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Developing Simple and Economic Buildings in the Gaza Strip Using Minimalist Architecture Principles

تطوير مبانٍ بسيطةٍ واقتصاديةٍ في قطاع غزة باستخدام مبادئ العمارة التقليلية

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Abstract

The term minimalism is used to describe a trend in design and architecture where the subject is reduced to its necessary elements. In terms of architecture and for the purposes of this thesis, the concept of minimalist architecture is described in the following way: To strip everything down to its essential quality and achieve simplicity, by sorting out highest priority architectural requirements are, and then to do the possibly least to achieve them. Other aspects of this trend are using basic and elemental geometric forms, raw materials, and the repetitions of structures which represent a sense of order and essential quality.

Such a description fits with the majority of residential buildings in the Gaza Strip which are known for their unfinished concrete plastered repeated grey boxes, as well as using simple building details. After the end of "Al-Furqan" Battle (Operation Cast Lead), January 2009, thousands of buildings were totally destroyed or partially damaged and needed to be rebuilt or rehabilitated again. The unstable economic situation, shortages in construction materials, and lack of access to raw building materials as a result of the blockade, are some of the related problems prevalent in the Strip which necessitate using such approach of building design principles.

Minimalist architecture is characterized by an economy with materials and a focus on building quality with considerations for ‘essences’ as light, form, detail of material, texture, space and scale, place and human conditions. The shortage of building materials often forces families to build back lower quality homes, therefore Palestinian architects working in the field should seek the essence and simplicity by rediscovering the valuable qualities of simple and humble materials, capturing their raw beauty and accepting their harshness. This thesis investigates how to validate the existing simple objects around us and minimal spaces we live in. And how to use minimalist architecture principles as a guideline for designing, constructing and rehabilitating economic buildings tailored to the community's needs and preferences. A major concern is how a minimal language could help in the existing situation here in the Gaza Strip.

Analytical methodology is used and had been divided into the following categories: review of literature, three examples of minimalist projects, analysis of the existing minimal situation in the Gaza Strip, one working and one building case studies and a questionnaire. In response to the objectives of this thesis, the main outcome of the research is that: adopting minimalist architecture in the Gaza Strip, Palestine will effectively lead to more economic, easier to build, more simple and livable buildings with better attitudes.

Keywords: Minimalism, minimalist architecture, architecture of simplicity, minimise, applied and reductive arts, abstract subjects, geometric shapes, elemental construction, raw beauty, the Gaza Strip.

المُلخص

التقليلية minimalism (التبسيطية أو الحد الأدنى) هي حركة فنية ازدهرت في الستينات خرجت من المدرسة التجريدية وتتميز بتقديم الأعمال الفنية بأقل عدد من العناصر والألوان، وتعتمد على التبسيط وحذف الكثير من التفاصيل. ظهر اتجاه العمارة التقليلية أو البسيطة minimalist architecture كردة فعل على الإسراف والبذخ والتكلف في العمارة (بعد الحرب العالمية الثانية) فإلى أي مدى نجح هذا الاتجاه في إيصال تلك الرسالة: القليل يعني الكثير؟

في قطاع غزة، يصفون مبانيها الرمادية بالصناديق الخرسانية boxes، فهل تكون تلك الصناديق هي الحل! هنا في غزة تظهر المباني السكنية على شكل صناديق إسمنتية متكررة وذات فتحات هي نوافذها، وتكرار هذه المباني الصندوقية أوجد المجموع العمراني للمدينة وبمعنى آخر أصبحت تمثل النمط السائد والعمارة الشعبية. فهل بالإمكان إعادة ترتيب هذه البنايات لتظهر من جديد بشكل أفضل مما هي عليه الآن؟

تهدف الرسالة إلى إبراز وتقديم أهم ملامح ومبادئ العمارة التقليلية، كما وتكمن أهمية موضوع الرسالة في إمكانية تطبيق تلك المفاهيم والمُخرجات على العمارة المحلية التي نقوم بتصميمها وتنفيذها، مما يزيد من قناعة الناس، المعماريين والمخططين، وأصحاب القرار بالقيمة غير الظاهرة للرصيد السكني في قطاع غزة وقابليته للتطوير والارتقاء اعتماداً على مبادئ العمارة التقليلية.

تتمثل منهجية البحث التحليلية في الاستفادة مما سبق وتناول لمفهوم التقليلية وأبجدياته المستخدمة في الفنون التشكيلية، الفنون البصرية والعمارة من خلال تحليل عدة مشاريع تم تناولها وتقسيمها وفقاً للمنطقة الجغرافية، ونوعية المواد المستخدمة، ونظم الإنشاء والتكلفة، وكذلك تبعاً لخصوصية كل مشروع من حيث الوظيفة والاستخدام. مع ملاحظة أن اختيار تلك المشاريع تمبناءاً على التوجه العام لدى المُصمم وليس على أساس أي تصنيف مُسبق للمعماري أو للمدرسة التصميمية التي يتبعها.

بالنسبة لقطاع غزة، فإن إعادة اكتشاف وإبراز النواحي الوظيفية والجمالية التي توفرها العمارة البسيطة سيكون من خلال بعض التمارين البصرية ومقارنتها مع بعض المشاريع التي نشرت في المجلات والمواقع المعمارية المتخصصة أو تلك التي حازت على جوائز عالمية. وكذلك في محاولة الاستفادة من الخبرة العملية التي توفرت للباحث خلال السنوات الماضية وعمله على مشروع لترميم وصيانة منازل لأسر فقيرة في مناطق نائية ومُهمشة في قطاع غزة ومحاولة لإظهار الجمال في تلك البيوت البسيطة، قبل وأثناء وبعد عملية الصيانة والتأهيل، يتبع ذلك مقارنة مع النماذج الدراسية وبيان أوجه الشبه.

لا يعمل الباحث هنا لتكريس هذا النمط السائد من البناء الصندوقي ذو اللون الرمادي ولكنه اجتهاد متواضع للتقليل من سلبياته القائمة ومحاولة إعادة النظر إليه لاكتشاف القيم الإيجابية الموجودة فيه. تتمحور مُخرجات الرسالة حول التركيز على كيفية اعتماد وتطوير تلك النماذج البسيطة من أجل تعميمها ونشر الوعي المعماري بهذا الخصوص.

الكلمات المفتاحية: التقليلية، العمارة البسيطة والاقتصادية، الفن التجريدي، الأشكال الصريحة، المواد الخام، قطاع غزة.

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Chapter 1

Introduction

1.1 Background

Minimalism in architecture and design can be traced back to various roots. Already at the beginning of the 20th century, the first signs of designing simpler residential spaces and furnishings emerged. The signs of a formal simplication in the applied arts were already apparent at the large Dresden-based applied arts exhibition in Germany 1906. With the founding of the German Work Alliance in 1907, the terms "realism", "functionalism" and "modern functional style" together with the first signs of an "industrial design" were discussed more and more openly. New realism ended with the power takeover by the Nazis and their culture policy, and many representatives of this movement immigrated to the United States. There minimalist art was created in the 1960s with artworks that appeared to be technically simplified, such as, the equally organized monochromatic cubes of the artist Donald Judd. In the 1980s, the British architect John Pawson published the book, Minimum, which strongly influenced the design world. Simplicity became a philosophy of life and a type of individual liberation (Oriol, 2007).

Simple architecture of minimal elemental forms, constructed in a logical, legible and resourceful way has a sense of timelessness and authenticity (Heal, 2010). This thesis explores what most of us as outsiders, view as unrefined building practices; accepting their harshness, crudity, and imperfections; digesting their vocabularies; and using these structures as a springboard from which we could develop a new, bold, and vital architectural aesthetic. The final result is to make poetry out of an uninspired utilitarian reality. Adjectives that come to mind include modern, reductive, unconventional, diverse, and contextual (Al Asad, 2002).

In the Gaza Strip, Palestine, the majority of building materials and furnishings are simple and durable, hollow concrete blocks for exterior and interior single walls, total concrete slaps and flat roofs and aluminum siding for exterior openings is chosen for its low-maintenance qualities. Due to the unstable and poor economic situation and its effects, majority of residential buildings in the Gaza Strip are not completed nor finished. This way of construction matches some of the principals of minimalism, especially in terms of simplicity, durability and minimisation of building resources. It can be developed to achieve more sustainable and economic standards. The thesis focuses on well-tried methods of improving the existing buildings and providing adequate architecture for future generations.

Using minimalist architecture principles means to design and construct in a direct but refined and artful way, producing buildings of simple form and visual calm often constructed with the appropriate use of a predominant *available* material (Heal, 2010) which is concrete and with respond to the community's needs in the Gaza Strip (Fig. 1.1).

> *"Modern isn't the cold interiors that many interpret as being unlivable, let go of the clutter and open your mind to a world of amazing detailing. This is where you really come to understand the impact of not just good design but amazing design. How our environments mold our lives in subtle ways that may not be clear to us. There's a reason you walk into a space and feel refreshed or excited or maybe even a little curious to see what lies ahead"* (Guevara, 2006).

Figure 1.1: A shelter made of a simple form with a visual calm. Source: the author, Shouka 2010.

Residential buildings in the Gaza Strip may look like disorganized groups of crowded grey concrete boxes. But when you start to look beneath their outer layers and begin to examine what's going on underneath, you will find all sorts of complex and human life-support systems at work in those dwellings, in which the prominent note is resourcefulness, not hopelessness.

1.2 Importance of the Thesis

This thesis aimed to be one of the few in the Gaza Strip, Palestine, to investigate minimum standards of buildings design and construction through using humble materials, basic to building, manufacture and construction in accordance with the design principles of minimalist architecture.

The thesis aims to demonstrate that it is beneficial to construct simple and economic buildings in the context of the current construction situation. Importance can be summarized in the following points:

- Motivating scholars and specialists (urban designers and architects) to benefit from this study through applying its outcomes at design and coming projects.
- Building capacities of national and local government officials and policy makers who need to quickly enhance their understanding of minimalist architecture issues.

1.3 Aim and Objectives of the Thesis

The main aim is to present the best design principles of minimalist architecture in terms of: design approach, materials and finishes, possibilities of savings and construction methods. To suit with the local current conditions of the Gaza Strip and to produce more economic and durable buildings, a major concern is how a minimal language could help in the existing situation in the Gaza Strip and then trying to assemble together designs with construction techniques to make a good piece of design.

The research aims to fulfill the following objectives:

- Establishing clear key principles to adopt and apply minimalist architecture standards for construction of residential buildings in the Gaza Strip.
- Discussing the current buildings situation in the Gaza Strip under existing constrains.
- To reach practical matters of architecture such as building material, possibilities of savings while construction and issues related to it.
- Making good designs of related costs with minimum thresholds and ceilings to ensure dignity while providing durable shelter solutions.
- Providing a technical level of coordination for all actors involved in construction.

1.4 Research Limits

Residential buildings in the Gaza Strip are the main focus of this research. Non residential buildings such as governmental and masjeds are taken partially into consideration through literature review. The structural skeleton system is used and it is often built with imported and contemporary materials, mainly reinforced concrete and concrete hollow blocks. Structural design requirements for reinforced concrete buildings are taken into consideration.

1.5 Problem Statement

The unstable economic situation and shortages in construction materials in the Gaza Strip often forces families to build back lower quality homes. The Israeli blockade that has continued, relentlessly, for six years and the 2008-2009 and 2012 military operations in the Gaza Strip have resulted in a substantial deterioration of the economic, social and political infrastructures of Palestinian society. The infrastructure was also significantly damaged, as a result of the continuous attack during the operation; more than 4,100 buildings were completely destroyed while more than 17,000 houses, governmental and public buildings were partially damaged. In the case of fuel and electricity, the plan of Israeli government was not to totally stop supplies of fuel and electricity but rather to set levels of supply that are much lower than what Gazans needed and allowing a minimal flow of fuel to reach the Strip. The electricity demand increases by about 10 - 15 MW annually as a result of the natural population growth and the expansion in various sectors, including the consumption of energy by the housing and domestic sectors, thus further aggravating the electricity shortage.

Out of necessity and for reasons of economy, at a space where land and resources are limited, buildings in the Gaza Strip tended to be minimised to the bare essentials. People in the Gaza Strip build individual homes for all sorts of reasons, but mainly because they want to create something tailored to their family's unique requirements. Houses those are functionally efficient and providing for basic human needs of shelter and comfort using basic elements such as floor, walls, roof and hearth. Most of people in the Gaza Strip have access to building resources and families control the housing construction process. They undertake building works by themselves, with self-finance and external technical assistance. Families rehabilitate or construct their houses according to their own ideas, possibilities and needs, and they may self-build or pay a contractor.

The so mentioned points are some of the related problems prevalent in the Gaza Strip which necessitate using minimization process. Minimum building standards in the Gaza Strip are applied as a result of the economic situation. In this context, this research investigates this situation which can be developed from negative to a positive attitude for buildings design approach through the using of minimalist architecture principles.

1.6 Hypothesis

Adopting minimalist architecture in the Gaza Strip will effectively lead to more economic, easier to build, more simple and livable buildings with a better attitude. Applying minimalist architecture principles could be a guideline for producing elemental construction through using more humble building materials and finishes with respond to the community's needs.

The idea behind the minimalist design and construction techniques is more important than the final product. The building still holds value, but it is driven by the concept.

