural design are intermingled. By intertwining the conventional and innovative aspects of architectural design through its cognitive characteristics, it brings together the interpretation and the production of architectural products over the common ground of culture. In this sense, working with types in design exists as a method that provides for the user, the visual and cultural continuities in the existing contexts; and helps the designer to approach to those contexts with sensitivity by providing a sense of cultural continuity. The value of this intersection is important leaning on the fact that architecture is a public art that shapes the shared human environment (Tesar, 2010, p. 7). It is through this intersection that architecture becomes a public art, which is given the responsibility of forming our built world. Therefore, returning to the hypothesis posed at the beginning of this study, it is now possible to argue that architectural type works cognitively as a cultural schema in the course of design and on this basis it has a seminal value for a contextually and culturally sensitive creativity in architectural design.

In order to observe and exemplify this issue within this framework, the dissertation included a case study in the fifth chapter that is conducted on the Aga Khan Award for Architecture winning dwelling projects in Turkey. This case study was used as the exemplar ground to test the theoretical inferences developed in the previous sections with an aim to

find out the possibility that lie in the use of traditional types in architectural design. Examining firstly the Aga Khan Award for Architecture and its history and mission, the architectural context in Turkey after the 1920's up to the present time, and the traditional "Turkish house", the chapter then analyzed and assessed the four award winning dwellings, which are respectively Ertegun House (1973) and Nail Cakirhan House (1971) in the province of the city of Mugla, and Gurel Summer Residence (1971) and B2 House (2001) in the province of the city of Canakkale.

These cases offered a viable ground to observe the use of types in creative architectural design, as they were selected to win the Award on the basis of possessing a sensitivity for the development of an innovative yet culturally sensitive architectural response, which communicated with the existing cultural substance while contributing to it. They were reflecting this sensitivity by way of having a respectful attitude to the familiarity provided by the local architectural types and by communicating with them one way or another in developing their architectural responses. On this basis, they offered good source of investigation in terms of observing how types were used creatively and how they were manipulated in the course of creative design.

The cases were studied both as examples of different design methods and also as physical demonstrations that completed all their phases. The connections that were devised from the theoretical study were observed and exemplified through their documented work and typological analyses. The collected contextual, archival and on site information about them and the evaluation criteria of the Awards to assess the projects, their archival material, and reports about them were used in their analysis and assessment. On this basis, the buildings were analyzed morphologically, so as to reveal their formal and spatial characteristics, and typologically so as to reveal the remnants of the traditional types that were used in their design and how they were used, manipulated or transformed in design. In this framework, the analysis of cases included respectively for each case, the study of the architects of the buildings, the physical context of the buildings and the dwelling types of the region, the general characteristics of the buildings (including the project identification, information about the site, the program, the project objectives, project history, project

description, construction and structural system, and materials) and the typological analysis and assessment of the use of the reference types in their design.

The analysis demonstrated four different architectural responses where culture, in the form of architectural types, was integrated respectfully and creatively within architectural design. It revealed the design strategies, or the gambits, by which the architects manipulated the traditional types of the context. The first case of Ertegun House (1973) showed how successfully the new could be integrated with the old, by making an imaginative preservation of a 100-year-old traditional Bodrum house and by designing a linear addition at its back in a modern but respectful language. It displayed an example of how new structures could be creativity yet sensitively added to the old context without making direct imitation.

The second case of Nail Cakirhan House (1971) demonstrated how a lost vernacular type could be revived and adapted to the needs of the contemporary times, by still keeping a delicate and careful craftsmanship. Going beyond the simple reproduction of the traditional dwelling types of the region, it displayed a rather selfless approach by making a very restrained manipulation and adaptation over the traditional types and demonstrated a direct continuation of the traditional values within their cultural context.

The third case of Gurel Summer Residence (1971) displayed a rather remarkable approach, where an architectural dialogue was constituted both with the nature and the culture of its context. It was seen to regard the natural characteristics of the site as an important figure and to build the units of the complex in harmony with it as if the units were a natural extension of the site. In terms of its formal manipulation and use of types, it showed a very refined adaptation that is far away from direct imitation. By making direct reference to the settlement patterns of the region in an undeniably modern language and by using local construction techniques and materials, it made a rather respectful interpretation of the traditional architectural types and on this basis it came out as a model where the traditional type is successfully adapted to a contemporary situation both in terms of the formal and the functional characteristics.

The fourth case of B2 House (2001) demonstrated how a contemporary architectural work could exist as distinct but harmonious in a traditional setting. In terms of its reference

and use of types, it showed a rather transformative and innovative approach that made a very slight reference to the traditional types of the context. Existing as a new and unique creation, it was still seen to acknowledge the traditional setting and the landscape it is in, being read as an integral part of it. On this basis, it showed how to respond to the opportunities of the new materials and spatial understandings of our era while still allying itself with the traditional types.

Consequently, by theoretically examining the position and cognitive use of types in architectural design and by analyzing and exemplifying four different architectural approaches that show us how types could be used creatively in architectural design, this dissertation suggested that that types have a generative value in architectural design and that the creative act can benefit from them in reaching towards noble and innovative solutions that value continuity in architecture. By demonstrating the value of types for creative production, the findings identified in this study attempted to contribute to the field by developing the critical perspectives about the nature of architectural design and by broadening the view on creativity in architectural design and education as to acknowledge the value of prior knowledge and cultural information therein.

6.2. LIMITATIONS OF THE RESEARCH

Several limitations need to be acknowledged regarding this study. Since the research strategy of the study was logical argumentation backed up by case study research, one major limitation was the lack of quantitative data. As the research did not depend on solid empirical evidence, it was not totally testable and empirically evident and the causality of the study was multifaceted and complex. Similarly, the interpretations of the theoretical data were personal and depended on personal emplotment. On this basis, the measure of the accuracy of the theoretical part was flexible and tested only with the critical evaluation made through the case study (Groat & Wang, 2002, p. 334-335). Moreover, since the case study was small in its sample size, the study was limited in its representativeness (Groat & Wang, 2002, p. 341-360). These limitations could be overcome by using other research strategies different than logical argumentation and case study research.

6.3. FUTURE RESEARCH DIRECTIONS

This research could be the basis for the future research about the cognitive use of types and precedents in architectural education. Although this topic has been briefly touched upon theoretically in the third chapter, it could be further investigated as to detect the benefits (or detriments) of using types and precedents empirically in the studio settings or as to develop the materials or techniques to include them within the educational curriculum.

As mentioned in the third chapter, recent theoretical studies suggested that students could become more successful in producing creative designs when they are supported with databases that consist of inter domain or intra domain sources and mentally cued by resources of previous designs, which are showing the design elements and how they are combined (Malhotraa, Thomas, Carroll & Millera, 1980, p. 119-140). They proposed that the design education should foster the design thinking skills of students by way of guiding the students in developing their ability of finding the relevant domain knowledge and developing techniques of using and processing it in design. In this line, they suggested that design education should consist of the knowledge of the cognitive structures (such as cognitive schemas or types) and cognitive strategies to use them (Oxman, 2001, p. 280).

Along this line, the future research could work on the improvement of the educational techniques to be used in design studios so as to methodologically develop the system to allow for the student to acquire the domain knowledge of design (in terms of the cognitive structures such as types or precedents) and the strategies of design thinking that could be used to manipulate them (such as analogy, refinement or adaptation) (Oxman, 2004, p. 110). This research area could be helpful for the betterment of design education in the schools of architecture.

