AN APPROACH TOWARDS A MORE USER-CENTERED ARCHITECTURAL DESIGN USING HUMAN SENSES, MIND & EMOTIONS
APPLICATION IN COFFEE SHOPS IN CAIRO

By

Heba Sherif Mourad

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
MASTER OF SCIENCE
in
Architectural Engineering

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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AN APPROACH TOWARDS A MORE USER-CENTERED ARCHITECTURAL DESIGN USING HUMAN SENSES, MIND & EMOTIONS - APPLICATION IN COFFEE SHOPS IN CAIRO

Key Words:

Cognitive neuroscience; architectural space; User-centered; Coffee shops

Summary:

The study explores the relationship between the people and architectural spaces they inhabit. First, the relation between human senses and architecture was explored, since the senses are the tools that connect people to the external environment. The study was then enriched by studying the influence of human mind and emotions on experiencing architecture, as people's impression are not limited to sensations. An applied research was conducted in coffee shops in Cairo which acted as architectural spaces where human behavior and impressions about architectural atmosphere could be studied with the objective of assessing the impact of architectural attributes on the sense of atmosphere of the space. The key findings from the practical and theoretical study were the priorities for a person visiting a coffee shop: meeting people followed by studying or reading, then going for the overall mood the coffee shop offers which had the same importance as going for food and drink. Other findings were the importance of considering the sense of smell in the design process as the most persistent memory of any space was its smell, and the importance of considering the sound aspect of the coffee shop; as it was the base of most of the problems. And finally that people needed more physical stimulants; more colors, more lighting, more windows in the coffee shops.

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ABCTRACT

The study explores the relationship between the people and the architectural spaces they inhabit; understanding the occupants' impressions when experiencing their surrounding environment. First, the relation between human senses and architecture was explored, since the senses are the tools that connect people to the external environment. The study was then enriched by studying the influence of human mind and emotions as well as people's impression were found not to be limited on sensations only. An applied research study was then conducted in coffee shops in Cairo where various activities are witnessed, from social encounters to business, and political meetings. The coffee shops acted as public spaces where human behavior and impressions about the architectural atmosphere could be studied with the objective of assessing the impact of architectural attributes on the sense of atmosphere of the space.
The key findings from the theoretical and empirical study were the priorities for a person visiting a coffee shop were as follows, meeting people followed by studying or reading, then going for the overall mood the coffee shop offers which had the same importance as going for food and drink. Other findings were the importance of considering the sense of smell in the design process as the most persistent memory of any space was its smell, and the importance of considering the sound aspect of the coffee shop; as it was the base of most of the problems. And finally people needed more physical stimulants in coffee shops; more colors, more lighting, more windows…etc. except for sound stimulants that needed to be controlled.

Chapter 1: Introduction

1.1 General Introduction

As life grows more hectic everyday living wears people out. As soon as an average person gets out of his home he is faced with the fast paced life demanding much of his/ her energy attention. Mental illness is considered the world's biggest disease problem after infectious diseases. People are now more likely to develop depression, anxiety, stress...etc especially in cities, which hold half of the world's population nowadays. In Germany, the number of sick days taken for psychiatric ailments doubled between 2000 and 2010; in North America, up to 40% of disability claims for work absence are related to depression, according to some estimates[1]. So this fast paced city life can become a major problem, affecting everyday living; affecting work, social life and the person's development. Accordingly, it is very important for people to find collective moments of retreat.

With the excessive amount of distractions, people get confused, and simple, effortless everyday activities interfere with important tasks of the moment. So how do people cope with this level of inconsistencies relates to three different realms[2]:

1. The way the mind works; psychology of human thought and cognition.
2. Information available from the appearance of objects; psychology of everyday encounters.
3. Ability of the designer to understand people and create suitable designs.

Norman (1990) stated: "Here's where the designer's knowledge of the psychology of people coupled with the knowledge of how things work becomes crucial.[3]"

Architectural indoor spaces can have the potential in making a difference in people's life. Specific indoor environments can be sensory stimulating, and can help trigger thoughts, and feelings that weren't there. Indoors can also work as healing environments, creating harmony between mind, body and spirit. Such environments can reduce stress and anxiety and positively affect people's wellbeing.

So what makes users feel that a certain place is warm or cold, Big or small, Calm or loud, or annoying? Why do people sometimes feel nostalgic when they enter a room, or on the other hand feel nervous? Hume, D. (1896); Norman, D. (1990); Desmet, P. (2002); Hekkert, P. (2002); Norman; D. (2004); Pallasmaa, J. (2005) among others showed that feelings are revealed to the unconscious mind, and the human mind and nervous system are constantly interacting; So while emotions form the basis of thoughts, the five senses fuel the emotions.

By designing with the invisible elements of architecture (sound, smell, textures, light, and temperature) and by employing suitable choices of indoor physical/visual elements such as materials, colors … etc. Architects can develop special interior designs that speak to the senses in the right way; and can evoke comfort and relaxation, and obtain satisfying, convenient results to fulfill people's needs emotionally as well as functionally; encouraging users to spend more time in a space that heals and enhances each person using it.

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[1] Abbott, A. (2012), Stress and the city: Urban decay. *Nature*. **490** (7419), pp.162-164.
[2] Norman, D. (1990), The design of everyday things, Doubleday/ currency, United states of America
[3] Ibid.

1.2   Problem Statement

With the development of technology, people are getting more and more isolated from their surroundings, while architecture could be more supportive and contribute more positively towards the proper integration of man, and the surrounding world. In order for architecture to play its role in regaining the engagement between people and their surroundings; space and time; architects should not be focusing on the visual aspects of buildings, but should be thinking about the whole experience, and about acquiring harmony and a more meaningful relation between man and his world.

1.3   Research Goal and Objectives

The main goal of the research is to integrate current research based information on cognitive neuroscience[4] to acquire a better experience for people in the space, and help in the development of an occupant centered design approach for architectural spaces. The goal would be accomplished through the following objectives:
- Having a better understanding of the relationship between people and architectural spaces, helping architects to understand how their users would later experience their work.
- Making architectural spaces respond to people's different needs; emotionally as well as functionally by interpreting invisible messages that physical attributes of the architectural spaces send to the human mind and senses.
- Helping architects to make suitable choices for their designs regarding colors, smells, materials… etc. that develops an occupant centered design approach for architectural space.

1.4   Scope of Research

The scope of the research to achieve the previous objectives is studying the relationship between the people and the architecture space, with the intention of not just being interested in how the place looks, but also in how it makes people feel and how it sounds, smells, and feels when touched. This relation is addressed through researching in the following realms:
- Studying how people use their senses in perceiving their surroundings, and forming impressions about their surroundings.
- Studying how people develop significant impressions about the built environment and architectural space through the mind and emotional influences as well.
- Learning about the various human concerns, and showing how architecture can fulfill some of these concerns.

An applied research study was conducted in a specific building typology, which for the scope of this study in coffee shops in Egypt were chosen for the applied research work. To accomplish the research objectives from the applied research in the coffee shops, the following realms were inquired about:

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[4] Cognitive neuroscience is the relationship between the mind and the senses. John Eberhard, Juhani Pallasmaa, and Maria Lehman are some of the authors who work in the field of architecture and neuroscience.

- The understanding of people's emotional and functional concerns from a coffee shop design.
- The knowledge of the current integration of senses in the coffee shops design
- The effect of the sensory attributes on people's impressions about the coffee shop design.

1.5 Research Methodology

The research is divided into more than one approach which collectively formulates the research methodology. First a theoretical study in the field of cognitive neuroscience and its relation to architecture was conducted. The study focused on the human emotions and people's concerns, particularly from architecture. Some deductions were concluded about people's impressions from architectural spaces and their relation to human perception and sensory experiences. This theoretical review and analysis was based on the work of famous theoreticians namely, David Hume, Donald Norman, Pieter Desmet, Juhani Pallasmaa, … etc.

The theoretical studies were then used in researching coffee shops in Cairo. The choice of coffee shops was based on being public spaces where human behavior and impressions can be studied easily by learning more about the people who visited the coffee shops; learning the reasons behind their visit to the coffee shops, and learning the impressions people got from their experiences in various coffee shops, and how the sensory attributes affect people's impressions.

The field work was conducted on two stages, first the diagnostic stage which lasted for two months. The diagnostic stage included conducting individual interviews and participant observations that resulted into deciding on the coffee shops and the sample group that would be studied. The main findings of this stage were People tended to relate their impression of the atmosphere to physical attributes of the place. Such as, relating cheerfulness with the lighting, finding out some of the reasons behind people's visit to coffee shops such as, meeting friends, eating, studying, and enjoying the view, finally people expressed their need for more stimulation from the coffee shop. The second stage was the data gathering using two approaches; first a descriptive approach; documenting the current state in the chosen coffee shops, taking notes, pictures and describing every aspect that forms the atmosphere of each coffee shop. This was followed by a structured questionnaire which was distributed among six coffee shops and 93 customers. The data gathering stage lasted for one month.

Five main findings were then deduced from this stage and then analyzed to obtain some useful and important information for architects, interior designers, and coffee shop owners.

1.6 Research Rationale

Coffee shops were chosen as the building type for applying the research for many reasons. Coffee shops can be considered a famous feature throughout history in the Egyptian culture, coffee shops in general witnessed various activities from casual social encounters to business and political meetings, that's why they can act as examples of public spaces where human behavior and impressions can be studied easily, and can be considered very suitable for studying the effect of sensations on users' preferences and the atmosphere of a place. Another reason for choosing coffee shops is that research

findings from the study can be generalized and applied to other spaces that hold similar activities such as restaurants, food courts in malls, cultural centers…etc. subsequently, assisting in the development of an occupant centered approach in the design process. In the field work, a variety of Coffee shops were chosen to provide a variety of atmospheres to enrich the study and to be able to compare results. But at the same time for the results to be rational the choice of coffee shops had to be limited to the ones that attracted almost the same clientele by choosing modern coffee shops in neighborhoods in Cairo that relatively have the same social level; Mohandeseen, Maadi, and Zamalek.

1.7 Contents of the Thesis

The study consists of six chapters including chapter one as an introductory chapter as the first chapter. Chapter two and three focus on the theoretical studies. Chapter four and five contain the field study, which addressed both quantitative and qualitative information; to study the relationship between people and architectural space in various coffee shops in Cairo. Chapter six handled the conclusion and main findings. [fig. 1.1] quickly summarizes the research outline.

Chapter one addresses important issues including the problem statement, research goal and objectives, and the scope of the research. The research methodology is then discussed and the rational of the research is stated showing why coffee shops were chosen as the building type for the study, and finally, the summarizing the contents of the study.

Chapter two studies the relationship between senses and architecture, and how by using scientific information about the senses the users can acquire a better and a richer experience within the architectural space. It addresses the current situation pointing out the lack of multi-sensory experiences through architecture, and the presence of a gap between people's needs and the architecture they experience. The chapter features the position of some prominent architects regarding the integration of sensory studies in architectural design, namely: Frank Lloyd Wright, Walter Gropius, Mies van der Rohe, Le Corbusier, Alvar Aalto, and Peter Zumthor.

Finally, each sense is studied separately; the sense of vision, touch, hearing, smell, taste. Starting from the physical stimulus that stimulates the sense to having a more in depth understanding to the impressions users have when experiencing the built environment. In the sense of vision three main topics were addressed; the dominance of vision, and its stimulus which is light, and how the technological development increased the dominance of vision. Finally, the possibility of integrating all the senses by working on the depth of the sense of vision. In the sense of touch four points were addressed; first, Contact and temperature as the stimulus of the skin, then the importance of the sense of touch in the process of integration within the physical environment, and how the Bauhaus focused on the sense of touch and its relation to architecture. Finally, stating some architectural examples that succeeded in the integration of the sense of touch in design. The sense of hearing addressed four main points; sound waves as the hearing stimulus, the way architecture is heard, the negligence of the employment of the sense of hearing in architecture, stating examples that elaborate the use of sound in architecture, and finally addressing Silence as an acoustic experience in architecture. The sense of smell addressed four points as well; the relation between smell and time, the relation between smell and memory, the smell stimulus, architectural examples that incorporated the sense of smell in design, and guide lines for integrating the sense of smell as an invisible dimension of architectural

space. Finally the sense of taste discusses how people identify different tastes, and the connection between taste and architecture, and finally the relationship between the sense of taste and the other senses.

In chapter three it is discussed how people develop significant impressions about the built environment and architectural spaces through the mind and emotional influences. The mind section handled the understanding the nature of the active process of perception and its kinds, the Exploration of roots of the mental images and impressions about architecture formed in the human mind, learning about attention and what makes the mind screen out some things, and accentuating other things, and finally how memory and imagination affect people's impressions. The emotions section handled the Explanation of the different typologies of human emotions (emotions, moods, and sentiments), the relation between emotions and architecture, and finally reviewing the possibility of architecture to fulfill humans' concerns.

Chapter four presents the details for the applied research, including data collection techniques, and survey procedures. The research employed different approaches at the different stages of data collection and data analysis which varied from diagnostic research approach to a descriptive research approach. Different tools and techniques were employed such as surveys and participant observations.

Six coffee shops in Cairo were chosen to conduct the practical study in, which are namely: Beanos, Pasqua, Cedars, Greco, Paul, and Cilantro. The coffee shops were chosen to provide various atmospheres but at the same time attracted the same clientele. Chapter five presents the analysis of the field work and the results of the questionnaires that were distributed on people. In each café a minimum of 15 answered questionnaires were obtained; making a total sample of 93 male and female adults from the age of 20 to 64.

The results of the analysis of each coffee shop were stated separately starting by giving a quick description to the sample that answered the questionnaire, then stating the reasons behind their visit to the coffee shop, discovering people's impressions about the overall atmosphere of the coffee shop, and finally stating the most appreciated and unappreciated criteria of design of the coffee shop.

At the end of chapter five a final summary for all coffee shops is deduced which includes a comparative analysis between the six coffee shops adressed in the field study. The comparison focuses on issues such as the incentives behind visiting the coffee shops, impressions on the atmosphere of the coffee shop, and how each coffee shop indulged on the senses of the users in its special way.

Chapter six finally holds the analysis of some interesting results. In conclusion chapter six can be considered a guide for architects, and interior designers to enhance the harmony and engagement between people and their surroundings, and most importantly developing an occupant centered approach in the design process by deducing architectural design criteria that better the adaption of coffee shops to the users' preferences from the sensory point of view. Limitations and future studies were discussed. Useful and important information for architects, interior designers, and coffee shop owners were obtained. The key findings from the practical and theoretical study were the priorities for a person visiting a coffee shop were as follows, meeting people followed by studying or reading, then going for the overall mood the coffee shop offers which had the same importance as going for food and drink. Other findings were the importance of considering the sense of smell in the design process as the most persistent memory of any space was its smell, and the importance of considering the sound aspect of the coffee shop; as it was the base of most of the problems. And finally

people needed more physical stimulants; more colors, more lighting, more windows…etc. except for sound stimulants that needed to be controlled.

Chapter one: Introduction	• Problem defenition. • Research objective. • Research scope. • research methodology.
Chapter two: Reception through Senses	• Interelationship between architecture and the senses. • Views of outstanding architects on the senses. • Impressions from the senses and its relation to architecture.
Chapter three: The Mind and Emotional Influences in the Perception of the Built Environment	• Impressions from the mind and emotional influences • Human concerns in architecture.
Chapter four: Applied Research - The Study of Sensory Experience in Coffee Shops in Cairo	• Applied research in six Cairene coffee shops. • Diagnostic and descriptive approaches. • Summarizing research methodology.
Chapter five: Meaning Making and analysis of Research Findings	• Reporting findings and results of the survey study. • Analysis of collected data.
Chapter six: Conclusion and recommendations	• Guide lines to obtain harmony and engagement between people and the surroundings. • Defining an occupant centered approach in architectural design.

Figure 1.1: Research Outline

Chapter 2: Interaction Through Senses

2.1 Introduction

This chapter studies the relationship between the senses and architecture, and how by using scientific information about the senses we can acquire a better and a richer experience within architectural space, we can enhance the occupants' everyday life style; and provide a better relation to the environment. By enhancing the occupant's experience, a more meaningful relationship with the world can be acquired. The chapter features the views of outstanding architects regarding the integration of senses in architectural design.

In an attempt to understand people's needs, the chapter studies how people perceive the environment firstly through their senses by providing a brief explanation about the senses in general and how the senses can be categorized, and the manner in which they were addressed through history. The chapter focuses on the research problem which is the link between architecture and the senses and the manner in which the built architecture does not consider the multi sensory experience in architectural design, which is reflected in the presence of a gap between people's needs and the attributes of the architecture they experience.

Finally, each sense is studied separately; the sense of vision, touch, hearing, smell, and taste. The chapter addresses the physical stimulus that stimulates the sense to having a more in depth understanding of the impressions the occupants have when experiencing the environment. This information should be utilized to inform design decisions in the future.

2.2 Experiencing Architecture - An Occupant Centered Approach

As Juhani Pallasmaa (2005) said: "Experiencing a work of art is a private dialogue between the work and the viewer, one that excludes other interactions[1]." And to have a better understanding of this dialogue one must first better understand the viewer. Marleau Ponty's philosophy makes the human body the center of the world and with it we are one with the universe, according to Ponty (1994): "Our own body is in the world as the heart is in the organism: it keeps the visible spectacle constantly alive, it breathes life into it and sustains it inwardly, and with it forms a system[2]."

And architecture is a very important medium that can help us relate to the universe and adapt to its changes. According to Pallasmaa (2005) Architecture is our primary instrument in relating us with space and time.

"Architecture is essentially an extension of nature into the man-made realm, providing the ground for perception and the horizon of experiencing and

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[1] Pallasmaa, J. (2005), The Eyes of the Skin: Architecture and the Senses, Wiley academy, Great Britain, p.52

[2] Ibid., p.40

understanding the world. It is not an isolated and self-sufficient artifact; it directs our attention and existential experience to wider horizons[3]." (Pallasmaa, 2005)

2.2.1 Research Problem

Rachel McCann[4]wrote in his award winning essay 'On the Hither Side of Depth: An Architectural pedagogy of Engagement' that architects have been trained to produce buildings to be read and interpreted rather than experienced, and the gravest problem facing the field of architecture is lack of engagement with the surrounding world. He added that the fact that we are connected worldwide through the internet on the other hand increases our isolation from our surroundings, burying ourselves within the virtual world[5].

Nowadays the sole dependency on computer aiding design programs, which definitely have their advantages; limits the architecture and deprives the user from having a full architectural experience that enriches his body and soul. According to Pallasma (2005) Computer imaging tends to flatten our magnificent, multi-sensory, simultaneous and synchronic capacities of imagination by turning the design process into a passive visual manipulation, a retinal journey[6].

> "Architecture is often designed to present itself compositionally to the gaze, aided and encouraged by our image-rich technology. Exotic shapes and eye-catching symbolic elements encourage us to visually consume and conceptualize architecture before ever corporeally experiencing it. They are meant to be taken up as images –short-circuiting embodied experience and producing instant meaning–rather than taken in spatially and materially over time[7]." (McCann 2005)

McCann pointed out as well that exploring the engagement with architecture is not only for design and architectural analysis basis, but as a model for developing an intimate and meaningful relationship with the larger world.

In other words the problem of the built environment lies in the manner architects perceive and visualize architecture, where buildings are regarded as abstract images printed in architectural magazines rather than as physical lived in spaces. Architects perceive architecture in abstraction so the outcome built environment is produced devoid of meaning.

2.2.2 Developing a Meaningful Relationship with the World

Frank Lloyd Wright stated that the main attribute of architecture was integrity. Just as it is in a human being, so integrity is the deepest quality in the building; if we succeed, we

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[3] Ibid., p.41

[4] Rachel McCann is an associate professor in the college of Architecture, Art and Design at the Mississippi state University in StarkVille

[5] McCann, R. (2005), "On the Hither Side of Depth": An Architectural pedagogy of Engagement, EAAE, Copenhagen

[6] Pallasmaa, op. cit.,

[7] McCann, op. cit.

will have done a great service to our mortal nature – the psyche – of our democratic society[8].

"Significant architecture makes us experience ourselves as complete embodied and spiritual beings. In fact, this is the great function of all meaningful art[9]." (Pallasmaa 2005) Architecture mediates meaning which is beyond the buildings themselves; it directs people to experience the reality of the world and feel their existence in the world, strengthening the sense of self by engaging fully and fulfilling their dreams, imagination, and desire. "Besides the functional demands, the question for design should be how the people feel inside the building and how they are going to experience the space. Not only in terms of how the space looks, but also how it touches, how it smells, sounds and maybe even tastes[10]." (Schueler 2006)

Considering the human senses in design can lift the quality of experience for the occupants they serve; buildings become more efficient in serving their occupants ever changing needs. And according to Maria Lehman, Sensory design should exist as a framework for adaptive architectural systems. And she added as well that it is important to use the emerging scientific discoveries instead of using one's intuition in figuring out what would work. This would better equip the architectural decisions to better connect with the occupants needs, thus bringing value to the buildings, and further empower the occupants they serve, and can solve problems starting from the most complex of commercial buildings to the simplest of home design, because it involves deep understanding of how occupants perceive and engage with the built environment, while also integrating and understanding how the environment affects them[11]. The relation between the senses and architecture has been a trending topic lately, conferences are held around the world addressing the subject to resolve the many problems rising in the cities; for example the noise issue.

2.3 The Senses and Architecture

"Architectural space is about layering for all the senses. Like a musical composition, spatial features come together into a symphony for occupants to experience. By engaging all of the senses, form and function may be more fully expressed so occupants can have deeper, more meaningful moments, interactions and experiences in the designed space[12]." (Eberhard, 2004)

Senses in the dictionary can be defined as a specialized function or mechanism (as sight, hearing, smell, taste, or touch) by which an animal or human receives and responds to external or internal stimuli[13].

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[8] Pallasmaa, J. (2005), The Eyes of the Skin: Architecture and the Senses, Wiley academy, Great Britain, p.72

[9] Ibid.

[10] Schueler, N. (2006), Senses in Architecture,
http://www.xs4all.nl/~bertbon/hyperbody/student_papers/Nora%20Sch%259fler%20-%20Senses%20in%20architecture.doc

[11] Lehman, M. (2011), How Sensory Design Brings Value to Buildings and their Occupants. Intelligent Buildings International, Taylor & Francis, London, Vol. 3, No. 1, pp. 46-54

[12] Ebhard, John P., Patione, Brenda. The Dana Foundation, Architecture with the brain in mind. April, 2004.

[13] Merriam Webster online dictionary: sense

Each living being lives in his/ her own subjective world that is not accessible to the direct observer; this world is made up of the information communicated to him/her from the outside through messages picked up by his/her sense organisms. "In order to understand man, one must know something of the nature of his receptor systems and how the information received from these receptors is modified by culture[14]."(Hall 1990) Based on these explanations this chapter intends to introduce us to the five senses and their stimuli in the surrounding environment.

2.3.1 Categorizing the Senses

Senses can be divided into two categories[15]:
1. The distance receptors: the eyes, ears, and nose.
2. The immediate receptors: touch, the other sensations we receive from skin, membranes and muscles; like taste.
The five main senses are vision, taste, touch, smell and hearing. But it is agreed that there are at least seven senses for humans, and a minimum of two more in other species. Further human senses are thermoception, the sense of heat which uses the skin, and nociception, the sense of pain. Or more important for architecture, the vestibular sense, that senses that are responsible for balancing of the body, and the kinesthetic sense, that gives the body the awareness of where its parts are located[16].

2.3.2 How People React with their Environment

There are three basic elements involved when humans react to their environment:
- The stimulus (both its physical character and its physiological attributes).
- The receptor (that receives the stimulus and reacts to it afterwards).
- The human organism (with both its prior experiences and current psychological state).

"A sensation occurs any time a stimulus activates one of your receptors. Perception occurs when you apply your experience to interpret sensations[17]." (Kasschau 1985) There is a difference between sensation and perception; sensation comes first then we perceive these sensations and our brain reacts to them based also on personal experience. There is no clear line of separation between sensation and perception but can be considered as a full process occupying both. When it comes to sensation we have the physical (real world) stimulus, like light, gas or cold temperature, and we also have the psychological experience,(how we experience the stimulus) such as vision, smell, or touch[18]. Thought can also be regarded a sense. With it we understand, evaluate and process experiences[19].

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[14] Hall, E. (1990), The Hidden Dimension, Anchor books, United States of America
[15] Ibid
[16] Schueler, N. (2006), (2006), Senses in Architecture, http://www.xs4all.nl/~bertbon/hyperbody/student_papers/Nora%20Sch%259fler%20-%20Senses%20in%20architecture.doc
[17] Kasschau,R. (1985), Exploring Behaviour, Pearson Prentice Hall, p.186
[18]Ibid., p.186,187
[19] Hekkert, P. (2006), Design Aesthetics: Principles of Pleasure in Design, Psychology Science, Volume 48, pp. 157 - 172

2.3.3 History of representing the Senses

In the Ancient Egyptian civilization there was a very popular symbol of power which is 'the eye of Horus'. It is drawn in six parts that corresponds to the six senses; Touch, Taste, Hearing, Thought, Sight, Smell. The eye was considered the receptor of input and the six senses were considered the six doors from which to receive data. The construction of the eye follows very precise laws. The senses are ordered according to their importance and according to how much energy must be eaten by the eye for an individual to receive a particular sensation. Touch was considered the most important and the one that cannot be displaced of the senses followed by taste, hearing, thought, sight and smell[20].

During the Renaissance times the system of the senses was related to the image of the cosmic body; vision was correlated to fire and light, hearing to air, smell to vapor, taste to water, and touch to earth[21]. At the present the five senses form a hierarchic system from the highest sense of vision down to the sense of touch.
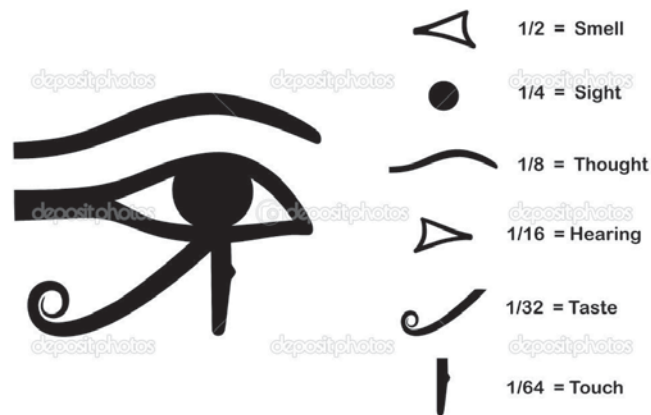
Figure 2.1: The Eye of Horus. depositphotos.com [19/05/2013**]**

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[20] https://sites.google.com/site/thegoldenpathofillumination/eye-of-horus

[21] Pallasmaa, J. (2005), The Eyes of the Skin: Architecture and the Senses, Wiley academy, Great Britain, p15,16

Figure 2.2: The Greek Cosmic Body. www.kheper.net [20/10/2013]

2.3.4 Absence of Multi-Sensory Experience in Architectural Design

Architectural design responds more often to just one sense, the visual one; the other senses are unfortunately frequently neglected. This limits the potential of architectural design since it is through the employment of all senses that architecture can have profound effect and greater value to users. The sensory stimulus that is experienced by the occupants of a building is regarded as a link between architecture and the occupant. According to Juhani Pallasmaa (2005) the dominance of the eye and the suppression of the other senses tend to push us into detachment and solitude in the technological world of today. The inhumanity of contemporary architecture and cities can be understood as the consequence of the negligence of the body and the senses, and an imbalance of our sensory system. "It is evident that life-enhancing architecture has to address all the senses simultaneously and fuse our image of self with our experience of the world[22]." (Pallasmaa 2005)

Some architects focus more on the visual aspect of architecture whereas consciously or unconsciously built architecture affects all other senses. We don't enter a place using only our eyes and shut off the other senses; we automatically notice the smell of the place while breathing, we are affected by noises we hear from the users in the place. The materials used in furnishing the space have a more important value that affect all senses besides the visual one. The choice of flooring for example is not all about choosing a nice pattern (which is important as well if done for a certain purpose, like directing people towards a certain orientation) In choosing flooring, the material's qualities are considered; how slippery, shiny, or hard for example. If the material is warm or cool, if the material produces an echo or absorbs noise, etc which result in a multi layered sensory experience of the architectural space.

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[22] Pallasmaa, op.cit., p.19

Many educators stress on the importance of teaching architectural students how to be sensitive to the sensory experience of space. It should be an experience that goes beyond the visual experience only. McCann stressed on the importance of teaching architectural students to position themselves temporally and spatially beyond the limits of the drawing sheet or computer screen.

> "As designers, they (students) need to develop an intimate relationship not with the world of the page or screen, nor even the forms and surfaces portrayed on them, but with the potential corporeal and multi-sensory experience of the emerging spaces[23]."(McCann 2005)

2.3.5 Integrating Senses in the work of Famous Architects

Many well known architects were aware of considering the importance of the senses in architectural design, and it had its impact in experiencing their work. Frank Lloyd Wright considered integrating the senses in his designs. According to Hall (1990) much of Frank Lloyd Wright's success as an architect was due to his recognition of the many different ways in which people experience space[24]. It was clearly shown in experiencing his architecture such as his changing levels, the circular stairs that connect floors impact the kinetic experience of space. The Wingspread was one of the many houses designed by Frank Lloyd Wright, it was also known as the Herbert F. Johnson house. It represents many of the key themes found in all architecture of Wright. As in all of his work, the play of light within the Wingspread is remarkable; the living room is flooded with natural light from rows of skylight [fig. 2.3]. Most importantly, Wright incorporated views between levels [fig. 2.4], allowing users to look down into the central spaces. Flooring as well was constructed out of four foot concrete squares that help moderate the temperature of the house through their use of radiant heating. Wright considered the children too when he introduced a playful spiral staircase for the children that led up to a lookout on the roof [fig. 2.3].

Alvar Aalto was consciously concerned with all the senses in his architecture and not only the visual aesthetics, His architecture was not looked as constructions of idealized vision, his buildings sometimes even may not seem very attractive on paper like Saynatsalo Town Hall for example [fig.2.5], but are very much appreciated in their actual physical and spatial encounter[25]. In his statement about furniture design he commented that:

> "A piece of furniture that forms a part of a person's daily habitat should not cause excessive glare from light reflection: it should not be disadvantageous in terms of sound, sound absorption, etc. A piece that comes into the most intimate contact with man, as a chair does, shouldn't be constructed of materials that are excessively good conductors of heat[26]."(Aalto 1954)

In this description Aalto responds to the sense of vision, sound, and touch while addressing the design of the furniture.

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[23] McCann, R. (2005), "On the Hither Side of Depth": An Architectural pedagogy of Engagement, EAAE, Copenhagen
[24] Hall, E. (1990), The Hidden Dimension, Anchor books, United States of America
[25] Pallasmaa, op. cit., p.70
[26] Ibid., p.70,71

Figure 2.3: Sky Light and Stair Case in Wingspread House. www.archdaily.com
[27/10/2013]

Figure 2.4: Views between Levels in Wingspread House. www.archdaily.com
[27/10/2013]

Figure 2.5: Saynatsalo Town Hall. En.Wikepidia.org [19/05/2013]

Philippe Rahm and Jean-Gilles Decostered approached architecture in a non conventional way which was called 'physiological architecture'. One of their projects was the 'Jardins physiologiques' in which they explored the idea of the incorporation between landscape architecture and the user's own internal self. Their approach dealt with the interactions outside the body and what it could produce within a body, their work concentrated on the possibility of affecting physiological state through architecture. Giving rise to physiological interactions would be achieved between plant and body, from the mouth to the stomach, from the skin to the blood, and from the nose to the brain. They dealt with the human senses, but with knowledge of the chemical and medicinal mechanisms as well between the organism and the active substances of plants.

The project takes the visitor through four different gardens relating to different dimensions of perception. The first is tactile where the experience ranges from extreme softness of willow seeds [fig. 2.7] to the extreme opposite to the giant Hogweed[27] [fig. 2.8] that can hurt the skin, and the second is a garden of the nose, which had a variety of scents from the sweetest rose scents to the most nauseating scents of ambrosia and the risk of allergy it entails. The third is the garden of taste which had the most delicious sugary taste of strawberries and the most disgusting flavors of belladonna which is a toxic plant. Then finally the fourth and last garden takes visitors through the states of mind, from the most soothing to the most distressing[28].

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[27] Giant Hogweed is a plant native to the Caucasus Region, produces a sap increases the sensitivity of the skin to sunlight.

[28] Barbara, A. (2006) Invisible Architecture: Experiencing Places Through the Sense of Smell, Skira, p.86,87

Figure 2.6: Jardins Physiologiques. http://www.archilab.org/ [19/05/2013]

Figure 2.7: Willow Seed
www.naturnorth.com [27/10/2013]

Figure 2.8: Giant Hogweed Seed
www.co.calumet.wi.us [27/10/2013]

Today, most architects and planners are bound by decisions made by financial experts, and these financial decisions and calculations which are not particularly concentrated with understanding human needs and perhaps even consciously ignoring them[29]. Making a profit is no doubt an important thing, but not at the expense of the quality of the architecture and its inner value. One must also think of how architecture can serve people's needs now and the needs of the following generations in many years to come. In the following sections a better understanding of each human sense is presented. Taking an occupant-centered approach in architecture and taking advantage of scientific discoveries and other famous architects' experiences to understand how occupants perceive their environment through their senses. Hopefully this information can be employed in the design decisions, providing a chance for improving human life style.

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[29] Hall, E. (1990), The Hidden Dimension, Anchor books, United States of America

2.4 The Sense of Vision

The first impression about architecture relies primarily on vision and the first glance we take of the architecture. But still we use all our senses in the perception process.
"Sight has historically been regarded as the noblest of the senses, and thinking itself is thought of in terms of seeing[30]." (Pallasmaa, 2005) That was obvious in the Classic Greek philosophy which was based upon vision. Greek philosophers stated clearly their appreciation and respect to the sense of vision intellectually. Aristotle considered sight as the most noble of senses, Plato regarded vision as humanity's greatest gift[31].
The dominance of the sense of vision resulted in the attempts of the optical corrections in the Greek architecture for example were mainly for the pleasure of the eye, but encouraged the unconscious ingredient in vision and enriched the experience for all the senses. "The eye invites and stimulates muscular and tactile sensations[32]." (Pallasmaa, 2005)

2.4.1 The Dominance of vision

Le Corbusier was one of many architects who were interested in the greatness of the aesthetical and visual aspect of architecture. Some statements by Le Corbusier prove the dominance of the sense of vision[33]: 'I exist in life if only I can see', 'One needs to see clearly to understand', 'Man looks at the creation of architecture with his eyes, which are 5 feet 6 inches from the ground'. But Le Corbusier didn't take care only of the visual aspect which he made clear in this statement "Architecture is the masterly, correct magnificent play of masses brought together in light[34]" (Le Corbusier, 1959). His statement clearly addresses the sense of vision, but with his sculpturing talent he managed to enrich other senses as shown in Villa Savoy, in the following figure as one of the examples of his work.

Figure 2.9: Villa Savoy Le Corbusier. en.wikiarquitectura.com, [19/05/2013]

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[30] Pallasmaa, J. (2005)

[31] Ibid., p.15

[32] Pallasmaa, op. cit., p.15

[33] Pallasmaa, J. (2005), The Eyes of the Skin: Architecture and the Senses, Wiley academy, Great Britain, p.27

[34] Le Corbusier (1959), Towards a new architecture; London, Architectural press

"With the technological development our world has become a lot faster than it
used to be. Screens, advertisements, radios. Constantly our senses are
triggered and it seems like time and space are fused by speed. The only sense
that can keep the pace of this development is sight[35]." (Schueler, 2006)

So with the technological development, the sense of vision became even the most
dominant and conscious in our every day experiences; leaving less chance for enriching
the rest of the senses and therefore making the experience more memorable and
affective. In Mies Van Der Rohe's work for example, the sense of vision is clearly
dominant but he enriches the experience of his buildings by integrating the other senses
as well. "In Mies van der Rohe's architecture a frontal percpectival perception
predominates, but his sense of order, structure, weight, detail and craft decisively
enriches the visual paradigm[36]." (pallasmaa, 2005) So through vision the architect can
take the user's attention and integrate his other senses. There are many determinants for
the visual experience such as; light, proportions, hierarchy, order, rhythm, etc. but light
is considered one of the most important factors for the visual experience.

2.4.2 Light (The Stimulus of Vision)

"The physical stimulus of vision is light which stimulates the eye." (Kasschau, 1985)
Light from any source has three physical characteristics: Wavelength, intensity (or
amplitude), and purity. And we perceive these characteristics as follows: we see the
wavelength as hue or color, intensity as brightness, purity as saturation[37]. For example
the color we perceive of an object comes from the wave lengths and of lights, that are
absorbed or reflected; only the reflected wavelengths reach our eyes and are seen as
color. Like the leaves of plants that absorb red, orange, green, blue and violet but reflect
only all the green wavelengths (according to its characteristics), therefore seen as
green[38]. The full spectrum of light could be seen in a rainbow or from a prism, and it
includes all the visible colors.
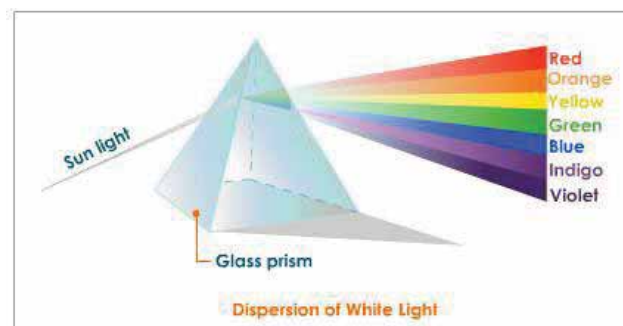
Figure 2.10: Spectrum Prism. Tutorvista.com [13/10/2013]

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[35] Schueler, N. (2006), Schueler, N. (2006), Senses in Architecture,
http://www.xs4all.nl/~bertbon/hyperbody/student_papers/Nora%20Sch%259fler%20-
%20Senses%20in%20architecture.doc

[36]Pallasmaa, op., cit. p.29

[37] Kasschau,R. (1985,) Exploring Behaviour, Pearson Prentice Hall, p.189

[38] Hecker, M., (2001), Light — Color & Human Vision, http://www.luminous-
landscape.com/tutorials/color_and_vision.shtml

As sir Isaac Newton discovered that white light from the sun is made up of the entire wave lengths combined. Light colors are organized into three primaries (red, green, and blue) and three secondaries (Yellow, cyan, and magenta) when the three primaries are overlapped they create the white light. And when the white light hits an object, the object will absorb the wave lengths that match its atomic structure, and reflect the rest back to our eyes. The eyes see the combination of wave lengths and the brain translates it into a color[39].

Le Corbusier considers that as we call the container in which we put water in a 'glass', we should consider 'architecture' the container of light. As the water fills the shape of glass, light fills the shape of architecture, therefore for him architecture is a receptor of light. The modern designer Satoshi Uchihara of Japan-based Uchihara creative lighting design describes his work in lighting design by saying that design is visible, but its objective is to design what is invisible as well. And he stresses as well about the role of lighting in creating this abstract ambience that can be felt in the air and cannot be seen[40]. The following figures show some of his works, Figure 2.11 shows how by valuing the atmosphere in the space can have a great effect as means of increasing hospitality to the users, and how with the aid of lighting design people's moods can be switched when looking at the mirror or touching the water. And figure 2.12 shows another example of a bar in Tokyo in where light changes by time with course dinners in the form of appetizer, main dish, and desert. Food, lights, and music create a natural harmony as time passes by. In figure 2.13 the inspiration of the lighting concept of the keyakizaka complex in Tokyo was 'wind' and was accomplished by fixing halogen spotlights on facades with different angels to give natural the feeling of wind.