With some initial and basic designs for buildings, brief technical instructions for how each building type should be done; firm but easy to follow. By hiring skilled workers to execute those simple buildings, the work did not require exceptional talent or expensive schooling, just straightforward workman skills and patient attention. If a building was done correctly that would be enough.

Figure 1.2: The workmen while working brick by brick. Source: the author, Shouka 2010.

1.7 Methodology

To achieve the goals of this research the descriptive analytical method was adopted as the main methodology tool to gather information about the problem and then to get out the results of the analysis. The data collection and the search for similar applied principles at existing architectural solutions conducted through:

1. Reviewing the available textbooks and references on minimalist architecture.
2. Field investigations with camera to different areas in the Gaza Strip communities: cities, villages, refugee camps, rural and marginalized areas used as comparative tool.
3. Interviews and exchange of experiences with local professionals in fields of design, building regulations and construction procedures.
4. Building and working case studies of Gaza projects (housing and rehabilitation types).
5. A questionnaire was used and revised many times in order to get some clear outputs that helped the researcher to evaluate the current building situation. The questionnaire contains different type of questions; some questions require specific information about the dwellings existing situation.

1.8 Structure of the Thesis

This thesis conducted minimalism theoretically, neither by criticism, nor by development analysis. But rather than that it will consider it as an approach to solve identified local problems. The research consists of two main parts; first part is the literature review which presents concepts essential to understanding minimalism and setting out the context for minimisation process in architecture. The second part is about minimalist architecture in the Gaza Strip, its potentials and evaluation. The research consists of five chapters. The first one is a general introduction. Other chapters are as follows:

Chapter (2) Minimalism and Architecture: The first part of this chapter is to inquire into the origins of the term minimalism and in how the minimalism phenomenon played out in other fields like art, painting and sculpture. From minimal art's inclination towards architecture, the second part is a practical review of those identified principles of minimalist architecture in order to link them with some other principles abstracted from studies of existing buildings with focus on traditional Mediterranean architecture simplicities.

Chapter (3) Minimalism in Gaza Strip, Palestine: This chapter covered the current situation in the Gaza Strip with regard to minimum levels at many aspects of daily life with concentration on the construction sector. This was followed by a building and working case studies. This is considered as a preliminary evaluation attitude depends on analysis of the researcher. The chapter aims to demonstrate that it is possible, and even beneficial to use minimal architecture in the context of contemporary construction industry in the Gaza Strip.

Chapter (4) Evaluation of Minimalist Architecture in the Gaza Strip: The researcher uses statistical manner through an assessment questionnaire to assess the potentials of minimalist architecture in the Gaza Strip. The aim of this chapter is to evaluate the existing situation's aspects of visual appearance, functionality and the internal environment of the house, as well as the economic simplicity, savings possibilities and overall impression for minimalist housing with its end users.

Chapter (5) Conclusion and Recommendation: This chapter gives a conclusion about potentials of minimalist architecture in the Gaza Strip with some recommendations.

1.9 Previous Researches

The following studies summarize some of the most related topics of minimalist architecture and simple buildings.

Minimalist Architecture. Author: Franco Bertoni. Publisher: BirkhŠuser, 2002.
This important book, with 9 monographical sketches and a superb introduction by Franco Bertoni, aims to highlight the most original contributions to the idea of simplicity, a concept that has been so extensively and incisively expressed in the field of architecture that it has become one of the key trends attracting the attention of critics and general public alike, above

all in the last two decades of the twenties century. The book discussed the term Minimalism and how it was used, at times with caution and at others with determination, to connote the works of architects from profoundly different origins and cultural backgrounds, who had based their own work on a reduction in expressive media, a rediscovery of the value of empty space and a radical elimination of everything that does not coincide with a programme, also with minimalistic design overtones, of extreme simplicity and formal cleanliness.

Minimal Architecture: From Contemporary International Style to New Strategies.
Author: Ilka & Andreas Ruby, Angeli Sachs, Philip Ursprung. Publisher: Prestel Verlag, 2003.
The aim of this book is not to pin down the meaning of the term minimalism but rather to examine the area where it is applied, to illuminate it and open it up to current architectural discussion. This trenchant re-examination of minimalism in architecture helps deepen our understanding of a style as diverse as the artists who practice it. What is minimalism? Or, more specifically, what isn't? In this aesthetic voyage three experts in the field of architecture and art history trace the development of minimalism as a style and offer perspectives on the directions the movement is taking as it morphs toward the future. In double-page spreads filled with colour photographs of the most innovative minimalist projects, this book illustrates three principal movements: the traditional, as practiced by Herzog & de Meuron in early works, Adolf Krischanitz and Tadao Ando; the ambiguous, in which architects not commonly associated with minimalism, such as OMA or Zaha Hadid, use it for specific projects; and the subversive, which appropriates minimalist concepts across a variety of new fields as exemplified in the architecture of Shigeru Ban or Lacaton & Vassal.

Coupled with an historical analysis of the relationship between minimalism in architecture to its appearance in art, the book examines minimalism as a paradigm for modern architecture. The book could be summarized as Peter Zumthor once said, "It is better not to talk of style but of a particular approach, a specific conscientiousness, in finding the solution to a task."

Building Simply: An investigation into the potential for Building Simply in the UK.
Amanda Heal, MPhil Architecture, Cardiff University, UK, September 2010.
The thesis explores the theme of Building Simply; architecture of simple, elemental forms, constructed in a logical, legible and resourceful way from raw local materials. These buildings have a sense of timelessness and authenticity, and express an empathy with the landscape in which they sit. The thesis aims to demonstrate that it is possible, and even beneficial to Build Simply in the context of the contemporary UK construction industry. ‘Building Simply’ means to design and construct in a direct but refined and artful way, producing buildings of simple form and visual calm often constructed with the appropriate use of a predominant local material. An ethical and economical approach to sensible resource use and a critical approach to site are adopted. Buildings are designed with quiet appropriateness in mind, rather than the louder formal manifestation of iconic architecture. Building Simply is not concerned with purely visual simplicity; it is concerned with minimisation to give tectonic clarity and not minimalism as an aesthetic style. With priority given to construction, relationship to context and considered composition of forms and spaces rather than surface aesthetics, this architecture

is timeless rather than fashionable. Principles for Building Simply are abstracted from a study of vernacular architecture. Having set out a framework which defines Building Simply, the thesis argues its benefits.

Minimalist Architecture; Discussion of Its Sustainability in Indonesia.
Silfia Mona Aryani, Interior Design Department, Sebelas Maret University, Indonesia, 2011.
The essay discusses the existence of minimalism in architecture; its historical relationship with modernism, the theoretical reviews which underpin the discussion and the appropriate adaptations need to be made to fit in tropical climate. Despite of its similarity with modernism, minimalist style in architecture actually can be suitable enough to be applied in a tropical climate like Indonesia as long as the design is made with climate consideration. This approach would make the building creates its own thermal comfort as an adaptation of conditional requirements. By being less dependent from artificial support, the minimalist architecture could reach its main goal in creating ease for the physical body.

The culture of building to craft: A regional contemporary aesthetic.
Puja NANDA, Massachusetts Institute of Technology, Department of Architecture, 1999.
This paper suggests an alternative paradigm to the current architectural practice that is subject to the global culture of co-modification and homogenization. It analysis the intersection of practice, craft and industry, to develop a 'culture of building' that draws references from its resource base and links various stages of design, fabrication and use. As we move towards irrational homogenization, this paper addresses the following key questions: Can the building industry be individually patronized by different groups of practice methodologies towards customization? Is it possible to rationalize customization of building industry, critically analyzing regional contexts and the available resources? Could we explore the potential of standardization of these regional customizations, in the overall building processes?

1.10 Conclusion

This chapter discussed the main points related to the thesis such as the existing situation with a focus on residential buildings. Due to the unstable and poor economic situation and its effects, majority of residential buildings in the Gaza Strip are not completed nor finished. The chapter assumes that this way of construction matches with some of the principals of minimalist architecture, especially in terms of simplicity, durability and minimisation of building resources.

Chapter 2

Minimalism and Architecture

2.1 Introduction

Minimalism is a movement in abstract art towards extremely simplified composition. In architecture it is considered as one of the dominant design trends today. Minimalist architecture or architecture of simplicity attempts to draw us back to a different way of living and feeling. Leaving aside present-day misuse and the inflation of the term, minimalist architecture represents one of the most significant contributions to a review of a discipline, and an attempt to endow it with new foundations, and a way of life (Bertoni, 1998).

This chapter explores the term "minimalism" in art and architecture, its roots both in the Eastern and Western World with focus on traditional Mediterranean architecture simplicities.

2.2 Understanding Minimalism

Minimalism is secretly complex. It is about striping away at an idea or thought, until you expose just the frame work that props it up. It is the distillation of an idea. An omelet without any ingredients is an egg, and an egg un-cracked is a white smooth orb like object (Fig. 2.1).

Figure 2.1: An egg with surrounding (a) and a Scotch egg (b). Sources: (a) the author 2007, (b): flickr.com.

Minimalism is the egg. Simple compared to an omelet, complex when you consider what is in it or what it can become. Just think of all the recipes eggs are the catalyst for (mog.com, 2012).

Minimising is about making things as simple as possible by reducing complexity. The definition of the word minimise is 'to reduce (especially something unwanted or unpleasant) to the smallest possible amount, extent, or degree.' In terms of architecture, this means getting rid of inessentials so that only the basic elements of the building remain. The essence of the building is condensed and strengthened in this way.

A minimum cannot be made simpler. Minimalist ideology is about the search of the essence of human condition, place, materials, space and light. The process of stripping down, the need to get down to the bones is coinciding with construction technique. A void in which to listen to figures with a pure and unconstrained eye in order to rediscover how many universal qualities are contained in the simplest and most common place objects. 'Minimise' is not necessarily the same as minimalism. Minimalism in the arts usually refers to the visual appearance of architecture, but what appears minimal and simple to the eye on the surface, may in fact be complex underneath (Heal, 2010).

2.3 Minimalism as a Way of Life and Thinking

The idea of simplicity appears in many cultures, especially the Japanese traditional culture of Zen Philosophy. The ideology of minimalism is rooted in two concepts - the ideas of a man named Wabi Sabi and the tenants of Zen Buddhism. The Japanese philosopher Wabi Sabi preached the merits of voluntary poverty. Zen Buddhists believe that the only possessions you should have are the bare essentials and reject materialism as a means of personal gratification and social standing. Not only does this philosophy enhance a person's general well being, but it is also practical for those who are trying to save space (Ambrose, 2012).

Less of everything does not just mean things like clothes or furniture. It also means less work and therefore less money. A central idea to modern minimalism is less consumerism, so less money made also means less spent and less bought. This has the domino effect of also having less stuff to maintain, move, clean or throw away. It seems like a strange concept in a culture where advertising and shopping are so deeply entrenched. Minimalists are not libertarians, anarchists or hippies. They are not vegans, are not against grooming, personal hygiene or modern clothing. Minimalism is not a religious faith or set of morals to which its followers must adhere. The reality is that minimalism is a very pragmatic and practical philosophy that is intended to reduce some of the material and spiritual clutter that stifles modern living and reduces it to a stressful, busy daily grind (Ambrose, 2012).

Life can be easy when you reduce it to essentials. There comes a time in everyone's life when realize life is too messy and simply too busy. Clutter has taken over our life! When you reach that point of exasperation, you have a few choices. You can store it, stack it, stash it, schedule it, organize it, colour code it or you can actually get rid of it. Minimalism is a tool that allowed us to simplify our lives by stripping away the excess stuff so we could focus on what's truly important. Minimalism means more than just leading a simple life of few possessions or responsibilities. Minimalism in the present day can be interpreted as a backlash against the consumerism and ownership that seem to be the main driving forces of today's society. Proponents of minimalist philosophy claim the quality of their lives has increased substantially, with less stress, sickness and general fatigue (Ambrose, 2012).

Many people practice the minimalist philosophy without even knowing it and more people are considering having a minimalist lifestyle in these times. Having minimalism as a way of life contains both tools and motivation for tackling the messy areas of our homes and practical steps for de-cluttering and organizing and will help on our way to living with less. Sustaining this lifestyle, with less clutter and more simplicity, practicing minimalism is difficult to say the least. A minimalist home (Fig. 2.2) is simple and basic, humble, unpretentious and not over-crowded. It is tidy and neat, clean and pure.

A few key benefits of a minimalist home are: Less stressful, more appealing and easier to clean. Seeing a home free of clutter is calming, liberating and just nice. The key is to remove the unnecessary stuff (Babauta, 2007).

Figure 2.2: A minimalist house. Source: nytimes.com, 2009.

Everyday life can be extremely busy, rushing to work, to see friends, to make appointments and so on, so when you finally arrive home at the end of the long day, you want nothing more to relax. Far from being cold, minimalist architecture actually becomes a haven.

Minimalist and commercial architecture used for those projects, other residential dwellings and commercial properties is all about being clean and streamlined in the design of the building, and using restraint in the design. Space (empty space) actually becomes a feature in and of itself, instead of being something that has to be filled (Fitzgerald, 2010).

2.4 Minimalism in Islam

Islam teaches simplicity. The right practices of Islam lead to a simple, minimal approach to life. The parts of the Quran specifically address this, the simple approach that the Prophet of Islam Muhammad (peace be upon him) had, to be humble and down-to-earth. The first place in Islam is a simple cube in structure. The Kaaba (Arabic, "a square building") is a very simple stone structure laying no claim to grandeur of size or beauty or architecture. It impresses by its very simplicity.