REFERENCES

Abdulac, S. (1983). Technical review of Nail Cakirhan Residence. Retrieved from Aga Khan Development Network website: http://www.akdn.org/architecture/pdf/0213_Tur.pdf

Aga Khan Award for Architecture. (1980a). Ertegun House. Retrieved from ArchNet Digital Library website: http://archnet.org/library/sites/one-site.jsp?site_id=111.

Aga Khan Award for Architecture. (1989a). Gurel summer residence. Retrieved from ArchNet Digital Library website: http://archnet.org/library/sites/one-site.jsp?site_id=798.

Aga Khan Awards for Architecture. (1980b). Ertegun House Project Documents. Retrieved from Aga Khan Development Network website: http://www.akdn.org/architecture/pdf/0051_Tur.pdf

Aga Khan Awards for Architecture. (1983a). Nail Cakirhan Residence. Retrieved from ArchNet Digital Library website: http://archnet.org/library/sites/one-site.jsp?site_id=236.

Aga Khan Awards for Architecture. (1983b). Nail Cakirhan Residence Project Documents. Retrieved from Aga Khan Development Network website: http://www.akdn.org/architecture/pdf/0213_Tur.pdf

Aga Khan Awards for Architecture. (1983c). Statement of the master jury. In R. Holod & D. Rastorfer (Ed.s). *Architecture and community: building in the islamic world today*, (p. 57). New York: Aperture.

Aga Khan Awards for Architecture. (1989b). Gurel Summer Residence Project Documents. Retrieved from Aga Khan Development Network website: http://www.akdn.org/architecture/pdf/0905_Tur.pdf

Aga Khan Awards for Architecture. (1994). Master jury report. In J. Steele (Ed.), *Architecture for Islamic societies today*, (p. 36). London: Academy Editions.

Aga Khan Awards For Architecture. (1998). 1998 Aga Khan Award For Architecture Report. Retrieved from Aga Khan Development Network website: http://www.akdn.org/architecture.

Aga Khan Awards for Architecture. (2004a). B2 House Project Documents. Retrieved from Aga Khan Development Network website: http://www.akdn.org/architecture/pdf/2763_Tur.pdf

Aga Khan Awards For Architecture. (2004b). B2 house. Retrieved from ArchNet Digital Library website: http://archnet.org/library/sites/one-site.jsp?site_id=8224

Aga Khan Awards For Architecture. (2010). Aga Khan Awards For Architecture 2010 Press Release. Retrieved from Aga Khan Development Network website: http://www.akdn.org/Content/1032Five-Projects-Receive-2010-Aga-Khan-Award-for-Architecture-Oleg-Grabar-Receives-Chairmans-Award.

Aga Khan Development Network. (2007a). Aga Khan Development Network. Retrieved from Aga Khan Development Network website: http://www.akdn.org/

Aga Khan Development Network. (2007b). Aga Khan Award for Architecture. Retrieved from Aga Khan Development Network website: http://www.akdn.org/architecture/

Aga Khan Development Network. (2007c). Aga Khan Trust for Culture. Retrieved from Aga Khan Development Network website: http://www.akdn.org/aktc.asp.

Aga Khan. (2011). In World View website. Retrieved from: http://www.agakhanfilm.org/who_is.asp.

Akin, O. (1986). *Psychology of architectural design*. London: Pion.

Akin, O. (2001). Variants in design cognition. In C. Eastman, W. Newstetter & M. McCracken (Eds.), *Design knowing and learning: Cognition in design education.* Oxford: Elsevier Books.

Akin, O. (2008). Case based instruction strategies in architecture. Retrieved from Carnegie Mellon University Research Showcase website: http://repository.cmu.edu/architecture/28

Akin, O., & Akin, C. (1996). Frames of reference in architectural design: Analyzing the hyperacclamation (a-h-a-!). *Design Studies*, *17*(4), 341-361.

Akin, O., & Lin, C. (1995). Design protocol data and novel design decisions. *Design Studies*, *16*(2), 211-236.

Albert, R. S., & Runce, M. A. (1999). A history of research on creativity. In R. J. Sternberg (Ed.), *Handbook of Creativity.* Cambridge : Cambridge University Press.

Alexander, C. (1979). *The timeless way of building.* New York: Oxford University Press.

Al-Hiyari, S. (2004). Technical review of B2 House. Retrieved from Aga Khan Development Network website: http://www.akdn.org/architecture/pdf/2763_Tur.pdf

Al-Radi, S. (1994). Gurel Summer Residence. In J. Steele (Ed.), *Architecture for the Islamic Societies Today* (pp. 81-85). London: Academy Editions.

Amole, D. (2007). Typological analysis of students' residences. *International Journal of Architectural Research (IJAR), 1*(3), 76-87.

Anderson, J. R. (2000). *Cognitive psychology and its implications*. New York: Worth Publishers.

Anderson, S. (1986). Critical conventionalism in architecture. *Assemblage*, *1*, 7-22.

Appropriation. (2012). In Merriam Webster Online Dictionary. Retrieved from: http://www.merriam-webster.com/dictionary/appropriation.

Aran, K. (2000). *Beyond shelter: Anatolian indigenous buildings*. Ankara: Tepe Architectural Culture Center.

Ardila, A. (2005). Cultural values underlying psychometric cognitive testing. *Neuropsychology Review*, *15*(4), 185- 195.

Argan, G. C. (1996). On the typology of architecture. In K. Nesbitt (Ed.), *Theorizing a New Agenda for Architecture: An Anthology of Architectural Theory 1965-1995* (pp. 240-248). New York: Princeton Architectural Press.

Arnold, M. (1869). *Culture and anarchy*. New York: Macmillan.

Aslanapa, O. (2004). *Osmanlı devri mimarisi*. İstanbul: İnkilap Kitapevi.

Aslanoglu Evyapan, G. (1991). Zaman mekan baglaminda kalicilik. *Arradamento Dekorasyon*, *29*(September), 92.

Assi, E. (2001, December). *Typological analysis of Palestinian traditional court house*. Paper presented at the International congress of UNESCO – ICOMOS , Paris.

Augustinos, M., & Walker, I. (1995). Chapter 3: Social schemas. In *Social cognition: An integrated introduction* (pp. 33-56). California: Sage Publications.

Baker, P. (Ed.). (2004). *Architecture and Polyphony: Building in the Islamic World Today (The Aga Khan Award for Architecture - The Ninth Award Cycle).* London: Thames and Hudson.

Balamir, A., & Erzen, J. (1996). Case study IV: Turkey. In I. Serageldin & J. Steele (Eds.), *Architecture of the contemporary mosque* (pp. 100-103). London: Academy Editions.

Bandini, M. (1984). Typology as a form of convention. *AA Files*, (6), 73-82.

Bartlett, F. C. (1995). *Remembering.* New York: Cambridge University Press.

Bensmaïa, R. (2005). Poststructuralism. In L. Kritzman (Ed.), *The Columbia History of Twentieth-Century French Thought* (pp. 92-93). New York: Columbia University Press.

Berke, D. (1997). Thoughts of the everyday. In S. Harris & D. Berke (Eds.), *Architecture of the everyday.* NY: Princeton Architectural Press.