Figure 2.11: Bathroom Design in the Intercommunication center in Tokyo.
http://www.ucld.co.jp/ [13/10/2013]

[39] Karlen, M., Benya, J., (2004), Lighting Design Basics, JOHN WILEY & SONS INC., New Jersey, p. 13
[40] Uchihara, S. (2012), Create light that exudes aroma, www.mea.lighting.philips.com [20/09/2012]

Figure 2.12: Lighting Design in Elements & Elements Bar Tokyo.
http://www.ucld.co.jp/ [13/10/2013]

Figure 2.13: Keyakizaka complex. http://www.ucld.co.jp/ [13/10/2013]

2.4.3 Lighting Design Approach in Architecture

According to Karlen and Benya (2004) most environmental experience occurs through vision, and without light we literally cannot see. Light can quickly and simply change the atmosphere of a space and how a person feels in it. So to better select the lighting in architecture, one must know first that the more saturated a white light source is with the full spectrum of wave lengths, the more accurately the eye and the brain will be able to interpret the true color of the object . And because of that artificial light sources are measured in two ways: color rendering index (CRI) and color temperature.

- Color rendering index: the CRI describes the quality of light on a scale of 0 (horrible) to 100 (perfect). This measurement illustrates the light source's ability to render the color of objects correctly; the more wave length-saturated the source is, the higher the CRI will be.
- Color temperature: the color temperature of a light source describes whether the light appears warm, natural or cool. The term "temperature" relates to the light emitted from a metal object heated to the point of incandescence. The higher the temperature, the whiter or cooler the light source appears.

Natural light is defined as having a CRI of 100 (perfect). The color temperature however, varies a great deal due to weather, season, air pollution and viewing angle. So before selecting appropriate artificial light, it is important to understand the positive psychological and physical effects of daylight on people. Natural light can be categorized into three types; morning light, daytime light, and night light. The early morning light penetrates the eyelids and causes melatonin levels in the blood to drop sharply (melatonin causes drowsiness and sleep). Daytime light and the exposure to the ultra violet rays cause the skin to generate vitamin D that is essential for the immune system as well as many other needs through the body. The falling of light causes the melatonin levels in the bloodstream to rise. The blood temperature drops, and the muscles and organs get vital rest[41].

2.4.4 Considerations in the Lighting Design Process

There are intangible qualities that are necessary considerations in the lighting design process of an interior architectural space. Like the sculptural quality of the space, the color and materials, the size and scale of luminaires, and last but not least the lighting design quality[42].

a) **Sculptural quality:** Other than the majority of rectangular spaces we live in; for example curved walls, or polygonal shape, or an arched, or domed ceiling demand lighting design solutions that enhance their unique shapes. Creating a gradient of light on a curved surface, using shade and shadow to articulate complex angular relationships.

b) **Color and materials:** since white light is made up of all wave lengths from the visible spectrum and artificial light sources contain different levels of various wave lengths. The color and quantity of light source can change how a material or object is perceived. There are two important factors to consider in the

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[41] Karlen, M., Benya, J., (2004), Lighting Design Basics, JOHN WILEY & SONS INC., New Jersey, pp.3-19
[42] Ibid., pp.75-82

relationship between and the material of the object to be illuminated. These two factors are the reflectance and the transmittance of the material:

- Reflectance: The reflectance of a material represents the percentage of light the material will reflect based on its color and the way in which the light is distributed after it hits the surface, which can vary greatly. For example if a material is glossy, the beam of light will remain as a ray and reflected back into the space at the same angle as it hit the surface. This can create unwanted reflected glare, but if it is done intentionally it can create sparkle and drama. And if the material is matte or textured, the light will be scattered in many directions.
- Transmittance: The transmittance of a material characterizes how light travels through the material. The finish and the texture of the material will also impact what the light will look after it passed through the material. For example if a material is transparent like clear glass or plastic, the shape of the beam is not altered, but only reduced based on the color or the coating applied to the material. And if the glass or plastic contain a texture this will scatter and refract the light and spread it.

c) **Scale and size:** The size and scale of luminaires are important design factors for all spaces. What can be appropriate for a living room is not appropriate for a grand lobby or auditorium. Ceiling height is of particular concern for lighting, where unusually tall space cannot rely on standard lighting of conventional ceiling height of residential scale for example. In addition the design of interior light can impact the actual sense of scale of the interior space; a high ceiling can be made shorter by increasing the light at the lower part of the room walls. Different light intensities can give the impression that the room is divided into many sections and the room feels larger than it actually is.

d) **Design quality:** The concept of design itself of the lighting varies widely and has many options. Highlighting a decorative wall treatment or richly textured drapery can make a difference in creating a room that is aesthetically satisfying. There are kinds of spaces such as churches, restaurants, and grand reception rooms that seem to demand a special kind of atmosphere that can be created mostly with lighting.

2.5 The Sense of touch

The sense of touch is more trusted; by vision we may assume, or be introduced to something new but not know for sure all the information about it until we touch it, then we collect the missing information about the object. If we assume that a surface is soft from a previous experience of a similar surface, we are not sure until we prove it with our sense of touch. "The eye is the organ of the distance, whereas touch is the sense of nearness, intimacy and affection. The eye observes and investigates, whereas the touch approaches and feels[43]."(Schueler, 2006)

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[43]Schueler, N. (2006), Senses in Architecture, 43
http://www.xs4all.nl/~bertbon/hyperbody/student_papers/Nora%20Sch%259fler%20-%20Senses%20in%20architecture.doc

Mies van der Rohe's use of different and contradictory textures in building materials encourages people to want to touch the building as well.

The sense of vision reveals what the sense of touch already knows, therefore the sense of touch can be considered as the unconscious side of the sense of vision. In the words of Merleau-Ponty "We see the depth, the smoothness, the softness, the hardness of the objects[44]" (Ponty, 1994) when we see a hard surface from a distance, we probably know the information that it is hard from a previous experience through the sense of touch to a similar surface; Therefore the sense of touch is related to the sense of vision in a way.

Figure 2.14: Mies Van Der Rohe's Barcelona Pavilion.
marlas.cgsociety.org [19/05/2013]

2.5.1 The Importance of the Sense of Touch

"Textures on and in buildings are seldom used consciously and with psychological or social awareness[45]."(Hall, 1990)

The texture and material has a lot of potential in enhancing the relation between man and his environment, and is of crucial importance to the user of the place. Even materials that may seem to have the similar visual effect may have totally different qualities when touched. "Structures have a visual effect but by touching them we feel more components can vary in materials that give the same visual impression[46]."

Juhani Pallasmaa emphasized the importance of the sense of touch in architecture in his book 'The eyes of the skin'. In his words "The door handle is the handshake of the building."[47]In the following statements he stated the role of the sense of touch in the process of integrating our selves with the world, and mentioned the depth of the sense

[44] Ibid., p.42

[45] Hall, E. (1990), The Hidden Dimension, Anchor books, United States of America, p.62

[46] Schueler, N. (2006), 43. Schueler, N. (2006), Senses in Architecture, http://www.xs4all.nl/~bertbon/hyperbody/student_papers/Nora%20Sch%259fler%20-%20Senses%20in%20architecture.doc

[47] Pallasmaa, J. (2005), The Eyes of the Skin: Architecture and the Senses, Wiley academy, Great Britain, p.56

of touch in knowing the weight, density, temperature, etc…According to Pallasmaa (2005), touch is the sensory mode that integrates our experience of the world with that of ourselves. "The hands are the sculptor's eyes; but they are also organs for thought […] the skin reads the texture, weight, density and temperature of matter[48]."(Pallasmaa 2005)

2.5.2 Contact, Temperature (the skin stimulus)

Skin senses have the richest and most diverse stimuli to which they are sensitive to. Contact is one stimulus, temperature is another. Contact results in our sense of touch, and as the force of contact increases, the sensation of touch becomes more complex to be that of pressure. A temperature stimulus is perceived cold if the stimulus is cooler than the surface of the skin, and it experiences warmth if the stimulus temperature it warmer than that of the surface of the skin[49].

> "Materials are judged not only by their surface appearance but also accordingly to their hardness and their heat-conducting ability. Those which may become very cold or very hot are equally unpleasant.[50]"(Rasmussen, 1962)

Materials should be based on all their qualities not for one quality only while ignoring others.

2.5.3 The Usage of the Sense of Touch in Architecture

One of the great examples of introducing the science of the senses in architecture and especially the sense of touch was the Bauhaus, where the importance of the sense of touch to architecture was introduced to students of the Bauhaus at the early stages of architecture learning.

In the Bauhaus -the school of modern architecture and design- new methods were introduced to train the senses to a higher degree of awareness than in ordinary schools. The Bauhaus education intended to avoid conventional architectural thinking and to liberate the creative capacity of students. So instead of learning about architectural materials in lectures, students learnt about employing different materials through experience; by recording their impressions of various materials they worked with. Emphasis was placed not simply on appearance of the surface but particularly on their feel[51]. Frank Lloyd Wright was known to be creative with the sense of touch as well; he would know how to involve people with the surfaces of the buildings. The interiors, like that of Robie house for example were guest are compelled to feel the interior walls by their hands.

> "Wright, an artist in the use of texture, used the roughest of bricks, then separated them by smooth, gilded mortar set in from the surface a full half-inch. Walking down these halls the guest is almost compelled to run his fingers along the grooves[52]." (Hall, 1990)

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[48] Ibid., p.56
[49] Kasschau,R. (1985), Exploring Behaviour, Pearson Prentice Hall, p.203
[50] Rasmussen, S. (1962), Experiencing Architecture, M.I.T.press, Cambridge, p.182
[51] Rasmussen, S. (1962), Experiencing Architecture, M.I.T.press, Cambridge, p.176,177
[52] Hall, E. (1990), The Hidden Dimension, Anchor books, United States of America

Minute differences in textural characteristics have a strong effect. Like the differences in Wright's house Falling water, which has rustic lime stone walls set against smooth blocks of white cement and shiny glass and steel[53].

Figure 2.15: Robie House by Frank Lloyd Wright. www.flickr.com [20/05/2013]
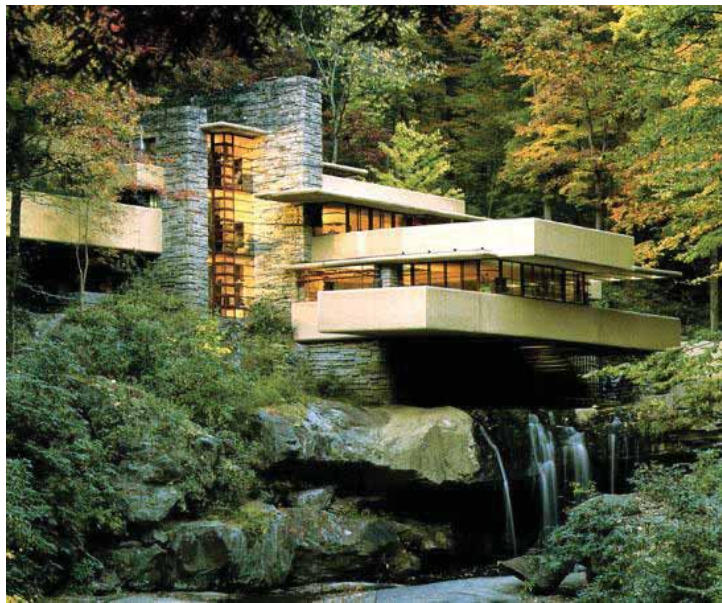
Figure 2.16: Falling Water House. architectureinsights.com.au [20/05/2013]

There are two very different examples of architecture regarding the textural experience which are the holocaust memorial in Berlin from Peter Eisenman or the interior of the iWeb by Kas Oosterhuis. Both the extremely smooth concrete and the sprayed foam

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[53] Rasmussen, op. cit., p.163

layer just invite to be touched. Though our vision leads us there only the touch is actually satisfying our curiosity[54].

Figure 2.17: The Holocaust Berlin. travel.nationalgeographic.com [20/05/2013]

Figure 2.18: Interior of iweb. www.flickr.com [20/05/2013]

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[54] Schueler, N. (2006), 43. Schueler, N. (2006), Senses in Architecture, http://www.xs4all.nl/~bertbon/hyperbody/student_papers/Nora%20Sch%259fler%20-%20Senses%20in%20architecture.doc

2.5.4 Considerations for Using the Sense of Touch in Architecture

The surface of an old object done with care by the hands of the craftsman becomes very inviting for the user to touch, according to Juhani Pallasmaa (2005), through the impressions of touch we shake the hands of countless generations[55]. So through the sense of touch as well we can witness history; by touching an old object that has been standing there for years, and touched by people at the time as well is like going through a history book, and witnessing how people lived at the time.

It is rarely considered how the light touches our skin and its effect on us, as light is important for us to see, it can be sensed with our skin as well, like feeling the warmth of sunrays for example. "The skin can sense more things. It can read texture, weight, density and temperature of matter[56]." (Pallasmaa, 2005)

There are four main items that demand textural or material choices; walls, ceilings, floorings, and furniture. So architect should study the texture, weight, density, and heat conductivity of the materials prior to their use on walls, ceilings, floorings, and furniture.

Figure 2.19: light Rays in the Pantheon

It is the Architect's job to consider how the users' feet contact the ground, and how will users experience that in the place that architects design. When it can produce totally

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[55] Pallasmaa,J. (2005), The Eyes of the Skin: Architecture and the Senses, Wiley academy, Great Britain, p.56
[56] Ibid.

different experiences; walking on sand is a totally different experience from walking on a wooden floor, both provide a totally different experience from walking on a porcelain floor. In Japanese gardens tiles and stepping stones are designed to be walked on with wooden clogs, and then these clogs are taken off before entering the house where the floors are covered with matting and everything is made of wood and paper and other friendly materials that are sympathetic to the touch[57]. An example of a Japanese garden is in [fig.2.20]

Texture impacts the sense of touch and can be used for different reasons in architecture. One of these reasons is to indicate change of level, or indicate change of zones like the example in [fig.2.21] in Athens below the acropolis where there is a clear urban flooring division; the path on the right leads to the acropolis and the herodion theatre, and the path on the left leads to a church. Change of texture can be used as no trespassing area as well; coarse gravel that cannot be stepped on around an outdoor statue display, course steps can be used to avoid slippery floors as well. Texture can be used as well to control glare, smooth surfaces shine and reflect light. And finally, alternating smooth and coarse surfaces can be used to treat boredom in a long elevation.

Figure 2.20: Japanese Garden. www.landscapingnetwork.com [14/10/2013]

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[57] Rasmussen, S. (1962), Experiencing Architecture, M.I.T.press, Cambridge, p.182

Figure 2.21: Flooring Division below the Acropolis in Athens

2.6 The Sense of Hearing (Acoustics)

In several interviews blind people were asked to describe their feelings about architecture, and they said that the outside could be sensed with hearing and description, they could hear the wind blow off the building and sense the size of it that way, smooth glass and steel was not preferred for example by some because it sounds very hollow and cold[58]. Others also described how they perceived the interiors of architecture without the sense of sight; for example inside rock walls tended to muffle the sound which wasn't a help for them, brick was reported to be a little better. High ceilings tended to make the room sound huge, wood paneling seemed to hold the noise out[59].

2.6.1 Hearing Stimulus

There are three factors that must be present for sound to be detected: first, the presence of a vibrating source or stimulus. Second, the presence of a medium for transmitting pressure waves from that source. (Gaseous as it usually is; like air, liquid or solid). Finally, the presence of the receptor.
The physical stimulus for sound is usually pressure waves, these vibrating waves of pressure are known as sound waves. Sound waves have three physical characteristics which are: wavelength (frequency of vibration), intensity (amplitude), purity. These

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[58] Schueler, N. (2006)
[59] American foundation for the blind

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characteristics are perceived by us as follows: we perceive wavelength as pitch, wavelength as loudness, purity as timbre which is complexity due to overtones[60]. The transmission of the sound includes such processes as reflection, dispersion, refraction, absorption, and so on. All of which depend on the properties of the space. When the sound waves arrive at the inner ear, they are then converted to neurological signals that are processed by the brain; connecting the external world to the inner consciousness[61]. In Steen Eiler Rasmussen Words in a chapter of his book called 'Hearing architecture' describing how sound can give us an impression about the form, he said:

> "We see the light it reflects and thereby gain an impression of form and material. In the same way we hear the sounds it reflects and they, too, give us an impression of form and material[62]."(Rasmussen, 1962)

2.6.2 Hearing Architecture

The special thing about the sense of hearing in architecture is that we have major roles in the resulting sounds we hear, every footstep, and word said forms the sound that we hear in the place. As Pallasmaa said that buildings do not react to our gaze, but they do return our sounds back to our ears[63].

> "It is omni-directional, not focused like vision. A view at a building will not show the person watching the building but a building will return the sound of a person walking in it and listening to the sound[64]." (Schueler, 2006)

Pallasmaa (2005) mentioned that we are not aware of the significance of hearing in special experience, although sound often provides the temporal continuum to the visual impressions[65]. And some researchers compared the sound in architecture to the sound in movies and how we get different impressions when the sound track changes or starts suddenly in a certain scene or is muted in another for acquiring different feelings from the viewer that are suitable to the scene. According to Schueler (2006) that like a soundtrack in a movie, where music is increasing the tension in a thriller or the drama in a love story, sounds in architecture can increase the intensity of its perception[66].

> "A space is understood and appreciated through its echo as much as through its visual shape, but the acoustic percept usually remains as an unconscious background experience."[67](Pallasmaa, 2005)

There is a different feeling one gets when entering an uninhabited and unfurnished house compared to that of entering an inhibited home, in which sound is softened by the objects used in living. And the ability to sense the size or the volume of the space in complete darkness if one hears the sound of dripping water[68].

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[60] Kasschau,R. (1985), Exploring Behaviour, Pearson Prentice Hall, pp.195-197
[61] Blesser, B., Salter, L. (2007), Spaces speak, are you listening? Experiencing aural architecture, MIT press, Cambridge, Massachusetts, p. 12
[62] Rasmussen, S. (1962), Experiencing Architecture, M.I.T.press, Cambridge, p.224
[63] Pallasmaa,J. (2005), The Eyes of the Skin: Architecture and the Senses, Wiley academy, Great Britain, p.49
[64] Schueler, N. (2006)
[65] Pallasmaa, op. cit.
[66] Schueler, op. cit.
[67] Pallasmaa, op. cit., p.50
[68] Ibid., p.50

Figure 2.22: Sound of Dripping Water. www.apraxiaadventures.com [20/05/2013]

2.6.3 Aspects of Aural Architecture

Auditory spatial awareness manifests itself in four different ways. First it influences users' social behavior; some spaces emphasize aural privacy or aggravate loneliness, other reinforces social cohesion. Secondly, it allows users to orient in and navigate through a space; hearing acoustic objects, or surfaces supplement vision or in the case of darkness or visual disability it actually replaces vision. Thirdly, it affects users' aesthetic sense of a space. Just like visual embellishments make a space aesthetically pleasing, aural embellishments can do so for the ear by adding aural richness to the space. Fourthly, auditory special awareness enhances our experience of music and voice. Physical acoustics of a musical space merge with sound sources to create a unified aural experience. These four aspects that show how auditory special awareness is manifested correspond to four aspects of aural architecture: social, navigational, aesthetics, and musical spatiality[69].

According to Blesser and Salter (2007) an aural embellishment is an acoustical object or geometry, wether local or global, that produces aesthetically recognizable acoustic attributes, adding aural richness and texture to the space. Local aural embellishments are experienced by listeners when they are relatively close, such as the sound of water from fountains. And on the other hand global aural embellishments can be experiences by listeners all over the place, like most acoustic objects. Aural embellishments can be categorized into two other categories as well, like visual embellishments they are categorized into active and passive. Active aural embellishments can be water spouting from fountains, birds singing in a cage, and wind chimes ringing. And passive aural embellishments can be reflecting and absorbing panels, curved surfaces that focus on sound, and the aural analogues of pictures, tapestries, mirrors, arches, and statues.

As previously mentioned before, almost every visual embellishment has some acoustic influence. For example, a large mirrored wall reflecting light also function as a perfect reflectant of sound. An elegant tapestry absorbs sound, and a marble statue diffuses it.

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[69] Blesser, B., Salter, L. (2007), Spaces speak, are you listening? Experiencing aural architecture, MIT press, Cambridge, Massachusetts, p.11, 12

Therefore depending on the sensibility of the designer or the perceiver, every embellishment can be perceived as either visual, aural, or both at the same time. Aural embellishments in a concert hall are considered to produce unwelcome acoustic effect and should be avoided, because aural experience of a concert hall should be uniform. In contrast, aural embellishments are welcome in a social or religious space, providing aural variety, symbolic meaning and spatial texture[70]. Therefore there are architectural case study categories for sound, and each category demands its specific treatment:

a) Spaces where public address is necessary, such as train stations, and air ports
b) Spaces where sound needs to be reflected based on activity. Such as mosques, and main halls in churches.
c) . Spaces where sound needs to be absorbed based on the activity, such as hospitals, libraries, halls surrounding conference rooms, and theatres.
d) Spaces with background ambient sounds from utensils and other noises that can be suppressed, such as hotel halls, malls or shopping spaces, and restaurants.
e) Handicap requirements at lifts, etc. announcing floors or arrival at a certain level for orientation of blind users.

Figure 2.23: Airport as an Example of Space where Public Address is Necessary. www.siasat.pk [10/09/2013]

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[70] Ibid, pp.51-53

Figure 2.24: Mosque as an Example where Sound Needs to be Reflected.
www.imageofblog.com [10/09/2013]

Figure 2.25: Mosque as an Example where Sound Needs to be Reflected.
Plus.google.com [10/09/2013]

Figure 2.26: Library as an Example where Sound Needs to be Absorbed.
www.ucl.ac.uk [10/09/2013]

Figure 2.27: Restaurant Kitchen as an Example of Space where Noise needs to be Suppressed. restaurantequipmenttogo.com [10/09/2013]

Sound manipulation for architectural spaces can be applied for three reasons. The first reason is to control the proximity of the sound of the speaker or the sound source in a room, making the sound feel louder or quieter, or even like focused whispers. The second application for sound manipulation in architecture could be the absorption of noise or illumination of noise. The third application for sound manipulation in architecture could be for giving a space a bigger or smaller illusion from experiencing its sounds.

2.6.3.1   Applying Aural Illusion to Expand a Space

There exist aural space manipulators the same way there exists visual space manipulators that can expand a space such as windows, mirrors and pictures by establishing a visual connection between the observer and the additional physical space,

a mirror expands space by connecting the observer to a replica of the existing space, and a picture expands space by inserting the image of another environment. Small rooms with many mirrors give the impression of being far larger than their actual size, with mirrors on multiple surfaces as in dance studios, make the space feel infinite.

To create aural illusion of an expanded space, architects replicate the sound field that would have been present if an additional space were actually present. Sound absorption is considered an aural space expander. Complete sound absorption simulates a virtual window into an infinite, unbounded space. Therefore a dense sound absorbing panel that would absorb all sound waves that arrive would aurally replicate a window into an absolutely open space. As if the sound had actually encountered a window and disappeared into open space.

But if the intended virtual space is to be equivalent to an actual room rather than an infinite void, the virtual space would reverberate sound entering from the real space through the virtual window, and architects would need to reproduce the appropriate sound field at the virtual window. This illusion would be done in a sequence of stages:

a) Embedding an array of small loud speakers in a sound absorbing panel. The sound speakers would duplicate at the surface of the panel the sound field of a space as it would appear at a virtual window.

b) For refining the virtual window onto a virtual space, the virtual space would need to respond to sound originated from the actual room. For example listeners would hear the reverberations of their voices when shouting through this window. This can be done by embedding an array of microphones into the panel that would create the virtual reverberations.

c) Finally, to make the virtual space simulate to an extension of an actual room, architects might expand the area of sound absorbing panel to cover an entire wall, such that sound arriving from the room would be completely absorbed. This would remove the aural perception of this wall and make it feel further[71].

2.6.4 Architectural Examples of Sound Manipulation

There is a clear architectural example of sound manipulation in the Rococo period, where the town houses were produced such that their rooms not only varied in size and shape, but also in acoustical effect. So the visitor first entered to a marble hall [fig.2.28] which resounded to the sound of his side arm and from his high heels, then came a series of rooms with more intimate and musical tones. First, a large dining room [fig.2.29] acoustically adapted for table music, then came a reception with silk paneled walls [fig. 2.30] which absorbed sounds and wooden furniture for the right resonance of chamber music, next came a smaller room for more fragile notes, and finally the 'Madame boudoir's' which resembled a satin jewelry box [fig. 2.31], and was for intimate talks and whispering[72].

Our cities nowadays have lost their echo, which depend on the pattern and the scale of the streets and the prevailing architectural styles and materials used as well; the echo of a renaissance city differs from that of a baroque city. The wide open spaces of contemporary streets do not return sound, and the interiors of today's buildings absorb

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[71] Ibid., pp.55-58
[72] Rasmussen, S. (1962), Experiencing Architecture, M.I.T.press, Cambridge, p.234

sound[73]. When we describe a place we have been to now, we barely say anything about its sound, there is no special sound characteristics in a place that we can recall later. "There is no longer any interest in producing rooms with differentiated acoustical effects, they all sound alike[74]." (Rasmussen, 1962)

Figure 2.28: Marble Entrance in Rococo Interior. www.mailments.com[10/09/2013]

Figure 2.29: Dining Room Acoustically Adapted for Table Music.
Thehistoryblog.com [10/09/2013]

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[73] Pallasmaa,op. cit., p.51
[74] Rasmussen, op. cit., p.235

Figure 2.30: Silk Paneled Reception that Absorbed Sound.
halfpuddinghalfsauce.blogspot.com[10/09/2013]

Figure 2.31: Room Interior like Satin Jewelry Box. wehearit.com [10/09/2013]

With the technological development nowadays and the lack of interest to enrich the hearing experience in architecture, people became even less aware of different sounds around them, when the sensitivity to sound is an important factor for survival. For example hearing the siren of the ambulance and detecting where the sound is coming from. Sound sensitivity is important in social activity as well, to detect were the sounds are coming from and paying attention to these sounds. According to Pallasmaa (2005), the programmed recorded music of shopping malls and public spaces eliminates the possibility of grasping the acoustic volume of space. And adds that our ears have been blinded[75]. Like pallasmaa said 'our ears have been blinded' we no longer are aware of the delicate sounds from the tapping of our shoes on the floor, or the water drops from a tap, or the sound from typing etc… we became accustomed to the recorded music that do not have any depth to them in perhaps understanding the volume of the space.
On the other hand we can find more recent examples that show the more dramatic use of sound, like the Jewish museum by Daniel Libeskind. The museum complex is designed with special rooms with high ceilings containing different installations, in one room copper plates in the shape of human faces put on the floor when visitors enter the space they step on the copper faces and noise echoed by high walls will fills the space reminding visitors of peoples sufferings. Other simple installations can be birds' song recording in an interior garden, or applying sand on the ground or metallic objects [fig.2.33] which could be heard while walking on it[76].
Aeolus Pavilion [Fig. 2.34] is another example providing an acoustical experience through architecture. Aeolus is considered an acoustic as well as optical pavilion that travelled around the world, and designed by Luke Jerram. It was designed to make audible the silent shifting patterns of the wind. Aeolus is an arch made of 310 internally polished stainless steel tubes and a web of harp strings that resonate and sing without electrical power or amplifying. The Aeolus pavilion has been touring in many countries and exhibitions for people to experience[77]. Luke Jerram has been researching acoustics, wind, architecture and light for a few years, but it was a trip to Iran exploring mosques that inspired this project and especially how well diggers described how 'wells' sing in the wind[78].

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[75] Pallasmaa,J. (2005), The Eyes of the Skin: Architecture and the Senses, Wiley academy, Great Britain, p.51
[76] Schueler, op. cit.
[77] http://www.rwa.org.uk/whats-on/exhibitions/2011/09/exhibition-luke-jerram/
[78] http://inhabitat.com/charming-giant-sculpture-aeolus-makes-wind-audible-in-london/acoustic-wind-pavilion-tubular-sculpture-london-2/?extend=1

Figure 2.32: Jewish Museum. www.designtavern.com [20/ 05/2013]

Figure 2.33: Jewish Museum metallic Sound Installations on the Floor

Figure 2.34: Aeolus Pavilion http://inhabitat.com [13/09/2012]

2.6.5 Example of Applying Silence as an Acoustic Architectural Experience

When we have a variety of sound experiences, then we can appreciate 'silence' as an acoustic experience in itself. In movies when the sound track stops suddenly, spectators concentrate more and get the feeling that something important is going to happen. Experiencing natural silence (not just absorbing every sound) and tranquility is very healing as it puts the person in a meditative like state of mind. The experience of silence has been used in the past as well.

> "One of the most exciting auditory experiences in architecture is tranquility. In the past the tool of silence has been used to create great atmospheres. The silence in the pantheon combined with the great view of the roof is indescribable. The absence of sound is actually creating the atmosphere[79]."(Schueler, 2006)

And according to Pallasmaa (2005), a powerful architectural experience silences all external noise; it focuses our attention on our very existence and as with all art, it makes us aware of our fundamental solitude[80]. Large enclosed spaces where a listener could hear the whisper of a speaker at a remote distance for example, dome of Saint Paul cathedral in London, Saturday hall in the capital at Washington D.C, and Saint John lantern in Rome were called "whispering galleries" according to Blesser, and Salter (2007) even if these examples were mostly architectural accidents resulting from curved surfaces presumably designed for the visual impact.

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[79] Schueler, N. (2006), Senses in Architecture
[80] Pallasmaa,J. (2005), The Eyes of the Skin: Architecture and the Senses, Wiley academy, Great Britain, p.52

Figure 2.35: The Pantheon

Figure 2.36: Curved Surface Visual Manipulation. Fineartamerica.com [10/09/2013]

The following explain how this experience of silence or whispering galleries can be created. The time delay for the sound to return from the ceiling, combined with its focused direction gives the visitor standing in the center of such a gallery the effect of an invisible and mocking presence. This is not an echo, for the visitor, the sound of the distant speakers' voice is focused directly at the him/her, as if the speaker is right next

to him/her. When a space has curved surfaces, its acoustics can readily change the aurally perceived geometry of the space. Like the side mirror of an automobile warning that visual objects are closer, larger then they appear. Curved surfaces also change the apparent location of aural objects. Particular surfaces can focus sound such that the source appears aurally closer or further, larger or smaller. Curved surfaces can also produce acoustic dead zones such as the source is inaudible as if it were in an acoustically isolated arena. This aural privacy doesn't require walls, some curved surfaces can give the same aural impression that a speaker is sitting on the right or left of the listener. A parabolic sound reflector can displace a speaker 30 meters away to an aurally perceived distance of 3 cm. finally, there is always the active way to acquire silence, which is by using sound absorption panels[81].

2.7 Sense of Smell

The researcher Maria Lehman stated that as architects, it was time to start to think about this invisible dimension which is the smell and integrate it with their design to make the architecture pop in all the right places. "You should use smell on purpose to create entire olfactory environments. Escape from the "cover up" mentality. Go beyond simply making everything smell clean[82]."(Lehman, 2010)

> "If you were to travel through your architectural built project using only your sense of smell, would you be able to find your way? How would you distinguish transition between spaces? And how would you know what to do and when? Also, how would different scents make you feel, think or behave?[83]" (Lehman, 2010)

These questions were asked by Lehman, a designer, author, and researcher from the United States whose research currently focuses on links between the human sensory system and new technology for architectural design. She asked these questions to get people thinking about the potentials of the sense of smell. Confirming the importance of the sense of smell, since the most persistent memory of any space is often its smell[84].

2.7.1 Theoretical Review of Sense of Smell in Architecture

Philosophers through history under appreciated the sense of smell; the act of smelling was seen as unproductive and having very little to do with acquiring knowledge. This lack of interest in the subject from the 17th to the 19th century not only affected the awareness towards smell in scientific research but also was reflected in our language. In the ancient Egyptian civilization scent played an important role in the connection with the afterlife. Nero –the last emperor of the Julio-Claudian dynasty– would put nets of roses suspended from the ceilings in some celebration events to scent the rain and create enjoyable air. In Japanese tradition, the practice of 'incense ceremony' which is dated back to the 6th century, in which several types of aromatic wood was burned and

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[81] Blesser, B., Salter, L. (2007), Spaces speak, are you listening? Experiencing aural architecture, MIT press, Cambridge, Massachusetts, pp.53-55
[82] Lehman, M. (2010), The Power of Scent for Architectural Design, www.sensingarchitecture.com
[83] Ibid.
[84] Pallasmaa,J. op. cit., p.54

considered as a mental training. Ancient Chinese culture, burning incense was used as a way of measuring time.

The smell of time can be noticed in the smell difference between morning air and night breeze, also the difference between the smell of spring and that of the snowy winter night[85]. Salvador Dali described the sense of smell as the one of the five senses that best renders the idea of immortality. He knew the critical relation between the sense of smell and time from the measurement of the life span of the odor[86].

2.7.2 Stimulus for the sense of smell

The physical stimulus for our sense of smell is gas, and not every gas can be detected by smell, the gas has to be from a kind that is soluble in water for us to be able to detect its smell. Even the smell of a solid such as our desk results from the minute gaseous emissions from the object[87].

Man can differentiate between more than ten thousand different scents, and if introduced to a new scent it is possible to remember the smell and recognize it later. Since it is not possible to name ten thousand scents, Man associates spatial qualities to the scent, such as the expression "it is a hospital smell" which is very familiar. These associations could be used in architecture to stimulate emotions, to guide, or to distract[88].

The sense of smell is very much connected with emotions. It can arouse distant memories from childhood even; if a person came across a familiar smell from the past then he quickly would be brought back to that moment in time[89]. According to Pallasma (2005), a particular smell makes us unknowingly re-enter a space completely forgotten by the retinal memory; the nostrils awaken a forgotten image[90]. Researchers as well have shown that while smell recognition is not as accurate as visual recognition, smell outlasts much longer. Another distinction between olfaction and visual experience is that olfaction arouses emotional response, while visual experience much likely involves thought and cognition[91].

On a more practical level, research has found that students who studied material while exposed to a certain scent performed better on tests when this particular scent is present. Their memory of what they learnt was improved by the presence of the scent that accompanied their exposure to the studying material.

From a biological point of view which scientifically reassures the relation between smell and emotion, we can find that the olfactory system which is the part of the brain responsible for the sense of smell very close to the limbic system, which is the part of the brain structure that is responsible for emotion, learning, and memory. That's why memory evoked by odor has a stronger emotional impact.

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[85] Wang, V. (2009), The Scent of Creativity, School of Design and Crafts, University of Gothenburg, master thesis

[86] Barbara, A. (2006), Invisible Architecture: Experiencing Places Through the Sense of Smell, Skira, p.74

[87] Kasschau,R. (1985), Exploring Behaviour, Pearson Prentice Hall, p.200,201

[88] Schueler, N. (2006), Senses in Architecture

[89] Larson, M. (2004), The Sense of Smell is a Ticket to Childhood, CAS, Oslo

[90] Pallasmaa, J. (2005) The Eyes of the Skin: Architecture and the Senses, Wiley academy, Great Britain, p.54

[91] Wang, V. (2009), The Scent of Creativity, School of Design and Crafts, University of Gothenburg, master thesis
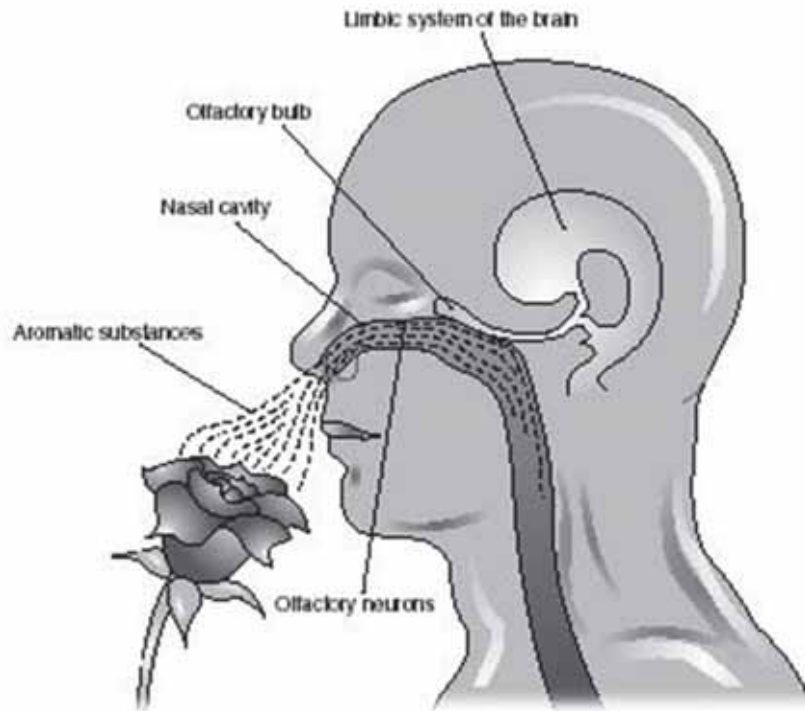
Figure 2.37: Smell & Emotion. www.faqs.org [20/05/2013]

> "It is hard to pinpoint the location of a scent, but nonetheless a smell can very
> well represent a space; it does not content in a space but rather enrich and
> characterize it. Every place has its distinct scent, whether it is a country, a city,
> a certain street, or even a room[92]." (Wang, 2009)

Chandler Burr, a perfume critic in the New York Times' uses his nose to remember the
places he has been to, and in one of the articles he wrote, 'scent of place' he described
how a bottle of air from a certain place, for example a certain country , can instantly
transport him there[93].

Odors are described to be wonderful and terrible at the same time, as unlike visual
attributes, people can choose to close or open their eyes at any time, but odor could not
be escaped from as it comes in with our breathing[94]. That is the importance of
considering the sense of smell in the architectural design, because it either creates a
memorable experience or a terrible one, and we have to admit that it already exists
whether we are aware of it or not.

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[92] Wang, op. cit.
[93] Ibid.
[94] Barbara, op. cit., p.86

2.7.3 Examples of the Application of Sense of Smell in Architecture

From the architects who worked with the sense of smell in their designs was the Swiss architect Peter Zumthor who believes that a place should have a certain atmosphere that moves our emotions someway; he meant by such atmosphere a combination between light, sound, temperature and scent. The Swiss pavilion at the Hannover expo in 2000 in Germany was constructed mostly of wooden beams, which provided coolness from the hot sunny days and warmer temperature when it was cool at night. But on a more delicate level the wood chosen for the design released a distinct scent into the air, giving the visitors the sensation of being in an aged wood shed, which might be very similar to the feeling of being in Switzerland's old towns[95].

Figure 2.38: Swiss Pavilion. http://viewpictures.co.uk/[17/10/2013]

The idea that a material has its own odor and that quality can be used as an architectural element attracted many architects. Gaetano Pesce, the Italian architect and designer, for example was interested in this unusual dimension of architecture. He experimented with three plastic materials for the bricks in 'Casa di bahia' bahia house. The three materials were: urethane, recycled rubber, and natural rubber. And he used 'juniper syrup' to the mixture, the syrup used to treat colds to avoid the bad smell of ammonia that may come out of old plastics. Thus his aesthetic concepts go beyond the visual[96].