Figure 2.3: Approaching the black cube, Kaaba. Source: the author performing Umrah, Mecca, February 2013.

One Sura of the Quran is called Sura Al-Takatur, Striving for more. This Sura spells out the mistake we make as humans in striving for more and more in this world. This means striving for more wealth, more status, and more things. The Quran goes straight to the point, "Striving for more distracts you, until you go into your graves"(102:1 and 2). It distracts us from what is the real value of the life that we have been blessed with. Distracts us not only from perceiving the presence of Allah in everyday life, but from each other.

Simplicity is a great lesson learned by Islam. Islam doesn't deny a person to spend his life with all those luxuries which he can afford. But the matter is fact that our Prophet Mohammad (S.A.W) always taught to Sahaaba-e-Karaam (R.A.) to avoid too many luxuries. Not only He taught this simplicity lesson to Muslims but also He was himself a lifelike example of it.

Muhammad (peace be upon him) was a very simple person and spent all his life in simplicity. He was very unceremonious and informal in his habits. He sat on the floor, bare ground or a mat without any hesitation, alone or in the company of other people. He ate bread made from coarse flour and even spent days on mere dates. He wore simple clothes and did not like display or show. He was by nature simple and liked simplicity and informality in everything.

Ibn Masud (may Allah be pleased with him) said that Allah's Messenger (peace be upon him) slept on a reed mat and got up with the mark of it on his body. He said, "O Allah's Messenger! I wish you would order us to spread something out for you and make something." The Prophet (peace be upon him) replied, "What have I to do with the world, I am like a rider who rests for a while under the shade of a tree, then goes off and leaves it." Ubaid-Allah bin Muhsin (may Allah be pleased with him) reported Allah's Messenger (peace be upon him) as saying, "If anyone among you is secure in mind in the morning, healthy in body and has food for the day, it is as though the whole world has been brought into his Possession."

He liked simple living and wanted his family to lead a simple life and abstain from ostentatious living. His bed was sometimes of rough blanket sometimes of skin filled with palm fibers and sometimes of ordinary coarse cloth. In the ninth year of Al-Hijrah, when the Islamic state had extended from Yemen to Syria, its ruler had only one bed and one dry water-bag of skin. A'isha (may Allah be pleased with her) reported that when he died, there was nothing in the house to eat except some barley.

Once Omar (may Allah be pleased with him) entered Muhammad's (peace be upon him) house and noticed the state of the furniture in it. Muhammad (peace be upon him) himself had only one sheet of cloth round him to cover the lower part of his body. There was one simple bed, with one pillow filled with nut fiber; on one side of the room was some barley and in one corner near his feet was an animal skin. There were some water-bag skins hanging beside his bed. Omar (may Allah be pleased with him) said that on seeing this tears came into his eyes. Allah's Messenger (peace be upon him) asked the reason for his tears. He replied, "O Allah's Messenger! Why shouldn't I cry! The strings of the bed have left marks on your body.

This is a small room with all your furniture; I can see what there is. The Kaiser (Cesar) of Rome and Kisra (Khosru) of Persia enjoy luxurious living while you, Allah's Messenger (peace be upon him), and the Chosen One, live like this." He said, "Ibn Al-Khattab! Don't you like that they choose this world and we choose the Hereafter?".

In short, Muhammad (peace be upon him) lived and liked a simple life and enjoyed every minute of it. He taught his companions, through his personal example, to lead a simple life and not to be ostentatious. Prophet Muhammad said, "A man's true wealth here after is the good he does in this world to his fellow man." (Elsergany, 2008).

Nowadays and looking back at the history of Islamic architecture or where the Muslims rule, there are two opposite approaches reaching the same result where Muslims use over decoration for elements inside and outside built mosques (Fig. 2.4). In addition, other social welfare problems such as poverty, hunger, and issues associated with global climate change are all common to every nation. By focusing on these common issues and the common, binding principle, it seems there may be an answer to several of these problems within minimalism.

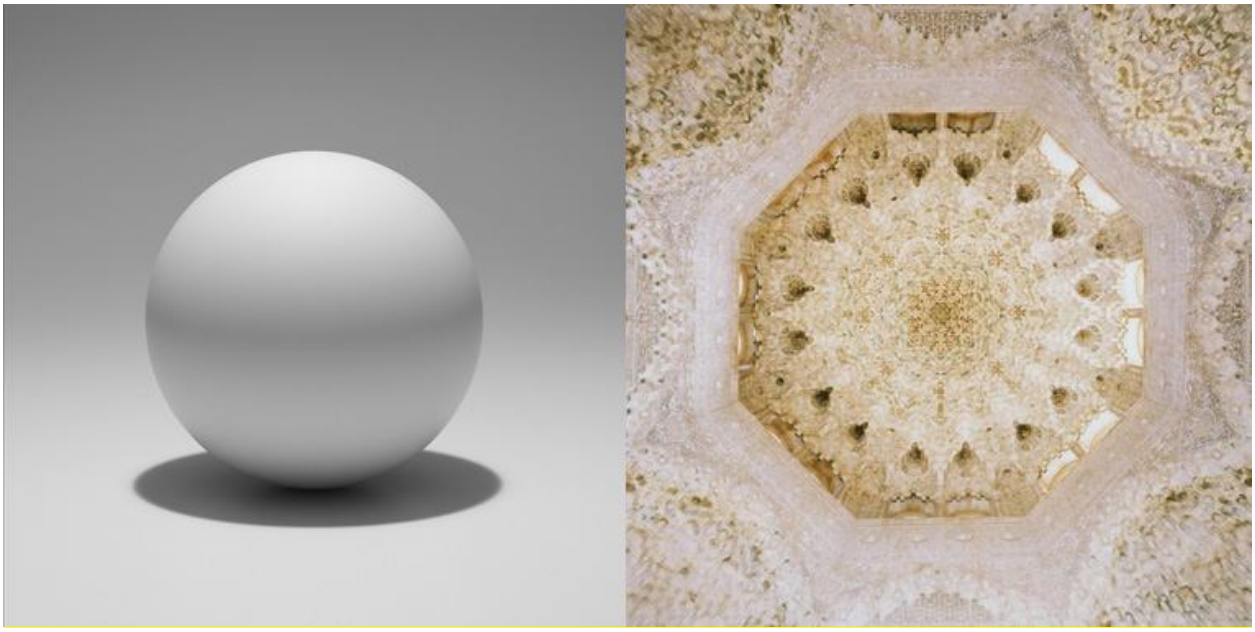

Figure 2.4: For simplicity, Lewitt's sphere vs. Alhambra's dome. Source: starwarsmodern.com, 2004.

2.5 Minimal Art

The definition of "art" had been permanently altered by 1913. Certainly reductive colour experiments of abstract painters as Ad Reinhardt and Josef Albers also provided inspiration for minimalist painting. While retaining the scale and directness of the abstract expressionists, minimalist artist attempted to eliminate the visible presence of the hand of the artist.

The sources of minimal art can be traced back to Kasimir Malevich's work: White and Black Squares on a White Ground, 1915 (Fig. 2.5). The key ideas learned from these works were that anything on canvas is a picture and that any object is a work of art. It tends to be defined by hard edges, use of industrial materials, reductive forms and repetition of forms (Isaacs, 2008).

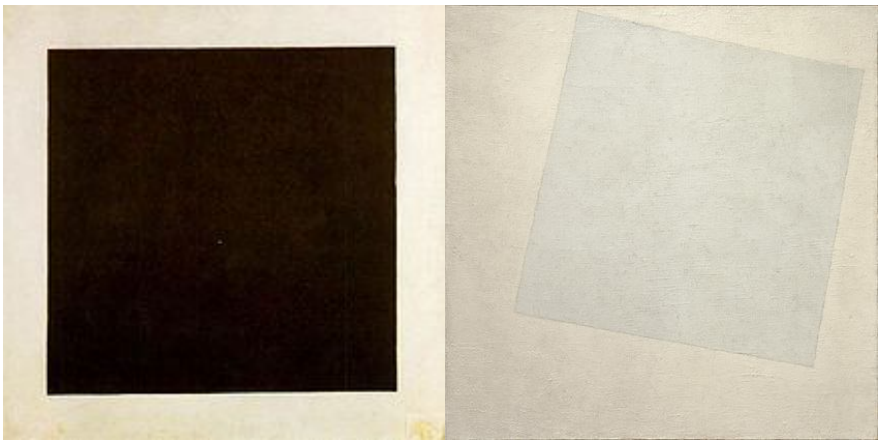

Figure 2.5: Kazimir Malevich, White Square on White (year 1918) and Black Square on a White Ground (year 1915), oil on canvas. State Russian Museum, St. Petersburg. Source: kazimir-malevich.org, 2012.

The term "minimalism" has evolved over the last half-century to include a vast number of artistic media, and its precedents in the visual arts can be found in Mondrian, van Doesburg, Reinhardt, and in Malevich's monochromes. Artists such as Dutch painter Piet Mondrian (1872 – 1944) wanted to simplify the subjects of their painting as much as possible until they were left with only lines and simple colors. They used only red, yellow, blue, black, white and grey. Minimalism was born as a self-conscious movement in New York City in the late 1950s and the early 1960s. Its leading figures: Josef Albers, Sol Lewitt, Donald Judd, Frank Stella, and Carl Andre, created objects which often blurred the boundaries between painting and sculpture, and were characterized by unitary, geometric forms and industrial materials. Emphasising cool anonymity over the hot expressivism of the previous generation of painters, the minimalists attempted to avoid metaphorical associations, symbolism, and suggestions of spiritual transcendence (Wolf, 2012). For example, the sculptures of Carl Andre are made of steel, brick, simple wooden assembly and ordinary things.

The following are some minimal artists, their quotes and works (Fig. 2.6 and Fig. 2.7):

Figure 2.6: "A picture was a flat surface with paint on it, nothing more", Frank Stella. Source: Wikipedia, 2012.

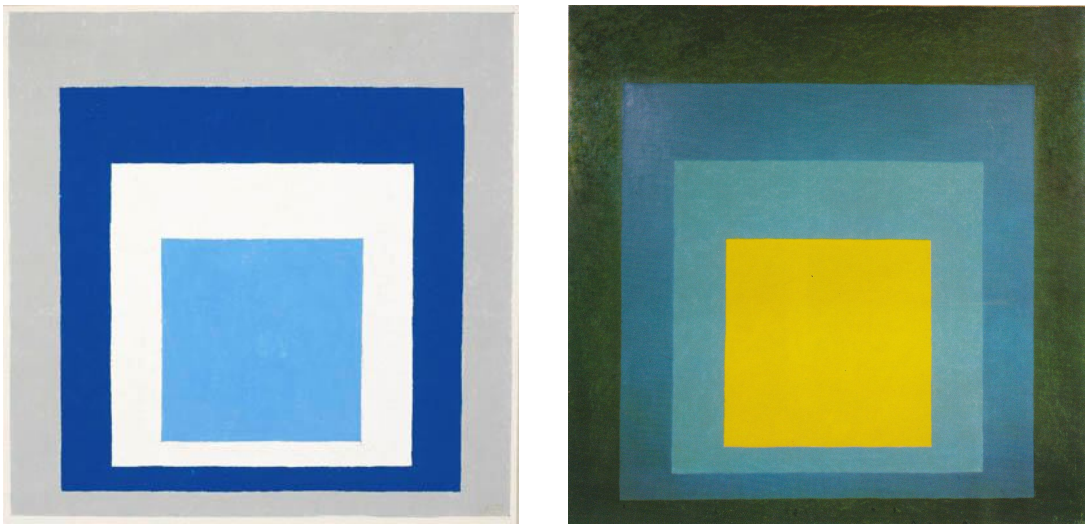

Figure 2.7: Josef Albers's abstract art paintings 'Homage to the Square', 1965. Source: Wikipedia, 2012.

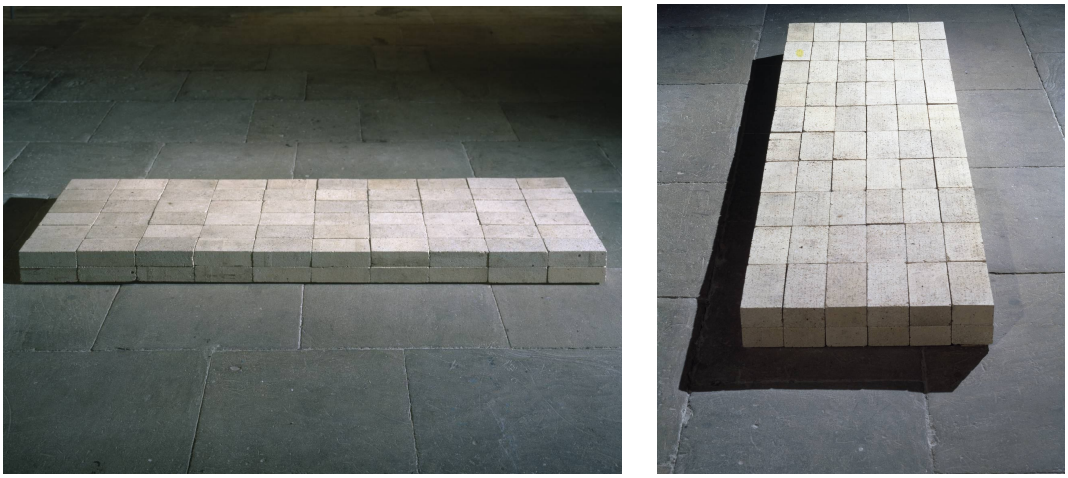

Figure 2.8: Carl Andre's floor sculptures of bricks, Equivalent VIII 1966, emancipation from “cultural overload”. This was the last in his series of Equivalent sculptures, each consisting of a rectangular configuration of 120 firebricks. Although the shape of each arrangement is different, they all have the same height, mass and volume, and are therefore 'equivalent' to each other. Source: TATE gallery, 2004.