Bingol, O. (2007). *The concept of type and typology in architecture*. (Unpublished doctoral dissertation, Mimar Sinan Fine Arts University, Istanbul, Turkey).

Bink, M. L. (2000). Cognitive regularities in creative activity. *Review of General Psychology*, *4*(1), 58-60.

Bizios, G. (2003). Building on principles. *Phi Kappa Phi Journal*, *Summer*.

Boden, M. A. (2004). *The creative mind: Myths and mechanisms.* London: Routledge.

Bonnardel, N., & Marmeche, E. (2005). Towards supporting evocation processes in creative design: A cognitive approach. *International Journal of Human Computer Studies*, *63*, 422-435.

Bonta, J. P. (1979). *Architecture and its interpretation.* New York: Rizzoli.

Bozdoğan, S. (1987). *Sedad Eldem: Architect in Turkey.* Singapore: Concept Media.

Bracey, G. W. (1991). Culture and cognition. *The Phi Delta Kappan*, *72*(9), 714.

Brookes A. & Poole, D. (Ed.s). (2004). *Innovation in architecture*. London: Spon Press.

Bruning, R. H., Schraw, G., Norby, M. & Ronning, R. (Eds.). (2004). *Cognitive psychology and instruction.* In Columbus, Ohio: Pearson Merrill Prentice Hall.

Cakirhan, N. (1983). Architect's record of Nail Cakirhan Residence, Aga Khan Award for Architecture Documents. Retrieved from ArchNet Digital Library website: http://archnet.org/library/files/one-file.jsp?file_id=332.

Cakirhan, N. (2005). *Nail Cakirhan: The poetry of traditional architecture - half a century in the art of building.* Istanbul: Ege Yayinlari.

Cansever, T. (1980). Architect's record of Ertegun House, Aga Khan Award for Architecture Documents. Retrieved from ArchNet Digital Library website: http://archnet.org/library/files/one-file.jsp?file_id=202.

Cantacuzino, S. (1985a). Nail Cakirhan House. In S. Cantacuzino (Ed.), *Architecture in continuity: Building in the Islamic world today.* New York: Aperture.

Cantacuzino. S. (Ed.). (1985b). *Architecture in continuity: Building in the Islamic world today*. New York: Aperture.

Carroll, J. M., Thomas, J. C., Miller, A. M., & Friedman, H. P. (1980). Aspects of solution structure in design problem solving. *American Journal of Psychology, 93*(2), 269-284.

Casakin, H., & Goldschmidt, G. (1999). Expertise and the use of visual analogy: Implications for design education. *Design Studies, 20*(2), 153-175.

Cataldi, G. (1998). Designing in stages: Theory and design in the typological concept of the italian school of saverio muratori. In Petruccioli, A. (Eds.), *Typological Process and Design Theory - Proceeding of the international Symposium of AKPIA* (pp. 35-54). Cambridge, MA : MIT Press.

Cave, C. (1997). Synectics (Manuscript). Retrieved from Creativity Web Website: http://members.optusnet.com.au/~charles57/creative/techniques/synectics.htm

Celik, B. C. (Ed.). (2008). *Sedat Gurel: Projects and life.* Istanbul: Sedat Gurel-Guzin Gurel Sanat Ve Bilim Vakfi.

Cerulo, K. (2002). *Culture in mind: Toward a sociology of culture and cognition.* New York: Routledge.

Chan, C. S. (1990). Cognitive processes in architectural design problem solving. *Design Studies, 11*(2), 60-80.

Chen, Z., & Mo, L. (2004). Schema induction in problem solving: A multidimensional analysis. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 30*(3), 583–600.

Chiappe, D., & Macdonald, K. (2005). The evolution of domain general mechanisms in intelligence and learning. *The Journal of General Psychology, 132*(1), 5-40.

Clark, R. H., & Pause, M. (2004). *Precedents in architecture: Analytic diagrams, formative ideas and partis*. John Wiley and Sons.

Cognition. (2012). In Merriam Webster Online Dictionary. Retrieved from: http://www.merriam-webster.com/dictionary/cognition.

Collins, A., & Gentner, D. (1987). How people construct mental models. In D. Holland & N. Quinn (Eds.), *Cultural models of language and thought* (pp. 242-248). Cambridge: Cambridge University Press.

Collins, P. (1971). *Architectural judgment.* Montreal: McGill-Queen's University Press.

Colquhoun, A. (1967). The type and its transformation: Typology and design method arena. In A. Colquhoun (Ed.), *Essays in architectural criticism: Modern architecture and historical change* (pp. 43-50). Cambridge, Massachusetts: MIT Press.

Colquhoun, A. (1996). Typology and Design Method. In K. Nesbitt (Ed.), *Theorizing a New Agenda for Architecture: An Anthology of Architectural Theory 1965-1995* (pp. 248-258). New York: Princeton Architectural Press.

Coyne, R. (1997). Creativity as commonplace. *Design Studies*, *18*, 135-141.

Cross, N. (2001). Design cognition: Results from protocol and other empirical studies of design activity. In C. Eastman, W. Newstetter & M. McCracken (Eds.), *Design knowing and learning: Cognition in design education.* Oxford: Elsevier Books.

Cross, N. (2006). *Designerly ways of knowing.* London: Springer-Verlag.

Cross, N. (2007). Editorial: Forty years of design research. *Design Studies*, *28*.

Cross, N., Christiaans, H. & Dorst, K. (Eds.). (1996). *Analyzing design activity.* Chichester, UK: John Wiley & Sons.

Crotty, M. (1998). *The foundations of social research: Meaning and perspective in the research process.* London: Sage, 66-110.

Crowe, N. (1995). Time and the Evolution of Things. In *Nature and the idea of a man-made world: An investigation into the evolutionary roots of form and order in the built environment*. Cambridge, Mass: MIT Press.

Csikszentmihalyi, M. (1994). The domain of creativity. In D. H. Feldman, M. Csikszentmihalyi & H. Gardner (Eds.), *Changing the world: A framework for the study of creativity.* London: Praeger Publishers.

Csikszentmihalyi, M. (1996). *Creativity: Flow and the psychology of discovery.* NY: Harper Collins Publishers.

Csikszentmihalyi, M. (1999). Implications of a systems perspective. In R. J. Sternberg (Ed.), *Handbook of creativity.* Cambridge: Cambridge University Press.

Culture. (2012). In Merriam Webster Online Dictionary. Retrieved from: http://www.merriam-webster.com/dictionary/culture.

Curtis, W. J. (1996). *Modern architecture since 1900.* London: Phaidon Press.

D'Andrade, R. (1981). The cultural part of cognition . *Cognitive science*, *5*, 179-195.

D'Andrade, R. (1987). A folk model of the mind. In D. Holland & N. Quinn (Eds.), *Cultural models of language and thought* (pp. 112-151). Cambridge: Cambridge University Press.

D'Andrade, R. (1989). Cultural cognition. In M. Posner (Ed.), *The foundation of cognitive science* (pp. 795-830). Cambridge: The Mit Press.

D'Andrade, R. (1992). Schemas and motivation. In R. D'andrade & C. Strauss (Eds.), *Human motives and cultural models* (pp. 23-44). Cambridge: Cambridge University Press.

D'Andrade, R. (2001). A cognitivist's view of the units debate in cultural anthropology. *Cross-Cultural Research, 35*(2), 242-257.

De Bono, E. (1969). *The mechanism of mind.* New York: Simon And Schuster.