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[95] Wang, V. (2009), The Scent of Creativity, School of Design and Crafts, University of Gothenburg, master thesis
[96] Barbara, op. cit., p.117

Figure 2.39: Casa di Bahia. www.designmag.it [20/05/2013]

Figure 2.40: Casa di Bahia www.designmag.it [20/05/2013]

In London's Heathrow airport, a scent of pine is released into the air pumped in the airport in order to put people at ease. Barbara (2006) mentioned that many Japanese companies actually use different odors over the course of the day to stimulate and enhance work: a bit of lemon in the early morning, flowers a little later, and forest scents in the early afternoon.

Some commercial and entertainment places now use scents to please their customers and for marketing benefits some apparel shops spray their own cologne to attract customers and make them stay longer, similar to the bakery effect, when the smell of the fresh baked products attracts the passerby into the shop. Also one of the largest Japanese architectural firms which is called 'shimizu' has been implementing customized scents into their projects. Since the late 1980s, they developed a system called 'Aroma Generation System' which releases subtle fragrances through air-conditioning ducts. Research results had shown enhanced efficiency and reduced stress among workers in these cases[97].

Figure 2.41: Heathrow Airport

2.7.4 Employing the Sense of Smell in Architectural Design

According to Barbara (2006) there are many factors that can play a role in the smell of the place, like the materials of the furnishing the space, and the activities occurring in the space over the course of time. It also depends on the orientation of the space, the

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[97] Wang, V. (2009), The Scent of Creativity, School of Design and Crafts, University of Gothenburg, master thesis

humidity of the air, and the air persistence, saturation, and timing[98]. Air can be a message bearer of purity and freshness or pollution and affects people's physical energy and feeling levels. Windows play the role of transmitting this air from outside to the interiors of architecture. Unfortunately outdoors are mostly polluted by traffic and indoors are polluted by off-gassing from furnishing, building and, maintenance materials, not forgetting sometimes body odor as well. And since nowadays hay fever and asthma along with other respiratory problems and chemical allergies are on the increase, using sense of smell in design to reduce the contact with this pollution as much as possible and improve the air quality is essential. Increasing the quality of respired air in architectural spaces can be done as follows:

a) Pollution reduction at the source itself; weather it is from traffic or a chemical substance, etc.
b) Increasing ventilation, so that pollution can be absorbed and digested.
c) More localized, is the extraction from business equipments, smoking rooms, cookers, etc.
d) Considering non-toxic options for building, furnishing and maintenance materials.

Furniture wise, the use of natural materials like blind of wood, reed, linen when heated by the sun re-radiate much less than industrial equivalents, and their internal air spacs moderate humidity, temperature, and polluted vapors. Such as all wood, or other natural material rooms, such as clay, lime and gypsum plaster boards smell and feel good[99]. Designing air and scent can be thought of in an infra structure sense, unlike using a perfume spray or a candle, the scent of a thing or a place is changed superficially. According to Elizabeth Diller[100], it is very possible that mechanical systems are the next frontier for architecture. Architects are rarely involved in the treatment of water, air and even electricity, except defensively to protect the designs from cruel mechanical demands. Architects can affect atmosphere from within[101].

Paints should be vapor permeable though, so as not to compromise their effect.

As for ventilation, it solves most of the problems, and is considered an easier solution for already existing buildings. But since some locations all outdoor air is too polluted for health, roof top air on this case can be cleaner than that at street level. Therefore controlling wind movements through design according to wanted and unwanted air is very important in architectural design, and manipulating scents in the design as well; deciding which smell enters where and which smell is needed to come out from where. For example in the following figure, there is an example of roadside houses that breathe roadside fumes. So this problem can be solved by sealing the front and drawing vegetation-cleaned fresh air from the rear can overcome this unhealthy smell of pollutants[102].

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[98] Barbara, A. (2006), Invisible Architecture: Experiencing Places Through the Sense of Smell, Skira, p.14
[99] Day, C. (2002), Spirit & Place, Architectural press, Uk, pp. 42-51
[100] Elizabeth Diller is a member of Diller Scofidio +Renfro a New York based architecture firm
[101] Barbara, A. (2006), Invisible Architecture: Experiencing Places Through the Sense of Smell, Skira, p.135
[102] Day, C. (2002), Spirit & Place, Architectural press, Uk, pp. 42-51
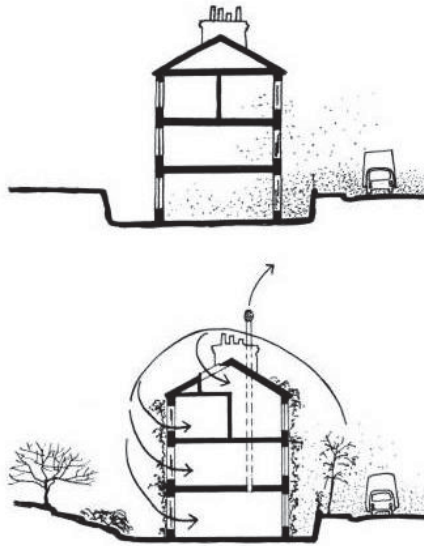
Figure 2.42: Controlling Wind Movement. Day, C. (2002), Spirit & Place, Architectural press, Uk, p. 43

2.8 Sense of Taste

While the sense of taste may seem so far from architecture and we might not realize that there might be a connection between both subjects, when as a matter of fact there is a connection between the sense of taste and other senses, therefore there exists a relationship between the sense of taste and architecture.

> "The taste in architecture does not literally mean to kneel down and try to eat the stone bricks, but it means that architecture can make our mouth water just by the sight of appealing materials."[103] (Schueler, 2006)

The tongue papillae are the bumps on people's tongues that house the taste buds and taste receptors and send signals to the brain. The brain processes these signals and identifies the taste[104]. Architecture can stimulate the sense of taste as well. Some interiors can make people feel hungrier than others, the same way some interiors encourage and help sleeping than others. And according to Pallasmaa (2005), certain colours and delicate details evoke oral sensation. A delicately coloured, polished stone surface is subliminally sensed by the tongue[105]. The sense of taste is related with the other senses. The taste and smell directly affect what flavor the food has, and most people could not differentiate food by taste when they cannot smell, see, or feel the food.[106]

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[103] Schueler, N. (2006) Senses in Architecture

[104] http://www.wegottaste.com/[accesed 8/07/2013]

[105] Pallasmaa, J. (2005), The Eyes of the Skin: Architecture and the Senses, Wiley academy, Great Britain, p.59

[106] Op.cit

2.9 Conclusion

After reviewing the senses separately, and studying how people use their senses in perceiving, and forming impressions about their surroundings. It is evident that each sense has its specific role in relating to the surroundings in its specific way. Each sense has its stimulus with both its physical and psychological attributes; light is the attribute related to vision by means of the eye. Contact and temperature are related to the sense of touch by means of the skin. Vibrating source or sound, and a medium are related to hearing by ears. And finally, gaseous emissions are the attributes related to the sense of smell by the nose. There is the receptor that receives the stimulus and reacts to it afterwards, like the eye, skin, ear, and nose. Then finally there is the human organism with both his/her prior experience and current psychological state.

It was concluded for each sense the way of applying the physical attributes related to the sense and manipulating them in architecture, coming up with important considerations for architects to take for acquiring a better integration between the senses and architecture. Thus, enhancing the interaction between users and the architecture as well.

Using this information is very beneficial for architects since it has an effect in enhancing people's everyday experiences, thus having a positive impact on people's lifestyles. By considering details about the occupants in the process of architectural design, design decisions could reasonably satisfy the occupants.

The following chapter links between sensing the built environment and perceiving it. As perception of the sensations are affected by past experiences and memories, and affected by the current psychological state and needs as well. And perception then affects people's judgment of the environment.

Chapter 3: Mind and Emotional Influences in the Perception of the Built Environment

3.1 Introduction

The interaction between people and the built environment is not limited to the reception of stimuli through the five senses; seeing, hearing, touching, and possibly even tasting. People develop cognition of the built environment and architectural spaces through the mind and emotional influences as well; which will be discussed in chapter three. This chapter aspires to fill in the gaps in understanding the user/architecture relationship, after reviewing the role of the senses in influencing the users' experience of the architectural space, this chapter then follows with the other variables in the perception process, as shown in [fig. 3.1].
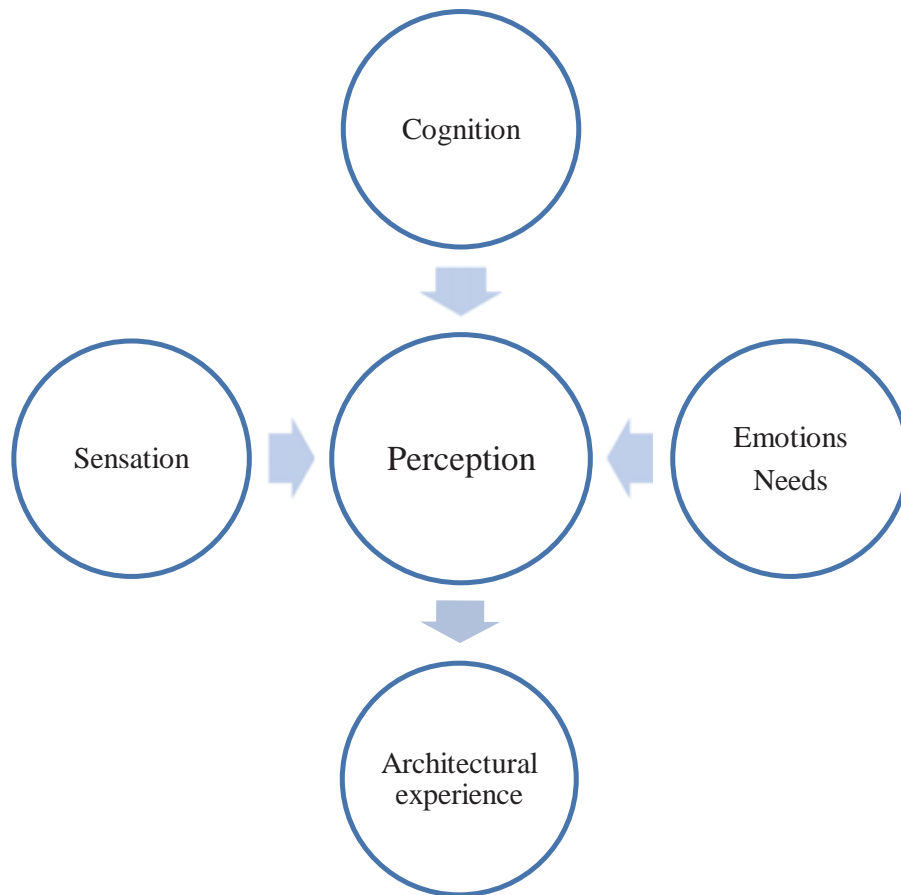
Figure 3.1: The Connection between Ch.2 & 3

This chapter addresses the nature of the active processes of perception, that can be subjective but at the same time grounded by general rules. It also explores the roots of the formation of mental images and impressions formed in the human minds about architecture. Another dynamic aspect of perception which is 'attention'; makes the

mind screen out some things, and accentuates others that most probably are then saved in the memory and stored as mental images, ready to be used again in similar circumstances.

The chapter then explores how humans' emotions affect people's judgment and interaction with a place by demonstrating first the different emotional states that affect people, then seeing how these emotions are manifested. Then a more practical model is shown that can be used with occupants to demonstrate the emotions that were aroused from experiencing a certain place. Users' emotions were then found to rely on their concerns and needs as human beings, and the role of architecture to fulfill some of these concerns was shown. And after reviewing the physical attributes in the architectural spaces that are related to each of the human senses in chapter two, the last section in this chapter summarizes all the physical and the non physical attributes that play a role in the ongoing relation between the users and the architecture they inhabit.

3.2 The Active Process of Perception

Maurice Merleau Ponty investigated the active process of perception and the nature of our perceptual contact with the world, and provided a direct description of human experience by stating that we cannot separate ourselves from our perceptions of the world.

> "Perception is the background of experience which guides every conscious action. The world is a field for perception, and human consciousness assigns meaning to the world.[1]" (Ponty, 1962)

Perception is more than just sensation; it is an active process from which we try to make sense of the world around us. And according to Ponty (1962): Perception is not purely senstation, nor is it purely interpretation. Consciousness is a process that includes sensing as well as reasoning[2].

3.2.1 Perception and Space

A space in the 18th century was summed up into simple three realities: space, time, matter. And that was a result to Sir Isaac Newton's discovery of gravity, and therefore the existence of a logical and simple explanation to a scientific conception of the physical world. So by space perception the eighteenth century philosophers and nineteenth century psychologists meant geometric perception of space. Perceived space at that time seemed to divide up into geometrical categories: Extensity, location, shape, and distance.

- Extensity is defined as space characteristics in two dimensions, corresponding to the plane of the vertical and horizontal axis in geometry.
- Location is also in two dimensional, describing the location of points in the visual fields corresponding to X, Y coordinates in geometry.
- Shape represents the form in the visual field, corresponding to abstract forms of Greek geometry [fig.3.2].
- Distance is the depth or distance which corresponded to the third dimension of space.

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[1] Ponty, M. (1962), Phenomenology of Perception, Routledge and kegan Paul Ltd, Great Britain
[2] Ibid.

All constituents of space were finally considered to be sensed. But that depth and distance were not considered simple sensations, and the visual third dimension of a space was and remained a phenomenon which only perception could explain. And conceiving sensory elements as well can vary according to perception. In James Gibson's words: "If everything we are aware of comes through stimulation of our sense organs, and if some things nevertheless have no counterparts in stimulation, it is necessary to assume that the latter are in some way synthesized. How this synthesis occurs is the problem of perception." Nativism assumed that the synthesis is intuitive, empiricism explained that was learnt from past experience[3].
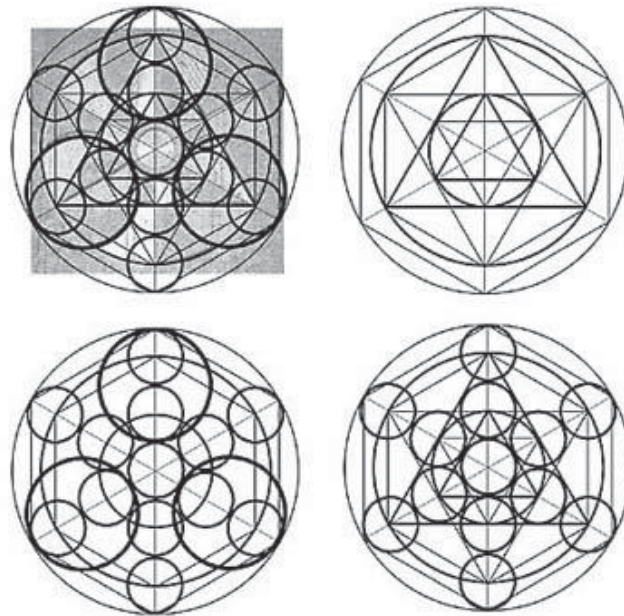
WINTERBOURNE BASSETT 1997 hexagonal geometry
© Freddy, Silva 1997

Figure 3.2: Ancient Greek Geometry. www.mcs.ca [20/10/2013]

3.2.2 The Subjectivity of Perception

"Perception occurs when one applies his/her experience to interpret sensations[4]." (Kasschau, 1985) The experience of home is structured by distinct activities: cooking, eating, socializing, reading, storing, sleeping, which is more than just visual elements[5]. Bryan Lawson explains that by describing his visit as a young architect to St Catherine's College in Oxford, designed by Arne Jacobsen. He described dropping a pencil he was sketching with, as bending down to pick it up he was quite shocked to feel how warm the floor was. The material was of a type that one would expect to feel cold, but it was warmed by the under floor heating. So Lawson stated that the material and the sensation of touching sent out signals that caused him to recall experiences of

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[3] Gibson, J. (1950), The Perception of the Visual World, The Riverside Pres, Cambridge, Massachusetts pp.14- 25
[4] Kasschau, R. (1985), Exploring Behaviour, Pearson Prentice Hall
[5] Pallasmaa , J. (2005), The Eyes of the Skin: Architecture and the Senses, Wiley academy, Great Britain

spaces that were on the whole smaller, warmer and more intimate than the great hall he was in[6].

Perception in general is not completely determined by the physical stimulus, it can be somehow subjective according to some contributions made by the observer himself, unlike sensations, which are somewhat basic, and tend to be the same for everyone. Perceptions, however, depend on past experiences of the individual, therefore they vary from one observer to another. This was a major theoretical issue on which psychologists were divided into two groups. One believed perception was a direct process; relying directly on the stimulus, others argued that the perceptual processes were not direct; but depended on the perceiver's expectations and previous knowledge, as well as the information available in the stimulus itself. This is where cognition comes in, which is the act of the mind that recalls old experiences to explain and understand new ones.

But what makes perceiving material objects, and the spatial environment not all subjective; depending from one person to another is that the visual worlds of different observers are almost the same. Which is why people, to a great extent get the same perceptions to the spatial environment. In James Gibson's quote:

"The evidence accumulates that men, and moreover even animals, appear to react to the spatial environment with an accuracy and precision too great for any known theory of space perception to be able to explain[7]." (Gibson, 1950)

In a study that emphasized the subjectivity of perception it was shown that young boys appreciated places in terms of 'who' they associate them with, and as they grew older they came to value them for the activities located there, and eventually they valued the space aesthetically. Therefore as the study summarized, the lake maybe initially a place to swim, but later a place to see a beautiful sunset[8].

This mainly means that we cannot talk about pure subjectivity or pure objectivity when we address the issue of perception. Because perception lies in the fuzzy area of interaction between subjective values and past experiences which could be unique, and common needs and patterns that push perception towards shared grounds with others.

3.3 The Dialectic Relationship between Architecture and the Human Mind

The relation between the human mind and architecture can be summed up in the influence of architecture on the mind and conversely the influence of the mind on experiencing architecture. "Architecture has the most impact when the ideas used in building design reflect our understanding of how the brain reacts in different environments[9]." (Eberhard, 2003) In the 1950s the famous biologist, Dr. Jonas Salk was working on a cure for polio (a fatal infectious disease) in a dark basement laboratory in Pittsburgh. And when his progress was very slow he decided to clear his mind and travel to Assisi, Italy where he spent his time in a 13th century monastery with its columns and cloistered court yards. Salk suddenly found himself coming up with new scientific insights, including the one that would lead to his successful polio vaccine. Salk was then convinced that he had drawn his inspiration from the setting he

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[6] Lawson, B. (2001), the Language of Space, Architectural Press

[7] Gibson, op. cit., p.14

[8] Lawson, B. (2001), the Language of Space, Architectural Press

[9] Eberhard, J. (2003), An Architect and a Neuroscientist Discuss How Neuroscience Can Influence Architectural Design, The SCAN, www.sfn.org [11-10-2012]

was in. He came to believe so strongly in architecture's ability to influence the mind that he teamed up with renowned architect Louis Kahn to build the Salk Institute in La Jolla, California, as a scientific facility that would stimulate breakthroughs and encourage creativity [fig. 3.3]. For example the institution has an open plaza with a narrow strip of water that runs down the center, shown in [fig.3.4], linking the buildings to the vast Pacific Ocean so it would direct a person's view towards nature, reminding people of their scale compared to that of the ocean.

And due to zoning codes, the first two stories had to be underground, sinking the laboratories in the courtyard. In order for these spaces to receive ample sunlight, Kahn designed a series of light wells on both sides of each building that were 40 feet long and 25 feet wide, shown in [fig.3.5]. The laboratories above ground are also well-lit spaces with large glass panes for their exterior walls[10].

Figure 3.3: Salk Institute. www.archdaily.com [20/10/2013]

Figure 3.4: Salk Institute Plaza. www.archdaily.com [20/10/2013]

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[10] Perez, A. (2010), AD Classics: Salk Institute / Louis Kahn, www.archdaily.com [20/10/2013]

Figure 3.5: Salk Institute Underground Floor. www.archdaily.com [20/10/2013]

Architects have long intuited that the places we inhabit can affect our thoughts, feelings and behaviors. But now, half a century after Salk's inspiring excursion, behavioral scientists are giving these ideas an empirical basis. Behavioral scientists investigate how to design spaces that promote creativity, keep students focused and alert, and lead to relaxation and social intimacy. The results inform architectural and design decisions such as the height of ceilings, the view from windows, the shape of furniture, and the type and intensity of lighting. Some architecture schools encourage interdisciplinary research into how a planned environment influences the mind, and offer classes in introductory neuroscience[11].

Donald Norman; an academic in the field of cognitive science; summed the reasons behind people's preferences to anything designed, which includes architecture into three main sections: visceral, behavioral, and reflective. Each of these three levels of design shape the experience of the user, and each is as important as the others, but each requires a different approach by the designer.

- Visceral reasons: The visceral design is about initial reactions from sensory inputs; how things look, feel, sound, which is often the first impression a person get about architecture. And sometimes visceral design is sufficient to make people want a designed object or refuse it. That's why brochures and advertisements depend mainly on the visceral design to gain people's attention.
- Behavioral reasons: Behavioral design is all about how things function, and the pleasure and effectiveness of use. Appearance doesn't really matter, when performance here does matter. The four components of good behavioral design are function, understandability, usability, and physical feel. The most important thing in behavioral design is to truly understand the user's needs.

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[11] Anthes, E. (2009), How Room Designs Affect Your Work and Mood, April 22 2009, www.scientificamerican.com, [10-11-2012]

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- Reflective reasons: Reflective design is about the message that comes from the meaning of things influenced by knowledge, learning, and culture, and is dependent on the individual and his/her background such as personal remembrances something evokes. The reflective design is about self image as well, as almost every person worries about his/her self image that is presented to others. Advertisement can work on reflective levels as well, such as giving prestige to a place such as a restaurant or a club by making it difficult to get reservations which increase its desirability.

Attractiveness for example is a visceral-level phenomenon; the response is entirely to the surface look of an object. While beauty on the other hand, comes from the reflective level. Beauty looks below the surface; it comes from the conscious reflection and experience influenced by knowledge, learning and culture. Objects that are unattractive on the surface can give pleasure in the other levels. And from the previous levels of design, users can appreciate a design for just one aspect or a combination and balance of more than one aspect. So for example, a person may prefer a design just for self image reasons, personal satisfaction, and memories, or a person may prefer a design for its aesthetic appearance only[12]. Therefore the people's preferences differ according to their different perceptions of the object, which makes the subject of perception important for any designer; including architects. In the following section the subject of human perception will be properly reviewed and analyzed to give architects a clearer view on their users.

3.4 Cognition and Perception

Throughout our experiences we develop impressions and ideas in the form of mental images sometimes called "schemata". These impressions play a great role in our perception of the architectural space with all its elements, and determine whether the space or the objects in it have succeeded in pleasing us or not. From there came the importance of understanding how we form our impressions.

The perceptions of the human mind revolve around two kinds as demonstrated in [fig. 3.6] which are impressions and ideas, which differ in the degree of force by which they invade our brain. And what is meant by impression is the comprehension of the sensations, passions, and emotions as they first enter the soul. The impressions are mainly the act of experiencing the world, this doesn't mean that they are not affected by previous experiences that occurred in the past as well. And 'Ideas' are the mental images in one's head after thinking, reasoning and trying to relate old experiences and impressions with new ones. And as David Hume stated, that all our simple ideas in their first appearance are derived from impressions, which are correspondent to them, and which they exactly represent. Ideas are the act of the mind which always try to create relations between old references of schemata and the recent ones. Therefore ideas depend on impressions and at the same time impressions are dependent on ideas.[13].
Impressions include two things, sensations and reflection; our mind trying to relate to this experience. Sensations arise from experience, and then reflection is derived from our ideas. As David Hume explained that impressions are first derived from the senses, for example the sensations of warmth or coldness. Then a copy of these impressions is taken by the mind and remains until after the impression stops and can be called

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[12] Norman, D. (2004), Emotional design: why we love (or hate) everyday things, Basic Books, United States of America
[13] Hume, D. (1896), TREATISE OF HUMAN NATURE, Oxford, London pp.1-7

'ideas'. Then when these ideas returns back to the soul, like the feelings of desire, fear, Etc. another impression is formed and then called the experience of reflection. These impressions are then copied as well by the memory and imagination and in turn form other new mental images, schemata that subsequently used as references w. So the impressions of reflection come before the ideas and come after the sensations[14].
En we experience the world around us once more.
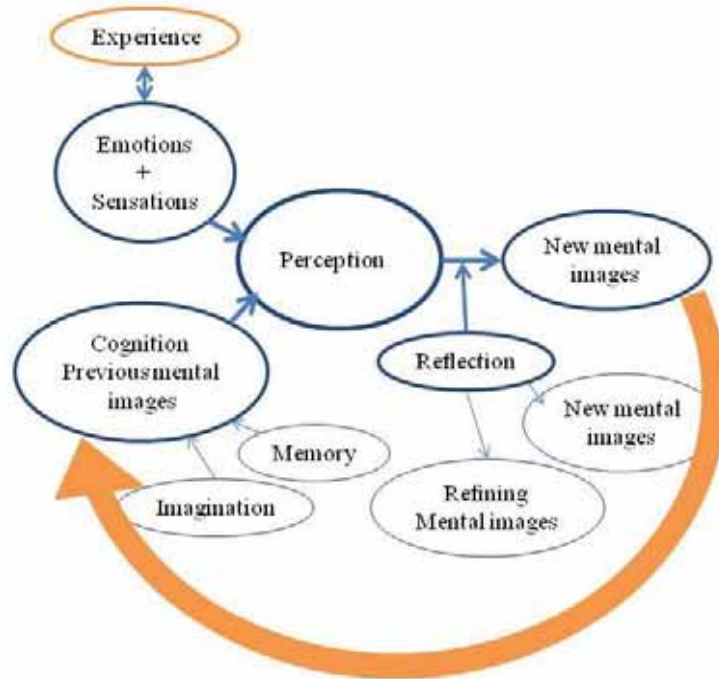
Figure 3.6: Perception of the Human Mind

And since human beings encounter every day millions of information when he/she experiences the built environment, people cannot digest all this information at once and especially if they need to perform even simple activities. What happens is that people will not perceive every single information around them, but their attention will be drawn to things on the account of other things that most probably will be stored in the memory. Therefore 'attention' is an important subject to consider in human perception. The following section reviews the subject of attention and the physical attributes that demand more attention than others.

3.4.1 Attention

Attention is a quality that affects perception. Attention is the selective processing of information that the mind performs when perceiving the world around us."Memory provides the framework that underlies active cognition, whereas attention is the motor[15]." (Ware 2004) Before understanding the ideas that are created based on our

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[14]Ibid., p.7,8
[15] Ware, C. (2004), Information Visualization: Perception for Design, 2nd edition, Morgan Kaufmann

memory and imagination, we must first understand what attracts our attention and most likely gets to be stored in our memory.

> "Attention itself does not create any perceptions, but may be directed toward any aspect of a perceptual field. Attention can enable conscious perceptions to be structured by reflecting upon them[16]." (Ponty, 1962)

Modern research emphasized the role of attention in perception. This dynamic aspect of perception was studied for example in tasks where observers were asked to detect changes in scenes presented to them, the main findings were that observers were 'blind' to changes in objects they were not attending to[17]. We can also find that subjects excuse certain faults or discomfort and might even not be aware of them for the pleasantness of the medium; like a beautiful voice can counterbalance a vulgar song[18]. And according to Hall (1990): Space perception is not only a matter of what can be perceived but what can be screened out[19]. The following paragraph shows what gives an object a foreground quality that draws the attention, and on the contrary puts another thing as a background and screening it out.

A most basic perceptual effect is that one thing must be dominant and nearer, the other must be background and seem formless, less easy to remember, and sensed somewhat further away. This principle is directly related to visual experiences, but applies to other senses as well. A parent is capable of hearing the sound of his or her baby's cry over the chatter of guests. The cry becomes the foreground, the party sounds becomes the background[20].

Figure 3.7: Foreground & Background. www.psychologytoday.com [21/05/2013]

The idea of foreground and background is fundamental to our perceptual systems. Due to tremendous amount of information that are available, We can see the whole scene but perceive parts of it, we then use some other methods, all relying on memory in some way to recreate the rest of the scene, and then we would be able to recall it if needed. Usually we are not consciously aware of such process. And this can be applied to other senses as well not only seeing, similar to vision, the sense of hearing has foreground and background as well; when standing in a crowded room one can

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[16] Ponty, M. (1962), Phenomenology of Perception, Routledge and kegan Paul Ltd, Great Britain
[17] Enns, J.(2006), Gestalt Principles of Perception, University of British Columbia, Vancouver
[18] Santayana, G. (1955), The Sense of Beauty; Being the Outline of Aesthetics, Dover
[19] Hall, E. (1990), The Hidden Dimension, Anchor books, United States of America
[20] Kasschau, R. (1985), Exploring Behaviour, Pearson Prentice Hall

relatively easily have a conversation with his neighbors while the rest of the people in the same room chat to each other[21].

There are many attributes that give objects a foreground quality; there are physical and psychological attributes. Any object can have one or more of these attributes. The accumulation of these characteristics determines the likelihood of us paying attention to the object. Not forgetting that our own mood and motivation also affect this[22] . The attributes that give objects a foreground quality are: verticality, symmetry, color, number, meaning, and context[23]. Each attribute is described briefly in the following section. These attributes attempt to change the object to be significantly observable like a landmark, stand out within its field and thus making it more memorable. This issue is particularly important to us as architects because architects can manipulate theses attributes through their designs and thus impact the perceptual experience by manipulating the attention of the perceiver. The attributes influence cognition because they help in the creation of mental images. Landmarks in the environment help in the creation of mental images.

Attributes that give objects a foreground quality:

- Verticality:

Psychologists discovered that the brain contains specific locations that respond to geometric stimuli. The brain therefore has certain departments responsible for perceiving straight lines, curved lines, triangles, squares and so on. The brain processes the visual information in a structural way which is hierarchical in organization. Not all departments are equally powerful; it has been found that the vertical and horizontal line departments are particularly influential.

- Symmetry:

Symmetry is considered another geometrical foreground giving characteristic, the axis of symmetry itself tends to be the most foreground place. Then it is hardly surprising that classically it is the location of main entrances in building facades. And since spheres are the most symmetrical possible forms, therefore spheres and their subsections in the form of domes create attention seeking focal points in space. Like the US Capitol building for example that is shown in (figure 3.4).

Figure 3.8: US Capitol. http://homedecorinteriordesign.com, [21/05/2013]

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[21] Lawson, B. (2001), the Language of Space, Architectural Press
[22] This will be handled with more depth in sections 3.5 & 3.6
[23] Lawson, op. cit.

- Color:

Colors are changes of the wavelength of light as mentioned in the previous chapter. But some colors appear to the eye more dominant than others. Yellow, orange and red parts of the spectrum claim more foreground attention than the blue, green and violet parts. This phenomenon works out rather well in our daily life, as we habitually see blue skies and green fields in the background of the natural world. The Bauhaus student of color, Johannes Itten, experimented with color combinations and came out with compositions of complementary colors, such as red and green, showing the proportions of each needed to command equal attention.

The general wisdom from literature on the effects of colour on our emotion is that colors are either 'warm' and 'advancing' or 'cool' and 'receding'. Red and yellow for example are described to be 'warm' colors that tend to advance and thus seem nearer, demanding more foreground attention. On the other hand, blue and green are described as 'cool' and receding colors. Therefore a space painted in red will in normal circumstances seem smaller than one painted in blue, as the walls would tend to advance and seem nearer to the occupants while demanding more attention. Researchers found subjects working in red offices to have higher levels of stress and anxiety, whereas those working in blue offices showed higher levels of depression, they also found fewer errors in tasks performed in red offices. This suggests that warmer colours demand indeed more attention, raising the level of arousal and alertness, thus enhancing performance[24].

- Number:

Regular repetition of an object eventually makes the object itself disappear; as described by Bryan Lawson that eventually we don't see trees but a forest. And he described it in architectural terms as well, a column eventually at some point becomes part of a colonnade. This phenomenon was explained by the fact that our short-term memory system was found to work reliably up to seven items. A repeated foreground object becomes background when it reaches seven items. Six columns form a portico that is the center stage of a classical façade It uses symmetry and the point of the gable above to emphasize the axis upon which the entrance would probably be located, like Jefferson's Pavilion V in the Academical Village in Virginia [figure 3.5]. However, a row of ten columns tend to become a colonnade, and form a background in front of which we might find a fountain or sculpture. Like Perrault's colonnade in the easternmost façade of the Louvre palace in Paris [fig. 3.6].

Figure 3.9: Portico in Pavilion V. http://www.virginia.edu/ [21/05/2013]

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[24] Ibid.

Figure 3.10: Perrault's Colonnade. wikimapia.org [21/05/2013]

- Meaning:

Objects that have meaning for us are likely to have foreground quality The famous British psychologist, Sir Frederic Bartlett illustrated a very important feature of our long-term memory by an experiment in which he showed a simple drawing to his first subject and allowed the subject to look for a while and try to remember it, the subject then returned to Bartlett's laboratory the next day, and was asked to reproduce the drawing from memory. This new image was shown to the next subject and so on. One picture that Bartlett used was that of an Egyptian bird, the Mulak (looks like a little owl), Bartlett finally ended up with a black cat. The subjects found it hard to remember the geometry, and were relying on descriptive techniques, because they were not aware of this kind of bird and the drawing looked like the conventional drawing of a cat. In some cases astonishing level of details were noticed like adding whiskers, and even a ribbon tied around the neck, as shown in [fig.3.7]. Therefore our long-term memory seems to work by using meaning and concepts rather than images. This drives our perception to seek out the meaningful and memorable; "The more ideas, concepts and words we have to describe the space around us, the more richly therefore we begin to perceive it[25]." (Lawson, 2001)

Therefore, designers can choose to express the qualities of an embodied experience, for example a when a designer wants to create a place that reproduces a Greek temple, rather than simply coping its elements or order, he or she may look beyond the temple's form and reproduce its experiential qualities and perhaps design a place that interacts with the moving sun in the same poetic way[26].

But one must be aware that an architect is educated about the built environment that he can associate a lot of meaning than most ordinary people. Taking a brick wall as an example; to many a brick wall is simply that, but to architects as Bryan Lawson explains, it has many characteristics. Not all bricks are the same shape, and they can be finished and made in many ways according to the pattern of the bonding or the overlapping of the bricks. The manner of shaping the joint as well may vary from round

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[25] Ibid.

[26] McCann, R. (2005), "On the Hither Side of Depth": An Architectural pedagogy of Engagement, EAAE, Copenhagen

recessed, to struck at an angle, to flush and so on. Lawson (2001) says combining all these and he barely sees two walls the same[27].

The idea that the meaning of an object is important to people is a very important one, for example a person's first reaction to a flight of steps may be 'here is a way to go up' rather than 'here is a series of surfaces', learning must be involved in a person's understanding of the meaning of objects. For example a wooden chair may afford sitting for human, but something to gnaw on for a beaver[28]. When an item offers a practical advantage or meaning to us, it brings us satisfaction. This satisfaction prompts an approval of the presented object. Even if the practical advantage is not clear yet, the vague senses that it holds advantage gives it expression.

Figure 3.11: Sir Frederic Bartlett Experiment. link.springer.com, 2013

- Context:

.An important way in which meaning has impact on attention is through the context of a situation. "What commands our attention and what we remember about places depends as much upon ourselves as on the physicality of the objects and places themselves[29]." (Lawson, 2001) Meanings are culturally, socially, and contextually ingrained. People brought from different cultures learn without noticing to screen out one type of information while paying close attention to another. As Edward T. Hall explained that Japanese, for example screen visually in a variety of ways but are content with just paper walls as acoustic screens, therefore spending the night at a Japanese inn while a

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[27] Lawson, op. cit.

[28] Goldstein, E. (1981), The Ecology of J. J Gibson's Perception, MIT Press, Leonardo, Vol. 14, No. 3, pp.191-195

[29] Lawson, B. (2001), the Language of Space, Architectural Press

party is going on next door is a new sensory experience for the Westerner. As German and Dutch depend on thick walls and double doors to screen sound, and face difficulty if they must rely on their own powers of concentration to screen out sound. And if there were two rooms of the same size and one screens out sound, but the other does not, then the sensitive German who is trying to concentrate would feel less crowded in the first because he would feel less intruded on[30].

3.4.2 Memory and Imagination

After reviewing the subject of 'attention' as a quality that influences cognition because it promotes the creation of mental images; which in turn influences perception. This section reviews the following step after a certain thing catches one's attention; which is storing it in one's memory or using it for one's imagination. This "thing" becomes a mental image, a memory, or a reference stored in the mind to be used in the act of cognition. People's impressions are affected greatly by their memory and imagination; past experiences of similar situations in general. Studies have shown that impression formation often relies on our long-term memory[31]. Then the role of imagination comes when memory no longer can help. Consequently memory and imagination affect how people perceive a place, thus demanding architects attention on the subject of memory and imagination and their mechanism to have a better understanding of how the users perceive architectural spaces.

- Memory:
  "To at least some extent every place can be remembered, partly because it is unique, but partly because it has affected our bodies and generated enough associations to hold it in our personal worlds[32]." (Pallasmaa, 2005)

Without memory one cannot compare a certain object or idea with a past one. Memory serves many functions such as remembering autobiographical events, recognizing people, learning concepts, navigating the environment, and most importantly related to the topic is developing mental images used as reference that affect responses in preferences and fear. For example, Marleau-Ponty described the memory as a capacity to recall or recognize the past, and may be influenced and influences changes in perceptions[33].

There are three types of memory: iconic, working, and long term. It is said also that there is an intermediate store that determines what from the working memory finds its way to the long term memory. Iconic memory is a very short memory holding what is very recent until several seconds or until it is replaced by something else. Long term memory is the information we retain from every day experience and can last for a lifetime. And the working memory holds objects of immediate attention[34].

"Until a particular individual in a particular species categorizes it in an adaptive fashion, the world is an unlabeled place in which novelty is frequently encountered[35]." (Edelman, 1989) Therefore one of the roles of the brain is to label the unlabeled world. According to Edelman (1987), a memory is the enhanced ability to categorize

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[30] Hall, E. (1990), The Hidden Dimension, Anchor books, United States of America
[31] Thomas, R., Paul, S. (1974), Use of long-term memory in impression formation, Psychological Reports, Vol. 34, pp 939-945
[32] Pallasmaa , J. (2005), The Eyes of the Skin: Architecture and the Senses, Wiley academy, Great Britain
[33] Ponty, M. (1962), Phenomenology of Perception, Routledge and kegan Paul Ltd, Great Britain
[34] Ware, C. (2004), Information Visualization: Perception for Design, 2nd edition, Morgan Kaufmann
[35] Edelman, G. 1989, *The Remembered Present.* New York: Basic Books, p.4

associatively, not the storage of features of attributes as lists[36]. Memory is not representational but a continuing process of recategorization. Arnold Modell (2003) stated that if memory is representational, the activation of a memory would consist of a static process analogous to retrieving items from a storage bank[37].

- Imagination:

Imagination manipulates the memory. Because we have an imperfect memory; we cannot remember every detail, we embellish. We give a past idea or object a separate identity, and change our original reaction with our imagination. Thus, it was found that creative people experienced life more vividly. The expression of a certain element is to a great extent dependant on the imagination of the observer himself, accordingly the expressiveness of any object increases accordingly with the intelligence of the observer as well.

Juhani Pallasmaa explained that the imagination and daydreaming are stimulated by dim light and shadow; in order to think clearly, the sharpness of vision has to be suppressed, for thoughts travel with an absent-minded and unfocused gaze.