Minimalism has found its fullest expression in sculpture, notably in the work of Carl Andre (Fig. 2.8), who employs industrial materials in modular compositions and seeks to eliminate everything, decorative, extraneous and additive, reducing all components to art's purest elements; it is precise, cerebral and austere rather than accessible. He once describes his works by saying "My art springs from my desire to have things in the world which would otherwise never be there." Donald Judd searches for clarity and autonomy in the construction of his work and with the space that it creates (Fig. 2.9): "A shape, a volume, a colour, a surface is something itself. It shouldn't be concealed as part of a fairly different whole."

Figure 2.9: Donald Judd's galvanized steel surface cubes arranged in modular rows and works in concrete. Source: contemporaryartdaily.com, 2012.

In 1955, American artist Sol Lewitt worked for the renowned architect I.M. Pei as a graphic designer. His experience in the architecture firm influenced not only his work, but also his process of creating art. Lewitt's wall drawings are related to architecture in process and also in product. In Lewitt's words, "an architect does not go off with a shovel and dig his foundation and lay every brick. He's still an artist", so why should Lewitt's work be treated any different than blue prints utilized by architects. While it is not unusual for an artist to employ assistants to produce their work, Lewitt takes on an even more removed position in the creation of his art. A Sol Lewitt wall drawing begins as a small sketch, and then Lewitt writes directions for completing the piece, the rest is up to the draftsman. Human error and interpretation affect the piece, making sure that no two wall drawings are ever exactly the same. Lewitt believed that "Ideas cannot be owned…they belong to whomever understands them", and allowed others to reproduce his works as long as they closely followed his instruction (massmoca.org, 2011).

This was a departure from the technique of creating a painting by first making a sketch. Many of the works are created by simply using the path of the brush stroke, very often using common house paint.

2.6 Minimal Art's Inclination towards Architecture

From Boutique Cistercianism to Mediterranean architecture, there is naturally given affinity between minimal art and architecture. It is more difficult to counter that minimal art is linked to architecture by particularly close tie. The term minimalism was coined, above all, as a means of describing in laudatory terms, or in a reductive and strongly critical manner, the works by protagonists of the American scene in the late Fifties and Sixties, like Donald Judd and Sol Le Witt.

Although minimal art has its roots in America, minimalist architecture was born elsewhere. Northern Europe, particularly Scandinavia, and Japan are important in the history of minimalist design, and in fact, these places continue to be among the biggest embracers of minimalism. AG Fronzoni believes that minimalism was first conceived in Greece where clear simplicity of classic architecture steeped with Mediterranean references (Bertoni, 2002). In fact in the 1980s and 1990s Donald Judd wrote repeatedly about architecture. He converted exiting building. He made sketches for projects, some of which were realized by architects. Formal similarities between the works of architect Alberto Campo Baeza and Donald Judd can be found such as the use of clear and simple forms. The term minimalism describes a range of design elements that are available everywhere and at all times such as the reduction of primary geometric forms, the right angle, the industrial "look" and the modular structure. Minimalism is a projection surface for ideas.

It is a kind of playing field on which art and architecture have engaged each other in a changing formation. Simplicity of shape does not necessarily equate with simplicity of experience. Minimalism lends itself to spirituality but it is also lends itself to shopping (Ruby, 2003).

2.7 Minimalism in Architecture

The term "minimalism" was a trend from early 19th century movement in response to the over decorated design of the previous period. The roots of minimalism in architecture are often traced back to the mid to late 1950s. The movement was a reaction to new styles of architecture and lifestyle that was being cultivated in the United States. Minimalism developed as a response to the increasingly commercial and consumerist lifestyles that were being reflected in design.

Minimalist architecture became popular in the late 1980s in London and New York, where architects and fashion designers worked together in the boutiques to achieve simplicity, using white elements, cold lighting, large space with minimum objects and furniture. Minimalist architecture simplifies living space to reveal the essential quality of buildings and conveys simplicity in attitudes toward life. The following are the godfathers of minimalist architecture:

- **Adolf Loos (1870 – 1933), Ornament is a Crime**

The Austrian architect Adolf Loos ranks as one of the most important pioneers of the modern movement in architecture. Ironically, his influence was based largely on a few interior designs and a body of controversial essays. "Ornament is a crime" was first spoken by Loos in 1910. It struck him that it was a crime to waste the effort needed to add ornamentation. Adolf Loos's writings focused on what he regarded as the excess of decoration in traditional Viennese design.

To Adolf Loos, the lack of ornament in architecture was a sign of spiritual strength. Adolf Loos referred to the opposite, excessive ornamentation, as criminal not for abstract moral reasons, but because of the economics of labor and wasted materials in modern industrial civilization. Adolf Loos argued that because ornament was no longer an important manifestation of culture, the worker dedicated to its production could not be paid a fair price for his labor. The writings rapidly became a theoretical manifesto and a key document in modernist literature and were widely circulated abroad. Le Corbusier later attributed "a Homeric Cleansing" of architecture to the work. Another point of contention decried by Adolf Loos was the masking of the true nature and beauty of materials by useless and indecent ornament.

Figure 2.10: Villa Muller, Austrian architect Adolf Loos. Source: mullerovavila.cz, 2012.

In his 1898 essay entitled "Principles of Building", Adolf Loos wrote that the true vocabulary of architecture lies in the materials themselves, and that a building should remain "dumb" on the outside. In his own work, Villa Muller 1930 (Fig. 2.10), Adolf Loos contrasted austere facades with lavish interiors. Loos arrived at the reduction of architecture to a purely technical tautology that emphasized the simple assemblage of materials. This article was followed by the 1910 essay entitled "Architecture", in which Adolf Loos explained important contradictions in design: between the interior and the exterior, the monument and the house, and art works and objects of function. To Adolf Loos, the house did not belong to art because the house must please everyone, unlike a work of art, which does not need to please anyone. The only exception, that is, the only constructions that belong both to art and architecture, were the monument and the tombstone. Adolf Loos felt that the rest of architecture, which by necessity must serve a specific end, must be excluded from the realm of art (architect.architecture.sk, 2012).

- **Gerrit Thomas Rietveld (1888 – 1964), the De Stijl Movement**

A Dutch furniture designer, architect and painter Gerrit Rietveld was one of the principal members of the Dutch artistic movement called De Stijl (from 1917 to around 1928).

The "De Stijl" artists formulated a language of forms that was intended to attain the greatest objectivity and autonomy in a work of art; their works are stringently non-representational, radically reduced to a geometric arrangement of horizontals and verticals and a palette consisting of the primary colours red, yellow, and blue with the addition of black and white. De Stijl applied these principles to both two-dimensional and three-dimensional work, such as furnishings and architecture. The works of Gerrit Rietveld was a major source of reference for minimalist architecture where he aimed for simplicity in construction. The Rietveld Schröder House 1924 in Netherlands (Fig. 2.11) is a prime example of his clean architecture minimalist architecture (gerrit-thomas-rietveld.com, 2012).

Figure 2.11: The Rietveld Schröder House, Dutch architect Gerrit Rietveld. Source: skyscrapercity.com, 2012.

- **Ludwig Mies van der Rohe (1886 – 1969), Less is More**

Famous for his dictum 'Less is More', the German architect Ludwig Mies van der Rohe attempted to create contemplative, neutral spaces through an architecture based on material honesty and structural integrity. Over the last twenty years of his life, Mies achieved his vision of a monumental 'skin and bone' architecture. His later works provide a fitting denouement to a life dedicated to the idea of a universal, simplified architecture (greatbuildings.com, 2012). Minimalist architecture exemplified by Mies van der Rohe's design aesthetic which he describes as "Less is more", refers to building designs that are reduced to the absolute bare minimum of elements, in other words, reduction of architecture to its most basic concepts of space, light and mass. The Farnsworth House (Fig. 2.12), designed by Mies van der Rohe in 1946 for his client, Dr. Edith Farnsworth, is seminal.

It asserted America as the pre-eminent home of modernism after the war. It also reduced (for the first time) the idea of a dwelling to its skeletal minimal.

Figure 2.12: Farnsworth House, Ludwig Mies van der Rohe. Source: dailyicon.net, 2008.

After presenting those pioneer architects and some of their works, the idea of simplicity in architecture is much more approached and understood.

Florian Musso wrote in the essay "Simply Good": On a large scale, the routes to simplicity change. Series products are brought together in uniform images to form components. The brick structure of a wall does not direct the attention towards the individual element, it becomes a texture. If the repeated element is of high quality and attuned to character and proportions of the building, this can have a positive influence on the overall quality. The complexity of the sum of the individual problems is then reduced accordingly.

Musso also describes an architectural "subsistence minimum" which developed in response to the inadequate living standards of the lower classes following the First World War. The aim was to provide ‘a minimum standard, affording human dignity and the necessities of life, even where the economic capability is insufficient’. To achieve this, he says, ‘Architects are concerned here with the simplicity and direct functionality… satisfying elementary needs without regard for exercises in style’ (Heal, 2010).

2.8 Principles of Minimalist Architecture

Minimalist architecture principles are connected to each other where the form is loyal, correct, basic and essential, one that conveys what is important. All these aspects can only lead to a sort of ethics of simplicity, beauty of simple elegance. Lessness architecture or the luxury of enough, essentialism, are some titles behind the idea that there exists such a thing as an essence or inner being that revealing or reaching this essence is the purpose of art and architecture.

Spanish architect, Alberto Campo Baeza's manifesto for architecture of 'essentiality' which achieves 'more with less': I propose an ESSENTIAL Architecture of IDEA, LIGHT and SPACE. Of a built IDEA, materialized in the ESSENTIAL SPACES animated by the LIGHT. An Architecture which has the IDEA as an origin, the LIGHT as a basic material, and in the ESSENTIAL SPACE the will to get MORE WITH LESS. An IDEA being called to be built, an ESSENTIAL SPACE with the capacity to translate efficiently these ideas, and the LIGHT which puts man into relation with those SPACES (Bertoni, 2002).

Purity in architecture can be achieved through simplicity and unity. In general, the idea of minimalism can be described as "less is more," or as some designers and architects are fond of saying, "doing more with less."

Dieter Rams (b 1932), a German architect and industrial designer credited with the memorable phrase "Less, but better". He uses form, proportion, and materiality to create order within his designs. His work does not try to be the center of attention; rather he allows his work to become part of the environment through precision and order (Fig. 2.13). He concentrates on the product's essential aspects so it is not burdened with non-essentials. Back to purity, back to simplicity (Borson, 2011).

Figure 2.13: L 2 Speaker, 1958, by Dieter Rams for Braun. Source: lifeofanarchitect.com, 2012.

Figure 2.14: Cappellini Fronzoni Chair by AG Fronzoni in 1964, Source: Cappellini.it, 2012

Philosophy of the Italian minimalist architect and teacher AG Fronzoni (1923-2002) states that: We need to aim at essential things, to remove every redundant effect, every useless flowering, to elaborate a concept on mathematical bases, on fundamental ideas, on elementary structures; we strongly need to avoid waste and excess. A chair designed by him (Fig. 2.14) in 1964, and manufactured by Cappellini was made of metal square tube with seat in lacquered wood is a good example of his philosophy (ideacollection.net, 2012).

"Emptiness allows us to see space as it is, to see architecture as it is, preventing it from being corrupted, or hidden, by the incidental debris of paraphernalia of every day life." J. Pawson

Minimalist architects use space as a design feature in and of itself. Instead of trying to fill space with features, they create designs in which the empty space is as carefully thought out and used as everything they add to the room. Basic shapes and straight clean lines are also important techniques used in minimalist design, as is playing around with different kinds of lighting. The outcome is elegant but without being fussy.

2.9 Economic and Sustainable Minimalist Architecture

Sustainable design in architecture complements minimalist architecture well both from a practical and aesthetic viewpoint. Orienting the house correctly and using glass as appropriate for lighting and heat control can create a clean look with a comfortable feel. Natural materials such as stone, wood and metal can be used and combined to create elegant looks while having a minimal impact on the environment. Reducing the need for artificial heating and cooling means that there are fewer elements to “clutter” the room, and also saves money. These and other sustainable design principles marry well with minimalism, as sustainability minimises your impact on the environment as well (Fitzgerald, 2010).

For simple buildings, architecture may have a minimal appearance, without decoration; but it is also minimised in its form, composition and construction. The number of materials, components and joints used in constructing the building is also minimised. In order to reduce complexity, the essential elements of the building may be doing more than one thing and multitasking is often used. One example might be a floor with a heating unit underneath, forming both the foundation for the room and warming the room. This allows designers to create optimum utility without crowding the space with more economic capability. Lighting is also put to good use in order to create good lighting for tasks while creating ambience. Simple design makes an important contribution to the preservation of the environment. It conserves resources and minimises physical and visual pollution throughout the lifecycle of the product.