De Quincy, A. C. Q. (1998). Type (Introduction by Anthony Vidler). In K. M. Hays (Ed.), *The Oppositions Reader: Selected readings from a journal for ideas and criticism in architecture 1973-1984* (pp. 617-620). Cambridge Ma: Mit Press.

Demiri, D. (1983). The notion of type in architectural thought. *Edinburgh Architectural Research-EAR, 10*.

Derfer, B. (1995). Mental models: how do our minds work? (Manuscript). Retrieved from: http://weber.ucsd.edu/~jmoore/courses/schemas.html.

Dewey, J. (1980). *Art as experience*, New York: A Perigee Book.

Diba, D. (1989). Technical review of Gurel Summer Residence. Retrieved from Aga Khan Development Network website: http://www.akdn.org/architecture/pdf/0905_Tur.pdf

DiMaggio, P. (1997). Culture and cognition. *Annual Review of Sociology, 23*, 263-87.

DiMaggio, P. (2002). Why cognitive (and cultural) sociology needs cognitive psychology. In K. Cerulo (Ed.), *Culture in mind: Toward a sociology of culture and cognition*, New York: Routledge.

Donald, M. (1991). *Origins of the modern mind: three stages in the evolution of culture and cognition*, Boston: Harvard University Press.

Donald, M. (1998a). Hominid enculturation and cognitive evolution. In C. Renfrew & C. Scarre (Ed.s.), *Cognition and Material Culture: The Archeology of Symbolic Storage*, Cambridge: McDonald Institute for Archeological Research.

Donald, M. (1998b). Material culture and cognition: concluding thoughts. In C. Renfrew & C. Scarre (Ed.s.), *Cognition and Material Culture: The Archeology of Symbolic Storage*, Cambridge: McDonald Institute for Archeological Research.

Du Gay, P., Hall, S., Jones, L., Mackay, H., & Negus, K. (Ed.s.). (1997). *Doing Cultural Studies: The Story of the Sony Walkman* (pp. 10-18). London: Sage publications.

Durand, J. N. L. (1981). *A parallel of architecture (Reprint of the original Paris 1800 edition of "Recueil of Parallele"),* Princeton: Princeton Architectural Press.

Eagleton, T. (2000). *The idea of culture*, Oxford: Blackwell Publishers.

Eastman, C. (1969). Cognitive Processes and Ill-Defined Problems: A Case Study From Design. *Proceedings of First Joint International Conference on Artificial Intelligence*. Washington D.C.

Eastman, C. (2001). New Directions in Design Cognition: Studies of Representation and Recall. In C. Eastman, W. Newstetter & M. McCracken (Eds.), *Design knowing and learning: Cognition in design education (*pp. 147-199). Oxford: Elsevier Books.

Eckersley, M. (1988). The form of design process: a protocol analysis study. *Design Studies*, 9(2), 86–94.

Edmonds, E. A., & Candy, L. (Ed.s). (2005). *Creativity & cognition: proceedings 2005, 12-15 April, Goldsmiths College, London.* New York, N.Y.: ACM Press.

Eldem, S. H. (1954). *Türk Evi Plan Tipleri: 1908-1988*, Istanbul: Istanbul Teknik Üniversitesi Mimarlik Fakültesi.

Erdogdu Erkarslan, O. (1999). *The Aga Khan Award For Architecture and The Issue of Cultural Identity In The Islamic Intelligentsia*. (Unpublished Doctoral Dissertation, Dokuz Eylul University, Izmir, Turkey).

Evans, G. W. (1980). Environmental cognition. *Psychological Bulletin, 88*(2), 259-287.

Faghih, N. (1980). Technical review of Ertegun House. Retrieved from Aga Khan Development Network website: http://www.akdn.org/architecture/pdf/0051_Tur.pdf

Feldman, D. H., Csikszentmihalyi, M. & Gardner, H. (1994). A framework for the study of creativity. In Feldman, D. H., Csikszentmihalyi, M. & Gardner, H. (Eds.), *Changing the World: A Framework For The Study of Creativity*. London: Praeger Publishers.

Feldman, D. H., Csikszentmihalyi, M. & Gardner, H. (Eds.). (1994). *Changing the world: A framework for the study of creativity.* London: Praeger Publishers.

Fernandez, J. W. (2001). Creative arguments of images in culture and the charnel house of conventionality. In J. Liep (Ed.), *Locating Cultural Creativity*. London: Pluto Press.

Finke, R. A. (1996). Mental imagery and visual creativity. In M. A. Runco (Ed.), *The creativity research handbook (vol. 1)*, Cresskill, NJ: Hampton Press.

Finke, R. A., Ward, T. B., & Smith, S. M. (1992). *Creative cognition, theory research and applications.* Cambridge: MIT Press.

Forty, A. (2000). *Words And Buildings: A Vocabulary of Modern Architecture*, (pp. 304-306). London: Thames and Hudson.

Frampton, K. (1997). *A critical history of modern architecture*, London: Thames and Hudson..

Franck, K. & Schneekloth, L. H. (1994). Type: prison or promise?. In K. Franck & L. H. Schneekloth (Ed.s), *Ordering spaces: types in architecture and design*, (pp. 17-21). New York: Van Nostrand Reinhold.

Gablik, S. (1984). Chapter 2: Individualism – Art for art's sake or art for society's sake. In *Has Modernism Failed*, NY: Thames and Hudson.

Gattis, M. (Ed.) (2001). *Spatial Schemas and Abstract Thought*, Cambridge Massachusetts: The MIT Press.

Gentner, D. (1983). *Mental models*, Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Gentner, D., Holyoak, K. & Kokinov, B. N. (Ed.s.). (2001). *The analogical mind: perspectives form cognitive science*, Cambridge, Massachusetts: MIT Press.

Gero, J. S. & Maher, M. L. (Ed.s). (1993). *Modeling creativity and knowledge-based creative design*, Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Goel, A. K. (1997). Design, analogy and creativity. *IEEE Expert*, *12*(3), 63.

Goel, V. (2001). Dissociation of design knowledge. In C. Eastman, W. Newstetter & M. McCracken (Eds.), *Design knowing and learning: Cognition in design education (*pp. 221-241). Oxford: Elsevier Books.

Goldschmidt, G. (1998). Creative architectural design: reference versus precedence. *Journal of Architectural and Planning Research*, 15(3), 258-270.

Goldschmidt, G. (2001). Visual analogy: a strategy for design reasoning and learning. In C. Eastman, W. Newstetter & M. McCracken (Eds.), *Design knowing and learning: Cognition in design education (*pp. 199-221). Oxford: Elsevier Books.

Gooding, D. C. (2006). Visual cognition: where cognition and culture meet. *Philosophy of Science*, 73, 688-698.

Gordon, W. J. (1976). *Synectics: the development of creative capacity*. New York: Collier Books.

Gottdiener, M. (2005). *Postmodern gostergeler: maddi kultur ve postmodern yasam bicimleri*. (E. Cengiz, H. Gur & A. Nur, Trans.). Ankara: Imge Kitabevi (Original work published in 1995).

Groat, L. & Despres, C. (1991). The significance of architectural theory for environmental design research. In G. T. Moore & E. H. Zube (Ed.s), *Advances in environment, behavior, and design, Volume 3*, New York: Plenum Press.

Groat, L. & Wang, D. (2002). *Architectural research methods*, New York: John Wiley and Sons.