> "Deep shadows and darkness are essential, because they dim the sharpness of vision, make depth and distance ambiguous, and invite unconscious peripheral vision and tactile fantasy[38]." (Pallasma, 2005)

Mist and twilight awaken the imagination as well, by making images unclear and ambiguous, for example a Chinese painting of a foggy mountain landscape gives rise to unfocused way of looking, evoking a meditative state. Memory and imagination activate and vitalize cognition because they create vivid mental images that help referencing the world around us and eventually impact our perception of the world.

Figure 3.12: Traditional Chinese Painting. commons.wikimedia.org [20/10/2013]

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[36] Edelman, G. 1987, *Neural Darwinism.* New York: Basic Books, p. 241
[37] Modell, A. (2003), Imagination and the Meaningful Brain, MIT Press, England, p.37
[38] Pallasmaa , J. (2005), The Eyes of the Skin: Architecture and the Senses, Wiley academy, Great Britain

3.5 Emotional Influences on Architecture

Emotion gives meaning to our lives, and our lives are ordered and organized by our needs, motives, and concerns. Human actions are motivated firstly by biological needs and plans to be achieved, secondly by social goals, motives and plans that issue from them. And it is built in people then to detect or evaluate if their internal state or the external environment is beneficial or harmful to their plans. Emotions translate the concerns into goal directed actions[39].

> "In the experience of art, a particular exchange takes place; I lend my emotions and associations to the space and the space lends me its aura, which entices and emancipates my perception and thoughts[40]." (Pallasmaa, 2005)

Architecture is not experienced as a series of isolated pictures, but as a fully integrated material and spiritual essence. Architectural spaces have certain atmospheres which influence the emotional state of a person. A certain space can make us feel small or big, safe or unsafe. Architecture can put us in a spiritual mood as well.

> "We can feel the immovable density of a stone pillar. Our spirits expand in a windowed tower and control in a confined, cellular space. Our bodies pick up the rhythm of the colonnade, and our eyes arrest and fix on a central focal point[41]."(Mccann, 2005)

Colours as well as shapes and lines can play a vital role in projecting an image and creating a mood, many common expressions recognize this fact like: "seeing red", "green with envy", "feeling blue", "purple passion". The general rule of colours is that some are cool, like blue. Others are warm, like yellow, orange, and red. But green is said to be the only colour that looks cool in summer, warm in winter. With putting in mind individual discrepancies such that the same space can calm someone and at the same time make another person uncomfortable, but we can see that most people feel small in a gothic church and unsafe in dark alley at night.

On the other hand, architects can use emotions to create architecture that responds to users more. Through space users can express their individuality and solidarity with others. Users can indicate their values and lifestyles, likes and dislikes. Architects can use space to help generate feelings of excitement or calm. "The language of space is a global one, since many of its roots can be found in the fundamental characteristics of the human race[42]."(Lawson, 2001)

"The strength of a good design lies in ourselves and in our ability to perceive the world with both emotion and reason[43]." (Zumthor, 1999) The Swiss Architect Peter Zumthor explained that when he works on a design he allows himself to be guided by images and moods he remembered and which can relate to the kind of architecture he was looking for. Then he tries to find out what these images mean, to be able to create a variety of atmospheres. The Dutch architect Herman Hertzberger says that architects too must watch what people do. Yet sadly, all too often architects seem interested in buildings not their occupants[44].

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[39] Christianson, S. (1992), The Hand book of Emotion and Memory : Research and Theory, Lawrence Erlbaum Associates
[40] Pallasmaa , op. cit.
[41] McCann, R. (2005), "On the Hither Side of Depth": An Architectural pedagogy of Engagement, EAAE, Copenhagen
[42] Lawson, B. (2001), the Language of Space, Architectural Press
[43] Zumthor, P. (1999), Thinking Architecture, Birkhauser- Publishers for Architecture
[44] Lawson, B. (2001), the Language of Space, Architectural Press

3.5.1 The Emotional States of Users and the Sense of Place

Emotion in architecture can be often linked by how well it exudes the "sense of place". The sense of place in architecture makes this architecture acquire a certain personality that then helps in evoking emotions in its occupants because it connects with them. And when the architecture is able to connect emotionally with its occupants its message and its meaning can be felt more deeply; thus leaving a lasting impression[45].

Architecture doesn't have to elicit only emotions of happiness; it depends on the situation, as it's possible that architecture evokes other emotions like recalling memories in a memorial, or evoking emotions of faith in religious buildings, and beauty in art museums for example. One way in which architects can tap the emotions of the occupants is by using their language in designing buildings; which is the senses and not limited to just the visual sense.

> "It is interesting to think of the moment where a stone wall becomes more than its materials and placement, when it becomes a celebration, a remembrance or even a space for contemplation[46]." (Lehman, 2011)

There are different emotional levels that affect people in general, the different emotional states can be summed up into three emotional states; emotions, moods, and sentiments. To have a more in depth understanding of the occupants then, here are the differences between the emotional states that affect people and influence their perceptions

   a) Emotions:

Emotions are intentional because they involve a relation between them and a particular event, object or surrounding. As when a person is afraid of something, or in love with something and so on. People are usually able to identify the subject of their emotion; one knows who he loves and with whom he is angry. Another characteristic of emotion is that it exists for a short time limited to seconds or minutes.

The stimulus that triggers emotions either is due to an event in the environment; for example someone calling our name, catching sight of a building. Or on the other hand it could be due to some change within us, such as thoughts or memories. In some particular cases a person maybe unaware of the cause of his emotion. Like when we get fascinated by a specific space without knowing the reason for its fascination.

   b) Moods:

The difference between moods and emotions is that moods are non-intentional (one is not sad or cheerful at something). Moods last a much longer duration than emotion; a person can be sad or cheerful for several hours or even several days, but it has a time limit as well as emotions. Moods can have combined causes, and that's why we are generally unable to specify the cause of a particular mood. A person sometimes even is not aware of being in a certain mood, for example if someone is grumpy in the morning he/she usually wouldn't realize it until someone else tells him/her.

   c) Sentiments:

Sentiments last longer and may persist through a life time. Our sentiments are our likes and dislikes towards certain subjects or objects. The difference between emotions and sentiments is clear in the following example: being afraid of dogs (sentiment) and being frightened from a dog (emotion). One of the definitions of sentiment is that it is the judgment prompted by feeling. Then we may have sentiments regarding architecture;

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[45] Lehman, M. (2012), How Emotion Impacts the Perception of Your Building, sensingarchitecture.com[17/10/2012]

[46] Lehman, M. (2011), Using Context to Spark a Spiritual Design that Touches Your Occupant's Soul, 17-05-2011, sensingarchitecture.com[17/10/2012]

we may have preference to a certain style and dislike another. So this in return affects our judgment[47].

To understand the occupants more, and develop a better understanding of their emotions in different atmospheres, one must first learn the ways these specific emotions are interpreted. Psychologists nowadays agreed upon some components that form and explain emotion, and described it as a multi faceted phenomenon with these four components: behavioral reactions, expressive reactions, physiological reactions, and subjective feelings.

   a) Behavioral reaction is the action or behavior one engages in when experiencing emotion, e.g. running seeking contact.
   b) Expressive reaction is the facial, vocal and postural expression that accompanies emotions, e.g. smiling or frowning.
   c) Physiological reaction is the change in the activity of the nervous system which accompanies emotion, e.g. increase in heart rate, and sweat production.
   d) Subjective feelings are the conscious awareness of the emotional state one is in, e.g. feeling happy of feeling inspired[48].

3.5.2 The Basic Model of Emotions

Despite the fact that people differ with respect to their emotional response, the way in which emotions are formed is universal. The basic model of emotions shown in [fig. 3.13] was created by Pieter Desmet Stated that a stimulus elicits an emotion when it is appraised as either harmful or beneficial for one of our concerns. The three variables in the model of emotions which are stimulus, appraisal, and concerns are clarified in the following paragraphs.
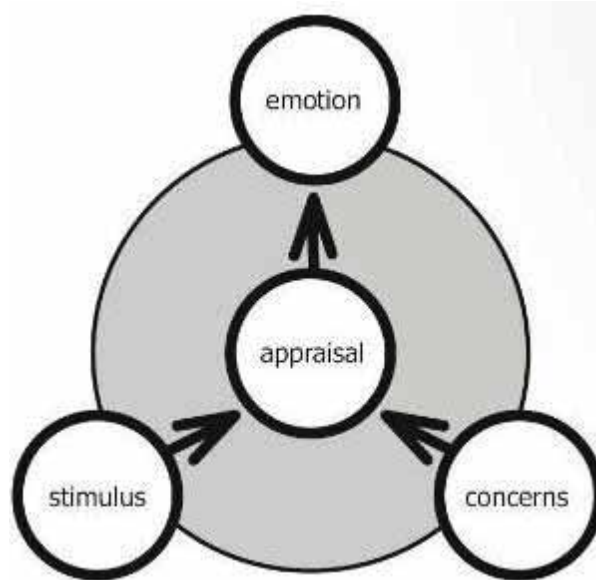
Figure 3.13: Pieter Desmet Model of Emotions. Droog, S., Devries, S. (2009), Emotion in Architecture, Research Thesis, Explorelab faculty of Architecture TU Delft

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[47] http://www.merriam-webster.com/dictionary/sentiments [10/09/2012]
[48] Droog, S., Devries, S. (2009), Emotion in Architecture, Research Thesis, Explorelab faculty of Architecture TU Delft

- Stimulus:

Any perceived change has the potential to trigger emotion (for example encountering something in a space). It doesn't have to be some physical event that evokes emotion; it could be evoked by remembered or imagined events[49].

- Appraisal:

According to Droog (2009), it is a non intellectual, automatic evaluation of the significance of a stimulus for one's personal well being. And because appraisal mediates between product and emotion, we can find different people experiencing different emotions towards the same product. Therefore it is the attached value or assessment of the product rather than the product itself that causes emotion.

- Concern:

Concerns can be considered a stable a reference to the appraisal process. "The significance of a stimulus for our well being is determined by an appraisal concern match or mismatch[50]." (Droog, Devries, 2009) Stimuli that match our concerns are approved as beneficial, and those that mismatch our concerns are considered harmful. Thus human concerns play an important role in our emotions and consequently our judgments[51].

The model applies to all human emotions; the three variables (appraisal, concern and stimulus) determine if a stimulus (product or any other stimulus) triggered emotions and if so which particular emotion was experienced, like the demonstrations in [fig. 3.14, 3.15] Droog and Devries (2009) explain the reason behind emotions about the Vinex housing in Netherlands, and Peter Zumthor's thermal bath in Vals with the aid of the model of emotion.
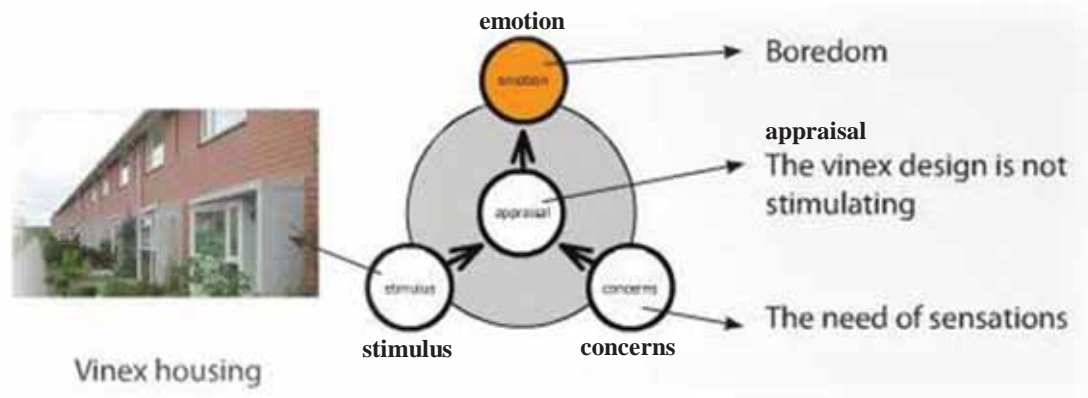
Figure 3.14: Model of Emotion Application on Vinex Housing. Droog, S., Devries, S. (2009), Emotion in Architecture, Research Thesis, Explorelab faculty of Architecture TU Delft

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[49] Ibid.
[50] Ibid.
[51] Human concerns will be handled In more details in section 3.6

Figure 3.15: Model of Emotion Application on Thermal Baths. Droog, S., Devries, S. (2009), Emotion in Architecture, Research Thesis, Explorelab faculty of Architecture TU Delft

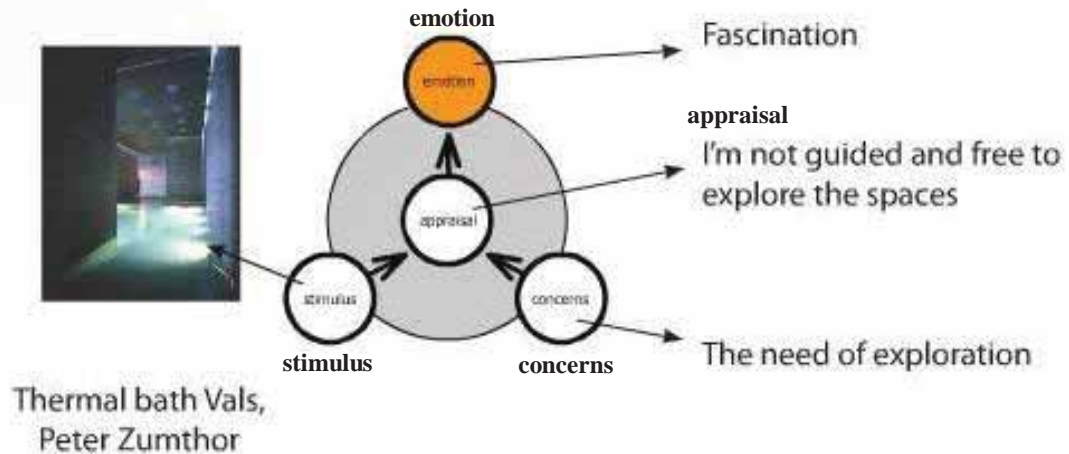So after exploring how humans' emotions affect people's judgment and interaction with a place, and the importance of emotional influence on architecture and vice versa. It was found that users' emotions relied greatly on their concerns and needs as human beings. So here comes the necessity of exploring people's basic needs in general, and their concerns from architecture in particular that can help them fulfill those needs to be able to have more control on users' emotions, and eliminate unwanted feelings or irritation of the users. The following section deals with the subject of human concerns, and needs.

3.6 Human Needs

There are rules that govern people's use of space that can be observed wherever people are gathered together, some of these rules maybe social, but many are a reflection of our needs as human beings. As Bryan Lawson explained in his book: 'language of space', that people are inseparable from space; whether inside buildings or outdoors. The space that surrounds people and the objects enclosing that space may determine how far people move, how warm or cold they feel, how much they can see or hear, and with whom they can interact. Space therefore may heavily influence the mood people are in, and the way they feel towards tasks they might have to perform and people they might find in their company. So people demand a great deal from this space.
On a basic level people need such things as adequate lighting and fresh air to breath. Then they also need to be able to reach furniture, equipment and other facilities to perform some tasks. And at a higher level, they need space to help them feel right about their current situation, and with the aid of all their senses[52].
Before getting to people's needs from the architecture, one must understand the categorization of people's needs in general and then try to understand how architecture

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[52] Lawson, B. (2001), the Language of Space, Architectural Press

can play a role in fulfilling some of them. From Maslow's theory of hierarchy of needs one can categorize human needs into five categories, starting from the most basic[53].

Figure 3.16: Maslow's Pyramid of Needs.
charactertherapist.blogspot.com[12-11-2013]

a) Physiological needs are the basic survival needs such as air, water, food and shelter.
b) Safety needs can be for example security of body and resources.
c) Love/Belonging needs are people's need to feel a sense of belonging and acceptance.
d) Esteem needs are self respect and self esteem, which is the need to be accepted and gain recognition from others.
e) Self -actualization needs are realizing a person's full potential. Also in this case it can help to make use of all the senses for example.

3.6.1 Some Concerns that can be Fulfilled through Architecture

There are some concerns derived from the previously mentioned basic human concerns that are fulfilled by architecture, such as the need for refuge, exploration, enticement, thrill, and dramatizing the idea of shelter.
a) Refuge and prospect area is the need for shelter against cold, rain, sun, wind…etc and the need of concealment from others as well. But at the same time there is a need for integration between the architecture as a refuge and the environment as in beautiful views to be aware of change (time of day, year).
b) Exploration is the need to explore and fulfill our curiosity, and being able to make a hypothesis of what comes next and anticipate a variety of possibilities. The more meanings an expressive object can hold, and the less we are able to specify them, the more beautiful the object that expresses them will be.

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[53] Wellington, J. (2011), Human beings have different types of needs, http://joannewellington.wordpress.com, [10/09/2012]

c) Enticement is to be attracted artfully and arouse desire. For example Humans prefer to explore from dark to light; to see without being seen as well. "We move from the dark refuge to the bright prospect so we can always retreat back to our safe refuge[54]" (Droog, Devries,2009)

d) Thrill is the combination of two emotions, fear and pleasure. People seek and enjoy challenge, since survival requires sensitivity to danger therefore sensing or seeing real danger and feeling the control of avoiding it is rewarding.

e) Dramatizing the idea of a safe place or shelter is dramatizing the nearness of comfort or even danger reinforces the sense of security. Like being tucked safe in bed when there is a thunder storm or pouring rain outside. Therefore intensifying the value of shelter by giving evidence of what it protects against.

Finally, Bryan Lawson summed these concerns into three emotional needs that people expect space to help them satisfy. As he says that most of people hate being bored and want some sort of amusement or entertainment, therefore that's a need for stimulation, and users demand that the space around them provides that. As people also avoid high levels of uncertainty and change, and require a degree of stability and structure in their lives, and that's a need for security, so users require spaces to keep them secure. Most people have a strong desire to belong somewhere. There is a need for people to belong somewhere or to be located in a space, and that can be called a need for identity. Therefore according to Lawson (2001), stimulation, security and identity are three needs to be addressed by architectural space[55].

a) **Stimulation**

Bryan Lawson said describing this need that it turned out to be rather more fundamental and less of a luxury. He also explained that at its extreme, boredom is not just dull, but plain dangerous. As in sensory deprivation experiments, when subjects may be placed in a darkened, silent and odorless space. In some cases they are loosely clothed, including soft gloves, to avoid any sensation of touch. In such cases subjects reported vivid images flooding into their mind, and soon turning into hallucinations. Most subjects asked to be released from such environment in a very short time thinking they had been there for many hours. Therefore it is clear that we are not meant to exist in such neutral space, and if that was the case we compensate by inventing our own mental stimulation, which can get out of control. And on the contrary, an environment in which we are bombarded with sensation is equally disturbing, as it was described by Bryan Lawson as well that if one was in a cell and a blinding light came on and off totally unpredictable, and if there were a similarly an unpredictable and deafening noise which one had no control upon, and finally a series of dreadful smells across the room. Of course that would be considered torture.

The level of stimulation people require varies; some people like the quiet life, while others prefer more action. Not only that but our needs change as our moods change and as we age. So this stimulation-performance curve in [fig. 3.13] can help determine the level of stimulation. And where we need to be on this curve depends on our situation. For example Listening to a lecture requires a high level of attention and concentration opposed to relaxed chatting with friends.

It is evident that over stimulating the environment can result in a form of stress disturbing attention .There are places where we go expecting them to provide large amounts of stimulation, like the city of Las Vegas for example [fig. 3.14], or any fairground particularly at night with its lights, noise, and smells of food. According to

[54] Droog, S., Devries, S. (2009), Emotion in Architecture, Research Thesis, Explorelab faculty of Architecture TU Delft
[55] Lawson, B. (2001), the Language of Space, Architectural Press

the previous curve such environment would divert us, which in this case is good; such a place is meant to drive away our cares and worries. But in general people do not live and work in fairgrounds. So the issue remains to find that point of balance on the top of the inverted 'U' curve that delivers a level of stimulation appropriate to the pattern of usage of the setting.
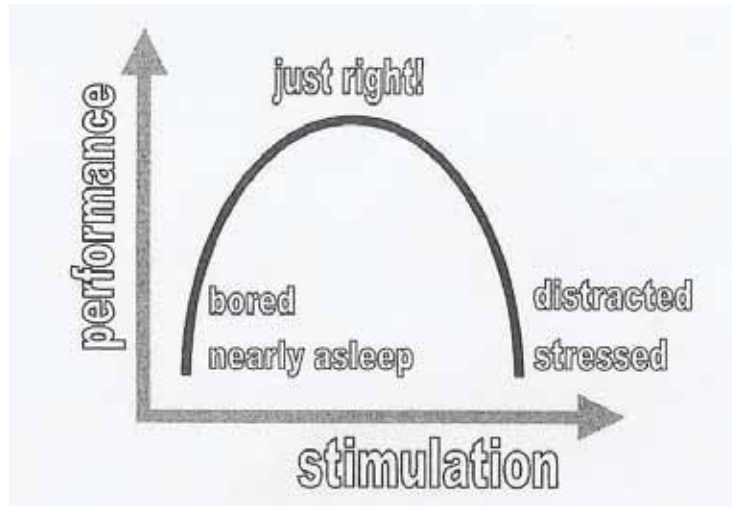
Figure 3.17: Stimulation-Performance Curve. Lawson, B. (2001), the Language of Space, Architectural Press

Figure 3.18: Night View of Las Vegas. news.frbiz.com [21/10/2013]

b) Security

According to Bryan Lawson, people have a deep and fundamental need of stability, continuity and predictability in their lives, and while it might sound exciting not to have this, but it would be very stressful for people to lead a life of constant unpredictability.

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Le Corbusier envisaged buildings to be like ocean-going liners, maintaining an even temperature and constant environment wherever they went. [Fig. 3.19, 3.20] show some of Le Corbusier's Buildings as examples.

Figure 3.19: Le Corbusier's Mill Owners' Association Building in India

Figure 3.20: Le Corbusier's Unite d'Habitation in Marseille

The need for security in architecture can be seen also in the late twentieth century with the expansion of multinational corporations and international travel; the world became physically smaller in terms of travelling time, and appeared more international hotels and restaurants, providing a shelter of security from the different local cultures.
Places also can provide security and stability in our lives by recording events for us. Like the graduation ceremonies, that recognize the changing status of the person and

celebrate a special phase in life. Places that have built into them the acknowledging or the measuring the passage of time have a reassuring effect on us, particularly those that express the passage of the seasons. "The need for windows is not purely a physical matter of providing light and ventilation, but of allowing the occupants of the space to remain in contact with the world outside[56]." (Lawson, 2001)As Bryan Lawson mentioned, that being aware of the weather and of the time of day through the movement of the sun seems to bring a security which many people value very highly.

c) Identity

"Our need to belong and to identify places as either exclusively ours or at least associated with us is demonstrated everywhere by the things people do to personalize locations[57]." (Lawson, 2001) And the need for identity can be found in many examples, for example people coloring their balcony in a different color from the rest of the building [fig. 3.17], or if the area is all villas, one can see people trying desperately to be different or known from the rest by maybe even adding elements that don't match but helps in gaining attention, like pediments, colonnades, finishing materials and colors. The need for identity can be shown even in the smallest of personal spaces, such as work desks as employees add their personal belongings like picture frames and even their personal working tools as a way to express themselves and personalize their spaces.

Figure 3.21: Balconies of Apartment Block in Cairo
www.redbubble.com[21/10/2013]

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[56] Ibid.
[57] Ibid.

3.6.2 Prioritizing Needs in Architectural Space

Spaces can always contribute to all the three requirements of stimulation, security and identity. However, some spaces are required by their nature to provide more of one of the requirements than others. For example at the dentist's waiting room, the familiar fish tank is a simple device for providing an element of diversion with a sense of soothing security. So in this case for example the diversion is intended. We have also the waiting spaces at transport interchanges that need not only to counter our boredom during waiting, but also consider our anxiety not to miss the train or boat or plane. Bryan Lawson confirmed this need by noticing a new railway station with a totally internal and relatively comfortable central waiting space. However, he noticed that people waited on the platform in the cold; they simply did not trust the announcements on the notice board. That meant that in that case, their need for security overcame their need for comfort, like this example in [fig. 3.18] of Ancona railway station in Italy where people are waiting for the train on the floor not emphasizing their need for comfort at the moment.

Figure 3.22: Ancona Railway Station Italy. http://www.flickr.com/ [22/10/2013]

So that means that our needs are not equally important to us; sometimes we have to prioritize some needs on others depending on the situation. And this mostly is dependent on the function of the place, and dependant at the same time as mentioned before on our emotional state.

3.7 The Atmosphere of an Architectural Space

Since people experience architecture with all their senses; sight, smell, taste, and hearing, with the mind and emotional interventions, therefore people's impressions about architectural space come from the expression of many elements that are in that

place. The effect of the architectural attributes of the users' perception creates the atmosphere of the place.

The definition of the word 'atmosphere' expanded in the late 18th century from just planetary gases to the sense of surroundings that influence the mental or moral environment. The emotional engagement that an atmosphere is capable of evoking in a person, makes it an important field for architects to create spaces that call on all the senses and seduce the occupants with the desire of reaching out and touching a lumpy wall or a voluminous ceiling that is exhilarating. It opens a new era where the eye has lost some of its ground, and the joy of touch and feeling in a space has gained value. By concentrating on designing a certain atmosphere through the manipulation of colour, transparency and reflection of light, the material of interior space becomes dissolved into the immaterial sensory quality of atmosphere, capturing the receptive visitor in this embrace[58].

Petra Blaisse, a Dutch designer when asked about the connection between function and atmosphere, she said that atmosphere is one of the functions that one requires from his environment, like acoustics, climatic, visual, light. And mentioned that textures and patterns (in 3D and openings) can be very effective to catch light and sound waves, and allow the through or scatter them. But together with colour is mostly used to influence the experience of a place, and tell something about it. Like history, intention, cultural meaning, or function of a building[59].

Atmosphere is a quality of space that is not only dependant on the space itself; but is affected by the users as well. The architect Rochus Urban Hinkel divided what creates or influences an atmosphere into two categories. First is the 'spatial hardware' which is what can be measured, like the construction of the interior with its materials and details. The second category is the 'spatial software' which is the intangible sensations within the interiors, together with the preconceived knowledge, and personal memories of the perceiving subject. Each of the spatial software and spatial hardware don't mean much without the other; they are co-dependent and co-present. The experienced atmospheres can shift and present different experiences for different users. In the words of Hinkel (2008): "Atmosphere is an ongoing process of negotiation between the experienced, the remembered, the thought, the known, the analyzed, the imagined as well as the forgotten[60]."

The architect Peter Zumthor as well, who believed that the quality of architecture is not just about architectural guides, histories, or even getting his work into a certain publication. But it is the ability of architecture to move people, or touch them in some way. Zumthor described nine elements that concerned him most when trying to generate a certain atmosphere in his buildings: The body of architecture, material computability, sound of space, temperature of the space, surrounding objects,

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[58] Weinthal, L. (2008), Bridging the Threshold of Interior and Landscape, PRESTON, J. & CASTLE, H. (Eds.) AD (Architectural Design): Interior Atmospheres. London, John Wiley & Sons, Vol. 78, No.3, pp. 67-71

[59] Ibid.

[60] HINKEL, R. (2008), Spatial Hardware and Software. PRESTON, J. & CASTLE, H. (Eds.) AD (Architectural Design) : Interior Atmospheres. London, John Wiley & Sons, Vol. 78, No.3, pp. 82-87

stimulation between composure and seduction, tension between interior and exterior, scale, light and shadow[61].

a) **The body of architecture:**
   Which is the material presence of things that form a space; the body with its literal meaning, not the idea of it.

b) **Material compatibility:**
   The endless variety of materials, and the reaction of these materials with one another.

c) **The sound of space:**
   In the words of Peter Zumthor "interiors are like large instruments, collecting sound, amplifying it, transmitting it elsewhere." And it is affected by many factors like the shape of the room, the surfaces of the materials they contain and the way these materials are applied. Most people are not aware of the sound of building itself; they are only aware of sound of people in it.

d) **The temperature of the space:**
   The temperature of the space affected by the materials used, like steel which can drag the temperature down. But not just the physical meaning of temperature but the psychological as well. As in what we see, what we feel and what we touch, even by the feet.

e) **Surrounding objects:**
   Like pictures, books, furniture, etc…

f) **Stimulation between composure and seduction:**
   Introducing certain composure rather than having occupants running around, looking for the right door. And seducing occupants to explore as well, in an organized sequel; with the aid of light for example. But at the same time seeming so natural, not a screaming out loud sort of thing.

g) **Tension between interior and exterior:**
   As well as the need for the people inside to look at a beautiful view outside or even be aware of time changes. It is important to think of what do we want people outside to see; what kind of message does architecture space send to the public outside.

h) **Levels of intimacy (scale):**
   It is related to proximity and distance. It refers also to size, dimension, and scale compared to the people in the place.

i) **Light and shadows:**
   How light falls on things and how surfaces react to that; the reflection, the shadows that are formed for instance.

3.8 Conclusion

Therefore from the previous elaboration on the attributes that formed and affected the architectural atmosphere, a table was done to summarize these attributes for further

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[61] Zumthor, P. (2006), Atmospheres: Architectural Environments, Surrounding Objects, Birkhauser

inquiry about an architectural atmosphere. The attributes were organized into a table [table 3.1] of 5 main sections; location, spatial character, sensory attributes, furniture, and people's behavior. And each section was divided into more specific attributes that played a role in each on the previous 5 main attributes. And to analyze then the atmosphere quality and its effect on the users, the theoretical study on the senses (mentioned in chapter two) will be used, in addition to the theoretical study on the mind and emotions (mentioned in this chapter), that can be summed in the following paragraphs.

People's Impressions are not limited to sensations only. The human mind for example is capable of drawing attention to certain things and even screen out other information. Like the idea of foreground and background, this happens due to the tremendous amount of information available. So there exist some features that give any element a foreground quality.

Impressions are based on our reflection on things as well. These reflections come from ideas that are formed throughout our experiences and come out through our memory and imagination. These ideas that affect our impressions are affected greatly by our emotions with all its stats; emotion, mood, sentiment. And at the same time our emotions are organized by our needs, motives, and concerns.

Unlike impressions from sensations, impressions of reflection can be quite subjective due to intervention of our ideas that are formed by our learnings and individual experiences, like people from different cultures may perceive the same thing differently due to their different learnings and ideas. But at the same time, our needs and concerns as human beings can put a general informative base to impressions and how occupants perceive a certain place. The intended function of the place as well is supposed to unite people's concerns and needs from this place.

Architects then should put in mind while designing, how to get the occupants attention, and think about what the occupants would remember the most about their design and most importantly, how to make the most of the occupants' experience of their architecture.

The next and final section before presenting the applied research, analyzes clearly the physical attributes in the architectural space. As theses architectural attributes are a part of the ongoing interaction between the users and the space.

Table 3.1: Attributes that affect the atmosphere

| 1. Location | 1.1 relation between inside & out side | View from inside |
| | | Expression from outside(what people see from outside) |

2. Spatial description	2.1 Walls	material
		Fenestration/windows views
		Decoration(cover, hangings, photos, ...etc)
		color
	2.2 Flooring	material
		pattern
		color

	2.3 Ceiling	height
		material
		Lighting fixtures
		color

	3.1 Sound	Background music
		Absorbing quiet/ reflective noisy
		Level of noise from utensils/people
		Sound effects
3. Sensory	3.2 Smell	Coffee/ food smell
		Scent used
		Cigarettes/shisha
		Garden aroma
	3.3 Light	Ambient
		Spotlight
		Task light
		Reflected
		Direct
		Sunrays
	3.4 Temperature	A.C
		cool
		warm
		ventilated

	4.1 Seating arrangement	
	4.2 type of seats	Materials, texture
		colors
4. Furniture		comfort
		Style
	4.3 type of tables	materials
		colors
		Style

	5.1 Attitude	Waiter's attitude
5. Behavior		Customers attitude

Chapter 4: Applied Research - The Study of Sensory Experience in Coffee Shops in Cairo

4.1 Introduction

The previous chapters emphasizes the importance of having a more in depth understanding of the occupants' impressions when contacting the environment, and the importance of using this information in future design decisions to make environments more occupant centered. Since the senses are tools that connect people to the external environment, understanding the sensory experience that people have through architecture is critical, as well as understanding the physical stimulus that stimulate the senses. Since there is no perfect stimulus for every case or every user; physical stimuli expected from a funfair would be different from those expected in a library; therefore there would be no standards for physical stimuli, and each situation would have to be studied independently as a case study.

Due to the huge amount of information available in the environment, people's impressions were found not to be limited to sensations only. The human mind could draw attention to certain things and screen out others through a selective process. Impressions as well can come from people's reflection on things based on previous experiences and learning. Emotions as well affect people's reflections, and since there was found a relationship between people's emotions and their needs, motives, and concerns, understanding these needs, motives, and concerns would constitute an important facet in understanding people's emotions towards a certain environment.

This chapter presents and discusses the details of the practical field study conducted in six coffee shops in the city of Cairo. The chapter covers data collection techniques, and survey procedures, it discusses the criteria for selecting coffee shops as the place to conduct the applied research; the chapter also includes methodological issues, and procedures for the applied study objectives and research design.

The applied research consisted of various methods for the different stages of the study. First a diagnostic study was conducted then the descriptive approach to document the current state empowered by a survey that would make the results more reliable, and that would represent a wide population in order to be able to conclude statistical generalizations for the study.

The descriptive research is based on the theoretical and analytical study of the attributes that impact the atmosphere of the space presented in (chapter 3, section 3.7).

The attributes that created the atmosphere of a place were summarized into five sections: first, the special character including wall, flooring, and ceiling description, secondly, the sensory attributes including sound, smell light, and temperature. Thirdly comes the furniture, fourthly people's behavior and attitude, and finally the location and the relation between the inside of the coffee shop and the outside.

4.2 Criteria for Selecting Coffee Shops as Case Studies

Coffee shops are places where people entertain, exchange news, share ideas, get advice through social encounter. Coffee shops through history have been places of learning; of making business deals; scientific, literary, political, philosophical, and economic

discussions; and even the typical social gossip is carried on in coffee shops. Historically in Egypt ideas initiated and discussed in coffee shops have been a source of political forums and discussions. Typical coffee shops share the characteristics of a restaurant or a bar but focus more on serving coffee, tea and snacks. However, a coffee shop can serve other things as well; like hot meals, deserts, sandwiches, soups, and alcohol, aside from bakery products[1]. The coffee shop accommodates groups of people informally for long time spans so people don't eat and leave, customers stay and are usually joined by others throughout the day, the profit is based on the cumulative and additive consumption of food and drinks.

Figure 4.1: Social Life in the 1950s at Al Fishawy Coffee Shop

In Egypt having coffee was related to smoking since the Ottoman's era; tobacco consumption of pipes at first, then came the traditional shisha that is very popular in traditional Egyptian cafes till now. Coffee shops in Egypt were originally designed for meeting people in a place outside homes to maintain the privacy of the residences. Because houses in Middle Eastern cultures in general, respected the privacy of domestic life. The coffee shops evolved more to be places for entertainment in general and celebrating events that can take place outside the home environment. When board games and playing cards became popular, customers were more tied to habitual entertainment in coffee shops. Coffee shops in Egypt witnessed many traditional arts; like storytelling on the 'rababa' instrument, poetry, singing, dancing, and some coffee houses aired live concerts of Om kolthum as well.

At the beginning, the upper social groups in the Egyptian society didn't entertain in the public coffee shops; coffee shops were mainly reserved to the lower and the middle lower social groups. Women weren't allowed to sit in the coffee shops until the famous women's movement in Egypt[2]. At the beginning of the 20th century, famous authors,

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[1] Anderson, C. The history of coffee houses, www.foodeditorials.com[17/02/2013]
[2] Abdallah, E. (2008), Coffee houses and the history of what history overlooked, www.youm7.com, 22/09/2008.

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poets and politicians such as Mostafa Kamel, and the famous poet Ahmed Shawky went to the coffee shops.

The Egyptian writer Naguib Mahfouz for example was famous for going to "Al Fishawy" coffee shop that is situated in the streets near Al Hussein mosque for observing people's lives. The coffee shop had huge mirrors on the walls, and tiny copper tables where tea with mint, Turkish coffee, or lemonade was served. It can be considered a typical Egyptian coffee shop. The picture in (figure 4.1) shows a number of famous Egyptian actors and actresses smoking shisha and having tea in the famous coffee shop 'Al Fishawy' in Cairo in the 1950s.

Another very famous coffee shop was Groppi in Talaat Harb square, which still retains its original mystique although its interior is now somewhat faded. Groppi was a creation of a Swiss pastry maker Giacomo Groppi, and has been featured in countless films and extensively written about. According to Linda S. Heard's article "If only Groppi's walls could talk" Groppi stands as a living legend and is still a magnet for visitors to Cairo today. It symbolizes a never to return era; a time of great wealth; the days of the Egypt's kings, princes, pashas, and when the Egyptian pound was worth more than either sterling or the dollar. It was once a place of political intrigue, a venue where historic deals were done and a beloved haunt of authors, journalists, artists, movie stars and socialites eager to be seen[3].

Figure 4.2: Al Fishawy Coffee Shop

[3] Heard, L. (2007), If Only Groppi's walls could Talk, http://www.alshindagah.com/Shindagah78/eng/Groppi.htm, [09/10/2013]

Figure 4.3: Groppi Coffee Shop

Today, coffee shops continue the tradition set in the past. They still remain a popular venue for people who want to relax and socialize where they can talk, read, catch up on the day's event, meet with people and enjoy food and drinks. This desire is evidenced by popular coffeehouses with franchises around the globe[4]. A very successful and famous franchise is the Starbucks coffee shop. According to O'Connell (2008), an average of six new Starbucks coffee shops open in the world each day. In fifteen years, Starbucks has not only seeped into 37 countries and all 50 states, but has grown from100 stores to 13,000. The chain serves about 40 million customers each week, giving jobs to 25 million coffee farmers. Starbucks infiltrated the American landscape more quickly than any other company in history; it was rated by Interbrand as the fourth-most effective brand in the world, after Apple, Google, and Ikea. It was found out that everything in Starbucks was carefully planned to express a certain image and a unique experience for the customers. Starbucks interviewed hundreds of coffee drinkers, seeking what it was that they wanted out of a coffee shop. The overwhelming consensus actually had nothing to do with coffee; what consumers sought was a place of relaxation, a place of belonging. The round tables at Starbucks for example were the result of interviewing people and considering how they wanted people to feel before considering what they wanted people to do. The round tables were found best to protect the self esteem of clients who visit the coffee shop on their own; as there is no awkwardness in empty seats at a round table. Service counters were built out of natural materials like warm woods and stone, rather than plastics and metals, to create a more cozy and an at home atmosphere[5].