2.10 Contemporary Minimalist Architects

Some important architects working in the field of minimalist design include: Luis Barragán, AG Fronzoni, Claudio Silvestrin, John Pawson, Peter Zumthor, Alberto Campo Baeza, Eduardo Souto de Moura, Tadao Ando and Michael Gabellini. The following are three notable architects and their works which reveals common elements and, at the same time, radical differences.

Luis Barragán (1902 - 1988) was one of Mexico's most influential 20th century landscape architects. Famed for his mastery of space and light, he reinvented the International Style as a colourful, sensuous genre of Mexican modernism. Barragán's work is notable for its use of traditional materials, rich spaces, and broad planar forms and unlike most of his contemporaries, the use of bright colours (Fig. 2.15).

Figure 2.15: Luis Barragán House, 1947 and his landscape architecture. The House reflects Barragán's design style. Source: theculturecreative.com, 2012.

Barragán time in Europe, and subsequently in Morocco, stimulated an interest in the native architecture of North Africa and the Mediterranean, which he related to construction in his own country. His work has been called minimalist, but it is nonetheless sumptuous in colour and texture. Pure planes, be they walls of stucco, adobe, timber, or even water, are his compositional elements, all interacting with nature (Bertoni, 2002).

Tadao Ando (b 1941), the Japanese minimalist architect, conveys the Japanese traditional spirit and his own perception of nature in his works. His design concepts are materials, pure geometry and nature. He normally uses concrete or natural wood and basic structural form to achieve austerity and rays of light in space. He also sets up dialogue between the site and nature to create relationship and order with the buildings. Ando's works and the translation of Japanese aesthetic principles are highly influential on Japanese architecture (Bertoni, 2002).

Figure 2.16: Azuma House by Tadao Ando, 1976. Source: behance.net, 2012.

Azuma House in Sumiyoshi, Osaka, Japan; replaces one of the traditional houses in this area built in wood. It is a small project yet it is simple and hit the concept. This concrete box row house is two storeyed with the living room and kitchen located on the ground floor separated by the central courtyard and having the staircase leads to the upper floor that the two bedrooms are linked by a walkway or a bridge (Fig. 2.16). Here the concrete box has no window and the central courtyard is the only source of natural light and ventilation. The reinforced concrete is the only ornamentation for the facade. The presence of a door in front suggests the use of this box.

Alberto Campo Baeza (b 1946) is a Spanish architect describes his work as essential architecture. He values the concepts of light, idea and space. Light is essential and achieves the relationship between inhabitants and the building. Ideas are to meet the function and context of space, forms and construction. Space is shaped by the minimal geometric forms to avoid decoration that is not essential.

Figure 2.17: Garcia Marcos House by Alberto Campo Baeza, 1991. Source: campobaeza.com, 2012.

Alberto Campo Baeza's earliest house, the Garcia Marcos house (Fig. 2.17) in Valdemoro near Madrid, built in a typical suburb with nothing much to see, this simple box within a box gives peace and quiet within its courtyards, shade from the sun and coolness with its double height living room. The Garcia house is a residence that client requested to be independent. The white colour of the walls reveals the simplicity and unity of the building. The feature of the structure makes lines to form the continuously horizontal house, therefore natural light projects horizontally through the building (Bertoni, 2002).

Minimalism in architecture has not always been used in a favorable sense, and even today it may be the cause of some confusion and ambiguity. The problem comes from the word's use in defining a creative current, school or trend when in fact it refers to an aesthetic. At the same time, this aesthetic is not chronologically well defined either and, moreover, interacts with different disciplines. This explains why we find minimalist buildings in periods very far apart from each other and in architects as different as Tadao Ando, Eduardo Souto de Moura, Jacques Herzog & Pierre de Meuron or Luis Barragán, among others. At this part of the chapter, the research tried to inquire into the origins of the term minimalism and in how the minimalism phenomenon played out in other fields like art, painting and sculpture. Minimalism in architecture define the result of the use of pure and simple lines, the reduction of language elements and, as far as architecture is concerned, the investigation of the treatment of space and of building possibilities.

2.11 Practical Review of Minimalist Architecture in the Islamic World

The last decades witnessed the resurgence of a historicist movement in architecture in the Islamic world that was influenced by contemporary architectural thinking in the West and fervent searches for cultural identities in the recently formed nation-states. The manifestations of this movement range from the romantic approach to historical precedents, pioneered by the late architect Hasan Fathy, to the free, and often arbitrary, usage of forms detached from their historical and geographic contexts, as exemplified by the high-quality works of Abd al Wahid al Wakil and Basil al Bayati, to the rational, abstracted, and at times minimalist, projects of architects trained in the modern tradition who applied logical and deductive methods to their dealing with history, to the scientific historicism whose proponents classify, analyze, and re-interpret historical examples to justify their uses (mit.edu, 2010).

In the field of architecture, the term minimalism was used, at times with caution and at others with determination, to connote the works of architects from profoundly different origins and cultural backgrounds, who had based their own work on a reduction in expressive media, a rediscovery of the value of empty space and a radical elimination of everything that does not coincide with a programme, also with minimalist design overtones, of extreme simplicity and formal cleanliness. 'Simplicity' at this region of the world did not mean 'Plainness'; it meant that every feature of his design would become a harmonious element in the harmonious whole. The inter-relationships in compositions were complete and nothing was superfluous. But this did not depend on elimination, it could mean elaboration too (Nanda, 1999).

This part is for case studies of contemporary buildings in three developing Muslim countries which are examples of using minimalist principles. A practical review of those identified principles of minimalist architecture with a try to link them with some other principles abstracted from studies of existing buildings. Each of the three buildings is tested within the framework for minimalist architecture which was set out at the previous part of chapter 2.

- **Buildings Selection Method**

The selection method for the following projects could be summarized as Peter Zumthor once said, "It is better not to talk of style but of a particular approach, a specific conscientiousness, in finding the solution to a task." The three buildings demonstrate the extent to which it is possible to achieve simple architecture, whilst highlighting the benefits of doing so. Data, drawings, photographs and commentaries on the buildings and their architects are collected from published material. These are then analyzed against the framework for minimal buildings in order to establish how simple the buildings really are in all aspects of design and construction.

The following are works of three architects that reveals common elements and at the same time, radical differences. The three building case studies are: Sherefudin's White Mosque, Villa Anbar, Work and Consultation Space for a Psychologist.

A. Sherefudin's White Mosque, Bosnia, 1980

The mosque, an emblematic building in Islam, while theoretically requiring nothing more than marking the direction of prayer, has developed a number of distinctive architectural forms. Local building traditions and differing social and cultural contexts have influenced the diversity of mosque architectures and methods in which mosques have been built. The very first mosque was in Mecca, and defined as the area surrounding the Kaaba, the most holy structure in Islam. With the passage of time, mosques became more complex and the first minaret, a tower from which calls to prayer were made, probably came in 703 AD, in Kairouan, Tunisia. The minaret, which was absent from early mosques, was probably inspired by the influence of religious buildings in Syria. A minaret is both functional and an embellishment to a mosque. The design of mosques changed from being very simple to the complex structures we see today in the comparatively short period of years. The shapes of mosques were often based on a mixture of the architectural shapes of conquered territories and the original simple patterns.

- **Project Description**

The mosque is located in Visoko, Bosnia. It is of great architectural importance to the town and area. The mosque's architect was Zlatko Ugljen; the craftsman was Ismet Imamović, while the contractor was Zvijezda from Visoko. First construction was completed in 1477, but it was completely reconstructed and finished in 1980. The mosque serves as a religious and intellectual centre for its community. Its most notable award came in 1983, when it was awarded the Aga Khan Award for Architecture. The jury commended the mosque for its boldness, creativity and brilliance, as well as its originality and innovation (AKAA, 1983).

- **Plan and Structure**

Its geometrically simple plan encloses a complex, slope-ceiling, skylight volume, pure, abstract, sparsely ornamented and painted white (Fig. 2.18). The archetypal Bosnian mosque has a simple square plan crowned by a cupola and entered by means of a small porch. The White Mosque's plan conforms to the archetype, but its roof is a freely deformed quarter of a cupola, pierced by five skylights, themselves composed of segments of quarter cupolas. The effect is one of confrontation between the elementary plan and the sophisticated hierarchy of roof cones.

The principal symbolic elements, mihrab, minbar, minaret and fountains, have a fresh folk art character subtly enhanced by the avant-garde geometries of their setting. Zlatko Ugljen has also been commended for "masterfully assimilating modern influences, especially Le Corbusier's Ronchamp Cathedral, and traditional Ottoman forms and elements".

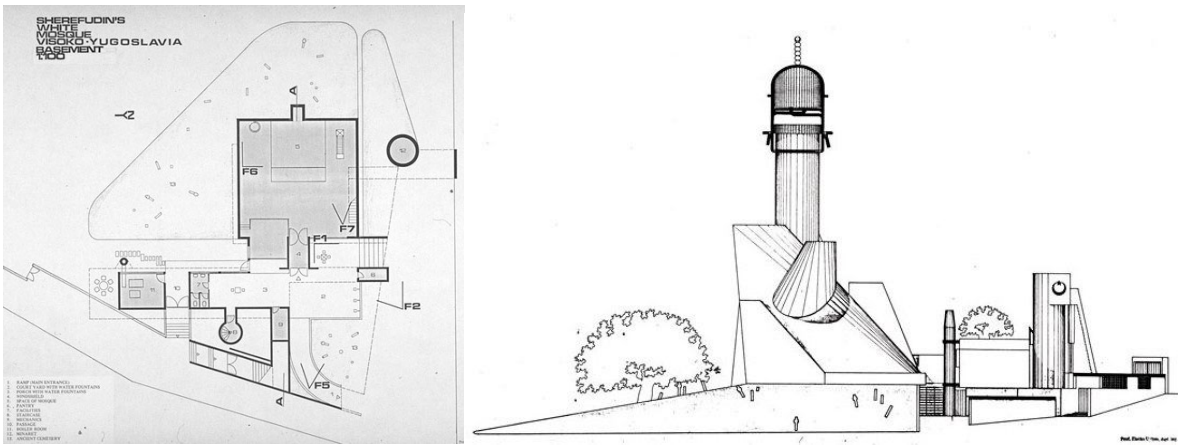

Figure 2.18: White Mosque's simple plan and sophisticated hierarchy of roof cones. Source: AKAA, 1983.

The mosque comprises five functional areas: Access space and first courtyard, mosque proper, annex building, graveyard and minarets. The central space of the mosque is designed both for praying and other religious activities such as lectures and discussions. The indoor area for praying is an annex building. The annex consists of a small auditorium and an office. Traditionally, in Bosnian mosques, graveyards act as a buffer between mosque and other buildings, but in this case the graveyard is isolated. Architect Zlatko Ugljen used the traditional layout of Bosnian mosques which consist of a courtyard leading to a square praying area, over which rises a cupola. The difference is in an unusual arrangement of this concept, where large glass panels make this mosque even better integrated with the rest of the building. The five roof windows symbolize five core principles of Islam, but also shafts light on key areas of the interior. The southeast facade of the cupola is faced toward the Kaaba. Fountains, pulpit and other decorative elements are simple, just like the calligraphy in the interior which is simple and readable. Both the interior and exterior of the mosque are painted white, while the beige colour was used for the floor, and green for a few metallic elements.

- **Materials Used**

Building materials were plastered concrete for walls and cupola, white mortar for the inner walls (Fig. 2.19), a combination of pine wood and white mortar for surfaces of many interior elements, local travertine tiles for exterior paths and courtyard paving, and iron tubes for minarets, while the floors inside the mosque are covered with green carpet (AKAA, 1983).

Figure 2.19: White Mosque's interior (a) and exterior (b). Source: AKAA, 1983.

- **Minimalism in this Project**

- The simplicity of the elementary forms which consists of rectangles and cylinders.
- The unity is reflected in the choice of one basic colour which is white.
- Illumination of interior spaces through natural light.
- Using industrial materials in decorating of features and recognizable objects.
- The presence of the gravestones.

B. Villa Anbar, Saudi Arabia, 1992

This building is an essay in the stripped aesthetic of Arabic vernacular and early Modernism. It is also a critical exploration of the complex social and power relationship encoded within the layout of a Saudi house. The Villa Anbar is a fairly small Saudi residence, executed under a tight budget, located in a middle class neighborhood. It is 300 m2 of built area and occupies a 510-m2 site. It is one storey high and has a tiny courtyard that pierces the centre, dividing the house into two sections; the front is for daytime use and receiving guests, the rear part is for sleeping and repose (Barber, 1996).

- **Formal Aspects and Functional Assessment**

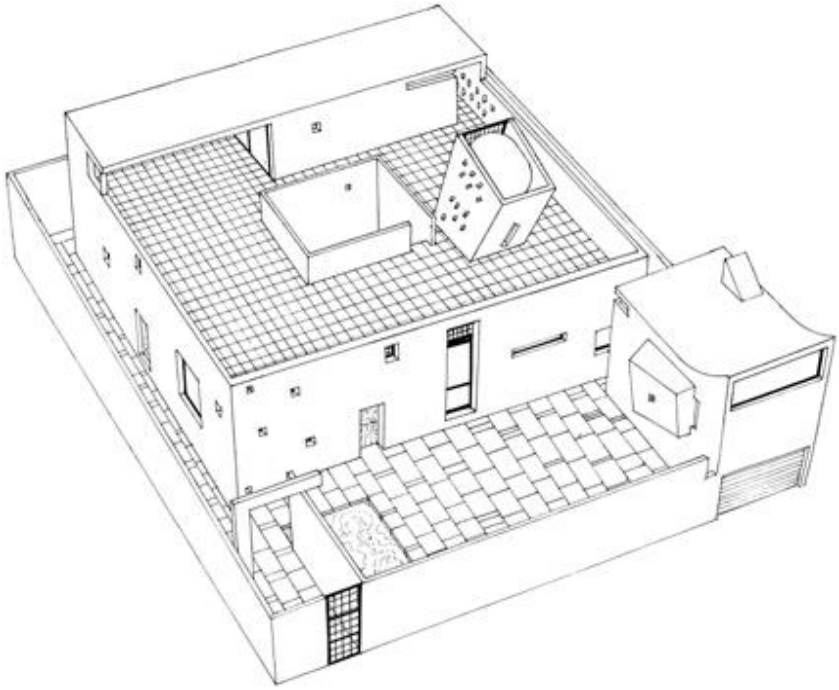

Figure 2.20: Villa Anbar's axonometric. Source: Barber, 2008.