Guba, E. G. & Lincoln, Y. S. (1998). Ch. 6: Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Ed.s.), *The landscape of qualitative research*, California: Sage publications.

Guba, E. G. (1981). Criteria for assessing the trustworthiness of naturalistic inquires. *ECTJ*, 29(2), 84-85.

Guilford, J. P. (1967). *The nature of human intelligence*. New York: Mcgraw-Hill.

Gurel, G. (1989). Clients Record of Gurel Summer Residence. Aga Khan Award for Architecture Documents. Retrieved from ArchNet Digital Library website: http://archnet.org/library/files/one-file.jsp?file_id=963.

Habraken, N. J. (1985). *The appearance of the form: four essays on the position designing takes place between people and things*. Cambridge, MA: Awater Press.

Habraken, N. J. (2000). *The structure of the ordinary – form and control in the built environment.* J. Teicher (Ed.), Cambridge: MIT Press.

Hall, S. (1997). Introduction. In *Representation: cultural representation and signifying practices*, London: Sage Publications.

Harvey, D. C. (2010). The space for culture and cognition. *Poetics*, 38, 184–203.

Hasirci, D. & Demirkan, H. (2007). Understanding the effects of cognition in creative decision making: a creativity model for enhancing the design studio process. *Creativity research journal*, 19(2), 259-271.

Hewett, T. T. & Kavanagh, T. (Ed.s). (2002). *Creativity And Cognition: Proceedings of The Fourth Creativity & Cognition Conference, October 13-17, Loughborough University, Loughborough, UK*. New York, N.Y.: ACM Press.

Hewett, T. T. (2005). Cognitive factors in design: overview and some implications for design. In *Proceedings of the 5th Creativity and Cognition Conference*. New York: ACM Press.

His Royal Highness the Aga Khan. (2009). In the Ismaili Website. Retrieved from: http://www.theismaili.org/cms/14/the-aga-khan.

Hoesterey, I. (2001). *Pastiche: cultural memory in art, film, literature*. Indiana: Indiana University Press.

Holland, D. & Quinn, N. (1987). Culture and cognition. In D. Holland & N. Quinn (Ed.s), *Cultural models of language and thought*. Cambridge: Cambridge University Press.

Holland, D. & Quinn, N. (Ed.s). (1987). *Cultural models of language and thought*, Cambridge: Cambridge University Press.

Holod, R. & Rastorfer, D. (Ed.s). (1983a). Introduction. *Architecture and community: building in the islamic world today*. New York: Aperture.

Holod, R. C Rastorfer, D. (1983b). Ertegun House. In R. Holod & D. Rastorfer (Ed.s). *Architecture and community: building in the Islamic world today*, (pp. 133). New York: Aperture.

Hubbard, W. (1980). Methods for making and architecture of convention. In *Complicity and conviction: steps toward an architecture of convention*. Massachusetts: MIT Press.

Hubka, T. (1986). Just folks designing. In D. Upton & J. M. Vlach (Ed.s), *Common places: readings in American vernacular architecture*, Georgia: University of Georgia Press, 1986.

Hutchins, E. (1995). Cultural cognition. *Cognition in the wild*, (pp. 353 – 374). Cambridge Massachusetts: The MIT Press.

Innovation. (2012). In Merriam Webster Online Dictionary. Retrieved from: http://www.merriam-webster.com/dictionary/innovation.

Isaac, J. & Michael, W. (1981). *Handbook in research and evaluation: for education and the behavioral sciences* (pp. 48). San Diego: Edits Publisher.

Jansson, D. G., Condoor, S. S. & Brock, H. R. (1992). Cognition in design: viewing the hidden side of the design process. *Environment and planning b: planning and design*, 19, 257 – 271.

Jencks, C. (2005). *Culture: key ideas*. New York, NY: Routledge.

Johnson, M. (1987). Chapter 2: The emergence of meaning through schematic structure. In *The body in the mind: The bodily basis of meaning, imagination and reason*. Chicago: University of Chicago Press.

Johnson-Laird, P. N. (1998). Mental models. In M. I. Posner (Ed.), *Foundations of cognitive science*. Cambridge, Massachusetts: The MIT Press.

Jones, J. C. (1970). *Design methods*. New York: John Wiley.

Karahan, E. (1985). Assos-behramkale uzerine bir inceleme (*Research Article*). Retrieved from Esra Karahan personal website: www.karahanmimarlik.com/content'view/21/40

Keesing, R. M. (1987). Models, folk and cultural. In D. Holland & N. Quinn (Ed.s), *Cultural models of language and thought*. Cambridge: Cambridge University Press.

Keim, K. (Ed.). (2001). *You have to pay for the public life: selected essays of Charles W. Moore.* Cambridge, Massachusetts: MIT Press.

Kitayama, S. & Cohen, D. (Ed.s). (2007). *Handbook of cultural psychology*. New York, NY: The Guilford Press.

Kneller, G. F. (1965). *The art and science of creativity*. New York: Rinehart.

Koestler, A. (1964). *The act of creation*. London: Penguin Books.

Kolodner, J. L. & Wills, L. M. (1996). Powers of observation in creative design. *Design studies, 17*(4), 385-416.

Kolodner, J. L. (1992). An introduction to case-based reasoning. *Artificial intelligence review 6*, 3-34.

Korkmaz, T. (2005). Preface: the 1980's and 1990's: Living on display. In T. Korkmaz (Ed.), *Architecture in Turkey around 2000: 1980-2005*, (pp. 1-10). Ankara: TMMOB Mimarlar Odasi Yayinlari.

Kroeber, A. L. & Kluckhohn, C. (1952). *Culture: A critical review of concepts and definitions*. Cambridge, MA: Peabody Museum.

Kuban, D. (1985). A survey of modern Turkish architecture. In S. Cantacuzino (Ed.), *Architecture in continuity: Building in the Islamic world today*. New York: Aperture.

Kubler, G. (1995). The propagation of things. Retrieved from Lecture Notes of Prof. Paul Tesar (Theory of building types: selected readings on types in architecture and design), Raleigh, North Carolina State University, College of Design.

Küçükerman, O. (1985). *Kendi mekâninin arayişi içinde Türk evi (2nd edition).* Istanbul: Turkish Touring and Automobile Association Publications.

Lakoff, G. & Johnson, M. (1980). *Metaphors we live by*. Chicago: University of Chicago Press.

Lakoff, G. (1987). *Women, fire and dangerous things: What categories reveal about the mind*. Chicago: University of Chicago Press.

Lavin, S. (1992). *Quatremere de Quincy and the invention of a modern language of architecture*. Cambridge: The MIT Press.

Lawrence, R. (1994). Type as analytical tool: reinterpretation and application. In K. A. Frank & L. H. Schneekloth (Ed.s), O*rdering space*: *type in architecture and design*. New York: Van Nostrand Reinhold.

Lawrence, R. J. (1989). Structuralist theories in environment-behavior-design research: applications for analysis of people and the built environment. In E. H. Zube & G. T. Moore (Ed.s.), *Advances in environment, behavior and design, vol. 2*. New York: Plenum Press.

Lawrence-Zuniga, D. L. (1997). Studying culture and history in exotic places and at home. In G. Moore & R. W. Marans (Ed.s), *Advances in environment, behavior, and design*, volume 4. New York: Plenum Press.