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[4] Anderson, C. The history of coffee houses, www.foodeditorials.com[17/02/2013]
[5] O' Connell, M. (2008), Not Just Coffee: Starbucks' Rise to Success, http://whittakerassociates.com/ [19/10/2013]

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Figure 4.4: Starbucks Coffee Shop. https://medium.com/what-i-learned-building/a844ec3343da [19/10/2013]

 In Egypt today there are different types of coffee shops; there still exists the traditional coffee shops that mostly serve shisha, and still in some low income communities they are all men, and there are the coffee shops with their modern look, Egyptian and foreign franchises. And the modern coffee shops are the ones that are studied in the applied research.
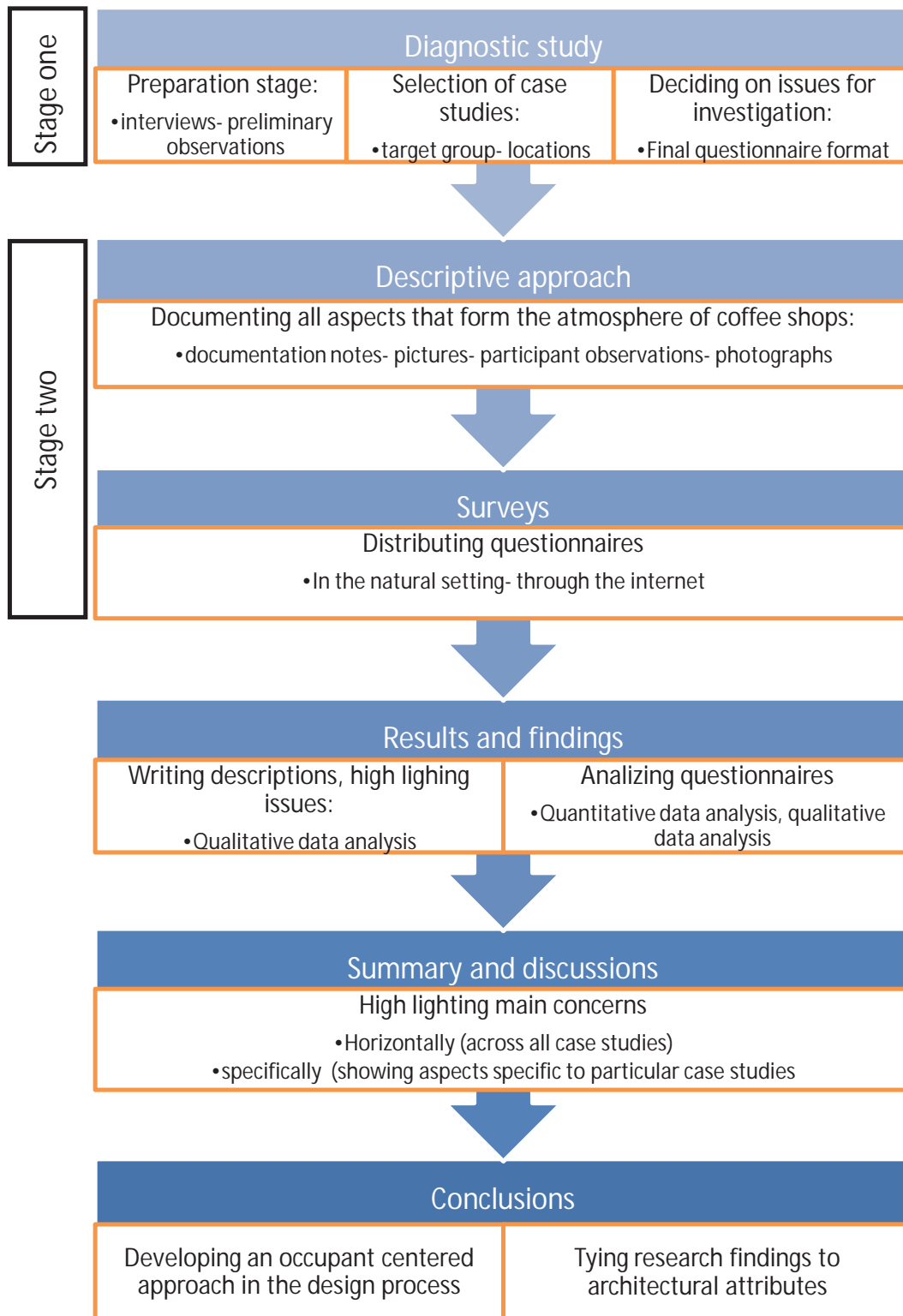
Since coffee shops are places where customers will revisit several times depending on their attachment to the atmosphere of the place, and recurring customers visit can be dependent on the atmosphere of the place more than its functional attributes, therefore studying why people prefer one coffee shop over another would shed a light on users preferences and emotions towards the built environment.

> "So often restaurants, hotels or locations are recommended on the strength of their atmosphere alone. It is this attribute in contemporary life that is able to mark places out from the everyday or the banal – that gives them emotional meaning and human connection[6]."Helen Castle

Finally, Coffee shops were found to be public spaces where human behavior and impressions can be studied easily, and because they contain a variety of activities, that do not require specific functional design criteria. Conclusively coffee shops seem to be the most suitable to study the effect of sensations on users preferences and the atmosphere of a place. As a next step the research findings can be generalized and applied to other spaces that hold similar activities such as restaurants, food courts in malls, cultural centers,…etc. subsequently, aiding in the development of an occupant centered approach in the design process.

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[6] Preston, J. (2008), Interior Atmospheres, Architectural design, Wiley, Vol.78, No.3, p.5

Stage one

Diagnostic study

Preparation stage:	Selection of case studies:	Deciding on issues for investigation:
•interviews- preliminary observations	•target group- locations	•Final questionnaire format

Stage two

Descriptive approach

Documenting all aspects that form the atmosphere of coffee shops:

•documentation notes- pictures- participant observations- photographs

Surveys

Distributing questionnaires

•In the natural setting- through the internet

Results and findings

Writing descriptions, high lighing issues:	Analizing questionnaires
•Qualitative data analysis	•Quantitative data analysis, qualitative data analysis

Summary and discussions

High lighting main concerns

•Horizontally (across all case studies)
•specifically (showing aspects specific to particular case studies

Conclusions

Developing an occupant centered approach in the design process	Tying research findings to architectural attributes

Figure 4.5: The Applied Research Approach

4.3 Applied Research Methodology

In the applied part of the research, several tools and approaches for data gathering were used in the different stages of the study to obtain a clear overview of the current situation of coffee shops. The design of the applied research approach is summarized in [fig. 4.5]. The applied research is composed of two stages. Stage one applied a diagnostic approach. Stage two applied a descriptive research approach.

In the first stage: the diagnostic approach represented the investigative stage. Major research decisions were taken, to be followed up and implemented in stage two. Stage one also included the pilot study phase where an experimental questionnaire was distributed, analyzed, discussed and corrected to develop the finalized questionnaire format that was distributed in stage two.

The second phase: the descriptive approach witnessed gathering the information through the utilization of two technologies:

1. The documentation of the physical situation of the selected coffee shops.
2. Gathering information about the users' perception of coffee shops through distributing the finalized questionnaires.

Then the results and findings from the survey were statistically analyzed to yield common results and findings regarding people's impressions about coffee shops and their atmosphere. Finally analyzing the results and reaching a conclusion that would aid in developing an occupant centered approach in the design process. And this ties the research findings to the realm of architecture.

4.4 Diagnostic study

The objective of diagnostic research is to help in gaining more insight into the topic, and high light the main issues that will be addressed in the study of coffee shop atmosphere and also to help in selecting the case studies that would be most revealing to the issues addressed. The diagnostic study consisted of three stages; the preparation stage that included interviews and observations, then the selection of case studies' locations and target groups, and finally deciding on issues for investigation and creating the final questionnaire format that will be distributed in the selected coffee shops. The diagnostic study lasted for two months.

4.4.1 Interviews

Firstly, one to one interviews were conducted with 10 people sitting in various coffee shops. The interviews were structured, and addressed the following issues:

a) Acquiring general description of the person; age, gender, occupation.
b) Inquiring about the reason for coming to the coffee shop.
c) Asking about the person's impression of the coffee shop atmosphere.
d) Inquiring about the architectural attributes that gave them that impression.
e) Taking the person's opinion regarding the cafe: materials, lighting, colors, smell, and sound.
f) Finally asking if anything needed to be changed in the coffee shop to improve its atmosphere.

Secondly notes were taken during the interviews and the data collected was grouped under general headings. Topics that were repeated were gathered under general themes. Thirdly, the data was then analyzed and the main findings from the interviews were

deduced. It was deduced that people tended to relate their impression of the atmosphere to physical attributes of the place. Such as, relating cheerfulness with the lighting, and relating the feeling of lightness with the wide space, and related the impression of warmth, excitement with the colors. The previous findings confirm the critical role of architectural attributes in forming people's feelings about a place. The second finding from the interviews was finding out some of the reasons behind people's visit to coffee shops such as, meeting friends, eating, studying, and enjoying the view. Finally, the third finding was that when people were asked about what they could change in the coffee shop it was found that they always needed to add stimulants as colors, textures, open the windows, …etc so when going back to Lawson's basic needs from architecture which were security, stimulation, and identity, here people showed their need for more stimulation.

From interviews the current situation became clearer; learning more about the customers perspective on coffee shops. And most importantly the reason behind their visit, or the activities they did in the coffee shop. After formulating this background about people's impressions about coffee shops came the part for choosing the criteria of selecting the specific case studies to be further investigated.

4.4.2 Criteria for Selecting Case studies

To be able to come out with proper statistical generalizations of the population, criterias had to be put for the selection of the case studies. Firstly the modern coffee shops that were opened in the 90s and afterwards were chosen over the old traditional ones to unify the type of coffee shops, then various atmospheres under this umbrella of modern coffee shops were chosen for the case studies to examine a variety of attributes that contribute to the coffee shop atmosphere. By this selection all criteria related to heritage will not be included in the discussion of perception and atmosphere of coffee shops.

Secondly, the selected coffee shops would be targeting more or less similar groups of people; to obtain reliable results as people's perspectives and needs may change according to age and social class. Upper middle class adults (20-64) were chosen as a wide sample or target group for the study. For their age group doesn't call for special issues like that of teen agers, children, or elderly. So they are more generic, and most importantly the group members were the majority encountered in the initial interviews. Finally for the choice of location, the selected coffee shops would be in residential neighborhoods inside Cairo, where the targeted social class is available, and where the neighborhoods have common qualities, such as the fact that they are upper middle class residential neighborhoods inside the city, and in old settlements not in new ones like the 6th of October city, and the new Cairo city that differ in the atmosphere from the already existing dense city structure. Coffee shops in the new settlements in Cairo are taking the trend of locating coffee shops and restaurants in separate zones for entertainment but still close to the residential areas, while on the other hand coffee shops in the old settlements in Cairo are within the residential urban tissue; mostly occupy the ground and first floor of residential blocks. So the pattern of usage of the coffee shops can vary in each of the previous cases. The selected coffee shops were chosen to be in older existing settlements in the following neighborhoods in Cairo that are shown in [fig.4.3]: Mohandeseen, Dokki, Zamalek, and maadi. And in these neighborhoods six coffee shops were chosen; which are shown in table (4.1).

Figure 4.6: Locations for Selected Coffee Shops

Table 4.1: Chosen Coffee Shops and their Neighborhoods

Coffee shop name	Neighborhood
1. **Beanos**	Zamalek
2. **Pasqua**	Mohandeseen
3. **Greco**	Maadi
4. **Cedars**	Mohandeseen
5. **Paul**	Mohandeseen
6. **Cilantro**	Dokki

4.5 The Descriptive approach

This is the second stage in the field research after the diagnostic study. In this stage of the research the objective is documenting and describing all the attributes that formed the specific atmospheres for each of the six coffee shops. The documentation was done for each coffee shop on a separate day from morning till sunset and over the course of one month from the end of December 2012 till the end of January 2013. The documentation was accomplished by taking notes and photographs as well. This documentation would act as a reference for the survey outcomes; to understand what people's answers are based upon. The following are the attributes to describe each coffee shop separately: the location of the coffee shop, the spatial attributes, the sensory attributes, the furniture, and people's behavior.

a) The location of the coffee shop describes the relation between inside and outside.
b) The spatial attributes describe the walls, floorings, and ceiling as components of the space.
c) The sensory attributes describe the sound, smell, light and temperature of the coffee shop.
d) The furniture describes the seating arrangement, type of seats, and tables, hangings, lighting fixtures, and additional decoration (bookshelves, flowers,…etc)
e) People's behavior in the coffee shop describes the waiters and customers attitude.

The documentation presented in the following sections is in the form of a table. The table is divided in to the five sections containing photographs and descriptions of the attributes that formed the atmosphere that were mentioned earlier; location, spatial attribute, sensory attributes, furniture, and people's behavior. Then observation plans for each of the six coffee shops are presented showing users activities, services provided by the coffee shop, and any unusual remarks regarding the coffee shop design that would help latter at the end of the study to come up with some findings. Finally the atmospheres of each coffee shop were summed up in a few lines after the observation plans as a conclusion about each studied coffee shop.

4.5.1 Observations and Documentation of the Coffee Shops' Atmospheres

**Table 4.2: Description of Beanos Coffee Shop Atmosphere**

Fact box			
	Coffee shop Name	Beanos	
	Location	Zamalek	
	Date of visit	25-12-2012	

Coffee shop background	Beanos is an Egyptian coffee shop chain that has 9 branches in Cairo and in Alexandria. This branch is a two storey café in El sheikh El marsafy square in zamalek, far from the strip of Abulfeda chains which makes it a more quiet location. Its ground floor is all non smoking.	

Location	Relation between inside and outside	The view from inside is a narrow street in zamalek off a small square with few apparent greenery and passersby from now and then attract the attention. passersby can see clearly what is happening inside through the glass panels onto the depressed ground floor level. The 1st floor is exposed by wide window panels. The coffee shop name is written on an orange background on the top of the facades.	

Sensory	Sound	English pop songs were played in the background in a very low volume. Noticeable sounds of people talking. And no noise from outside can be heard. Basically this part of Zamalek is a quiet zone except at time when school finishes; as there is a nearby school and traffic can get a bit loud.
	Smell	From now and then there are nice smells of chocolate, or some things that are prepared or warmed on the service counter at the ground floor level. Down stairs area is no smoking, no cigarette smells are noticeable even upstairs.
	Light	Spotlight system is very well distributed in a comfortable way, shade and shadow are visible on certain walls near some spot lights. Natural light enters the place from the glass paneled walls which also allow a lot of sunshine giving the place a warm atmosphere. Blinds are added from the inside to protect the space from over exposure with sun rays.
	temperature	Windows are not designed to open, Heater is turned on and it is very warm or AC. In the hot summer days. Mechanical temperature control added to the noise control aspect. As windows are not opened no noises from outside interfere with the interior atmosphere.

Spatial description	Walls	The walls are golden beige textured stone cladding, with parts of grey or dark brown wood cladding, pastel green, and turquoise plastic paint. With big glass panels on the sides facing the street. Pastel colored paintings of vegetables and coffee beans are hanged on the walls. Plazma T.V screens hanged on the wall, muted with news channel running. There are bookshelves with magazines and books.	
	Flooring	40*40 Beige, marble texture ceramic tiles in a diamond pattern.	
	Ceiling	It consists of two stories, each floor is three meters high, finished in white plastic paint with built in spot lights as the lighting system.	

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Furniture	Seats	Comfortable beige and brown Leather contemporary arm chairs and a few sofas with a wooden structure.	
	Tables	Chocolate brown contemporary wooden tables with comfortable proportions for eating. Plastic finish no table cloth.	

Behavior	waiters attitude	Waiters' attitude was very friendly and cheerful. Waiters acquainted with frequent customers, they all know English to serve foreigners.
	customers	People of different ages, mainly Egyptians with very few foreigners (5 out of 15). They either sat alone or two people together or in groups around four people. All customers were busy with something; studying, reading novels, newspapers, using laptops. But seemed relaxed at the same time.
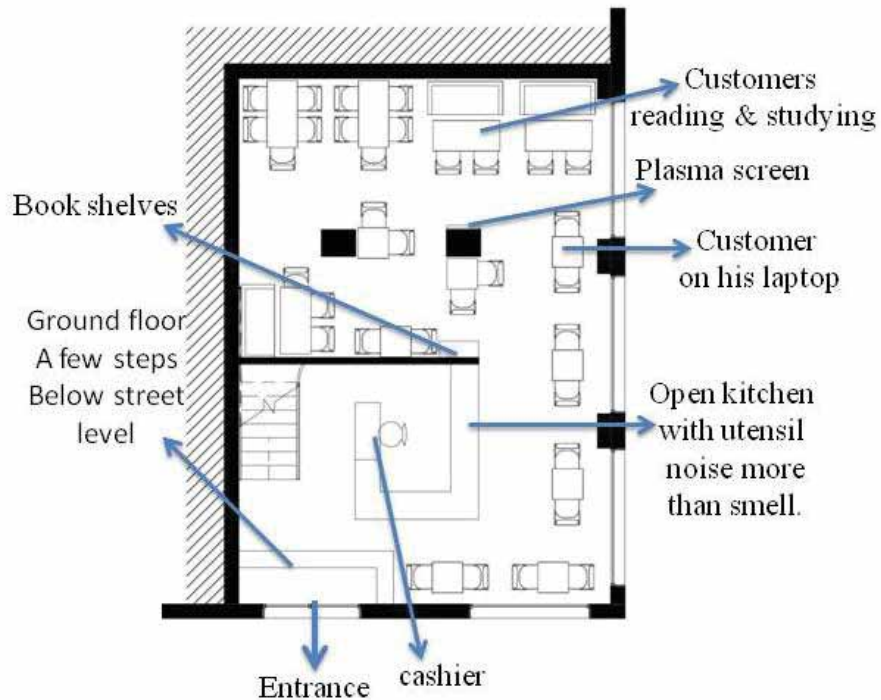
Figure 4.4: Beanos Ground Floor Observation Plan

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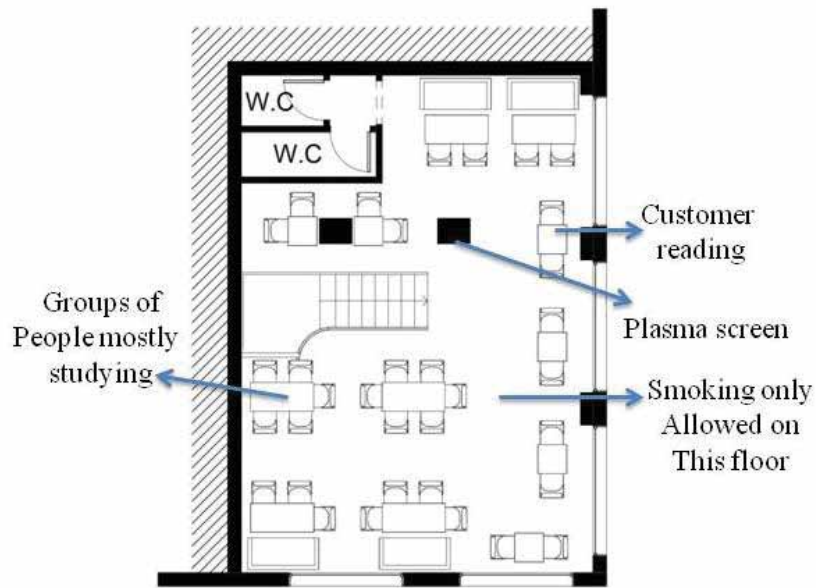
Figure 4.5: Beanos First Floor Observation Plan

The coffee shop's location in a calm neighborhood in Zamalek near Gezira sporting club, the Italian cultural center and some English schools has a great effect in attracting frequent customers; foreign customers, customers who go to Gezira sporting club as well. The atmosphere of the coffee shop is very warm and relaxing, its interior design is modern and simple with a cool color scheme of pastel colors. The coffee shop provides Wi-Fi connection as well as food and drink, and has bookshelves with books, magazines, and newspapers. The coffee shop has the capacity for 40 people upstairs and 40 people down stairs as well. There are customers who sit alone reading the news paper, or a book and others using their laptops, there are other customers who are in groups socializing or studying, and some families come with children. The coffee shop's ground floor is a non smoking floor. The coffee shop doesn't have strong coffee smell although its logo is coffee beans with their smell coming out from them. There is no noise from outside, but people sometimes can be loud and noise come from the service counter from blenders and other kitchen utensils.

Table 4.3: Description of Pasqua Coffee Shop Atmosphere

Fact box	Coffee shop name	Pasqua	
	Location	Lebanon square, Mohandeseen	
	Date of visit	26-12-2012	

| **Coffee shop background** | Pasqua is an Egyptian coffee shop that has three branches in Cairo. This particular branch is located at the chaotic Lebanon square with bright billboards and cars honking all the time. The entrance is from the corner with one side of the coffee shop on Lebanon square and the other side on smaller, quieter street. Pasqua has a glass walled interior dining room that is surrounded by a patio creating the illusion of openness and space when it is not that big. | |

| **Location** | Relation between inside and outside | Their logo and a popping red color on a pediment are visible for people passing by, people inside cannot be seen easily from outside bamboo sticks partially block visibility from outside but from the inside between the bamboo sticks wall customers can see some trees outside. Since the coffee shop is a few steps below the street level and because of the bamboo as well, the street outside in not visible easily. |
| | | |

Sensory	Sound	Instrumental music played. Sounds of people talking weren't very noticeable. Noise from the traffic outside was very clear, and sounds of birds humming were very clear and calming.
	Smell	Shisha smell is very clear and dominant in the whole place. Indoors and in the patio area.
	Light	Weak spotlight system inside plus indirect light from glass cylinders on the tables and from vases on the ground. Natural light enters the place from the bamboo walls and the open part in the ceiling, permitting sun rays without hurting or bothering the eyes.
	temperature	The semi open space is nice sunny, ventilated. And the door to the next area is kept open to permit quite a bit sun and breeze as well unless the A.C is needed in summer.

Spatial description	Walls	The walls are either off white plastic paint finish or stone cladding framing some bamboo sticks in the semi open air area. With big glass panels on the sides facing the street. Their logo of an active waiter handing coffee in a hip busy café in bright mostly prime colors is hanged on the wall as a large painting. Plasma T.V screens hanged on the wall.	
	Flooring	40*40 Beige ceramic tiles, and big beige organic shaped tiles with smaller, darker borders.	
	Ceiling	It is three meters high, finished in off white plastic paint with a few built in spot lights with little intensity. There is a semi shaded area with off white fabric on a wooden structure and a part at the entrance it is open to the sky with no fabric.	

Furniture	Seats	Comfortable red Leather contemporary arm chairs with a wooden structure. In the patio are and metal chairs and a few sofas with off white and red pattern inside.
	Tables	Contemporary black wooden tables with dark green granite tablet inside and in the patio aseua with comfortable proportions for eating.

Behavior	waiters attitude	Waiters' attitude was very friendly; some customers know them by name. But at the same time their attitude was bit formal and wore classic uniforms.
	customers	People seemed in their early 30s or 40s, mainly Egyptians.There were no people sitting alone, and they were either couples or a very small intimate group of friends, mostly two as well.
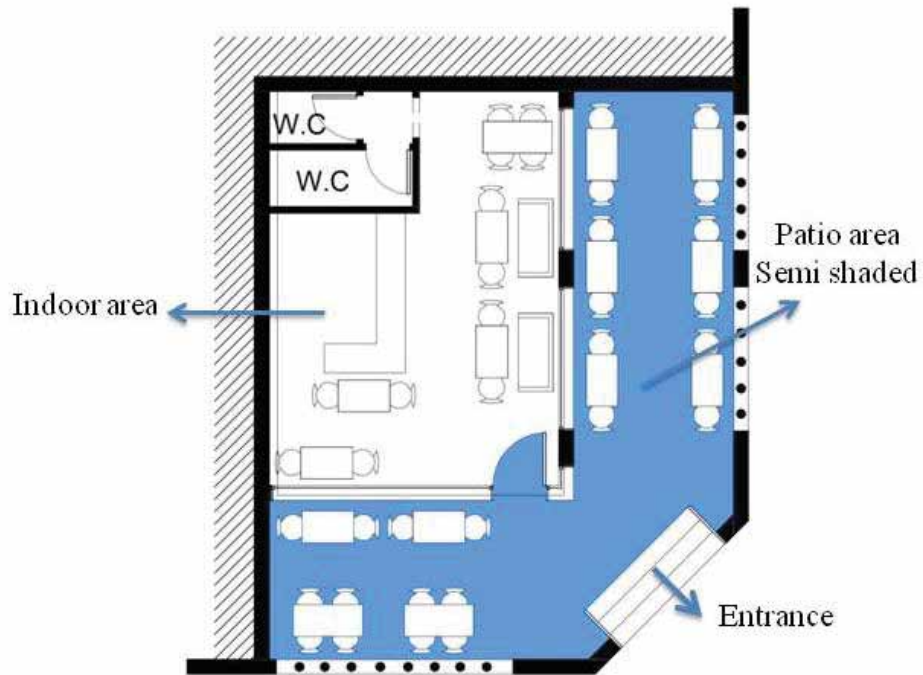
Figure 4.6: Pasqua Zoning Plan

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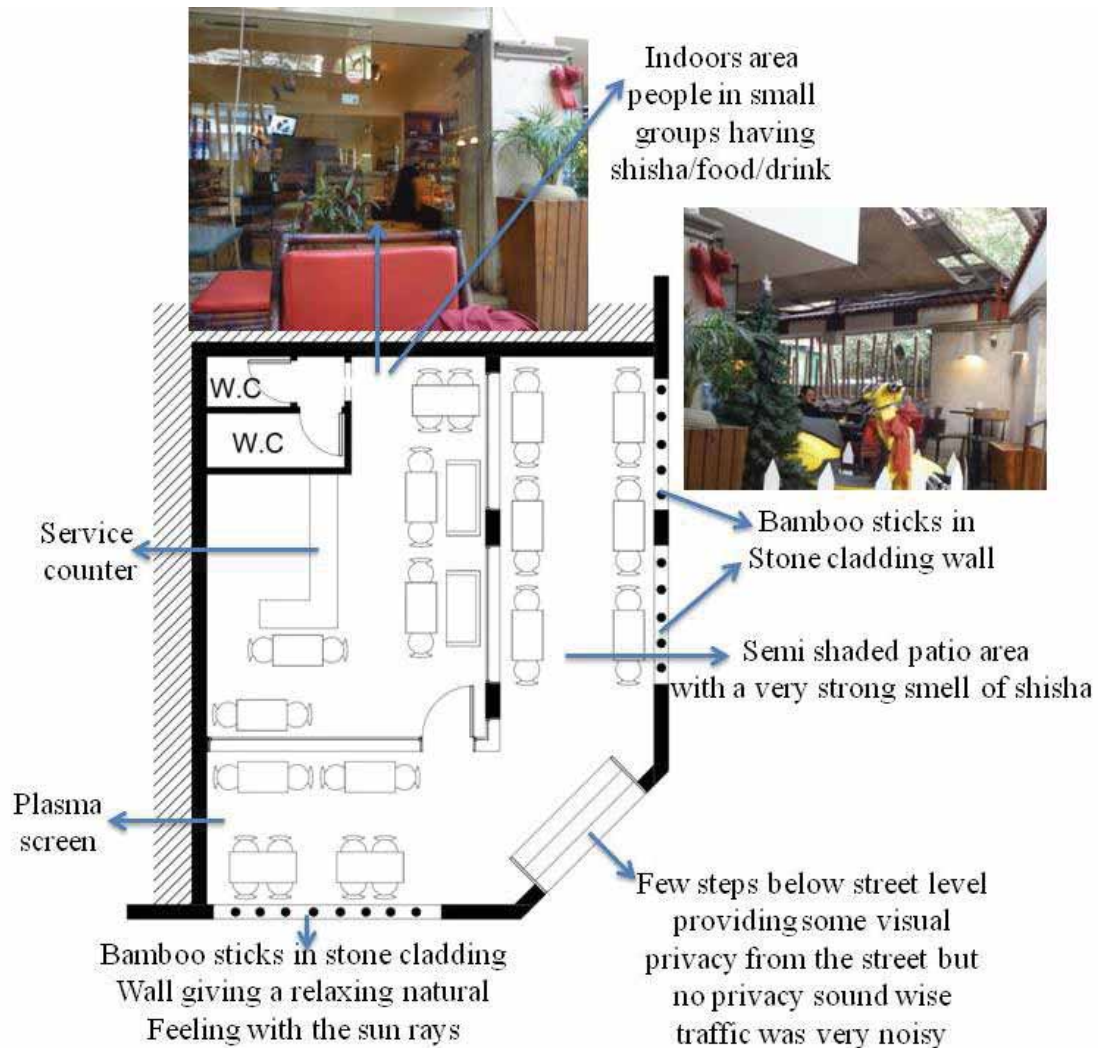
Figure 4.7: Pasqua Observation Plan

The coffee shop's location in high density traffic area makes traffic noise a very noticeable attribute in the place. The coffee shop is famous for serving shisha, the shisha smell is very dominant. The atmosphere doesn't encourage reading or studying, lighting isn't sufficient for reading, and the traffic noise is so loud. The coffee shop has the capacity of 30 people outside and 20 inside. People mostly sat as couples or small groups of people. People didn't come alone. The overall atmosphere of the coffee shop is interesting, stimulating by its popping red color scheme as well. Although the coffee shop was in front of a private lessons center for high school teenagers, the teen agers were not the common customers, the frequent customers were a older; most of them seemed over 30.

Table 4.4: Description of Greco Coffee Shop Atmosphere

Fact box			
Fact box	Coffee shop name	Greco	
	Location	Maadi, road 9	
	Date of visit	15-01-2013	

Coffee shop background	Greco is an Egyptian coffee shop that has two branches in Maadi, this is the more public branch; the other is in a community service association. The coffee shop sells coffee beans by kilo as well as serving it in the coffee shop with other food and drink. Its interior design is reminiscent of a cafeteria.	

Location	Relation between inside and outside	The coffee shop is located on road 9 streat in maadi, a very lively street with many other coffee shops integrated with the houses, and many unique shops. From inside the coffee shop some trees are visible, And from the outside of the coffee shop few tables are set outside, but one cannot see what is inside, a pediment only can be seen which leads to the entrance door. So people get an idea of ancient Greek	

|		
Sensory	Sound	Slow English songs played in the background. Sound of people can be noticed and cheerful in a way. Sounds of plates and cups that are being washed maybe can be heard from the kitchen. Very clear metro sound and vibrations as a metro passes beneath the next parallel street to the coffee shop.
	Smell	The coffee smell is very strong; coffee is the main smell in the place, but the coffee shop serves many pastries as well.
	Light	The artificial lighting is quite dim; not all the spot lights are turned on. But the yellow color scheme doesn't make it feel so dim. Little sun light enters from the high small windows on one wall and from the glass door.
	temperature	It is sunny and warm inside and outside most of the time; depending on weather.

Spatial description	Walls	The walls are divides into two upper and lower panels. The lower panel are dark wood from the ground, around one meter high and second panel is yellowish beige plastic paint till the ceiling or 'Tromp l'oeil' wall paper with the same yellowish beige color scheme. The drawings are either ancient bricks or fluted columns and arches that show landscape scenes. There are rectangular fluted columns in the yellowish beige color as well. The windows are very high and small and cannot be opened, they only allow sunlight in. the entrance glass door has brown wooden panels that divide the glass into squares. There are some paintings on the plain walls of Ancient Egypt and pictures of a cup of coffee with the same yellowish beige color scheme. There are wooden bookshelves with newspapers and magazines.	
	Flooring	The flooring is mainly composed of big yellowish Beige ceramic tiles inside, and outside the cement area is on the cement pavement.	
	Ceiling	It is about four meters high and the entrance lobby is three meters, finished in yellowish beige plastic paint and a brown cornice. There is a white beam that divides the ceiling. There are circles in the ceiling that are extruded in the form of inverted domes that have a brown sun shaped center surrounded by a circle of spot lights that are not all turned on.	

Furniture	Seats	Seats are black metal chairs with green cloth cushions and the Greek logo of the sun on the back of the chair. And a very few wooden arm chairs with beige cloth cushions.	
	Tables	Black metal tables with black and white granite table top that is comfortable, and has a cold feel.	

Behavior	waiters attitude	The coffee shop is self-service, with a few friendly staff cleaning up after customers, and working on the cashier.
	customers	People seemed in their 20s or 30s, mainly Egyptians. People seemed happy; enjoying their time chatting and a few working or studying. People were either sitting in small groups of two or three, or sitting alone with laptops.
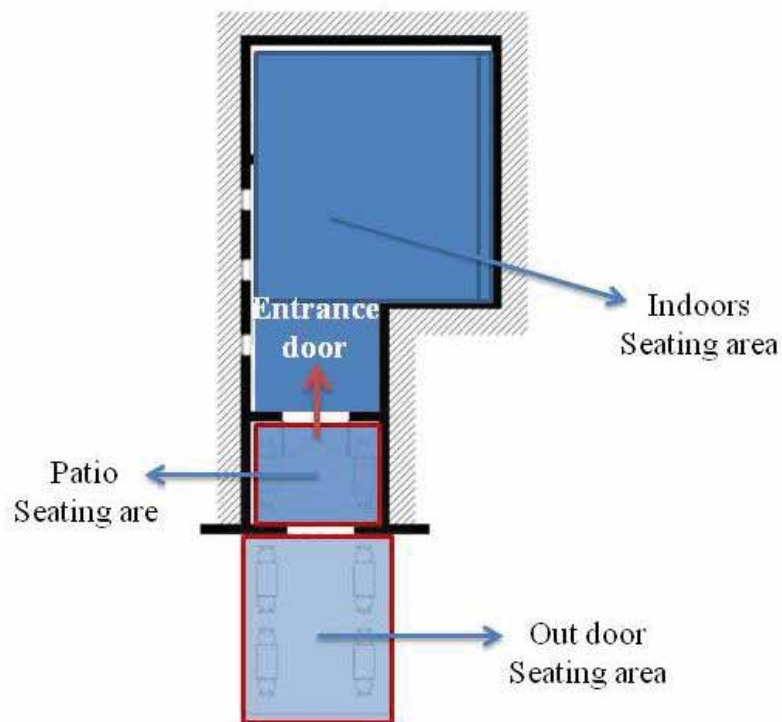
Figure 4.8: Greco Zonning Plan
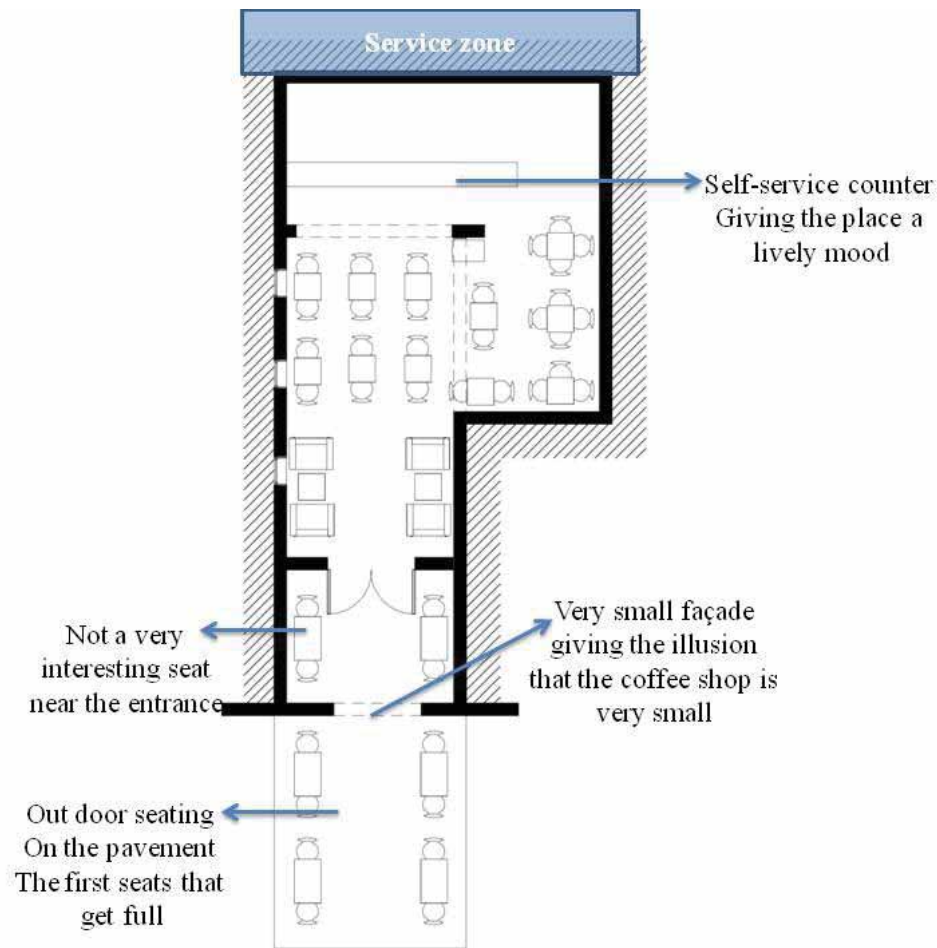
Figure 4.9: Greco Observation Plan

The coffee shop has an interesting, attracting atmosphere with an obvious Greek inspiration combined with the Egyptian atmosphere of an old cafeteria. The coffee shop has a very lively mood as well with people moving around due to its self-service concept and the fact that it's famous especially among people who live in Maadi. The coffee shop surprises people when they discover the spacious space inside with a capacity of 35 people; compared to the apparent capacity outside of 8 people. The interior is full of strong coffee smell, and interruptive metro noise is heard every now and then. People are either sitting with lap tops, reading alone, or socializing with a group of people.

**Table 4.5: Description of Cedars Coffee Shop Atmosphere**

Fact box	Coffee shop name	Cedars	
	Location	Geziret el arab, mohandeseen	
	Date of visit	23-01-2013	

| Coffee shop background | Cedars is an Egyptian coffee shop that has two branches in Cairo. It serves Lebanese food and appetizers as well as being a coffee shop that is famous for its shisha. The coffee shop consists of two main areas; an outer patio that is shaded with transparent plastic textile on a metal structure as the ceiling and with walls and the other area is a totally indoor area with concrete ceiling. | |

| Location | Relation between inside and outside | The coffee shop is located on Geziret el arab street; a lively street that has many other coffee shops and shops. From inside the street is almost not seen and the same from outside; the inside is barely seen because of the green plants that make like a buffer zone between the street and the coffee shop. | |

|		
Sensory	Sound	Old Lebanese songs play in the background. Other people's conversations could be heard. And traffic noises of people honking their cars can be heard every now and then from outside.
	Smell	Shisha smell is very clear and dominant in the whole place.
	Light	Hanging chandeliers emit yellow light, there are a few spot lights as well. And since the ceiling in the patio is transparent material sunlight enters the place. And the reflection of the square grid structure in the patio is reflected inside.
	temperature	The patio area is nice and sunny, ventilated. And the inner area has the air condition on fan to make the place seem ventilated.

Spatial description	Walls	Textured beige brick cladding with big arches in glass inside that act as windows and in the patio there are smaller arches with wooden frames and metal pins that act as art frames for photography with accented yellow and red colors.The inner area has a circular column with the same finish of all the built walls.	
	Flooring	40*40 cm Reddish brick textured tiles that are oriented in diamond patterns. And the outer patio flooring pattern is beige organic shaped tiles with smaller, darker tiles as borders.	
	Ceiling	Three meters high, in gold cafe plastic paint with a few spot lights. There are recessed areas that have the shape of the chandeliers. From the recessed parts hang the yellow glass and metal chandeliers from metal chains. In the patio there are smaller chandeliers and old looking fans that are hung from the ceiling which is a metallic square grid structure covered in transparent material.	

Furniture	Seats	Dark wooden bamboo chairs with aubergine textured cushions with fewer bamboo armchairs and sofas both inside and outside.	
	Tables	Dark wooden tables with glass table top that act as a display of an assembly of rocks and purple dried flowers.	