The project is rectangular on all sides (Fig. 2.20). The plan of the house is rectangular with a small courtyard in the middle and a single frontage on the street from the west side.

The house consists of two reception rooms, a kitchen, two bathrooms, two water closets, three bedrooms, and a maid's room with another kitchen on the roof terrace. There is a driver's room located on top of the garage that overlooks a swimming pool / waterfall located in the front yard. The courtyard illuminates corridors inside the house on three of its four sides. The remaining side directly faces the reception hall. Courtyard openings are small and appear to be scattered informally along the façades. The house can be entered from two sides. The main entrance is from the West, overlooking a garden and the street. The first room one enters is a reception hall, the largest space of the building. From this space one can proceed to the dining room, or walk through two corridors, which flank a small courtyard.

The facades of the villa are simple with openings that vary in size, shape and level. The reinvention of the Arabian house starts at the entrance. A gate gives a partial view into the courtyard, but a wall to the right prevents the gaze penetrating any further. The threshold is defined by a lintel gateway which slips over the top of the occluding wall. The entrance is at once defined and the denied, as something else beyond is hinted at. The lintel serves a double function, taking water to the swimming pool on the other side of the wall.

The sound of water brings the presence of the family at their most private and vulnerable (unclothed and at play) to the most public setting. Through the manipulation of simple elements, wall, water and lintel, a charged scene is established in which the family is neither completely shut off nor completely revealed.

Figure 2.21: Simple and white facades of the villa. Source: Barber, 2008.

The order and containment of the lower courtyard is contrasted with the freedom of the roof garden. The authority of the nearby mosque is put into context through the contrast of its minaret with the tilting block on the roof of the villa-the symbolic stability of the one juxtaposed with the playful strangeness of the other. Interiors are simple and filled with natural light. Only vases are placed inside small niches in the walls (Fig. 2.22).

Figure 2.22: Interior of the villa filled with natural light. Source: Barber, 2008.

These small formal devices (with their larger social implications) are executed with a precision that reminds one of the villas of Adolf Loos. The same tensions are set up here as one finds in the Villas Muller and Moller. It is known that Loos made continual adjustments to his buildings when on site. The same is true of the Villa Anbar. The drawings set the general structure, but the fine tuning and precise control was achieved by Barber's continual presence on site during construction when he was able to manipulate relationships which are impossible to accurately predict (or now read) from the drawings alone (Barber, 1996).

- **Project's Minimalism**

The success of the Villa Anbar is that it acts as a critique of the place in which it is conceived, without resorting to rhetorical or symbolic gestures, it works subliminally rather than obviously. At this level it is highly architectural, affecting the perception and inhabitation of the building through the deployment of space, light, and views so that one is made constantly aware of things that might otherwise be taken for granted. Clients' demands, cost constraints, contractual procedures, and technical problems, all these aspects compound to allow architects to avoid confronting the political and social dimensions in which their buildings will be situated through:

- Executed under a tight budget.
- Architecture is reduced to pure form (aesthetics) and pure technique.
- The project is rectangular on all sides and the plan of the house is rectangular.
- The level of technology is a standard issue.
- The choice of material is within the limited Saudi building budget.
- White walls and pure light.
- Using some elements which serve a double function.

C. Work and Consultation Space for a Psychologist, Jordan, 2001

Architecture at this part of the world is just as alluring and mystifying. It is strongly influenced by old calligraphy and arabesque, or the repletion of forms and patterns. Just like the whole world, the Middle East world has also caught on minimalist bug, but still maintains the Middle Eastern vibe we are all familiar with. The main building material is concrete which is made from rocks, sand, water and processed limestone. Concrete doesn't grab the imagination and create a call to action. It is hard, gray and boring when compared with the face of a desperate little child. The first thought that comes to mind when trying to analyze this project is its modesty. It is a renovation of a small (less than 60 square meter in addition to a 20 square meter open forecourt) nondescript portion of a residential structure that was carried out with the relatively tight budget of around 11,000 Jordanian Dinars (15,500 USD).

Hiyari explores the concrete buildings of the less affluent sections of eastern Amman for inspiration. To Hiyari, eastern Amman is the core of Amman. This is where three-quarters of the city's population live. Moreover, eastern Amman (Fig. 2.23), with its compact urban fabric and vibrant pedestrian life, is the urban Amman, while the more sparsely occupied and automobile dominated western Amman is the suburban Amman. However, eastern Amman remains absent from the consciousness of the city's architectural community.

Figure 2.23: Eastern Amman. Source: CSBE, 2002.

- **Treatment of the Exterior**

This project is primarily an interior one. Exterior interventions therefore are relatively limited. Hiyari re-plasters the exterior façades with a roughly textured layer of concrete that is mixed with steel powder. The powder is intended to rust, and the resulting rough texture of the concrete articulated by the brownish speckles of rusted steel provides for a calculated harshness that well tolerates the process of weathering (Fig. 2.24).

A standard feature of many houses in Amman consists of protective iron grills that cover the windows of the lower floors of buildings. These have come to serve both utilitarian and aesthetic purposes. They provide security against theft, but they also serve as decorative elements that incorporate various patterns, ranging from simple vertical or horizontal strips to ornate curving designs. This project has one ground-floor window facing the street, and Hiyari provides it with a protective iron grill. Hiyari has approached this commonplace element in a most uncommon manner.

Figure 2.24: Facades with a roughly textured layer of concrete mixed with steel powder. Source: CSBE, 2002.

The grill (Fig. 2.25), which is arranged as sun breaking panels, was left to rust before a protective sealant was applied to it. In other words, rather than attempting to resist the oxidization process, which in many cases is an inevitable result of weathering, poor craftsmanship, or poor maintenance, Hiyari accepts it and even develops an aesthetic statement out of it. The end result consists of interesting textures and colours that incorporate various shades of brown.

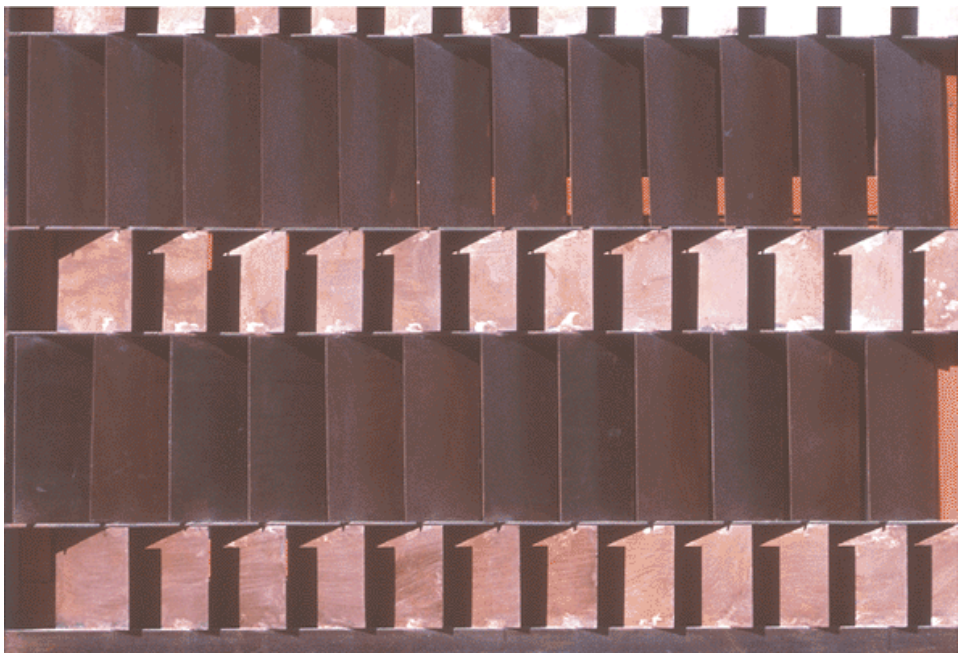

Figure 2.25: A protective iron grill with textures and colour shades of brown. Source: CSBE, 2002.

- **Treatment of the Interior**

The treatment of the exterior elevation described above is continued in the forecourt. Its walls are covered with rough concrete plastering mixed with steel powder. The openings of the structure facing the forecourt are articulated with sliding grills consisting of brise-soleil panels. In addition, Hiyari introduces deep brown wooden frames for the windows. The floor of the courtyard is paved with closely spaced pebbles, giving the floor an undulating smooth texture that contrasts with the rough texture of the walls. Two preexisting lemon trees are incorporated within the design of the forecourt. These provide a link with the structure's past, and also introduce elements from nature into the otherwise manmade space of the forecourt.

The ground floor consists of a kitchen, bathroom, and a work and consultation room. Each of the spaces provides a unique experience in terms of spatial qualities, manipulation of light, and use of materials and of textures.

Every interior detail seems to reflect the tremendous care and creativity applied to this project. In the case of the floor, some of the original decorative terrazzo tiles were preserved, but the rest of the floor was redone with a cement finish. The result is a delicate reminder of the 1950s that is combined with a harsher contemporary concrete surrounding. A stair leads to the upstairs room, which is intended as a contemplative space. It has a bed that is a mattress placed on top of a concrete platform, which also functions as a storage box. The space also incorporates built-in shelves made of concrete.

Figure 2.26: The bed at the upstairs room. Source: CSBE, 2002.

Hiyari mentions that this project was designed around the "possible rapport between architecture and self discovery, and the question of how this space can facilitate such a process." This definitely is one theme that this design addresses.

However, it goes much beyond that, and provides a powerful statement about the state of contemporary architecture within the context of a developing country such as Jordan. Much of the debate about this architecture remains bogged down within the dichotomy of "modernity vs. tradition." This design, in contrast, transcends this debate to create its own modernity and plant the seeds for a new tradition.

Architect Hiyari, has decided to accept the present realities and constraints of the existing built environment and to work with them. He examines the crude concrete boxes of cities and develops them to reach a higher realm of architectural production. In other words, he proposes turning the tables and letting the highbrow learn from the lowbrow, a position that in some ways has been espoused by Robert Venturi in statements such as "Main Street is almost alright." In the case of Hiyari, ugly concrete boxes are almost "alright" (Al Asad and Khasawneh, 2012).

- **Minimalism in this Project**

Hiyari's approach is to search the margins and the marginalized for solutions. He studies what most of us view as unrefined building practices; he accepts their harshness, crudity, and imperfections; he digests their vocabularies; and he uses these structures as a springboard from which he develops a new, bold, and vital architectural aesthetic. In the final result, he creates poetry out of an uninspired utilitarian reality.

- The project was carried out with the relatively tight budget of around 11,000 Jordanian Dinars (15,500 USD).
- The project pays attention to the smallest detail, and unequivocally declares that high-quality architecture does not have to be expensive architecture. It creates effective spaces that show a masterful and dynamic manipulation of colour, light, and texture.
- Making good use of simple inexpensive common-day industrial objects is expressed in projects' spaces.
- Using some elements which serve a double function: a bed that is a mattress placed on top of a concrete platform, which also functions as a storage box.

2.12 Conclusion

After introducing minimal art and minimalist architecture, examining the previous three minimalist buildings designed by architects at those countries, where each project is informed first by its practical use, then by its natural environment, resources, and technology to define clearly articulated, visually stunning spaces. The outcome presents a profusion of images detailing the innovative synthesis of functionality, light, mass, space, and aesthetics that merge in minimalist designs.

Minimalist architecture is a great thing in today's busy world. It is simple and clean, which means that homes and buildings that are designed in this style become refuges and havens, a place where you can go to quiet your mind. Used correctly, it is warm and inviting, and far from being cold. The deceptively simple facets of minimalism investigated and the themes described in this chapter inform the framework for minimalist architecture in the Gaza Strip set out in chapter 3.

Chapter 3

Minimalism in the Gaza Strip, Palestine

3.1 Introduction

In the Gaza Strip there is another meaning of minimalism where everything has been reduced to a minimum. The Gaza Strip's access to fuel, electricity and other basic needs is not free but restricted by Israel - whose control of the Gaza Strip's theoretical borders is absolute - to levels falling far beneath the area's normal requirements (Nusseibeh, 2008). The cultural urban transformation in the Gaza Strip, changes in social structure and urban landscape from open to closed spaces, all these factors lead to form a signage for residential buildings which are gray boxes.

Concrete boxes are uncluttered by formal concepts: there was a way to build, and most buildings were done that way. Absence of concepts produced simplicity of form. Developing simple and economic buildings in the Gaza Strip is not concerned with purely visual simplicity; it is concerned with minimisation to give tectonic clarity and not minimalism as an aesthetic style. With priority given to construction, relationship to context and considered composition of forms and spaces rather than surface aesthetics, this architecture is timeless rather than fashionable (Heal, 2010).