Lawson, B. (1979). Cognitive strategies in architectural design. *Ergonomics*, 22(1), 59-68.

Lawson, B. (1980). *How designers think*, London*:* Architectural Press.

Lawson, B. (1994). *Design in mind*, Oxford, UK: Butterworth-Heinemann.

Lawson, B. (2004). Schemata, gambits and precedent: some factors in design expertise. *Design studies*, 25(5), 443-457.

Laxton, M. (1969). Design education in practice, In K. Baynes (Ed.), A*ttitudes in design education*. London: Lund Humphries.

Lechte, J. (2003). *Key contemporary concepts: from abjection to zeno's paradox*, London: Sage publications.

Leupen, B., Grafe, C., Körnig, N., Lampe, M. & De Zeeuw, P. (Ed.s). (1997). *Design and analysis*. Rotterdam: 010 Publishers.

Lewcock, R. (1988). Working with the past. In M. Sevcenko (Ed), *Theories and principles of design in architecture of Islamic societies: Proceeding of a symposium held by the Aga Khan Program For Islamic Architecture (AKPIA*), Cambridge, Massachusetts: AKPIA.

Liep, J. (2001). Introduction. In *Locating Cultural Creativity*, (pp. 1-13). London: Pluto Press.

Linsey, J. S., Claus, J. P., Claus, E., Wood, K. L. & Markman, A. B. (2007). Increasing innovation: A trilogy of experiments towards a design by analogy method. In *Proceedings of the ASME 2007 International Design Engineering Technical Conferences & Computers and Information In Engineering Conference IDETC/CIE*. Las Vegas, Nevada.

Lowenthal, D. (1993). What makes the past matter?. In B. Farmer & H. Low (Ed.s), *Companion to contemporary architectural thought*, New York: Routledge.

Lubart, T. I. (1999). Creativity across cultures". In R. J. Sternberg (Ed.), *Handbook of creativity*. Cambridge: Cambridge University Press.

Madrazo, L. (1994). Durand and the science of architecture. *Journal of architectural education (JAE)*, 48(1), 12-24.

Madrazo, L. (1995). *The concept of type in architecture: An inquiry into the nature of architectural form*. (Unpublished doctoral dissertation, Zurich Federal Institute Of Technology, Zurich , Switzerland).

Malhotraa, A., Thomas, J. C., Carroll, J. M. & Millera, L. A. (1980). Cognitive processes in design, *International journal of man-machine studies*, 12(2), 119-140.

Markus, H. R. & Hamedani, M. G. (2007). Sociocultural psychology. In S. Kitayama & D. Cohen (Ed.s), *Handbook of cultural psychology*. New York, NY: The Guilford Press.

Marshall, S. P. (1995). *Schemas in problem solving*. Cambridge: Cambridge University Press.

Mayer, R. E. (1999). Fifty years of creativity research. In R. J. Sternberg (Ed.), *Handbook of creativity*. Cambridge: Cambridge University Press.

Mcdermott, J. (1982). Domain knowledge and the design process. *Design studies*, 3(1), 31-36.

Mcvee, M. B., Dunsmore, K. & Gavelek, J. R. (2005). Schema theory revisited. *Review of educational research*, 75(4), 531-566.

Medin, D., Unsworth, S. & Hirschfield, L. (2007). Culture, categorization and reasoning. In S. Kitayama & D. Cohen (Ed.s), *Handbook of cultural psychology*. New York, NY: The Guilford Press.

Mervis, C. B. & Rosch, E. (1981). Categorization of natural objects. *Annual review of psychology, 32*, 89-115.

Moneo, R. (1978). On typology. *Oppositions, 13*, 23.

Morris, E. K. & Levin, E. (Ed.s). (1982). Typology in design education. *JAE*, 35(2), whole issue.

Muller, W. & Pasmani, G. (1996). Typology and the organization of design knowledge. *Design studies*, 17(2), 111-130.

Nesbitt, K. (1996). An analogical architecture. In K. Nesbitt (Ed.), *Theorizing a new agenda for architecture: An anthology of architectural theory 1965-1995*. New York: Princeton Architectural Press.

Nesbitt, K. (1996). Introduction. In K. Nesbitt (Ed.), *Theorizing a new agenda for architecture: An anthology of architectural theory 1965-1995*, (pp. 16-72). New York: Princeton Architectural Press.

Nickerson, R. (1999). Enhancing creativity. In R. J. Sternberg (Ed.), *Handbook of creativity*. Cambridge: Cambridge University Press.

Nisbett, R. E. & Norenzayan, A. (2002). Culture and cognition. In D. L. Medin (Ed.), *Stevens' Handbook of Experimental Psychology, Third Edition*, New York: John Wiley & Sons.

Nisbett, R. E., Peng, K., Choi, I. & Norenzayan, A. (2001). Culture and systems of thought: holistic versus analytic cognition. *Psychological review*, 108(2), 291-310.

Norman, D. (1993). *Things that make us smart*. New York: Addison Wesley Publishing.

Olson, D. & Torrence, N. (1996). *Modes of thought: explanations in culture and cognition*, Cambridge: Cambridge University Press.

Oxman, R. E. & Oxman, R. M. (1992). Refinement and adaptation in design cognition. *Design studies,* 13(2), 117–134.

Oxman, R. E. (1990). Design shells: A formalism for prototype refinement in knowledge-based design systems. *Artificial intelligence in engineering*, 5(1), 2-8.

Oxman, R. E. (1990). Prior knowledge in design: a dynamic knowledge-based model of design and creativity. *Design studies,* 2(1), 17–28.

Oxman, R. E. (1994). Precedents in design: a computational model for the organization of precedent knowledge. *Design studies*, 15(2), 141-157.

Oxman, R. E. (1996). Design by re-representation: a model of visual reasoning in design. *Design studies,* 18(4), 329–347.

Oxman, R. E. (1999). Educating the designerly thinker. *Design studies*, 20(2), 105-122.

Oxman, R. E. (2001). The mind in design: a conceptual framework for cognition in design education". In C. Eastman, W. Newstetter & M. McCracken (Eds.), *Design knowing and learning: Cognition in design education,* (pp. 269-295). Oxford: Elsevier Books.

Oxman, R. E. (2004). Think-maps: teaching design thinking in design education. *Design studies*, 25(1), 63-91.

Oyserman, D., Sorensen, N., Reber, R. & Chen, S. X. (2009). Connecting and separating mind-sets: culture as situated cognition. *Journal of personality and social psychology*, 97(2), 217–235.

Ozkan, S. (2005). A new introduction to modern Turkish architecture. In R. Holod & A. Evin (Ed.s), *Modern Turkish Architecture: 1900-1980*, (pp.1-4). Ankara: TMMOB Mimarlar Odasi Yayinlari.

Ozsel Akipek, F. & Kozikoğlu, N. (2007). Prototypes in architectural education: as instruments of integration in the digital era. *METU JFA*, 24, (2), 169-178.

Pamir, H. (1986). Architectural education in Turkey in its social context. In *Architectural education in the Islamic world: P*roceedings *of seminar ten by the Aga Khan Award For Architecture* (pp. 131-152). Singapore: Concept Media.

Patton, M. Q. (1990). *Qualitative evaluation and research methods* (pp. 96-115). Newbury Park: Sage.

Perez Gomez, A. (1998). Introduction to architecture and the crisis of modern science. In K. M. Hays (Ed.), *Architecture theory since 1968*. Cambridge: MIT Press.