Behavior	waiters attitude	Waiters speak loudly to each other from a distance with a casual attitude as if in the street.
	customers	People seemed mostly in their 30s and 40s. Most of the table had shisha with or without food or drink. People sat in groups of varied numbers, and even a few sat alone with an ipad or laptop social networking or alone with a shisha yawning from time to time.
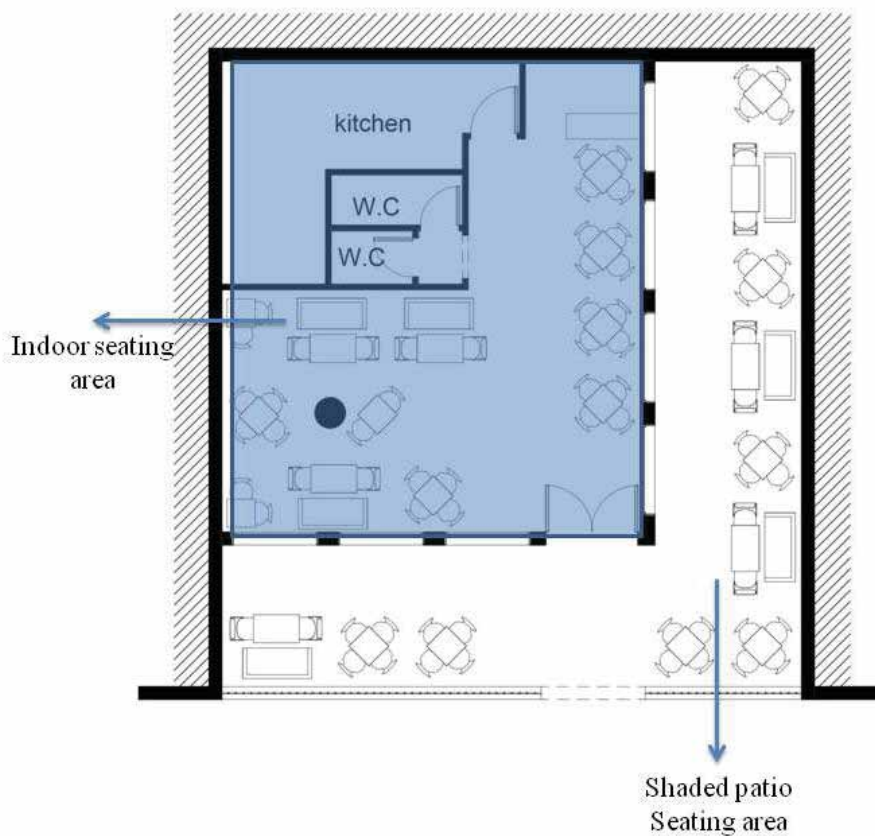
Figure 4.10: Cedars Zoning Plan
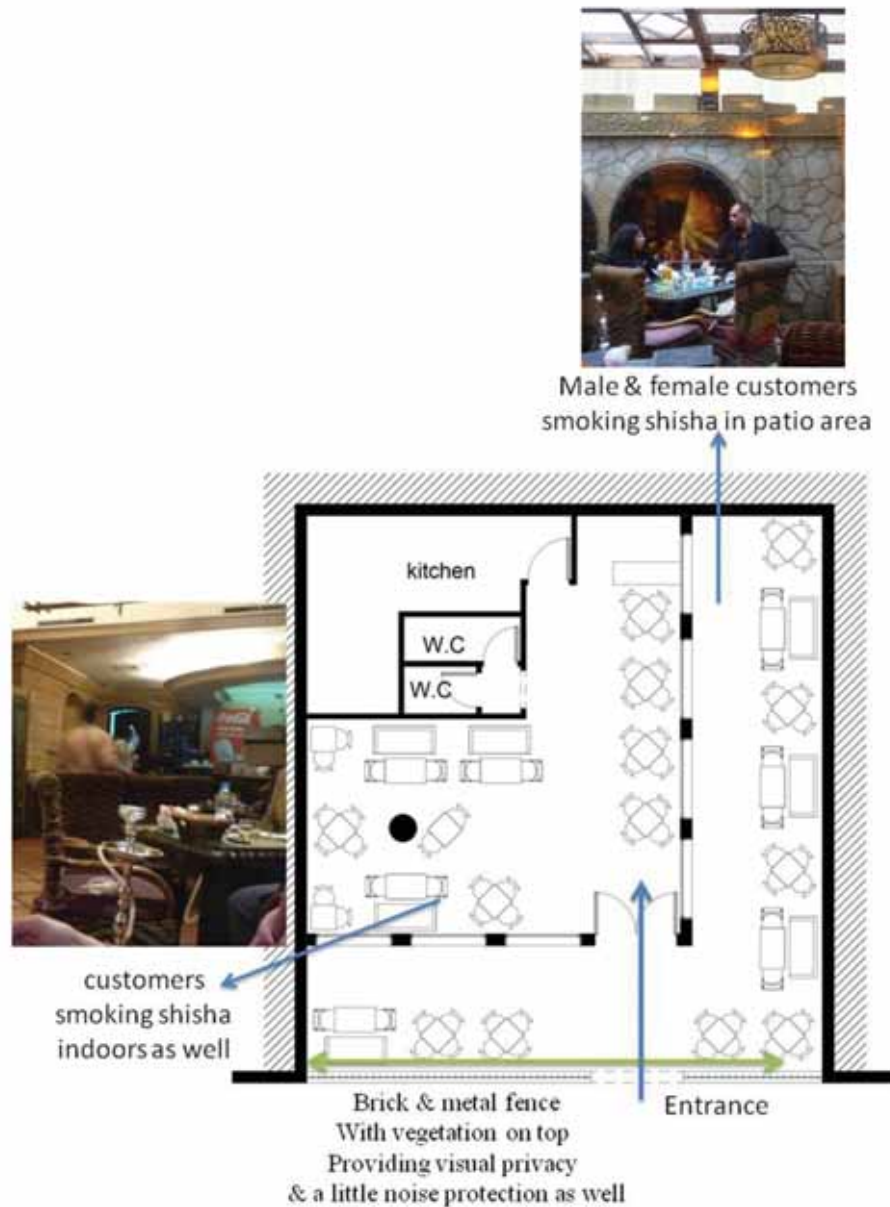
Figure 4.11: Cedars Observation Plan

The coffee shop's location on Geziret el arab street; the famous shopping commercial street in a residential area in mohandeseen attracts a lot of people and give it a lively atmosphere. But the coffee shop tries to offer a more tranquil, relaxing experience from that of the surrounding area by surrounding itself with green vegetation that act as a buffer zone visually and a little bit audibly as well; except when it is too crowded with honking cars. Shisha smell is very strong all over the coffee shop. It had an authentic national atmosphere; not the standard international interior design of many coffee shops, it kept a clear Egyptian identity. The coffee shop has the capacity of almost 44 people outside and 42 people inside as well.People mostly have shisha with or without food or drink socializing in groups, some people came with laptops alone or sat alone smoking shisha.

**Table 4.6: Description of Paul Coffee Shop Atmosphere**

<table>
<tr>
<td rowspan="4">Fact box</td>
<td>Coffee shop name</td>
<td>Paul</td>
<td rowspan="4"></td>
</tr>
<tr>
<td>Location</td>
<td>Geziret elarab st., mohandeseen</td>
</tr>
<tr>
<td>Date of visit</td>
<td>23-01-2013</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</table>

<table>
<tr>
<td>Coffee shop Background</td>
<td>Paul is an old French bakery with an incorporated coffee shop area or/and restaurant. Paul has many branches around the globe with the famous black facade, and recently entered Cairo, now it has four branches in Cairo; this specific branch and three others in shopping malls.</td>
<td></td>
</tr>
</table>

<table>
<tr>
<td>Location</td>
<td>Relation between inside and outside</td>
<td>The view from inside is nothing special; some ordinary shops. And from outside one table can be clearly seen as if on display in addition to a display of French bread. Not forgetting the famous black façade.</td>
<td></td>
</tr>
</table>

<table>
<tr>
<td rowspan="4">Sensory</td>
<td>Sound</td>
<td>French songs played as the background music. People mostly speak quietly, so loud tables sometimes take the attention as strange.</td>
</tr>
<tr>
<td>Smell</td>
<td>Baked desserts and bakery in general.</td>
</tr>
<tr>
<td>Light</td>
<td>The main lighting system is spotlights, in addition to classic lamps hanging on the wall and classic chandeliers in the entrance lobby. Sunlight can be seen from the big window display and the door, but other than that the sun light doesn't fill the place.</td>
</tr>
<tr>
<td>temperature</td>
<td>It is air-conditioned, turned on heater this time of year.</td>
</tr>
</table>

Spatial description	Walls	White plastic paint with few small rectangular panels of grey paint with an antique look. The entrance lobby is finished in yellow textured paint, and the wall behind the counter is finished in white and chocolate brown ceramic tiles that are set in brick setting. The windows are sliding black aluminum in a rectangular shape. The door is black painted wood with square glass panels. Hanged on the walls there is a mirror and an illusion of a bookcase with books when it is just an art work. And in the counter area bread is displayed on shelves.
	Flooring	Brown café ceramic tiles that have a wooden texture. And the flooring in the counter area is black and white chess pattern.
	Ceiling	Ceiling is white in the seating area. It is around four meters in the entrance lobby with two hanged classic chandeliers. And in the rest of the seating area the height is shorter because there is a false ceiling with built in A.C and spot lights. The ceiling in the counter area is light wood panels with wooden beams.

Furniture	Seats	Wooden classic chairs with cushioned or cane backs and cushioned seating with either café or green textured cloth. And big wooden corner sofas with two shades of purple cushions that are continuous between tables
	Tables	Light brown wooden classic tables.

Behavior	waiters attitude	Waiters are very friendly and are all dressed in white chef uniforms. They greet people at the entrance in French words although the waiters and customers are Egyptian.
	customers	Mostly Egyptians and some foreigners. There are families with kids and friends. People are having conversations and seam cheerful.
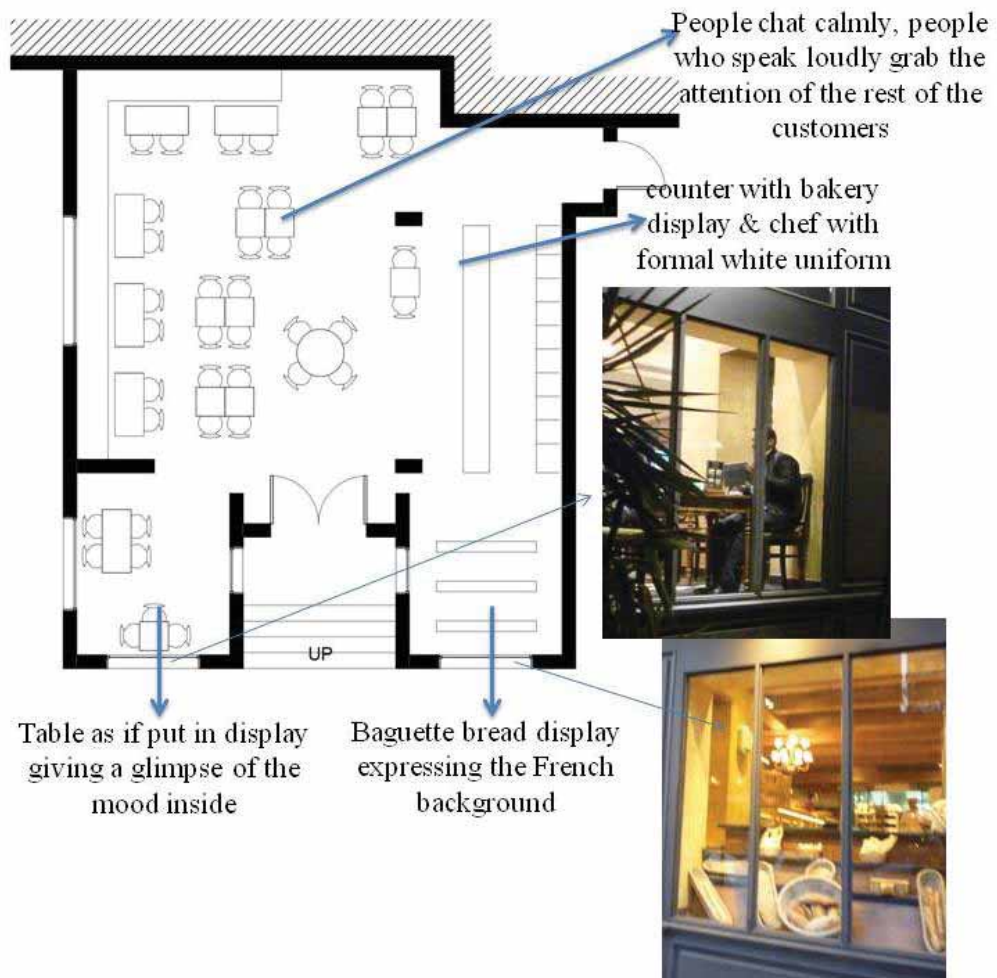
Figure 4.12: Paul Observation Plan

The coffee shop has a classic classy atmosphere. It is part of an international chain originated in France, it has famous marketing interior design features like the black façade, the classic French furniture, and chess tiles for example provide the same atmosphere as if the customers are in the branch in France, and added to that the French songs in the background, the waiters chef uniforms and greetings to customers in French, the food and drink orders in their French names all those attributes give a French atmosphere. The coffee shop has the capacity of 50 people. People are socializing mostly.

Table 4.7: Description of Cilantro Coffee Shop Atmosphere

Fact box	Coffee shop name	Cilantro	
	Location	Off Mohieldeen st., Dokki	
	Date of visit	28-01-2013	

| Coffee shop background | Cilantro is an Egyptian coffee shop that opened in the beginning of the millennium in Cairo setting the trend of western coffee shops all around Egypt. Now it has more than 30 branches in Egypt and a branch in Saudi Arabia as well. This branch in particular is two stories, and in a quieter street in dokki, off a main busy street. There are a few coffee shops in the area as well. Cilantro serves a variety of readymade sandwiches, pastries and drinks. | |

| Location | Relation between inside and outside | The view from inside is a rather quiet street in dokki; not on a main street. From outside the façade is half grey and beige brick cladding and half brown wooden cladding and big glass widow panels. There is an ATM machine on one of the glass panels that has a seating area behind. | |

Sensory	Sound	Calm English songs, the peoples' sound is loud, and no noise from outside can be detected.
	Smell	Coffee smell can be detected, but not very strong. Cigarette smell is noticeable. Cigarette smell reaches non smoking areas easily.
	Light	The main lighting system is spotlights, in addition to lamps hanging from the ceiling and a chandelier above the stair case. Sunlight can be seen from the big window display and the door, but other than that the sun light doesn't fill the place, except those close to the windows.
	temperature	It is air-conditioned, turned on heater this time of year.

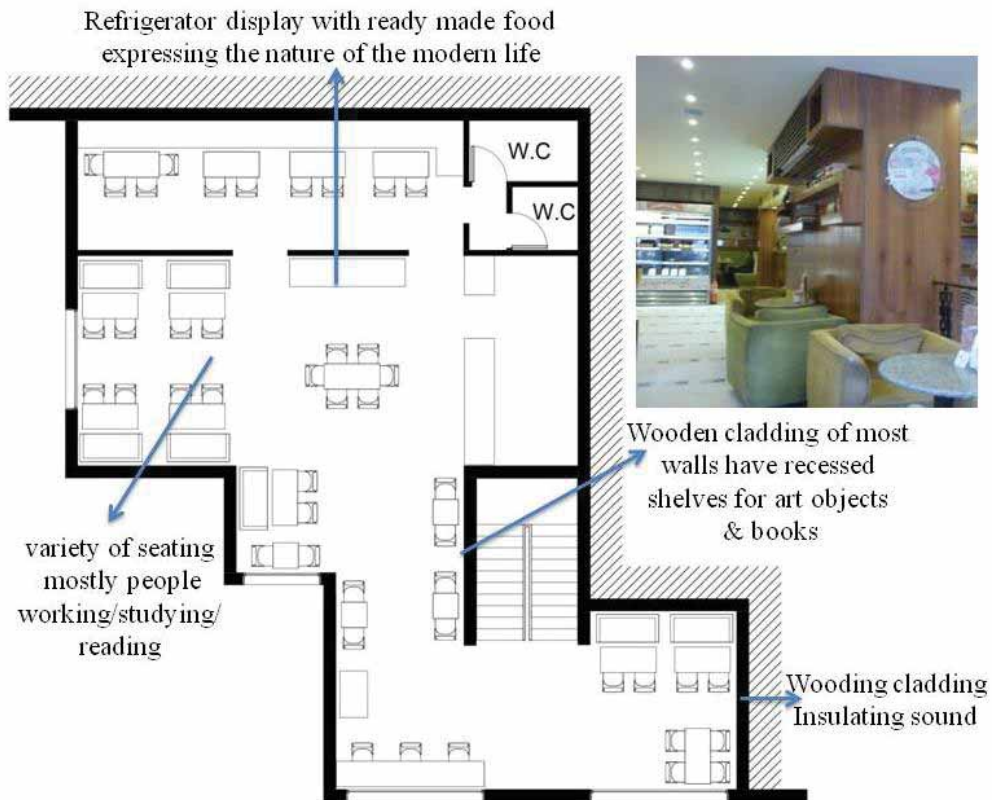|			
Spatial description	Walls	Mostly wooden cladding and beige wall paper with coffee and a young man skating. There are small vertical panels of orange/ pistache/yellowish beige plastic paint. There are strips of horizontal panels of mirrors. Big glass windows that are not for opening and a glass door in the entrance glass panel. The glass has drawings of coffee beans. There are wooden shelves with old books and small figures.	
	Flooring	Off white, matt 40*40 square tiles with smaller, darker tiles (dark beige, grey) that are put in strips between the main tiles.	
	Ceiling	Three meters high, finished in white plastic paint with a grid of well distributed spot lights and a few hanging lamps over a seating area. There is a modern big chandelier over the stair case that is covered in golden metal strips.	

Furniture	Seats	Wooden chairs, cushioned armchairs, and sofas all covered in green, orange, and beige comfortable and textured cushions.	
	Tables	Small metal tables with beige, and black granite table tops.	

Behavior	waiters attitude	Friendly and helpful waiters working at counters and serving tables. They wear green aprons matching with the interior color scheme.
	customers	There is a variety of ages from young adults in their 20s to older people in their 40s or 50s. People seem happy. People are chatting, enjoying their time, or studying with or without laptops. People who are alone are mostly reading a newspaper or any other thing.

Service counter
waiter welcomes customers
When they enter

ATM machine in an
inconvenient place
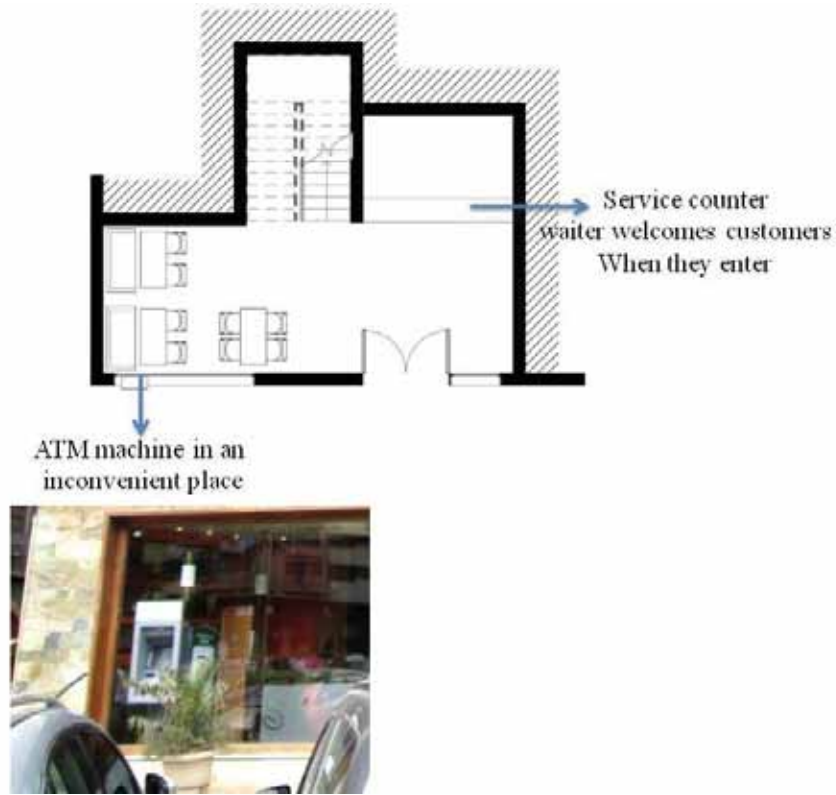
Figure 4.13: Cilantro Ground Floor Observation Plan

Refrigerator display with ready made food
expressing the nature of the modern life

W.C

W.C

Wooden cladding of most
walls have recessed
shelves for art objects
& books

variety of seating
mostly people
working/studying/
reading

Wooding cladding
Insulating sound

Figure 4.14: Cilantro First Floor Observation Plan

The coffee shop's atmosphere is simple modern with interesting popping colors. Many people come to work or study or even just socialize. Cilantro has a small seating area downstairs with a capacity of 15 people and the main seating area in the first floor with the capacity of 75 people. It is very popular and practical for studying; it offers internet coverage furniture is comfortable for staying for long hours. It smells like coffee inside, cigarette smell clear most of the time especially when crowded.

4.5.2 Summary of Observations

a) All coffee shops studied occupy floors or parts of floors of already existing buildings and were not originally designed as coffee shops.
b) There were two basic activities in the coffee shops studied; some coffee shops such as pasqua, cedars, and Paul had all people entertaining, while other coffee shops such as beanos, Greco, and cilantro mostly had their customers reading, and studying.
c) Transparency between inside of the coffee shop and outside varied for the studied coffee shops; for example cedars and pasqua provided privacy for their customers from the street, as for Greco it offered a wrong impression from the outside about being small when in fact it is not. Then beanos and cilantro were mostly transparent; with large glass panels, and finally paul that gave passer bys a glimpse of what is happening inside the coffee shops by putting a seating area in a way as if it were in a vitrine.
d) Sound privacy varied in the coffee shops; some coffee shops other tables' conversation sounds were very clear and seemed to be reflected for other customers and other coffee shops people's conversation sounds were not clear and seamed to dissolve or spread in the place.

4.6 Surveys

After the stage of the observations and documentation of the current state in each of the six cafes, there had to be done another stage which is the survey stage; to be able to get out with reliable findings that would represent a wide population and be able to conclude some statistical generalizations for the study. The survey phase was done in parallel with the descriptive and documentation phase; on the course of one month from the end of December 2012 till the end of January 2013.

4.6.1 The Survey Setting

The survey setting for two of the coffee shops; Beanos and Pasqua, the survey was done in the natural setting of the coffee shop; without adjusting anything. The questionnaires were distributed manually on the customers. The distribution of the questionnaires was done on one day for each coffee shop. And for the rest of the four remaining coffee shops; Greco, Cedars, Paul, Cilantro, the questionnaires were distributed through the internet with the aid of some social media like face book and twitter, because the owners and managers of the coffee shops didn't welcome the intrusion on their clients' privacy or just had orders for not distributing anything on the customers.

4.6.2 Sample Population

It was decided for a minimum of 15 people; male and female to properly undertake and complete the survey in each of the six selected cafes. Making a total number of 93 questionnaires were distributed on adult men and women from ages 20 to 64 which is the age group of most of the customers. Also with the attempt to exclude the teenagers and the elderly group which might exhibit different preferences.

4.6.3 The Questionnaire

A questionnaire was designed, tested on a group of volunteers to ensure that the questions were correctly understood and to test the length and the time consumed for its completion, after the responses of the testing sample of customers/ informants, the questionnaire was corrected, adjusted, and distributed to the actual informants group.[7] The importance of the questionnaire was to get a more clear description of the clients and their impressions of the selected coffee shops. According to Schroeder (1951) in commercial design too many designers do not realize who their real clients are. "You are not working for the man who pays the bill; it's your client's clients that you must bend all your energies to please. If they are satisfied, your client will be too"[8]. The questionnaire mainly inquires about three main topics. First is the general introduction, and getting to know general information about the person; this person's age, gender, occupation, and nationality. And then the reasons behind his/her visit to the coffee shop. The second and most important part of the questionnaire focuses on the informants' impressions about the atmosphere of the coffee shop, and how certain attributes played a role in forming these impressions. Five descriptors were used in describing people's impressions of the coffee shops (attractive-cheerful-interesting-comfortable-inspiring), the descriptors were taken from people's wordings in the diagnostic stage and additions by the researcher that would help in the elaboration of people's impressions. In order to control the length of the questionnaire the second section was limited to the sensory attributes; sound, smell, lighting, colors, textures, and temperature. The third and final part of the questionnaire has open ended questions that dealt more with individual preferences and dislikes about the café, questions of comparisons with other similar coffee shops, suggesting for changes needed.

4.7 Conclusion

Data collection phase was reviewed in this chapter after performing a diagnostic study, the data collection was done in two stages; first the descriptive study documenting the aspects that formed the atmospheres of the coffee shops, then the survey phase with the distribution of the questionnaires. The following chapter reviews the analysis phase firstly by analyzing the questionnaires obtained from the customers/informants in a qualitative and quantitative data analysis, then the summary and discussion of the main concerns; horizontally across all the case studies, and specifically showing specific aspects to particular case studies. Finally the conclusion that ties research findings to architectural attributes and helps in the development of an occupant centered approach in the design process is discussed.

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[7] Please refer to a complete sample of the questionnaire in appendix I
[8] Schroeder, F. (1951), Anatomy for interior designers and how to talk to a client, Whitney publication Inc., New York, p. 83

# Chapter 5: Analysis and Research Findings

5.1 Introduction

This chapter describes the results of the questionnaires that were distributed on people. The results of each coffee shop were stated separately; starting by giving a quick description for the sample that answered the questionnaire. Then stating the reasons behind their visit to the café, and afterwards describing their impressions about the overall atmosphere of the coffee shop, and how the sensory attributes affected their impressions. And finally stating the most appreciated and unappreciated aspects in the design of the coffee shop. And at the end of the chapter a final summary for all coffee shops is obtained about the reasons behind people's visit to coffee shops. Comparisons were conducted between the six coffee shops regarding people's impressions of the coffee shops' atmospheres, and how each coffee shop indulged the senses.

5.2 Beanos Coffee Shop (15 responses)

| The sample description		
	Age	67% from 20-24
		20% from 30-39
		7% from 40-49
		7% from 50-64
	Gender	47% male
		53% female
	Occupation	60% university students
		40% working in the following professions (judges, doctors, engineers, professors, architects)
	Nationality	1 American
		14 Egyptians

Table 5.1: Beanos Sample Description
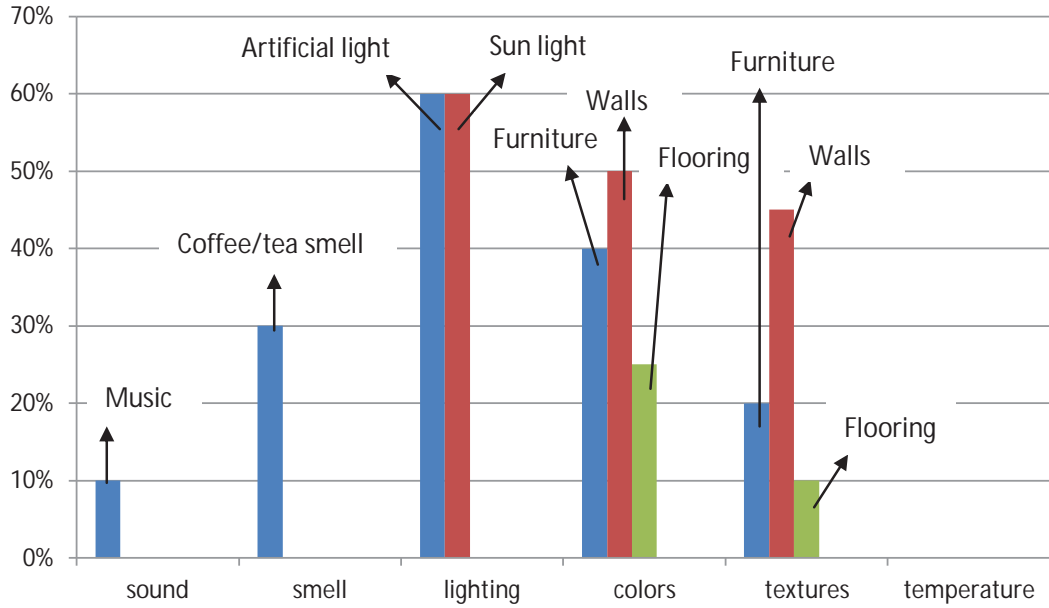
- Their Reason for coming to Beanos:
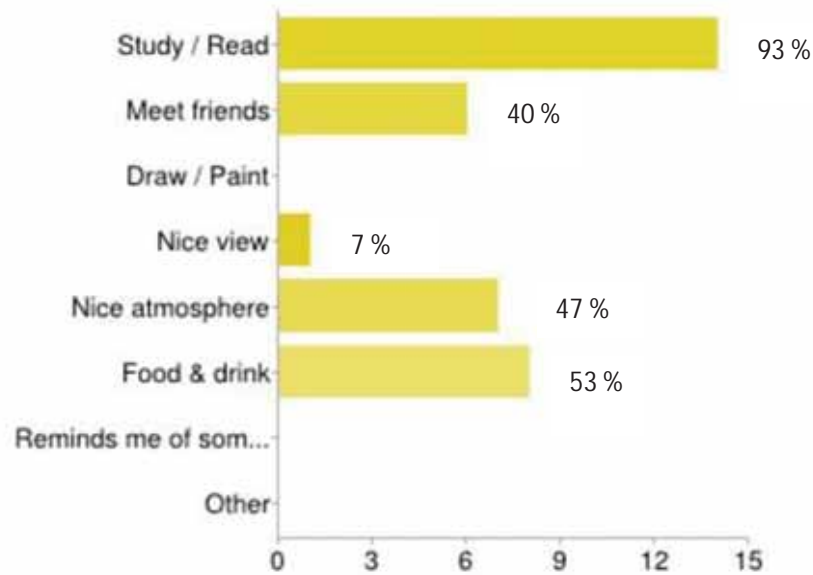
Figure 5.1: Reasons for going to Beanos

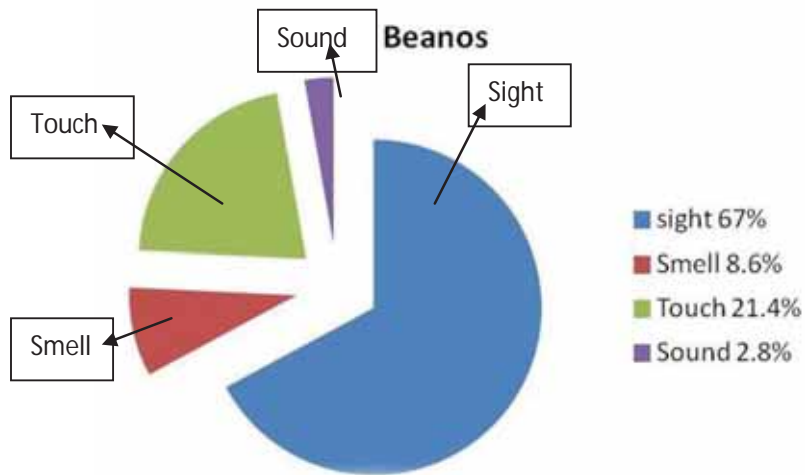- People's impressions about the atmosphere:
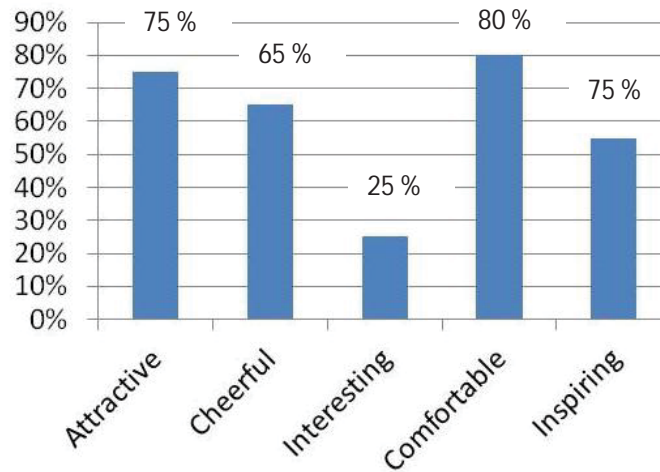
Figure 5.2: Attributes of Beanos Atmosphere

116

Figure 5.3: Assessment of Attributes according to their formation of People's Impressions of Beanos

- **How the café indulged people's senses :**

Figure 5.4: Integration of Senses in Beanos

**Figure 5.5: Likes & Dislikes in Beanos**

- **The most things people liked about the design of the coffee shop:**
1. 19.2% said the furniture was convenient.
2. 13% liked the color scheme of the coffee shop.
3. 6.7% liked the smoking free floor.
4. 6.7% liked the transparency between inside and outside.
- **The most things people disliked about the coffee shop:**
1. 33.4% disliked the noise; either from the open kitchen or people talking loudly, or disliked the music.
2. 6.7% said some pictures were irrelevant to the place.
3. 6.7% were uncomfortable with the temperature in the coffee shop (too hot).
4. 6.7% didn't like the location of the coffee shop, as it wasn't visible for everyone.

5.3 Pasqua Coffee Shop (16 responses)

The sample description	**Age**	19% from 20-24
		44% from 25-29
		38% from 30-39
		7% from 50-64
	Gender	56% male
		44% female
	Occupation	13% university students
		6% Retired
		81% working in the following professions (advertisers, teachers, doctors, administrators, traters)
	Nationality	1 Syrian
		1 Tunisian
		14 Egyptians

Table 5.2: Pasqua Sample Description
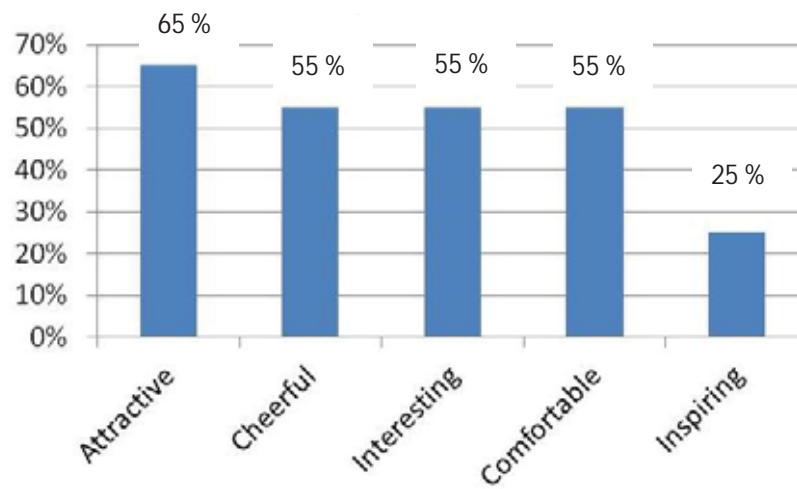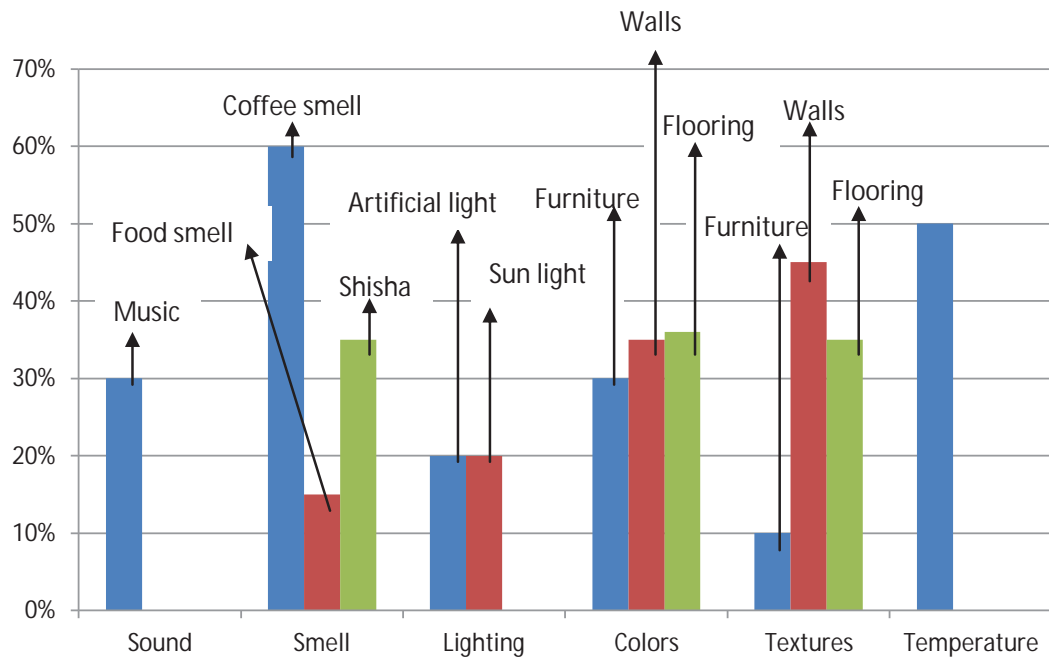
- Their Reason for coming to Pasqua:
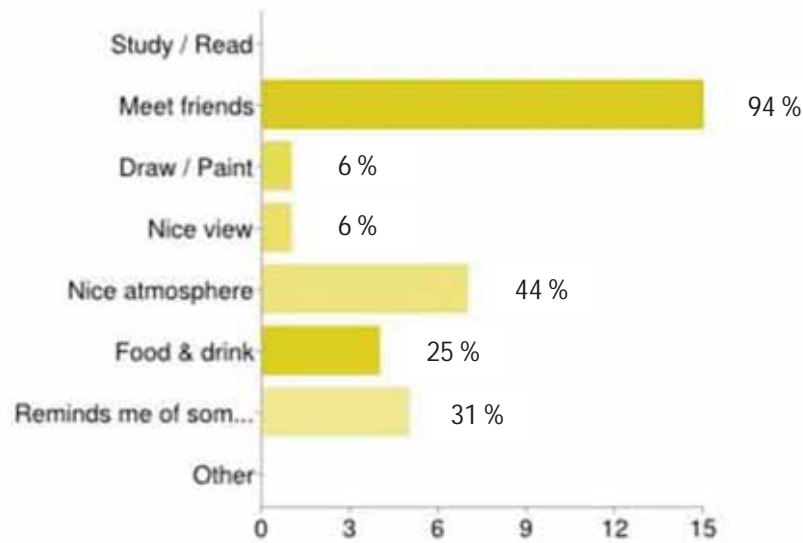
Figure 5.6: Reasons for going to Pasqua
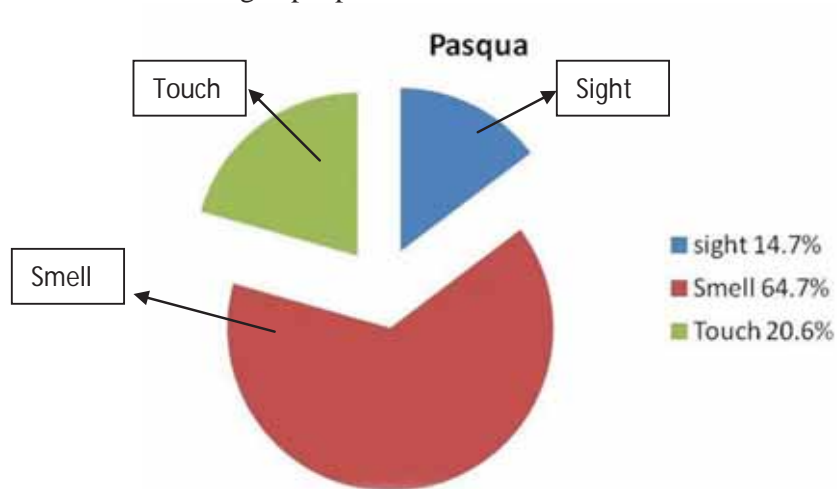
- People's impressions about the atmosphere:

Figure 5.7: Attributes of Pasqua Atmosphere

Figure 5.8: Assessment of Attributes according to their Formation of People's Impressions of Pasqua

- How the café indulged people's senses :

Figure 5.9: Integration of Senses in Pasqua

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Figure 5.10: Likes & Dislikes in Pasqua

- **The most things people liked about the design of the coffee shop:**
1. 18.7% like the patio seating area the best.
2. 6% liked the colors.
3. 6% liked the view.
4. 6% liked the logo of the café showing the service concept.
- **The most things people disliked about the coffee shop:**
1. 18.7% mentioned that the metal chairs were uncomfortable.
2. 18.7% mentioned that the spaces between the tables were uncomfortably narrow.
3. 12% didn't like the music.
4. 12% didn't like the lighting.
5. 6% were bothered by the noise from outside.
6. 6% didn't like the absence of wifi.