As you walk through the neighborhoods in the Old Gaza City, you will notice the number of box-alike buildings scattered amongst the traditional old houses. Most were awful, and looked like they might have been built in the 70’s or 80’s. it is the impact of the new vernacular architecture in the city, especially in the Old City. So even though these moderish-mishaps were less appealing in comparison with old traditional buildings, they were nonethess encouraging and spread among other neighborhoods.

This chapter discusses using minimalist architecture principles for construction of buildings with domestic spaces and concentrates on a minimum cost as a source for buildings of contemporary aesthetic. Minimal architecture in the Gaza Strip is not an alternative paradigm, but is a consequence for the current situation with regard to material resources, building techniques and form making process. The chapter aims to demonstrate that it is possible, and even beneficial to use minimalist architecture in the context of contemporary construction industry.

3.2 Overview of the Gaza Strip Situation

As cities are expanding upwards, urban life of their citizens is shifting from horizontal to vertical. Urban life in the Gaza Strip had been shaped by periods of growth as well as by crises. During the 1990s, Gaza city grew taller, for many high-rise apartment buildings proliferated in the city centre and neighborhoods. In the wealthiest neighborhoods, construction was marked by vertical as well as by horizontal growth. On the other hand the Israeli blockade that has continued, relentlessly, for six years and the 2008-2009 and 2012 invasion of the Gaza Strip have resulted in a substantial deterioration of the economic, social and political infrastructures of Palestinian society. The corrosion of these essential infrastructures is worsened by the density of Gaza's population, a population residing in the most densely populated stretch of land in the world. Also, the Gaza Strip's isolation from the rest of the world because of its permanently closed borders means that Gaza's Palestinians must rely on Israel for many of their basic needs and essential services. This dependency represents another way the Israeli control the daily lives of Palestinians. According to a recent report by the United Nations, school hours in the Gaza Strip are often shortened because of frequent blackouts and over-crowded classes, resulting in lowered education standards. This, coupled with psychological trauma and a lack of healthcare professionals equipped with the training necessary to treat patients and other issues, has devastating ramifications (Qwaider, 2012).

Locked into the Gaza Strip, all of the above mentioned problems provide fertile ground for a prolonged humanitarian crisis. The Strip has passed through many political and economical periods in the last years; this has affected the construction and building process.

- **Location**

The Gaza Strip (Fig. 3.1), Palestine, is a narrow land area located in the South-eastern Mediterranean Sea, with a length of about 41 km and a width ranging from 6 to 12 km. At mid 2012 there were approximately 1.64 million inhabitants living in the Strip according to the Palestinian Central Bureau of Statistics (PCBS) in an area comprising 360 km2, which makes it one of the most densely populated areas in the world.

The Gaza Strip is linked to the outside world through five border crossings; four with Israel and one with Egypt. All materials and goods required for the people in the Gaza Strip are officially to enter through the Israeli border crossings, whereas the Egyptian crossing is only for persons' movement. Access to the Mediterranean Sea is limited to three nautical miles along the Strip coastline (ILO Gaza Strip Assessment, 2012).

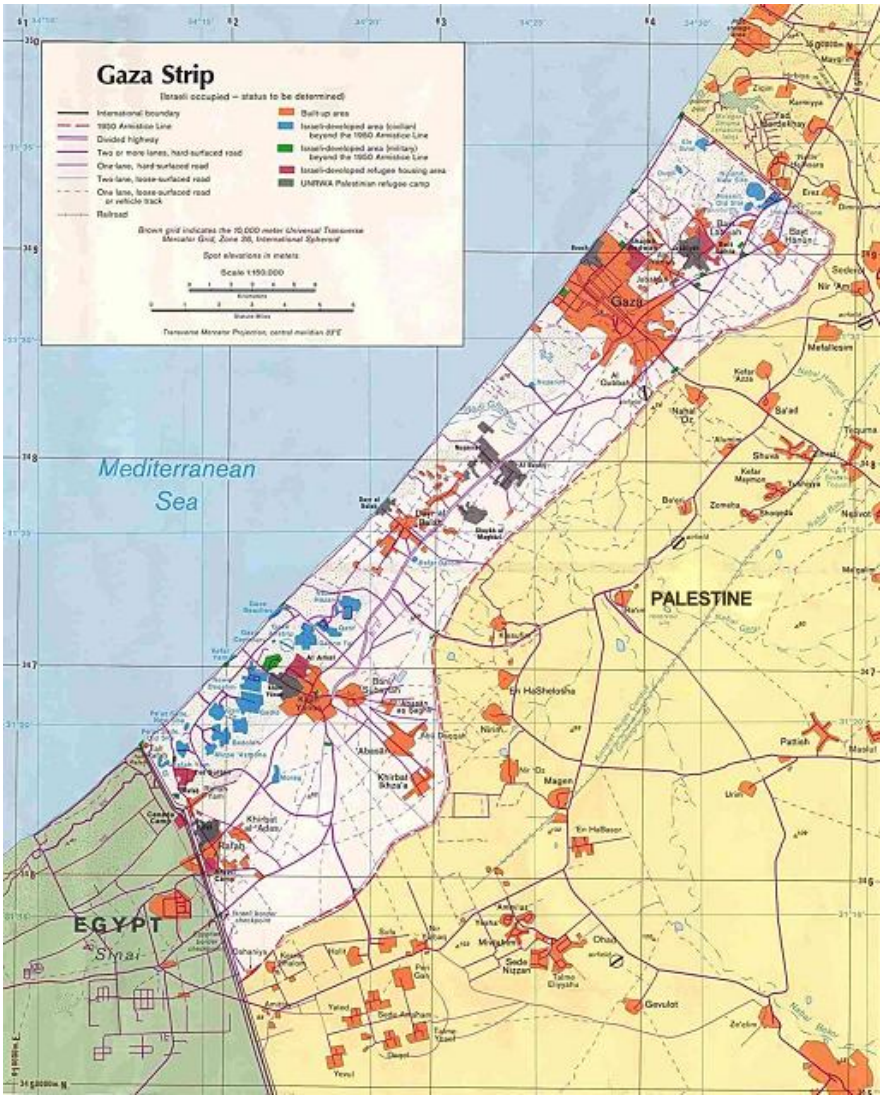

Figure 3.1: The Gaza Strip map. Source: palestinehistory.com, 2012.

- **Blockade**

Israel has imposed a strict blockade on the Gaza Strip since the Hamas Movement took power over the Strip in June 2007. The blockade included the closure of all crossings that link the Strip with the occupied Palestinian territories (oPt), preventing the movement of people and the entry of goods and materials, with the exception of some basic humanitarian necessities. It has resulted in a severe deterioration in the social and economic situation in the Gaza Strip. The Strip has endured difficult circumstances for several years. One of these circumstances is low income and a high rate of unemployment as well as the siege which prohibits the entry of many essential items into the Strip. One of these essential items is construction materials which exacerbates the difficult conditions Palestinians face.

The small amounts of construction materials which are available in the local market make prices of any reconstruction extremely high and unaffordable by many particularly poor families. What makes this situation harder is the Cast Lead military operation which resulted in destruction of thousands of civilian homes, businesses and public buildings both completely, severely or partially so homes and schools cannot be repaired due to the ban on the entry of construction materials (Humanitarian Practice Network, 2009).

- **Military Operations on the Gaza Strip**

On December 27th 2008 Israel launched a military assault on the Gaza Strip known as "Al-Furqan" Battle (Cast Lead Operation) that lasted for 22 consecutive days. About 1,400 people were killed and more than five thousands wounded, many of which were civilians. This operation had a destructive effect on all aspects of life where large areas of the Gaza Strip had been razed to the ground, leaving many thousands homeless and contributed considerably to worsen already deteriorated economic and social conditions. The widespread destruction to homes, infrastructure and productive assets during the offensive has further deepened poverty and undermined the chances of economic recovery, if and when conditions improve. The infrastructure was also significantly damaged, as a result of the continuous attack during the operation, more than 4,100 buildings were completely destroyed while more than 17,000 houses, governmental and public buildings were partially damaged (Amnesty International, 2009).

Another conflict on November 2012 has had a devastating impact on the people of the Gaza Strip. With 163 killed, 1,200 injured, thousands displaced and significant damage to infrastructure over a period of eight days. A number of 213 houses destroyed or severely damaged, and another 1,500 in need of repair (Islamic Relief, 2012).

- **Power-less Towards Minimum Humanitarian Standards**

The Israeli authorities have reduced to a bare minimum the list of items considered as humanitarian assistance. In the case of fuel and electricity, the plan of Israeli government was not to totally stop supplies of fuel and electricity but rather to set levels of supply that are much lower than what Gazans needed and allowing a minimal flow of fuel to reach the Strip, indicating that it could not go below certain limits, citing the need to abide by the minimalist moral imperative to avoid a humanitarian crisis. For this reason, this new orientation can be called "moral minimalism". There is a moral minimalism to be decried for being minimalistic, and a minimalism to be decried for being there at all (Nusseibeh, 2008).

In June 2006, however, the power plant was directly targeted by six Israeli air force missiles. The missile strike caused major damage to the plant and led to a cut of about half of the electricity supply for the residents of the Gaza Strip. Although the plant was later repaired, and some improvements in the electricity supply occurred, the harsh effects of the plant damage can still be felt, and the power generation in the plant has still not returned to its full

design capacity. Auxiliary damages caused to the electricity distribution networks in the hostilities in 2008 have further impaired the provision of electricity in Gaza. The total electricity load supplied to the Gaza Strip today is about 197 MW coming from three sources as follows: the Gaza power plant (60 MW), the Israeli electric company (120 MW) and Egypt (17 MW). The actual requirements for electricity in the Gaza strip are however estimated to be about 300 MW, which means that there is a shortage of about 100 MW (34% of the total needs). As a result of the electricity load shortage, the electric current is cut off at least eight hours per day, causing disruptions in economic activities and all aspects of live. It should further be noted that the electricity demand increases by about 10 - 15 MW annually as a result of the natural population growth and the expansion in various sectors, including the housing and domestic sectors, thus further aggravating the electricity shortage (ILO Gaza Strip Assessment, 2012).

- **Housing Needs and Difficulties**

A population locked into one of the most densely-populated places on Earth, housing shortages in the Gaza Strip continues to increase, driven by rapid natural population growth, conflict, and Israeli restrictions on importing reconstruction materials. Overcrowding is now a major issue in a context where long term and chronic overcrowding can lead to increased protection concern including increase domestic violence and general breakdown of social and culture norms. Despite all the efforts that have been done by the Ministry of Public Works and Housing and other international NGOs, approximately 79% of current housing needs are due to natural growth (and the refugees currently living in camps who need to be re-housed), with an estimated 9% due to destruction of housing by military operations (USSD, 2012).

Four years after the end of Operation Cast Lead 2008, plans to reconstruct housing damaged or demolished as a result of the conflict remain stagnant. Although the direct compensation of demolished units has been almost fulfilled but the housing needs continue to increase day by day putting pressure on already overburdened coping mechanisms and structures. In addition to the significant housing needs prior to the last military operations, and the caseload resulting from Cast Lead, over 500 additional shelters have also been damaged or destroyed by Israeli military action in the Gaza Strip in the last years; total shelter needs, including for natural population growth, are now estimated to be almost 100,000 units. The shelter sector estimates that 20% or 20,000 families of this total are in an extra vulnerable position, including some 120,000 women, men, boys and girls with particularly acute protection concerns. Another 20,000 individuals are estimated to still be displaced within the cramped and crowded Gaza Strip (USSD, 2011).

The scarcity of land in the Strip limits the alternatives for housing projects to multi story building (Fig. 3.2). The housing crisis continues to permeate and create social problems for affected families, contributing to an overall inability for Palestinians to fulfill their rights to adequate housing.

Figure 3.2: A partially damaged housing project with multi story buildings.

3.3 Construction Sector in the Gaza Strip

Israeli restrictions on the import of raw building materials into the Gaza Strip remains the major reason for the chronic lack of housing construction and reconstruction, compounded by Egypt's tight control of its border with the Strip for people and goods. Israeli procedures for importing aggregate, reinforcement steel bars and cement into Gaza are expensive and time consuming. Agencies can expect significantly increased operational costs and losses by formally applying for raw materials from Israel, funds which should be spent on beneficiaries. UNRWA estimates that in order to account for the construction supplies transferred to Gaza for its use under the current system, the Agency will pay US$1.3 million in additional cost per year (USSD, 2012).

The challenges facing the construction sector are also reflected in the employment rates. In 2005 the housing construction sector in Gaza provided direct employment for a total of 22,200 workers. Following the imposition of the blockade restricting the availability of construction materials, and the consequential decline in construction activities in Gaza, this number had dropped to only 4,800 by the end of 2009. The number of jobs in the construction sector in Gaza is slowly however increasing following a limited easing of the restrictions in the blockade since the beginning of 2010, the approval and implementation of a number of construction and infrastructure projects funded by international organizations, as well as increased activity in smuggling construction materials through the tunnels beneath the border with Egypt. In the last quarter of 2010, the recorded number of people working in the construction sector in Gaza had thus increased to 7,900, or to slightly over a third of 2005 levels (ILO Gaza Strip Assessment, 2012).