Petrucciolli, A. (1998). Exoteric, polytheistic, fundamentalist typology: gleanings in the form of an introduction. In A. Petrucciolli (Ed.), *Typological process and design theory: Proceedings of the international symposium sponsored by the Aga Khan Program for Islamic Architecture at Harvard University and the Massachusetts Institute of Technology*. Cambridge, MA: Aga Khan Program for Islamic Architecture.

Pevsner, N. (1976). *A history of building types*, London, UK: Thames And Hudson.

Piaget, J. (1952). *The origins of intelligence in children*. (M. Cook, Trans.). New York: International Universities Press.

Piaget, J. (1970). *Structuralism*. New York: Basic Books.

Pinker, S. (1999). *How the mind works*, London: Penguin Books.

Policastro, E. & Gardner, H. (1999). From case studies to robust generalizations: an approach to the study of creativity. In R. J. Sternberg (Ed.), *Handbook of creativity*. Cambridge: Cambridge University Press.

Posner, M. I. (1998). *Foundations of cognitive science*. Cambridge, Massachusetts: The MIT Press.

Poynor, R. (2003). *No more rules: graphic design and postmodernism*. New Haven: Yale University Press.

Purcell, A. T. & Gero, J. (1991). The effects of examples on the results of design activity. In J. S. Gero (Ed.), *Artificial intelligence in design aid*. Oxford, UK: Butterworth-Heinemann.

Rapoport, A. (1969). *House form and culture*. Milwaukee: University of Wisconsin.

Rapoport, A. (1990). *History and precedent in environmental design*. New York: Plenum Press.

Raza, A., Kausar, R. & Paul, D. (2006). Culture, cognition and knowledge-based development. *Journal of knowledge management*, 10(5), 137-145.

Reed, S. K. (1996). *Cognition: theory and applications (4th ed.).* Belmont, CA: Thomson Brooks/Cole Publishing.

Renfrew, C. & Scarre, C. (1998). *Cognition and material culture: the archeology of symbolic storage*. Cambridge: McDonald Institute For Archeological Research.

Robbins, M. C. (1966). Material culture and cognition. *American anthropologist (new series*), 68(3), 745-748.

Robinson, J. (1989). Architecture as a medium for culture: public institution and private house. In S. Low and E. Chambers (Ed.s), *Housing, culture and design, a comparative perspective*. Philadelphia: University of Pennsylvania Press.

Robinson, J. (1994). Question of type. In ed. K. Franck & L. H. Schneekloth (Ed.s), *Ordering spaces: types in architecture and design*. New York: Van Nostrand Reinhold.

Rockcastle, G. (1991). The value of type: a debate. In G. Rockcastle (Ed.), *Type and the impossibility of convention*. Minnesota: University of Minnesota.

Rosch, E. & Lloyd, B. B. (Ed.s). (1978). *Cognition and categorization*, Hillsdale, New Jersey: Lawrence Erlbaum.

Rosch, E. (1973). Natural categories. *Cognitive psychology, 4*, 328-350.

Rose, D. M. (1968). Culture and cognition: some problems and a suggestion. *Anthropological quarterly*, 41(1), 9-28.

Rosenman, M. A. & Gero, J. S. (1999). Evolving designs by generating useful complex gene structures. In P. Bentley (Ed.), *Evolutionary design by computers*, (pp.345-364). San Fransisco: Morgan Kaufmann.

Ross, N. (2004). *Culture and cognition: implications for theory and method.* California: Sage Publications.

Rossi, A. (1985). *Aldo Rossi: buildings and projects*. New York: Rizzoli.

Rossi, A. (1988). *The architecture of the city*. New York: MIT Press.

Rossi, A. (1996). Analogical architecture. In K. Nesbitt (Ed.), *Theorizing a new agenda for architecture: An anthology of architectural theory 1965-1995*, (p. 346). New York: Princeton Architectural Press.

Rowe, P. (1987). *Design thinking*. Cambridge, MA: MIT Press,.

Rowe, P. (1999). A priori knowledge and heuristic reasoning in architectural design. In J. M. Stein & K. Spreckelmeyer (Ed.s), *Classic readings in architecture*, (pp. 362-374). Boston: Mc Graw Hill.

Rumelhart, D. E. & Ortony, A. (1977). The representation of knowledge in memory. In C. Anderson, R. J. Spiro & W. E. Montague (Ed.s.), *Schooling and the acquisition of knowledge, (*pp. 99-135). Hillsdale, NJ: Lawrence Erlbaum.

Rumelhart, D. E. (1978). Schemata: the building blocks of cognition. In R. J. Spiro, B. C. Bruce & W. F. Brewer (Ed.s.), *Theoretical issues in reading comprehension*, (pp. 33-58). Hillsdale, NJ: Lawrence Erlbaum.

Rumelhart, D. E. (1984). Schemata and the cognitive system. In R. S. Wyer & T. K. Srull (Ed.s), *Handbook of social cognition*, (pp. 161-188). Hillsdale, NJ: Lawrence Erlbaum.

Runco, M. A. & Chand, I. (1995). Cognition and creativity. *Educational psychology review*, 7(3), 243–267.

Runco, M. A. (1997). *The creativity research handbook, volume one*. Cresskill, N.J.: Hampton Press.

Runco, M. A. (2004). Creativity. *Annual review of psychology, 55*, 657-687.

Safdie, M. (1981). Private jokes in public places. *The atlantic monthly*.

Sarkis, H. (2007). Tumertekin, the stranger. In H. Sarkis (Ed.), *Han Tumertekin: recent works*. Massachusetts: Harvard University Graduate School of Design.

Schneekloth, L. H. & Franck, K. (1994). Type: prison or promise?. In K. Frank & L. H. Schneekloth (Ed.s), O*rdering space*: *type in architecture and design*. New York: Van Nostrand Reinhold.

Schon, D. A. (1988). Designing: rules, types and worlds. *Design studies*, 9(3), 181-190.

Seligman, W. (1976). Runcorn: historical precedent and rational design process. *Oppositions,7*.

Serageldin, I. (1996). A critical methodology for discussing the contemporary mosque. In I. Serageldin & J. Steele (Ed.s), *Architecture of the contemporary mosque*, (pp. 12-20). London: Academy Editions.

Setha, M. L. & Chambers, E. (1989). *Housing, culture and design: a comparative perspective*, Philadelphia: University of Pennysilvania Press.

Shore, B. (1996). *Culture in mind: cognition, culture and the problem of meaning*. Oxford: Oxford University Press.

Simon, H. A. (1973). The structure of ill-structured problems. *Artificial intelligence, 4*, 181–201.

Simonton, D. K. (2000). Creativity: cognitive, personal, developmental, and social aspects. *American psychologist*, 55(1), 151-158.

Smith, S. M., Ward, T. B. & Finke, R. A. (1995). Introduction: cognitive processes in creative contexts. In *The creative cognition approach*. Cambridge, Massachusetts: the MIT Press.

Solzhenitsyn, A. (1993). The relentless cult of novelty and how it wrecked the century (*book review*). *New York Times*, February 7.

Sozen, M. (1970). Anadolu Turk mimarisi. In *Anadolu uygarliklari, cilt 5*, Istanbul: TTOK yayini.

Sozen, M. (1984). *Cumhuriyet dönemi türk mimarisi*, (pp. 43-85). Ankara: Türkiye Iş Bankası Yayınları.