5.4 Greco Coffee Shop (15 response)

The sample description	Age	53% from 20-24
		33% from 25-29
		7% from 40-49
		7% from 50-64
	Gender	20% male
		80% female
	Occupation	33% university students
		13% jobless
		53% working in the following professions (teachers, sales & marketing, engineers, ecommerce)
	Nationality	15 Egyptians

Table 5.3: Greco Sample Description

- Their Reason for coming to Greco:
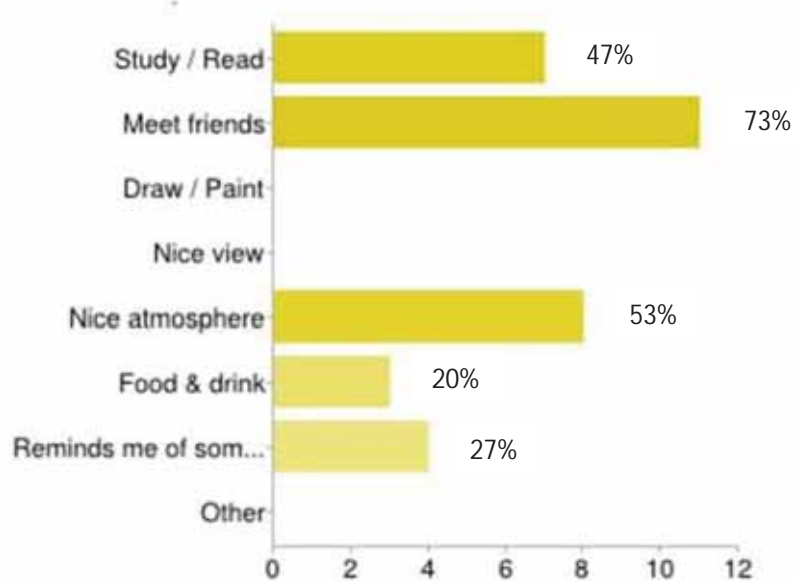
Figure 5.11: Reasons for going to Greco

- People's impressions about the atmosphere:
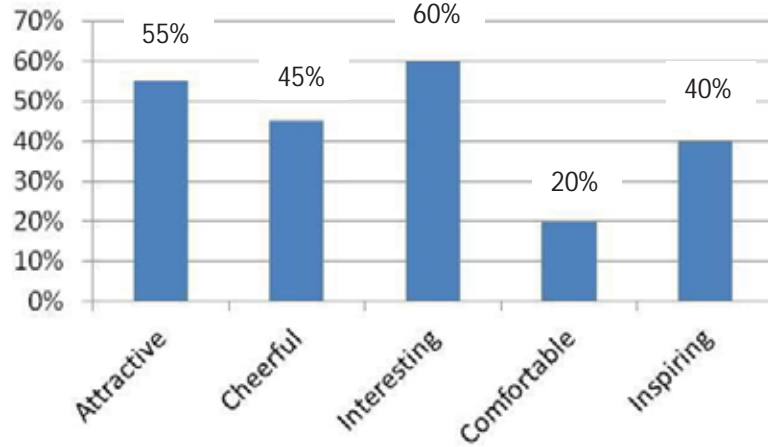
Figure 5.12: Attributes of Greco Atmosphere
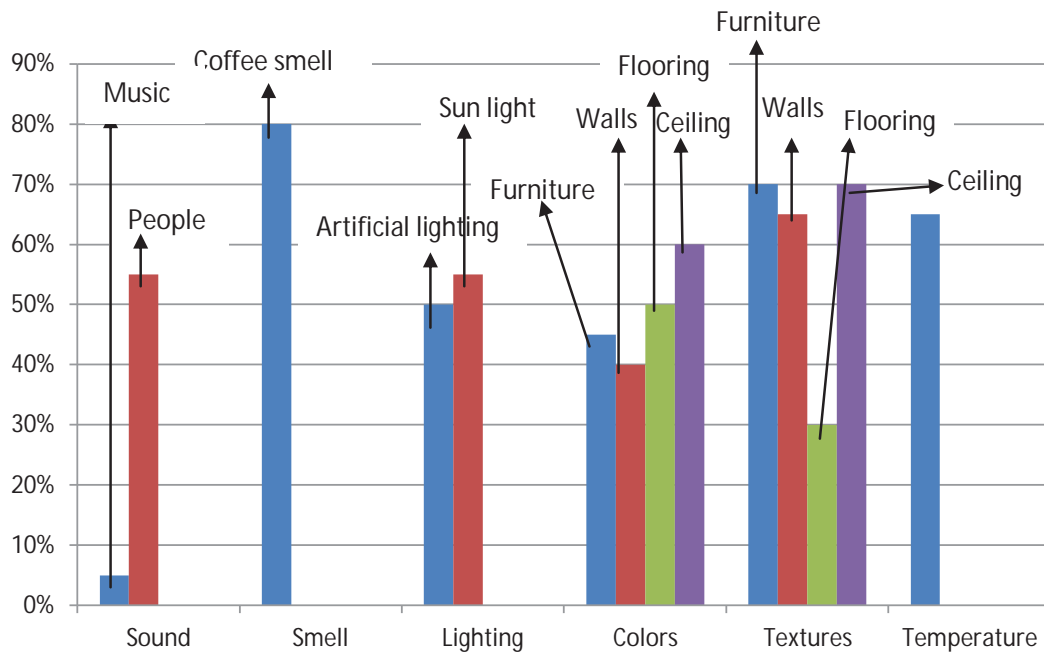
Figure 5.13: Assessment of Attributes according to their formation of People's Impressions of Greco

- How the café indulged people's senses :
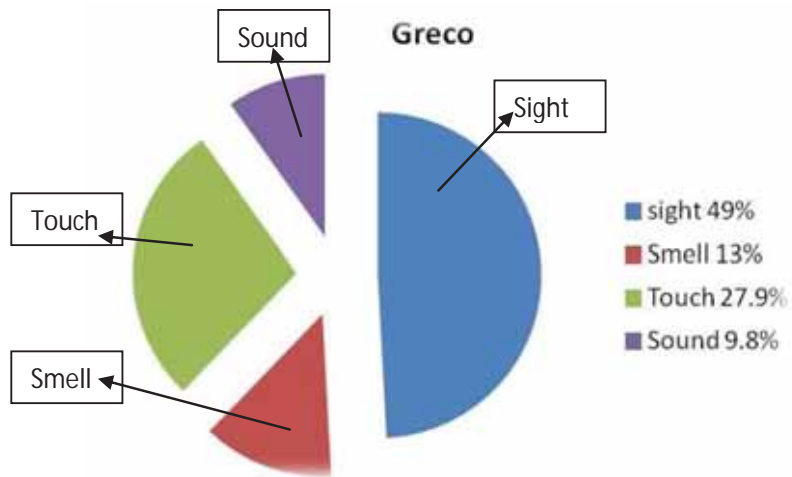
Figure 5.14: Integration of Senses in Greco
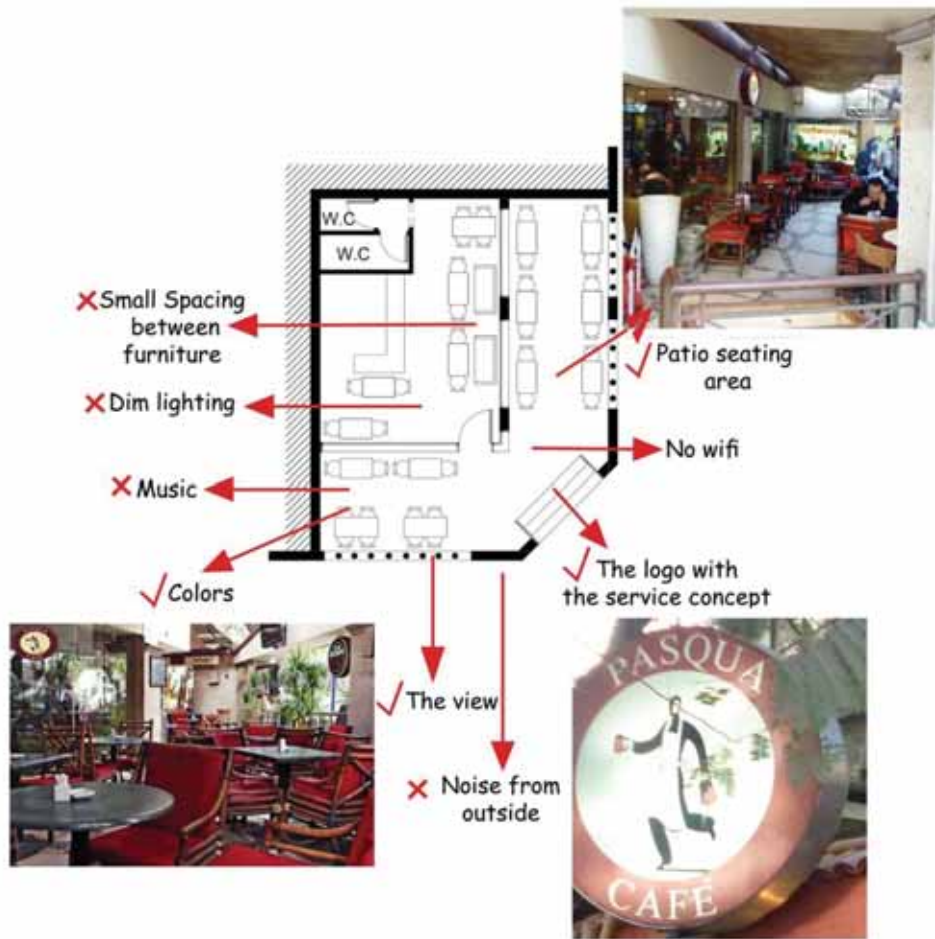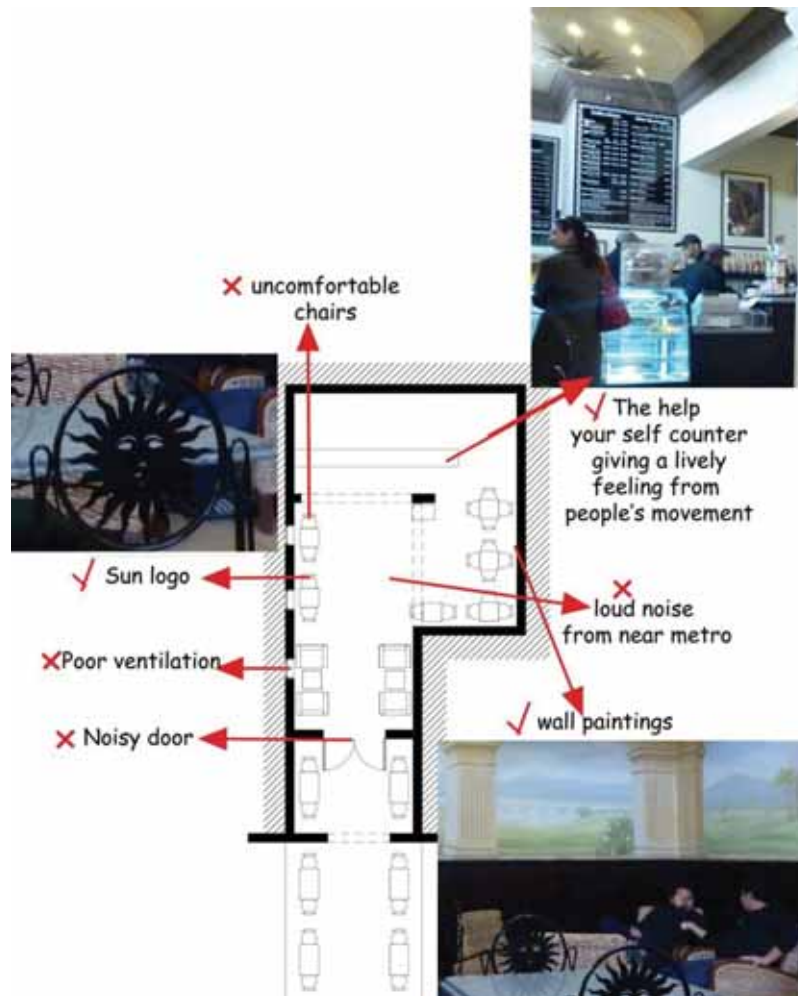

Figure 5.15: Likes & Dislikes in Greco

- **The most things people liked about the design of the coffee shop:**
    1. 13% appreciated the layout of the tables and the bar counter; giving a lively atmosphere from people walking around getting their orders to their tables.
    2. 6.7% liked the paintings on the walls and ceiling the most.
    3. 6.7% liked the sun logo.
- **The most things people disliked about the coffee shop:**
    1. 20% mentioned that the chairs were uncomfortable.
    2. 20% were irritated by the noise; sound of the metro and noisy door for example.
    3. 6.7% mentioned poor ventilation.

5.5 Cedars Coffee Shop (15 response)

|		
The sample description	**Age**	47% from 20-24
		7% from 30-39
		40% from 40-49
		7% from 50-64
	Gender	13% male
		87% female
	Occupation	20% university students
		7% jobless
		7% retired
		67% working in the following professions(teachers, administrators, managers, architects)
	Nationality	15 Egyptians

Table 5.4: Cedars Sample Description

- Their Reason for coming to Cedars:

Figure 5.16: Reasons for going to Cedars

- People's impressions about the atmosphere:
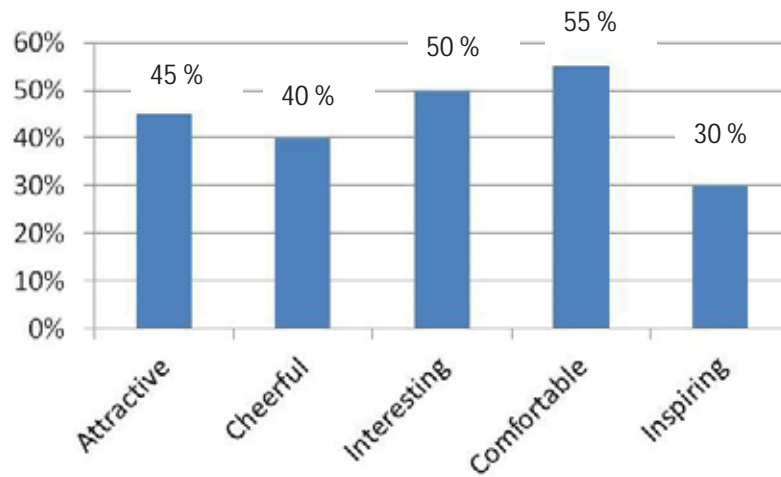
**Figure 5.17: Attributes of Cedars Atmosphere**
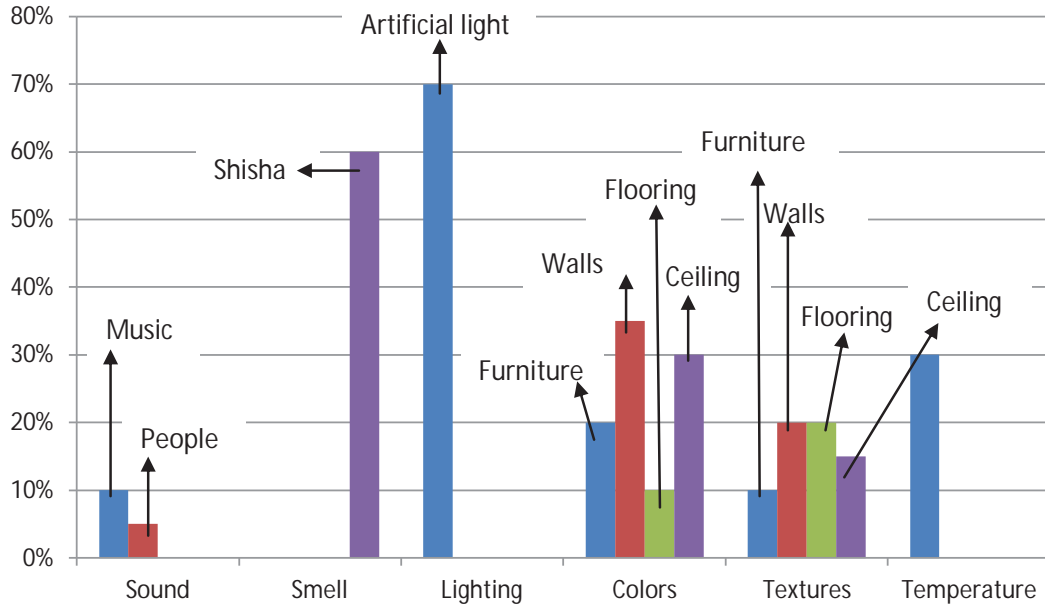
Figure 5.18: Assessment of Attributes according to their formation of People's Impressions of Cedars

- How the café indulged people's senses :
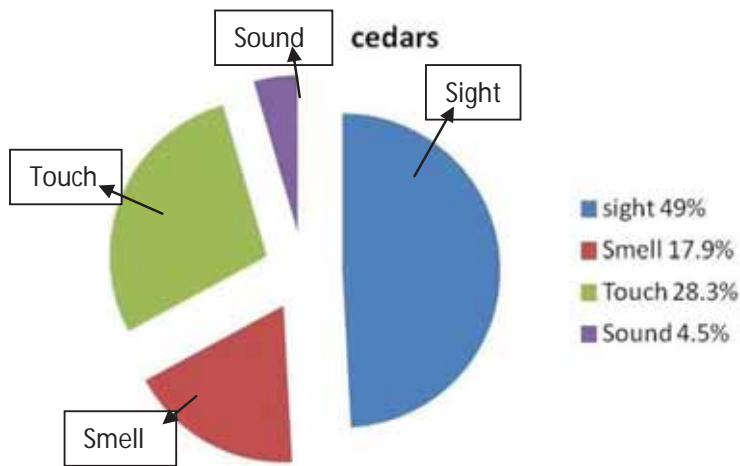
Figure 5.19: Integration of Senses in Cedars
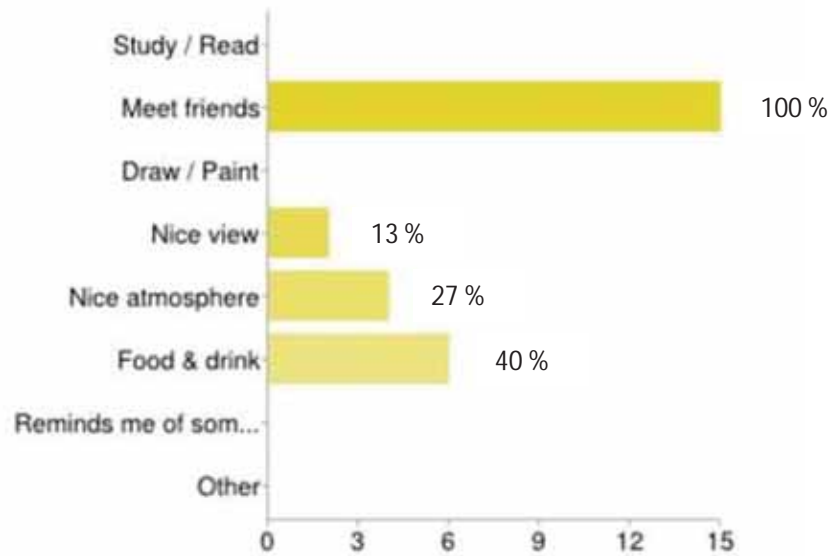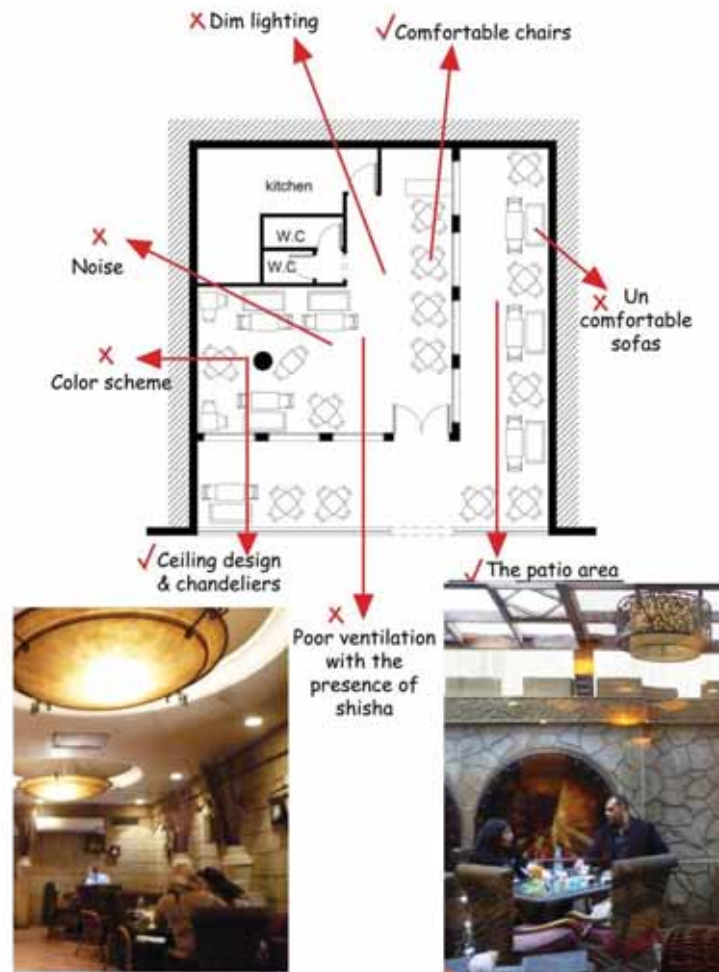
Figure 5.20: Likes & Dislikes in Cedars

- **The most things people liked about the design of the coffee shop:**
    1. 20% liked the comfortable chairs and tables that can hold large groups.
    2. 20% liked the ceiling design and chandeliers.
    3. 13.3% liked the patio.
- **The most things people disliked about the coffee shop:**
    1. 26.7% didn't like the colour scheme.
    2. 26.7 % didn't like the presence of shisha and said ventilation was poor.
    3. 20% didn't like the noise.
    4. 20% said the lighting was uncomfortable.
    5. 20% said the sofas were uncomfortable.

5.6 Paul Coffee Shop (17 responses)

|	Age	29% from 20-24
		18% from 25-29
		35% from 30-39
		18% from 40-49
The sample description		
	Gender	100% female
	Occupation	12% university students
		6% retired
		82% working in the following professions (teachers, teaching assistants, interior designers, managers, architects)
	Nationality	15 Egyptians

Table 5.5: Paul Sample Description

- Their Reason for coming to Paul:

Figure 5.21: Reasons for going to Paul

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- People's impressions about the atmosphere:
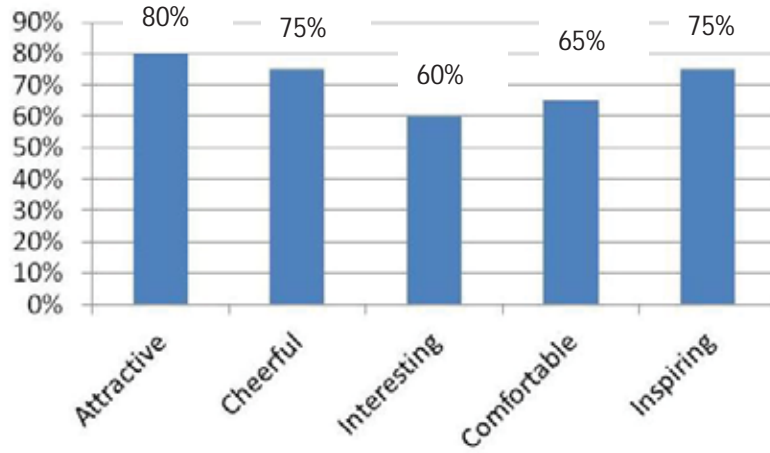
Figure 5.22: Attributes of Paul Atmosphere
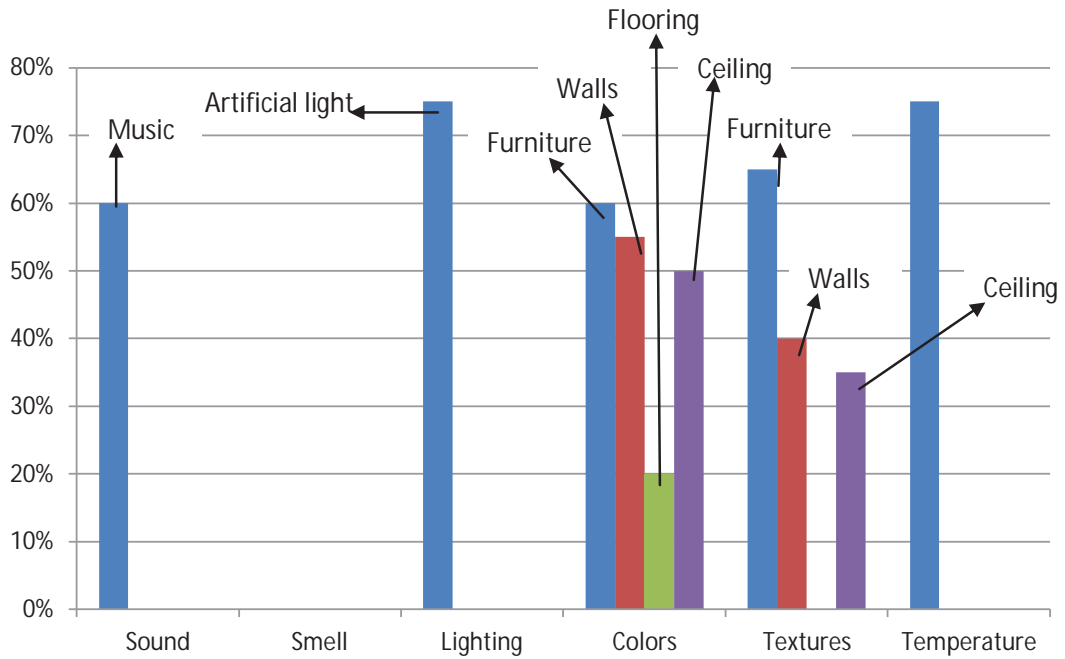
Table 5.23: Assessment of Attributes according to their formation of People's Impressions of Cedars

- How the café indulged people's senses :
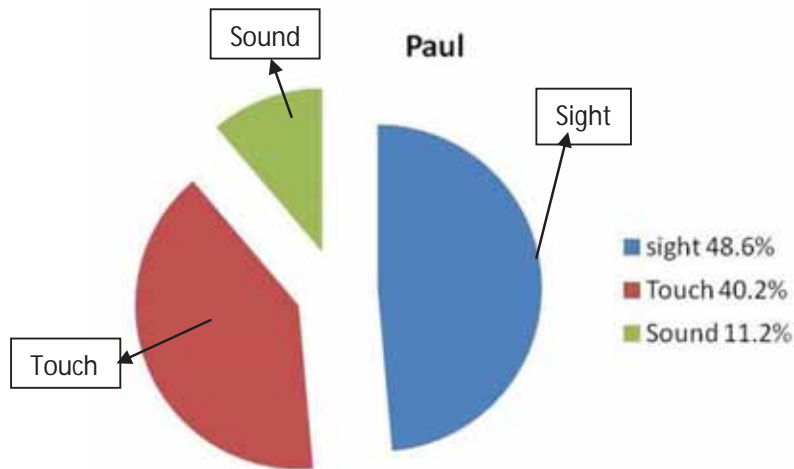

Figure 5.24: Integration of Senses in Paul
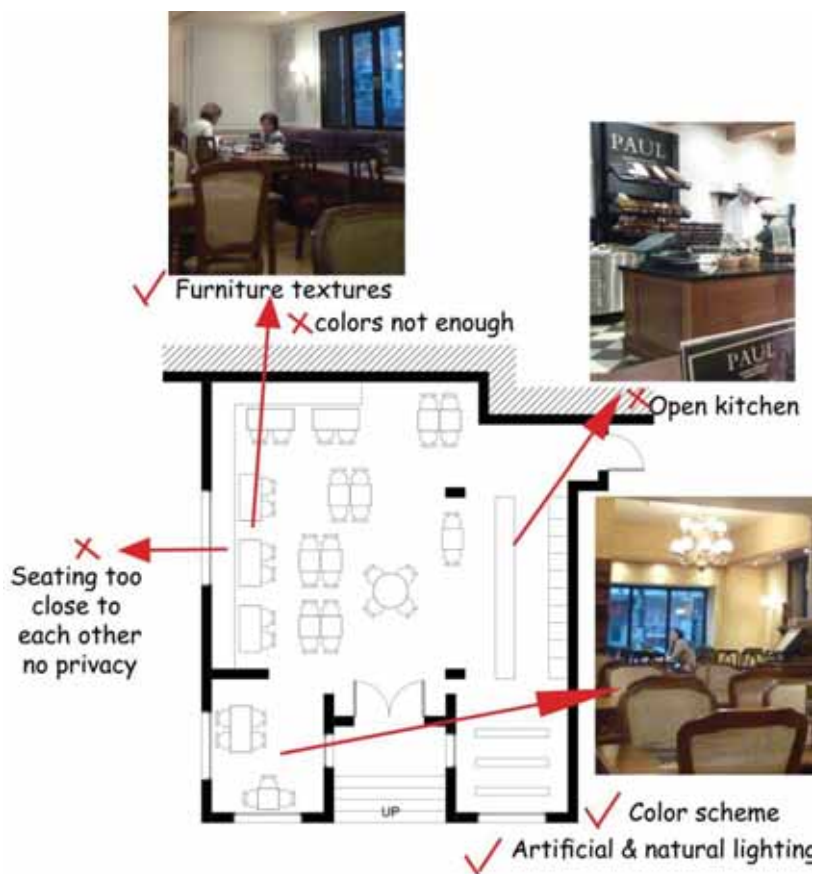
Figure 5.25: Likes & Dislikes in Paul
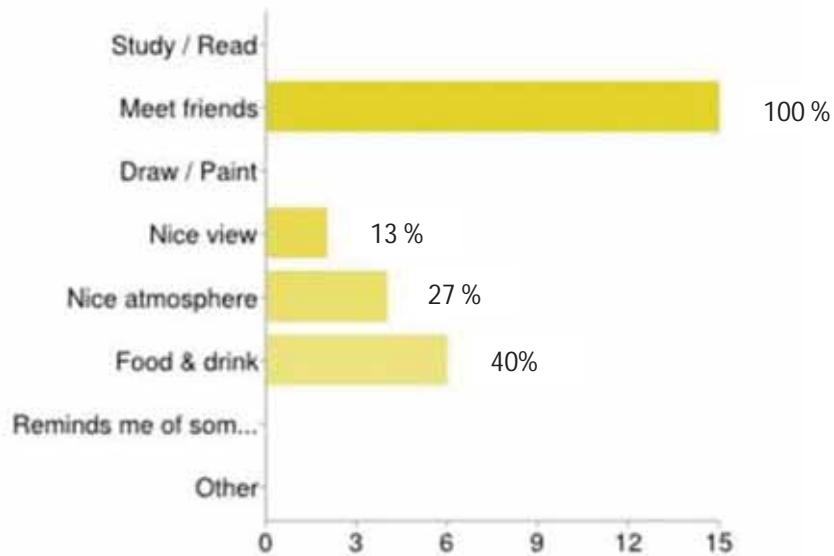
- **The most things people liked about the design of the coffee shop:**
  1. 41.2% liked the finishing materials and the textures.
  2. 23.5% liked the colors.
  3. 11.8% preferred the artificial and natural lighting.
  4. 5.9% liked the shelves on the walls.
- **The most things people disliked about the coffee shop:**
  1. 70% were uncomfortable with the furniture arrangement and complained it was so close; not allowing some privacy.
  2. 10% didn't like the open kitchen.
  3. 10% said there were not enough colors on walls or furniture.

5.7 Cilantro Coffee Shop (15 responses)

The sample description		
	Age	93% from 20-24
		7% from 25-29
	Gender	13% male
		87% female
	Occupation	47% university students
		7% jobless
		47% working in the following professions (urban planners, SAP consultants, financial analysts, architects)
	Nationality	15 Egyptians

Table 5.6: Cilantro Sample Description

- People's impressions about the atmosphere:
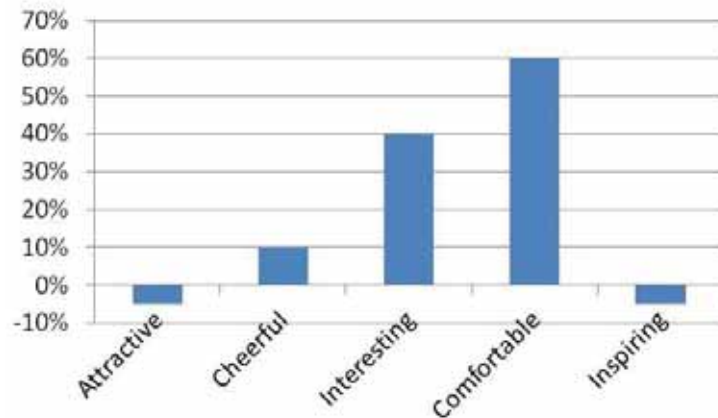
Figure 5.28: Attributes of Cilantro Atmosphere

Their Reason for coming to this Cilantro:
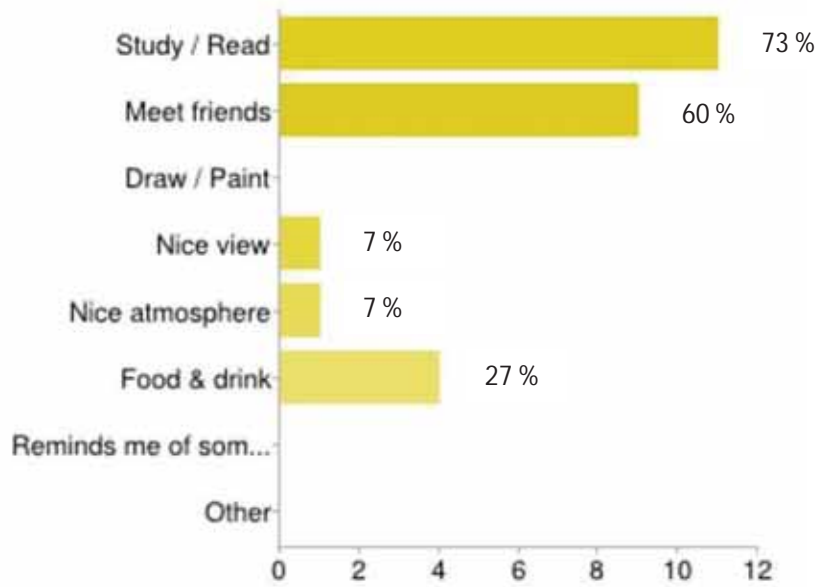
Figure 5.29: Reasons for going to Cilantro
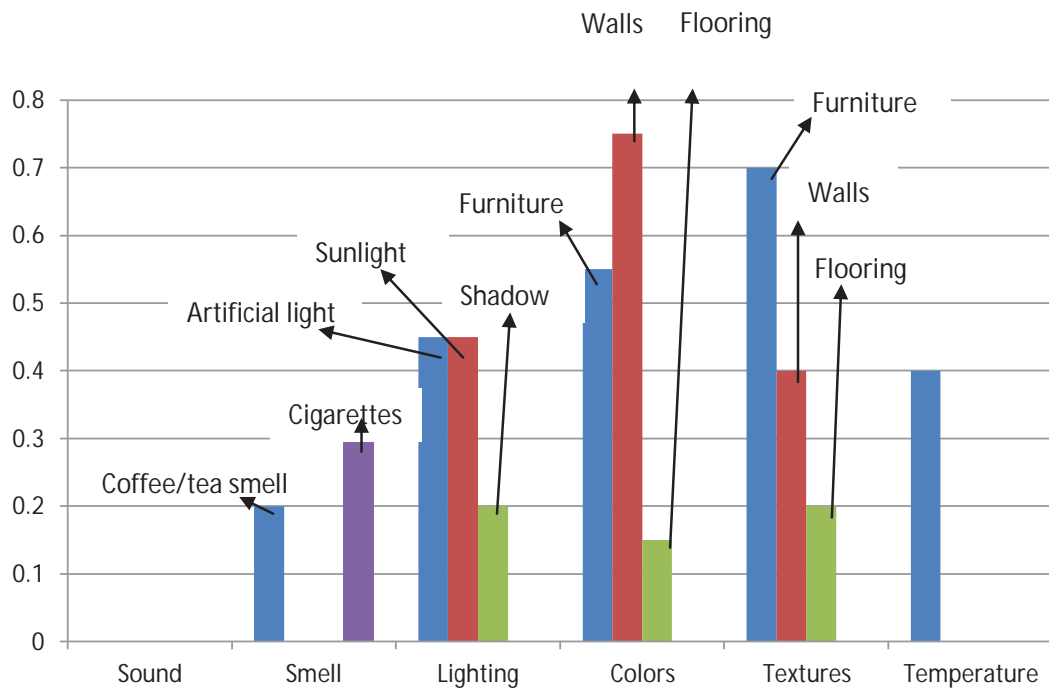
Figure 5.30: Assessment of Attributes according to their formation of People's Impressions of Cedars

- How the café indulged people's senses :

Cilantro

- Sight
- Touch
- Smell

- sight 43%
- Smell 4.6%
- Touch 52.3%
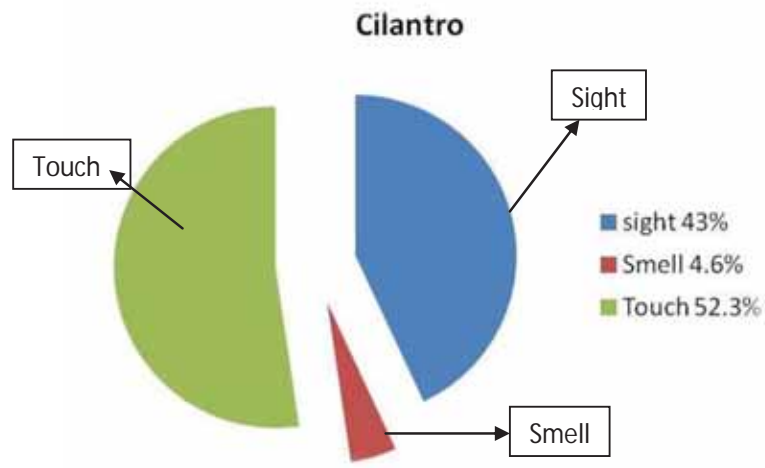
Figure 5.31: Integration of Senses in Cilantro

X ATM machine unconvenient place, no privacy

√ Walls' expression

√ Color scheme
X un comfortable furniture

√ Variety in no. of seating

√ Big windows

135

- **The most things people liked about the design of the coffee shop:**
    1. 22.2% preferred the color scheme best
    2. 22.2% preferred the big widow taking the entire wall.
    3. 22.2% liked the writing, drawings and shelves on the wall.
   4. 11% liked the variety in seating; depending on the number of people or their mood.
- **The most things people disliked about the coffee shop:**
    1. 50% were not comfortable with the furniture distribution; they either thought the spaces between tables were too small or they were too close to the window and people stared at them from outside, or the place of an ATM machine on the glass façade in front of a table.
    2. 30% complained about uncomfortable seats size of tables was too small.
    3. 20% thought the music was sometimes loud, preventing them from concentrating.
    4. 20% were annoyed by the smoking.