Sperber, D. & Hirschfeld,L. (1999). Culture, cognition, and evolution. In R. Wilson & F. Keil (Ed.s), *MIT Encyclopedia of the Cognitive Sciences*, (pp.111-132). Cambridge, Massachusetts: The MIT Press.

Sperber, D. (1996). *Explaining culture: a naturalistic approach*. Oxford: Blackwell Publishers.

Steele, J. (1994). A search for meaning. In J. Steele (Ed.), *Architecture for Islamic societies today*, (p. 29). London: Academy Editions.

Sternberg, R. J. & Lubart, T. I. (1999). The concept of creativity: prospects and paradigms. In R. J. Sternberg (Ed.), *Handbook of Creativity.* Cambridge : Cambridge University Press.

Sternberg, R. J. (2007). *Cognitive psychology*. Australia: Thomson Wadsworth.

Sternberg, R. J. (Ed.). (1999). *Handbook of Creativity.* Cambridge : Cambridge University Press.

Suwa, M., Purcell, T. & Gero, J. (1998). Macroscopic analysis of design processes based on a scheme for coding designers' cognitive actions. *Design studies*, 19(4), 455-83.

Symes, M. (1994). Typological thinking in architectural practice. In K. Franck & L. H. Schneekloth (Ed.s), *Ordering spaces: types in architecture and design*, (pp. 17-21). New York: Van Nostrand Reinhold.

Tanyeli, U. (1991). Cagdas Mimarlikta Islami Icerik Sorunu ve Cansever. *Arradamento dekorasyon*, 29, 83-89.

Taylor, C. W. (1988). Various approaches to and definitions of creativity. In R. J. Sternberg (Ed.), *The nature of creativity: contemporary psychological perspectives*. Cambridge: Cambridge University Press.

Taylor, M. C. (1995). Rhizomic folds of interstanding. *Technema, 2*, Techniques And Finitude.

Tesar, P. (1991). The other side of types. In G. Rockcastle (Ed.), *Type and the impossibility of convention*. Minnesota: University of Minnesota.

Tesar, P. (1998). Architecture as environment: Architecture as habit. In *Architecture as environment exhibition catalogue*, (pp. 6-12). Spiers Gallery, Brevard College, NC.

Tesar, P. (2010, June). *Types as intersubjective expressive systems*. Paper presented at EDRA 41/types-II Symposium - Annual Conference Of The Environmental Design Research Association.

Thagard, P. (2005). *Mind: introduction to cognitive science, second edition*. Cambridge, Massachusetts: MIT Press.

Thomas, J. C. & Carroll J. M. (1979). The psychological study of design. *Design studies*, 1(1), 5–11.

Tice, J. (1993). Theme and variations: A typological approach to housing design, teaching and research. *Journal of architectural education*, 46(3), 163-164.

Tomasello, M. (1999). *Cultural origins of human cognition*. Cambridge Massachusetts: Harvard University Press.

Tomasello, M., Carpenter, M., Call, J., Behne, T. & Moll, H. (2005). Understanding and sharing intentions: the origins of cultural cognition. *Behavioral and brain sciences, 28*, 1-61.

Troadec, B., Zarhbouch, B. & Frède, V. (2009). Cultural artifact and children's understanding of the shape of the earth: the case of Moroccan children. *European journal of psychology of education*, 24(4), 485-498.

Tumertekin, H. (2004). Architect's record of B2 house. Aga Khan Award for Architecture Documents. Retrieved from ArchNet Digital Library website: http://archnet.org/library/files/one-file.jsp?file_id=1305.

Turgut Cansever Biography. (2009). Retrieved from Turgut Cansever personal website: http://www.turgutcansever.com/

Type. (2012). In Merriam Webster Online Dictionary. Retrieved from: http://www.merriam-webster.com/dictionary/type.

Typology. (2012). In Merriam Webster Online Dictionary. Retrieved from: http://www.merriam-webster.com/dictionary/typology.

Urey, O. (2010). *Use of traditional elements in contemporary mosque architecture in Turkey*. (Unpublished master's thesis, Middle East Technical University, Ankara, Turkey).

Uysal, Z. C. (2004). *Architectural Interpretations of Modernity and Cultural Identity: A Comparative Study on Sedat Hakki Eldem and Bruno Taut In Early Republican Turkey*. (Unpublished master's thesis, Middle East Technical University, Ankara, Turkey).

Vanlehn, K. (1998). Problem solving and cognitive skill acquisition. In M. Posner (Ed.), *Foundations of cognitive science*. Cambridge Massachusetts: The MIT Press.

Vidler, A. (1977). The production of type. *Oppositions*, p.95.

Vidler, A. (1987). From the hut to the temple: Quatremere Quincy and the idea of type. In *The writing of the walls: architectural theory in the late enlightenment*. New York: Princeton Architectural Press.

Vidler, A. (1996). The third typology. In K. Nesbitt (Ed.), *Theorizing a New Agenda for Architecture: An Anthology of Architectural Theory 1965-1995*. New York: Princeton Architectural Press.

Vidler, A. (1997). Idea of type. *Oppositions*, spring, n.8, 93-100.

Vidler, A. (2002). The third typology. In K. M. Hays (Ed.), *Architecture theory since 1968*, New York: The MIT Press.

Villari, S. (1990). *J. N. L. Durand (1760-1864) Art And Science Of Architecture*. (Eli Gottlieb, Trans.), (p. 33). New York: Rizzoli International Publications.

Wallas, G. (1926). *The art of thought*, (pp. 82-85). Newyork: Harcourt Brace. & Co.

Ward, T. B. (2007). Creative cognition as a window on creativity. *Methods*, *42*, 28-37.

Ward, T., Smith, S. M. & Finke, R. (1999). Creative cognition. In R. J. Sternberg (Ed.), *Handbook of Creativity*. Cambridge : Cambridge University Press.

Warr, A. & O'Neill, E. (2005). Understanding design as a social creative process. In Proceedings of the 5th conference on creativity & cognition, London, UK, p. 118-127.

Welling, H. (2007). Four mental operations in creative cognition: the importance of abstraction, *Creativity research journal*, 19(2-3), 163-177

Wertsch, J. (Ed.). (1985). *Culture, communication and cognition: Vyogotskian perspectives*. Cambridge: Cambridge University Press.

Westwood, R. & Low, D. R. (2003). The multicultural muse: culture, creativity and innovation. *International journal of cross cultural management*, 3(2), 235-259.

Williams, R. (1983). *A vocabulary of culture and society*. Oxford: Oxford University Press.

Wittkower, R. (1971). *Architectural principles in the age of humanism*. New York: W.W.Norton.

Wujek, J. (1993). Tradition and innovation. In B. Farmer & H. Low (Ed.s), *Companion to contemporary architectural thought*, New York: Routledge.

Yilmaz, S., Seifert, C. M. & Gonzalez, R. (2011). Design heuristics: cognitive strategies for creativity in idea generation. In J. S. Gero (Ed.), *Design computing and cognition `10*, (pp. 35-53). Springer.

Yucel, A. (2005). Pluralism takes command: the Turkish architectural scene today. In R. Holod & A. Evin (Ed.), *Modern Turkish Architecture: 1900-1980*, (pp. 125-155). Ankara: TMMOB Mimarlar Odasi Yayinlari.