5.8 Summary and Discussion of Results

From the survey in the six cafes, there were mainly five findings. The first and very important finding was the reasons behind people's visit to cafes. The graph in [fig.5.31] shows the percentages of people who came for each mentioned reason. And the reasons behind coming to a cafe can be arranged according to the popularity of each reason as follows: 1) Meeting friends. 2) Studying/ reading. 3) The nice atmosphere and the food and drink. 4) Nostalgia/ memories. 5) The nice view. 6) Draw/ paint.
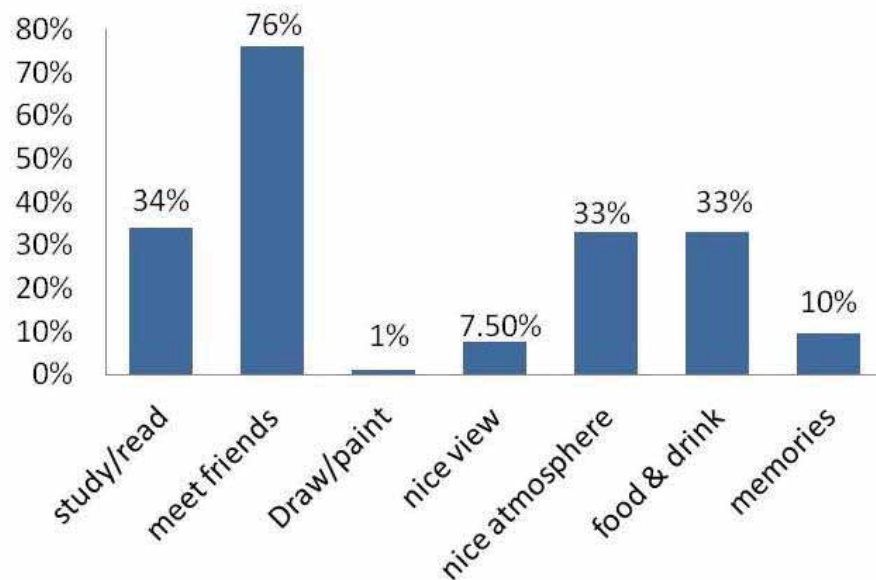
Figure 5.31: Reasons behind going to a Coffee Shop

So meeting people was the most popular reason for going to a coffee shop; not changing from the past early times of the appearance of coffee shops in Egypt. Meeting people and studying came before food and drink. And going for just the sake of the nice atmosphere came on the same level with food and drink; which confirms the importance of designing with the atmosphere in mind. Then came the effect of memories in making people come and visit the place for nostalgic reasons as well. Few people came for the nice view and even fewer, unmentionable number came to draw or paint.

So the attributes that would fulfill theses needs would be enough lighting for reading, quiet enough to study but not very quiet so people can chat comfortably, comfortable furniture setting that would encourage people to talk within their table, orienting the smell of coffee by ventilation to stimulate the memory, providing a nice view, and a welcoming approach to attract people to the coffee shop.

The second group of data collected from the survey, was people's impressions about the atmospheres of the coffee shops. And since it was found that three of the coffee shops a percentage of the people came to study (Beanos, Greco, Cilantro), and on the other hand the other three coffee shops people only came to hang out; no studying was found (Pasqua, Cedars, Paul). Therefore two separate graphs were formed to compare people's impressions about the coffee shops atmosphere; one graph in [fig. 5.38] for the coffee shops with studying, the other graph in fig. 5.39 for the other coffee shops. In the [fig. 5.38, 5.39] the number zero on the y-axis represents neutral, number one represents quite a bit, and two represents extremely.
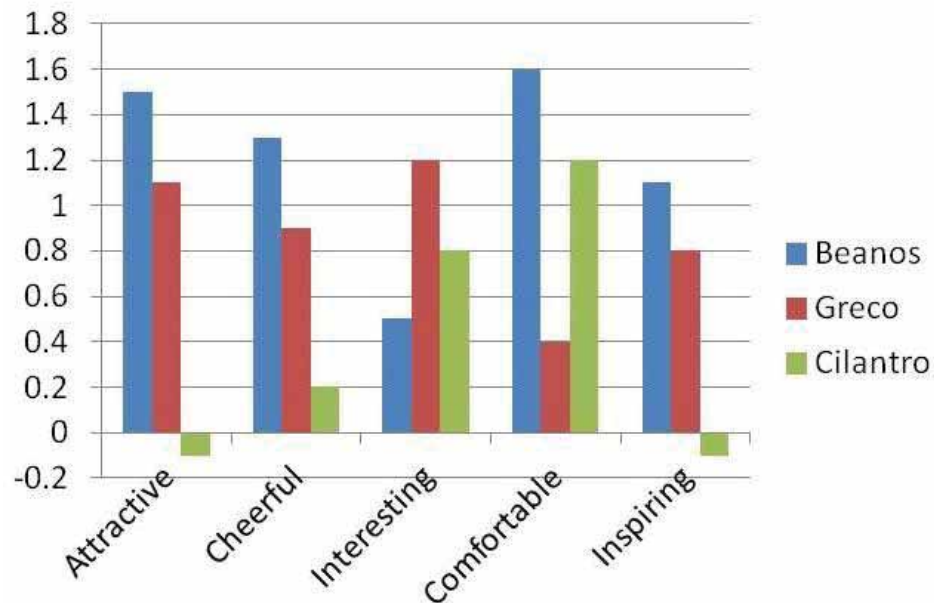
Figure 5.32: People's Impressions about Coffee Shops with Studying activity
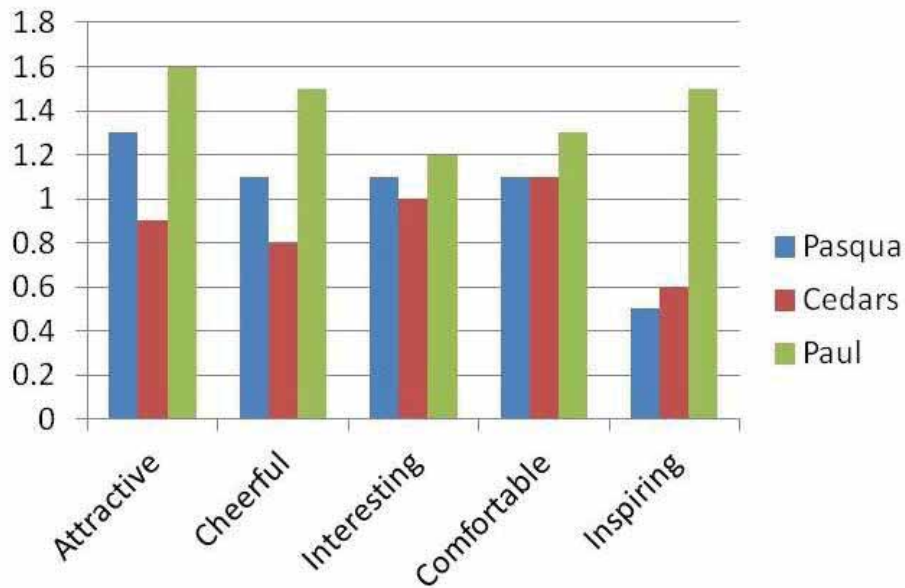
Figure 5.33: People's Impressions about Coffee Shops with no Studying Activity

From fig. 5.38 Beanos atmosphere was found to be the most attractive, cheerful, comfortable, inspiring, but least interesting. While Greco's atmosphere was found to be the most interesting, and cilantro's atmosphere was found to be the least attractive, cheerful, and inspiring. From [fig.5.39] Paul's atmosphere was found to be the most attractive, cheerful, interesting, comfortable and inspiring. Paul was followed by Pasqua, then Cedars except for the comfort where Cedars and Pasqua were even and the inspiration where Cedars was found to be a little more inspiring that Pasqua. Thirdly, from people's answers in the survey it was found how each coffee shop indulged people's senses; other than the sense of taste which is a given, because they were cafes. From the graph in [fig.5.40], Most of the coffee shops integrated the other senses with the sense of sight, Beanos was the only coffee shop that had a very dominant sense of sight over the other senses. Some coffee shops lacked good integration of one sense and the increase of another instead; like Pasqua lacked the good integration of the sound, but had the most effective smell with regard to the rest of the coffee shops. Paul lacked the good integration of smell while it had the most effective sound with regard to the other coffee shops. Cilantro lacked the good integration of sound, but on the other hand the integration of the sense of touch was more effective than the other coffee shops.
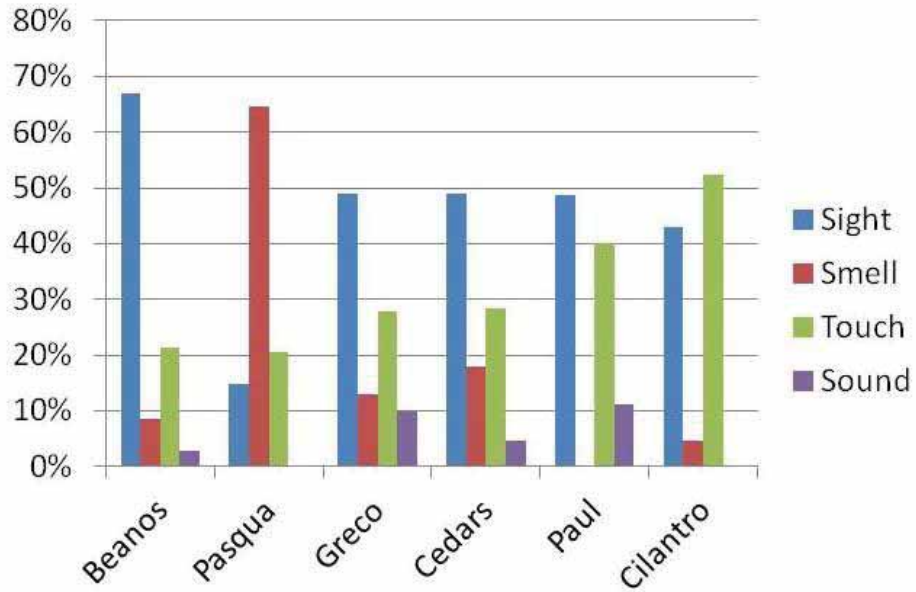
Figure 5.34: How each Coffee Shop Indulged People's Senses

Finally, the last group of information got from the survey was the most appreciated and unappreciated things in the design of each coffee shop. These points were then compared to the reason of people's visit and people's impressions about the atmosphere of the coffee shop, and from these information the reason behind people's impressions was understood more, and greater overview on the coffee shop was obtained as well, but would be elaborated on more in the analysis part in the next chapter.

Chapter 6: Conclusion and Recommendations

Beginning from the objectives of the research study; that is acquiring harmony and a better experience for people in the architectural space. Not just by being interested in how the place looks, but how it makes people feel and how it sounds, smells, and feels when touched. So the theoretical study was directed to the following topics.

- Studying how people use their senses in perceiving their surroundings, and forming impressions about their surroundings.
- Studying how people develop significant impressions about the built environment and architectural spaces through the mind and emotional influences as well.
- Learning about the various human concerns. Explaining as well how architecture can fulfill some of these concerns.

Then studying the previous topics in a practical study; studying the relationship between the architectural space and the people in six coffee shops in Cairo (beanos, pasqua, Greco, cedars, paul, and cilantro) as public architectural spaces where human behavior and impressions can be studied easily. From the survey in the six coffee shops, there were mainly five findings.

- The reasons behind people's visit to coffee shops.
- People's impressions about the atmospheres of the coffee shops.
- How each coffee shop indulged people's senses.
- The most appreciated things in the design of each coffee shop.
- The most unappreciated things in the design of each coffee shop.

6.1 Analysis of Results

After analyzing the findings some useful and important recommendations for architects, interior designers, and coffee shop owners were obtained and stated in the following sections.

6.1.1 Marketing Coffee Shops by their Atmosphere

From the previous survey it was found that third most popular reason for going to a coffee shop was simply its atmosphere, and it even was as popular as coming for food and drink. There was no coffee shop from the six case studies that didn't have people coming for the atmosphere. This information confirms what was mentioned earlier in chapter four; that certain locations like coffee shops, restaurants, or hotels could be recommended on the strength of their atmosphere alone. Because it was the attribute in contemporary life that could mark places out from the normal ones; it could give them emotional meaning, or human connection[1].

Therefore to attract people to come to a coffee shop, it would be effective to create an atmosphere by directing the attributes that impact special feature in the interior design then to publicize the atmosphere of the coffee shop and market the coffee shop by its atmosphere. The Dutch designer Petra Blaisse mentioned as well that the atmosphere

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[1] Preston, J. (2008), Interior Atmospheres, Architectural design, Wiley, Vol.78, No.3, p.5

was one of the functions that one requires from his environment, like acoustics, climatic, visual, textures. And is mostly used to influence the experience of a place, and tell something about it. Like history, intention, cultural meaning, or function of a building[2]. It is important for designers then to guide themselves with a mood board to inspire them through the design process and keep them focused on the desired mood for the project when choosing the location of the project, spatial character, sensory attributes, furniture, and the kind of human activity/behavior they want.

6.1.2 How the senses were Integrated into the Coffee Shops Design

Since the coffee shops integrated people's sense of taste in some way; like selling them food and drink, it was only studied how the rest of the senses were integrated as well. The average amount of stimulants for each sense in the studied coffee shops was as follows. 43.5% for the visual stimulants, 30.6% for the touch stimulants, 17.4% for the smell stimulants, and finally 8.6% for the sound stimulants.

In all the studied coffee shops, the highly effective attribute that affected people's impressions were mostly visual attributes; either natural, artificial light, or wall colors. And second came the sense of smell with coffee smell that played the major part in people's impressions for two cafes; pasqua and Greco. And finally the sense of touch with the attribute of temperature was the first attribute to form people's impressions in Paul beside the artificial light. Not mentioning the sound as the most effective in any of the cases.

So to have a significant effect from a certain sense wouldn't necessarily have to be by increasing its stimulants. For example in café Greco the percentages of the amount of stimulants were as follows. Visual stimulants with 49%, smell stimulants with 13%, and touch stimulants with 27.9%. and on the other hand the most sensory attribute that affected people's impressions wasn't a visual attribute, it was a smell attribute; coffee smell. And the percentage of smell stimulants in Greco was ranked as third after the visual and the touch attributes. And cilantro as well was found to affect people's impressions mostly by its wall colors, when on the other hand the percentage of its sight stimulus wasn't the biggest; it was 43.5%. While the touch stimulus was 52.3% and the smell stimulus was 4.6%.

So as mentioned in the earlier chapters that the first impression we get from architecture most of the time relies on vision, but still we use all our senses in the perception process. And the fact that the sound was not mentioned once as most effective in people's impressions, and its low percentage of stimulants in the studied café; the least percentage compared to the other senses, this could mean that culturally we accept high levels of noise; high level of chatting noise can pass unnoticeable. As it was learnt from the earlier chapters that people brought in different cultures can perceive noise differently according to their original way of living. But at the same time since there were complaints about noises of utensils or service counters…etc. This also means that sound is important, and noise could annoy customers and act as a negative attribute that pushes people away from a coffee shop.

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[2] Weinthal, L. (2008), Bridging the Threshold of Interior and Landscape, PRESTON, J. & CASTLE, H. (Eds.) AD (Architectural Design): Interior Atmospheres. London, John Wiley & Sons, Vol. 78, No.3, pp. 67-71

6.1.3 People's Attention to Sensory Attributes

In three of the studied coffee shops, people didn't mention one of the senses in playing a role in their impressions or catching their attention. But at the same time this unmentioned sense is sometimes a very effective factor in the atmosphere of the coffee shop. The reasons behind people's negligence of a sensory attribute that is present were analyzed as follows:

First one was Pasqua that had the most percentage of smell stimulants compared to the rest of the six studied coffee shops. And at the same time people didn't mention the sense of hearing in this coffee shop when later when people were asked about what they disliked in the coffee shop, music and noise where from the points mentioned. At the same time Pasqua had the least percentage in visual stimulants in playing a role in people's impression when on the other hand it had popping red colors that is one of the warm colors that demand attention to it and an attractive logo with warm colors as well that would normally have a big share of attention from people.

The second one was Cilantro, where the sound almost didn't catch people's attention at first, and at the same time Cilantro had the most percentages in touch stimulants. But then one of the things that were disliked in the coffee shop and mentioned by people in cilantro was the music. Therefore sound affected them in some way but on first though didn't catch their attention, and when asked about things they disliked in the coffee shop they fetched more in their heads and realized they didn't like the music.

And finally the third coffee shop was Paul, where the smell was neglected as well in spite of the fresh bakery available there. And the sound stimulants were the highest compared to the other six studied coffee shops. So it was observed that in all the coffee shops that people almost denied the presence of one of the senses were the same coffee shops that excelled in other senses, or as it was clearly shown in Pasqua and Cilantro that the unmentioned sensory attributes were perceived by the customers as negative attributes, so people only mention attributes if they regard them as positive. So researchers must put in mind that people can miss mentioning some information just because they offered a negative experience for them. And if architects want a full sensory experience for their users they should not increase only one sensory attribute, as it takes all the attention, and deprives the users from the full sensory experience.

6.1.4 Memories and Space

One of the reasons mentioned for going to coffee shops was the nostalgia, or for the memories the coffee shop gave people. And this reason was ranked from the survey as the fourth popular reason just after food and drink. Only in two coffee shops from the six studied; Pasqua and Greco, people mentioned coming because of memories.31% in Pasqua and 27% in Greco came because they had memories in the coffee shop. In pasqua this reason came in as third popular after meeting friends and the nice atmosphere, and in Greco coming for nostalgic reasons came in fourth after meeting friends, the nice atmosphere, and studying or reading.

At the same time, Pasqua and Greco were the only coffee shops from the other six studied coffee shops that had a smell as the first and most effective sensory attribute that played a role in people's impressions about the coffee shop. And in both coffee shops this smell was that of coffee. So only when the first attribute that affected people's impressions was a smell, people mentioned the importance of memories they had in the coffee shop that were a part of their reasons for coming back.

This smell and memory relationship confirms what was mentioned earlier in chapter two, about the sense of smell being connected with emotions and has the ability to arouse distant memories. And it was found as well that the olfactory system which is the part of the brain responsible for the sense of smell very close to the limbic system, which is the part of the brain structure that is responsible for emotion, learning, and memory. That's why memory evoked by odor has a stronger emotional impact. Confirming as well Pallasmaa's saying, that the most persistent memory of any space is often its smell[3].

6.1.5 What Annoyed People the Most in the Coffee Shops Design

From people's answers it was found that quarter of the problems that were mentioned were related to the furniture setting. And the most common words used by people to state the reason behind this problem were 'uncomfortable', and 'no privacy'. People didn't feel comfortable with the little spaces between tables; they wanted more space to feel more comfortable. And regarding the privacy issue, it was learnt that people needed privacy regarding their conversations; on the sound level, and the visual level was not mentioned except once were the people were annoyed by passersby outside the coffee shop starring at them, and never mentioned that visual privacy was needed inside the coffee shop; among its customers. So if the spaces between the tables were kept the same and visual barriers were used; in Cairene coffee shops that wouldn't solve the problem.Then the second most popular problems were the uncomfortable furniture, and again problems regarding the sound in the coffee shops; whether it was the noise from outside, or the noise from people or any element inside and the music played as well. Then the rest of the things that annoyed the people are shown in [fig.6.1].
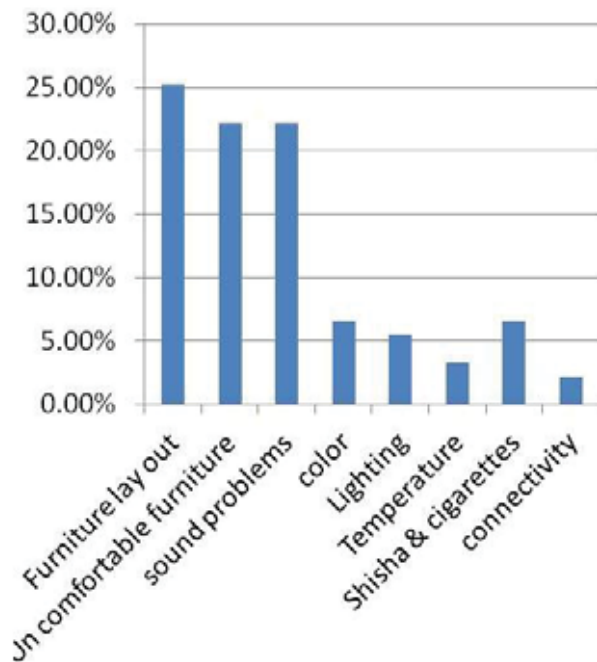

Figure 6.1: Things that annoyed people in coffee shops

[3] Pallasmaa,J. (2005), The Eyes of the Skin: Architecture and the Senses, Wiley academy, Great Britain, p.54

The rest of the problems were less popular in the coffee shops; like shisha and cigarette smoking; which is one of the main public welfare offences , and other complaints about the colors, lighting, and temperature. Finally, the last problem was the lack of connectivity; which is one of the main requirements. The lack of connectivity was on an internet level if there was no wifi, and on a physical one as well if the coffee shop was not visible enough for many people.

So the lack of sound control can push people away from a coffee shop and architects need to enhance the hearing experience for the coffee shop users with the aid of some aural embellishments that are mentioned in details later in section 6.4: The mistakes that should be avoided by architects.

6.1.6 The Relation between People's Impressions and their Motives for Visiting a Coffee Shop

As previously discussed, People's impressions are not limited to sensations only. Impressions are based on our reflection on things as well. Reflections come from ideas that have been formed throughout experiences and through memory and imagination. Finally ideas that affect people's impressions are affected by their emotions which are organized by our needs, motives, and concerns.

 The empirical study shows the relationship between people's impressions and their motives, for example, Cilantro was found to be the most unattractive coffee shop in the public's opinion. And when their responses for their likes and dislikes about the coffee shop it was found that the people liked the visual aspects of the coffee shop the most; color scheme, graphics, windows. As well as mentioning the atmosphere, and the variety of seating choices. And regarding the dislikes, half of the complaints from the coffee shop were regarding the people being uncomfortable with the distribution of the furniture; not giving them the degree privacy they needed. And another 20% of the complaints were regarding people not being able to concentrate from the music played. And another 20% complained about the small size of the tables, 20% complained about the smoking, and finally 10% complained that the seats were uncomfortable.

So although the coffee shop was described as unattractive to some degree, there were no complaints regarding the visual aspects, but on the contrary people liked most of the visual aspects of the coffee shop.

And all the complaints on the other hand went back to unfulfilled concerns and needs; like working or socializing comfortably. This shows the priority of respecting people's specific concerns over just making the place look pretty. As it was stated in Pieter Desmet's basic model of emotions; that a stimulus elicits an emotion when it is appraised as either harmful or beneficial for one of our concerns. This gives critical importance to people's needs from a place, and gives needs importance over the atmosphere of the place. In this case of coffee shops the five main concerns were found to be meeting people, studying/reading, the atmosphere, food and drink, memories, and the nice view. So the attributes that would fulfill theses needs would be enough lighting, quiet enough to study but not very quiet so people can chat comfortably, comfortable furniture setting that would encourage people to talk within their table, orienting the smell of coffee by ventilation to stimulate the memory, and providing a nice view.

6.1.7 Emotional Needs to be Fulfilled in the Coffee Shops

According to Bryan Lawson's the emotional concerns that people expect any architectural space to satisfy are summed up in three concerns; the need for stimulation, the need for security, and the need for identity. And not forgetting that the importance of each need may vary according to the function of the place or on the emotional state of the person, giving priority sometimes for some concerns over the others.
So in this case; for coffee shops, it was found that the need for stimulation was mentioned often in different ways. When people were asked for things to change in the coffee shops, it was always more colors, more light, more windows…etc. For example dim light was not appreciated, and there was an appreciation for more lighting. Also coffee shops with popping colors, or various colors in its color scheme were appreciated over the others with neutral colors, and stimulant from outside like sunlight and wind were appreciated and needed in coffee shops with little fenestration.
But on the other hand sound stimulants were unappreciated when loud and at the same time people didn't feel comfortable when near tables can hear them, so the sound in the coffee shop needed to be manipulated; not just increasing it and not just making it quite for people to be uncomfortable to even speak[4].
And from the appreciation of transparency in the coffee shops; even if the windows didn't open, just the visual transparency to see outside, it was shown the need for security in the feeling of time passing from observing the natural light cycle. And from the appreciation of the coffee shop logos when present or any unique expression in the coffee shop it was shown the need for identity, people wanted to visit coffee shops that had atmospheres with unique identity.

6.2 Final Results and Observations from the practical and theoretical studies

Design Intentions:
- A person's needs and concerns from going to a coffee shop were prioritized as follows: meeting people came at first place followed by studying or reading. Then, going for the overall mood or atmosphere of the coffee shop, which had the same importance as going for food or drink. When one might think that the food and drink were people's first and main concern.
- There was no coffee shop from the six studied that didn't have people coming for the atmosphere. Coffee shops could be recommended on the strength of their atmosphere alone, which come from its location, spatial character, sensory attributes, furniture, and human behavior.

Stimulants in coffee shops:
- People don't experience the coffee shop, or any other place with just their senses; For example there are ideas that affect people's impressions which are affected greatly by their emotions to a great extent. And these emotions are organized by their motives, and concerns.
- Though the first impression people get from architecture most of the time relies on vision, still people use all their senses in the perception process.

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[4] The suitable tools for sound manipulation in coffee shops are mentioned later in section6.4: the mistakes that should be avoided by architects.

- In the current situation in the studied coffee shops people felt positive interaction between them and the coffee shops more in the sense of vision than that of touch, and in the sense of touch more than that of smell and the least interaction was mentioned in the sense of hearing as in the sense of hearing there were some negative experiences, and people only seemed to mention the attributes they considered positive when explaining the reason behind their impressions.
- It was found as well that the stimulus for a certain sense didn't necessarily have a big effect on people by just increasing the quantity of the stimulus.
- When a sense stimulus increased very much it affected people's attention to the other sense stimulus; making them not aware of other sense stimulus that might be present.
- The importance of considering the sense of smell in the design process was clearly shown as well from realizing that the most persistent memory of any space is its smell.

Recommendation about stimulants:

- And the importance of considering the sound aspect of the coffee shop as well; as it was the base of the most popular problem; which was the furniture layout or setting. It lacked some privacy sound wise in most of the people's opinions.
- And finally people needed more physical stimulants; more colors, more lighting, more windows…etc. except for sound stimulants that needed to be controlled.

6.3 The Mistakes that Should be Avoided in the Design of Coffee Shops

- **The lack of connectivity in both its physical and virtual ways:**

People in coffee shops needed to feel connected visually and socially, people needed to feel accessible for others to come and join them easily. Like in the case of beanos, the coffee shop was not on a main street, and its location wasn't a vital one for people to pass by. The solution for this case for example can be easily in designing its approach, and indicating that there is something in this area. The tools could be plantation, signs, different floorings...etc. and connecting people even virtually through providing internet connections in the coffee shop.

- **The lack of sound control:**

People in the coffee shops were annoyed from many sources of noise, first of all, the outside noise especially if the coffee shop was in a vital street full of traffic. The second type of noise was from the kitchen utensils and that from the service counter. And finally the last source of noise was that coming from people's talking. The possible solution for these noises can be through the use of some aural embellishments like tapestries to absorb some noise in specified areas of noise, or the use of absorbing panel, or manipulating the reflection of sound actively by curved surfaces reaching even acoustical dead zones. But that could not be applied evenly in all the coffee shop, as people wouldn't feel comfortable talking in a very quiet place; people need some acoustical privacy so as near table wouldn't be able to hear their conversation. Therefore in the compact seating areas, some aural embellishments can be also used like marble figures that diffuse sound or actively manipulating the reflection of sound by curved surfaces to make the sounds feel further and change the apparent location of

people sitting nearby speaking. Green buffers can be used as well to block street noise, but not in high traffic ones; it was not successful in the coffee shops studied because they were on main streets with very high traffic.

- **The lack of stimulation:**

People's need for more stimulation was apparent in the coffee shops. People didn't appreciate the dim lighting or neutral beige colors. People appreciated the usage of many different textures, and colors. Even when people liked the color scheme of a coffee shop, when asked what they would change, people demanded more colors. It was always the demand of more colors, more lighting and more windows that transmit outer stimulants carried by the wind or sun rays; people were a bit bored with the stimulants offered and needed more stimulation that integrated all their senses more.

6.4 Limitations and future studies

One limitation to this study could be the fact that the analysis of people's impressions from the coffee shops are based on what they say; not necessarily what is really happening inside their brains. That's why in this study it was important to conduct a survey for a large group of people in a wide variation of coffee shops. And for future studies; to know how people's brains respond to being in coffee shops or any other kind of buildings it would be beneficial to be part of a laboratory that has sophisticated equipment to observe people's brain activity, or simply have more informal interviews. For future studies as well, it could be very beneficial to concentrate on each sense by itself and then study its relation with the other senses to come up with more specific solutions for more specific sensory problems. For example it was noticed in the analysis of results that people automatically screened the noise input in the space they are in, and one of the reasons could be that our culture made us used to blocking sounds without noticing them much. A phenomenon like that could be studied in more detail. Site analysis impact on coffee shops could be tested and investigated future studies as well. Other studies as well could be aimed at the marketing of the coffee shops; after understanding the reason behind people's visit to the cafes, with their motives and concerns.

6.5   General Guide Lines towards Obtaining Harmony and Engagement between People and their Surroundings

After exploring the relation between people and the architectural spaces they inhabit, senses were found to be the main tools for connecting people with the surrounding environment but at the same time not the only tool as people are influenced by their mind and emotions as well. After applying the study on coffee shops the recommended design intentions for coffee shops were mentioned, stimulants in the coffee shops were reviewed and recommendations about attributes of physical space were stated from the previous mistakes. Finally, a brief summary of how to obtain harmony between people and their surrounding in an architectural space, and designing with a user centered approach was put in the form of a chart [fig.6.2]. This chart should be considered before the working drawings and design choices are taken. The chart basically shows two main issues to think about when designing with a user centered approach; senses and emotions. And from the consideration of users' senses and emotions in design, seven guide lines were obtained.
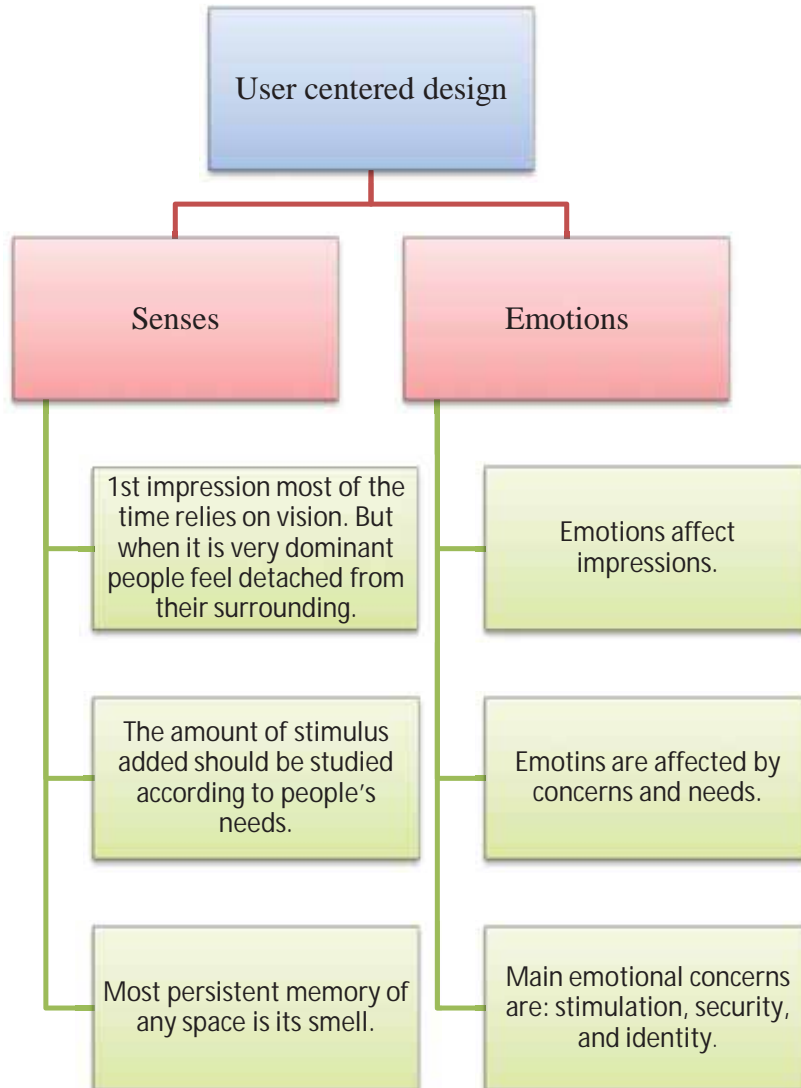
Figure 6.2: Guide Lines to Obtain Harmony between People and their Surrounding in an Architectural Space

Concerning the senses there were four main issues to be put in consideration. First of all the fact that the first impression about people's surrounding most of the time relies on vision, the second issue to be considered is the fact that if architects relied only on visual aspects in design people would feel dethatched and isolated from their surroundings, just connecting with the world only through their eyes when people's language with their surrounding environment consists of all the senses. The third issue was the fact that the amount of stimulant added should be studied according to people's needs and that just increasing the amount of stimulants doesn't necessarily affect people positively. The last consideration for the senses is that the most persistent memory of a place is its smell. The three considerations for people's emotions are the facts that emotions affect impressions about people's surroundings, and people emotions are affected by people's concerns and other than functional concerns of space,

the main emotional concerns for people in architecture are: the need for stimulation, the need for security, and the need for identity.

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Appendix I: The Questionnaire

This questionnaire is done for academic intentions only. Informant doesn't have to write his/her name. Participation would be very beneficial for developing the ongoing research.

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1   Please fill in the required information and tick your choice:

Age:	From 12 – 15 ☐	from 25 to 29 ☐	from 50 to 64 ☐
	from 16 to 19 ☐	from 30 to 39 ☐	65 and upwards ☐
	From 20 to 24 ☐	from 40 to 49 ☐	
Gender:	Male ☐	Female ☐	
Occupation:	School student ☐ Jobless ☐	University student ☐ work (specify field) ☐	retired ☐ ------------
Nationality:			
Name of this café			

2   What makes you come here? (You can choose more than one)

a) Study/ read ☐
b) Meet friends ☐
c) draw/paint ☐
d) Nice view ☐

e) Nice atmosphere ☐
f) Food & drink ☐
g) Reminds me of something ☐
h) Other (specify) ……………. ☐

3   What is your impression about the atmosphere? Tick your choice

	(a) Extremely	(b) Quite a bit	(c) Neutral	(d) Quite a bit	(e) Extremely	
Attractive	( )	( )	( )	( )	( )	Unattractive
Cheerful	( )	( )	( )	( )	( )	Dull
Boring	( )	( )	( )	( )	( )	Interesting
Comfortable	( )	( )	( )	( )	( )	Uncomfortable
Inspiring	( )	( )	( )	( )	( )	Uninspiring

4 **What are the things that formed your impression of the café? From the table give each attribute a number according to how much it got your attention**

(1) Extremely, (5) Very slightly. (Choose one number only for each attribute)

Extremely ←——→ Very slightly

Attributes		1	2	3	4	5
Sound	Music					
	Sound of people talking					
	Sound of utensils					
	Sounds from out side					
Smell	Coffee/ tea smell					
	Food smell					
	Scent used					
	Cigarettes/shisha					
	Plants/ flowers					
Lighting	Artificial light					
	Natural/Sun light					
	Shades and shadow					
Colours	furniture					
	Walls					
	Flooring					
	Ceiling					
Textures/ materials	furniture					
	Walls					
	Flooring					
	Ceiling					
temperature						

5 **What is the most thing you like about the design of the café? Why?**
Like:………………………………………………………………….……

Why:………………………………………………………………………

6 **What is the most thing you dislike about the design of the café? Why?**

Dislike:………………………………………………………….………………

Why:………………………………………………………………………

7 **Is there anything you would like to change in the café?**

…………………………………………………………………………………………
………………………………………………………………………………………

8 **Write the name of another café that you like better than this one and why?**

Name:…………………………………………………………………………………

Why do you like it?...

Thank you for participating! :)

الملخص

تستكشف الدراسة العلاقة بين المستخدمين و الفراغات المعمارية من خلال فهم إنطباعات الناس عند الإتصال بالبيئة المحيطة. يتناول البحث دراسة العلاقة بين حواس الإنسان و العمارة، حيث تعتبر الحواس الوسيلة التى تصل الإنسان بالبيئة المحيطة. يتناول البحث أيضا دراسة تأثير عقل الإنسان و مشاعره على إدراك العمارة لأن الإنطباعات لا تقتصر على الحواس فقط. أجريت دراسة عملية فى مقاهى حديثة بالقاهرة حيث يمكنها أن تشهد نشاطات مختلفة من لقاءات إجتماعية إلى مقابلت عمل و لقاءات سياسية و أنشطة أخرى تتيح الفرصة لدراسة سلوك الإنسان و إنطباعاته عن المناخ العام للمكان. إشتملت النتائج الرئيسية للدراسة العملية و النظرية الأتى: الأهداف الرئيسية لزيارة المقاهى الحديثة بالنسبة للرواد هى أولا مقابلة الأصدقاء ثم القراءة ثم الإستذكارغالبا فى مجموعات ويأتى فى المرتبة الثانية الذهاب للمقاهى للإستمتاع بالجو العام للمقهى الذى يأتى فى نفس المرتبة مع الرغبة فى تناول الطعام و الشراب. و من التوصيات الهامة مراعاة حاسة الشم فى التصميم حيث أنها الحاسة ذات المفعول الأطول على الذاكرة. و أيضا من التوصيات الهامة ضرورة مراعاة حاسة السمع و مشكلة الضوضاء فى المقاهى كعنصر من عناصر التحكم فى خصائص المناخ العام فى المقاهى. و أخيراً تبين إهتمام المستخدمين بزيارة و مراعاة المنبهات المادية فى التصميم المعمارى مثل زيادة استخدام الألوان و زيادة مستوى الإضاءة و زيادة الشبابيك.

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الممتحن الخارجي   الاستاذ الدكتور: دينا شهيب

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