- **Availability of Construction Materials**

Most of the construction materials manufactured in the Gaza Strip (concrete blocks, floor tiling, paintings, electrical fittings, plastic pipes for water supply, pipes for sewer, and solar panels for water heating, plastic water tanks) are using row materials from different sources such as from Israel or Egypt. Some construction materials purchased from Israel and officially entered Gaza such as lime, wood, aluminum and glass. Palestinian traders are purchasing many constriction materials from Egyptian traders and sending them to Gaza via tunnels where some building materials are smuggled into Gaza, but in small volumes. There is significant increase in prices of these materials compared to its prices in Egypt or Israel (Gaza Repair Strategies, 2010).

- **Self-build Buildings**

In this dense urban area, residential buildings in the Gaza Strip are filled with a wide variety of housing and building qualities, ranging from extremely solid concrete frame constructions with all services, to squalid windowless shacks made of concrete blocks. Those buildings and the people who live in them are not all the same. Some occupants will be able to mobilize enough funds to improve their housing up to middle-class standards, while others will continue living in the most basic shelters, unable to afford any improvements at all. The main concern of so many people was to build a shelter in a very economical way regarding the form or shape.

Out of necessity and for reasons of economy, buildings in the Gaza Strip tended to be minimised to the bare essentials. People in the Gaza Strip build individual homes for all sorts of reasons, but mainly because they want to create something tailored to their family's unique requirements. Houses those are functionally efficient and providing for basic human needs of shelter and comfort using basic elements such as floor, walls, roof and hearth.

- **Uncertainty of Planning**

Single and extended family houses scattered throughout the Strip and align outer perimeter of the Gaza City. With a slap of living spaces, raised on pilotis, and a flat roof, they look like local variations of the modernistic villa. It was indeed the influence of early modernism that first arrived in the region via occupied Palestinian territories, reaching its zenith in the 1930s that filtered through to the Strip via Palestinians construction workers, to almost become the new vernacular (Weizman and Dietrich, 2000).

The lack of urban and regional planning and management of constructed properties in the Strip is a critical issue. Building licenses are granted liberally, existing land use regulations are often ignored, and the Gaza Strip lacks experience with planning in general. At the same time the population is increasing while the available land is decreasing. In order to meet the needs of its population, Gaza needs urban and regional planning to use its remaining land most effectively.

Figure 3.3: A typical self-built house in the Gaza Strip where form is dictated by needs of occupants.

Forms and spatial relationships are dictated by lifestyle and the needs of the occupants (Fig. 3.3) rather than the willful composition of a designer if there is any! The architect until late 1980s was not the only designer and building process could pass even without the architect's signature.

Building without architects is the common practice in the Gaza Strip. Good and low skilled workers are used to maintain the good quality of buildings where almost all of poor houses do not plaster their walls either from outside or inside.

3.4 Minimizing Construction and Architectural Components

Building's geometry is dictated by the materials available for construction (Fig. 3.4) and the topography of the landscape. To build in the most efficient way, materials have to be put together according to their inherent properties which include the size and shape of the materials and components. This gives an order to the architecture which is not based on conceptual ideas, but logic and rationale. Architecture is about making order in space but order and rhythm in the Gaza Strip do not determine the quality of work, although they are not easily discernible. Inspite of buildings could traditionally be constructed with few trades and local knowledge; buildings are no less poetic than any orderly planning process. Construction methods in most of the local buildings of the Gaza Strip are kept simple and minimal because skills are not technologically advanced. Each individual building deviates little from the rational arrangement and construction which results from the local climate, materials, skills and knowledge.

Figure 3.4: Hollow concrete blocks with which local work crews in the Gaza Strip are well versed.

On the other hand the client's budget; which mandated that the architects work with local builders, determined the main building component: concrete masonry units (Fig. 3.4) the only popular material with which the workers had experience. With small plans work had employed poured concrete and concrete masonry units as some of their principal building blocks. Blocks are then coated with a lime plaster wash to protect against humidity and are arranged with apertures that provide screening and filter daylight into interior spaces. Responding to the limitations of the local workforce, plans employ simple materials and construction techniques, with no interest in innovating with material but in using everyday materials in different ways.

3.5 Reinventing Minimalism in the Gaza Strip

From object to environment, the objects do not stand in an autonomous space that separates from their surroundings. They take place in what Judd describes as "actual space". They share the space in which the viewer's body is also located (Fig. 3.5). In other words: the effect of a minimalist artwork in an exhibition would vanish were no one to place it in a frame or on a pedestal. And the most impressive photographs are those that do not isolate the minimalist art works but rather show them in their surroundings (Ruby, 2003).

Figure 3.5: Similar to those of Carl Andre, a local arranged bricks at a particular manner, Beith Lahia, 2007.

Seeing reality related to art situation in the Gaza Strip, and due to limited exhibitions and galleries, little number of people is able to see paintings and sculptures. Art experts, artists and critics, had to receive education abroad in some Arab countries and Europe. Given dire economic situation in the Gaza Strip, art was limited to school education and few other activities, such annual exhibitions organized by some association of artists, owing to which the professionalism of artists began to grow (Al Asad, 2012).

People in the Gaza Strip have constantly been in the band of political instability. An ordinary citizen looked upon art only in terms of its utility, and it was thus no accident that period primarily saw the development of applied arts.

Residential buildings in the Gaza Strip may look like disorganized groups of crowded grey concrete boxes. But when you start to look beneath their outer layers and begin to examine what's going on underneath, you will find all sorts of complex and human life-support systems at work in those dwellings, in which the prominent note is resourcefulness, not hopelessness.

Palestinian women in the Gaza Strip used to prepare traditional flat bread for their families using wheat flour they got from humanitarian aid agencies. Baking bread at home saves hundreds of shekels on groceries every year. Fresh-baked bread is prepared everyday at some houses (Fig. 3.6). Similar to the basics of minimal art objects, women are laying dough with clean flat surfaces and repeating them in rows and columns. The natural light coming through the frame of aluminum windows at each empty room and actual space of the house; and their metals protection show another sign of this simplicity, order and abstraction attitude (Fig. 3.7).

Figure 3.6: Dough circles repeated in rows and columns inside a poor local house, Beith Lahia, 2007.

Figure 3.7: Horizontal and vertical lines, a typical aluminum window (a) vs. a painting (b), homage to Mondrian.

In industrial arts, beauty can be only a part of their total meaning. No matter how much of an artist a builder or a potter may be, he is necessarily controlled by the practical needs which houses and pots subserve. As applied art is the application of design and aesthetics to objects of function and everyday use. Whereas fine arts serve as intellectual stimulation to the viewer or academic sensibilities as well as produced or intended primarily for beauty; the applied arts incorporate design and creative ideals to objects of utility, such as a cup, magazine or decorative park bench. There is considerable overlap between the field and that of the decorative arts; to some extent they are alternative terms (Parker, 2007).

Aesthetics of the raw material, the relationship of objects to actual space, the effects of natural light, and producing highly reduced arrangements are available within the visual context in the Gaza Strip. Followed these basic principles, local minimal art sculptures were primarily made from industrial materials, such as concrete, wood, steel, aluminum, glass, plastic or stone. The objects, frequently reduced to very simple geometric shapes, were industrially produced, thus removing the artist's personal signature from the work. The works were also characterised by serial arrangements of a number of shapes in small and medium dimensions.

Metallic tubes and wooden stacks laid at the streets of the Gaza Strip with their circular and rectangular ends being repeated in lines horizontally and vertically. Wood pallets, stacks of plywood, rusty tubes, all this concentration on the formal aspects of the composition led to a close link with the applied arts and industrial design. While watching the blacksmith at his workshop working metal with hammer and anvil, and carpenter while working at his carpentry, they are making a piece of sculpture, keeping it simple, and keeping it cheap!

Figure 3.8: Stacks of construction materials.

Also the concept of concrete art could be seen while moving through the streets of the Strip. Solid and hollow cement blocks arranged in sculptured pattern similar to those of Judd cubes arranged in modular form. Each local worker is making his own way of arrangement according to block thickness. Many of these works convey a concept of minimal art in which the pictorial elements no longer have any meaning beyond their own selves. Other static minimalistic objects such as stacks of construction materials (Fig. 3.8) at streets of the Gaza Strip, stacks of wood and cement bricks in a unit-bar version, concrete exterior walls (Fig 3.9).

Figure 3.9: Static minimalistic objects at the streets of the Gaza Strip.

3.6 Gray Boxes and Form Making Process in the Gaza Strip

Thousands of Palestinians in the Gaza Strip live in moderate or poor shelters that have gradually become permanent settlements. The over crowded residential buildings are equipped with cement blocks for internal and external walls and flat slabs concrete roofing. On a larger scale, where there are many buildings together, type is minimised as forms are repeated across the site. For larger buildings, which have a natural tendency to be more complex than smaller buildings, it may be necessary to reduce complexity through repetition. A generic form or type can be repeated to accommodate a complex project brief. In this way the number of different forms and buildings types is minimised. The same can be said for repetitive use of building products and components in construction which come together to form a simple whole.

Designs emerge as responses to their surroundings. Not to think of the work as objects but to engage with the context rather than just making forms. This approach is evident in the plan of these buildings, which took cues from existing structure of the plot. An unthinking, uncritical attitude towards construction had developed, which can be described as a "culture of laziness". This could be an analysis of the current situation in the Gaza Strip and the form or gray boxes making process (Fig. 3.10). Hence styles and tastes vary through the ages. The sensibility of a particular structure may be grandeur, simplicity, or whimsy. There is no contemporary architecture in the Strip. There are buildings with no architectural identity, yet simple and gray.

Figure 3.10: Repetitive use of building products and components in the Gaza Strip.

Regarding the cubic forms, human by nature tend to build cubic forms. Architectural abstraction could be easily seen at the streets of the Gaza Strip (Fig. 3.11).

Figure 3.11: Architectural abstraction of cubic forms at local buildings. Source: Islamic Relief's archive, 2012.

Also the gray colour of concrete (Fig. 3.12) could be noticed while moving through the city roads. And while "gray" might be the first image that comes to mind when we think of concrete, this can add an element of style and aesthetic to buildings with raw beauty.

Figure 3.12: The gray colour of concrete.

3.7 Simple and Economic Buildings in the Gaza Strip

As it had been discussed and found earlier, majority of buildings in the Gaza Strip are simple with architecture of a minimal appearance, without any additives or decoration; but it is also minimised in its geometric form, composition and method of construction. The number of materials, components and joints used in constructing the building is also minimised.

The unstable economic situation in the Gaza Strip, shortages in construction materials, and lack of access to raw building materials as a result of the blockade, are some of the related problems prevalent in the Gaza Strip which necessitate using such approach of building design principles.

This shortage of building materials often forces families to build back lower quality homes. In order to suit local conditions of the Gaza Strip and to produce more economic and durable buildings, Palestinian urban designers and architects working in the field should seek the essence and simplicity by rediscovering the valuable qualities of simple and humble materials, capturing their raw beauty, accepting their harshness, crudity, and imperfections. Minimalist architecture is characterized by an economy with materials and a focus on building quality with considerations for ‘essences’ as light, form, detail of material, texture, space and scale, place and other related human conditions.

Adopting minimal architecture in the Gaza Strip will effectively lead to more economic, easier to build, more simple and livable residential buildings with better attitude. Applying minimalist architecture principles could be a guideline for producing elemental construction through using more humble building materials and finishes with respond to the community's needs.

The current buildings construction situation in the Gaza Strip was determined. This will be followed by presenting the best design parameters of minimal buildings in term of materials and construction methods. The following part of the thesis will investigate some existing case studies applied the minimalist principles.

3.8 Building and Working Case Studies in the Gaza Strip

Each and every society has brought an aesthetic sense to their buildings, going beyond simply providing shelter or some other function. The following are two local case studies; the selection of the first one was based on design approach and building materials used in this development which are reinforced concrete, hollow concrete blocks, aluminum and glass, plastering and different coloured paints in the main elevations.

For the second case study and in order to identify the challenges for minimal buildings in the Gaza Strip, a ‘live’ project is followed through the need assessment, design, procurement and

construction stages, providing a discussion on each of the themes of the framework. Together with the building case study, this enables conclusions to be drawn about the feasibility and potential for building more simple and economical buildings in the Gaza Strip.

A. Austrian Housing Project, Khan Younis, 1999

As the product of foreign donation policies seeking visual presence in Palestine after Oslo Agreement, developments are generally large and autonomous in their facilities. In their relative remoteness they avoid the traditional streets and replace it with neighbourhood centres for services and commerce. This housing complex is one such example.

- **Project Description**

The Austrian compound is designed by the Austrian architect Johannes Fiedler and built in collaboration with the Palestinian Ministry of Housing west of Khan Younis (a city in the southern Gaza Strip) for employees of the Palestinian National Authority.

An agreement between the Federal Chancellery of the Republic of Austria and the Palestinian National Authority signed in January 1997 stated that two Housing Projects shall be constructed in Palestine, one project in Khan Younis and another in Nablus in the West Bank. The construction of the buildings was completed in July 1998 and the infrastructure and site works in June 1999. The Beneficiaries started to move to their apartments in May 1999 (El Hindi, 2012).

- **Site Plan**

The design of public housing in the Gaza Strip, similar to the mass housing development of post war in Europe, is based on an attempt to deal with a colossal and urgent need for housing. The housing block is cluster, the most basic and direct typological translation of need into form, has been chosen as the rational solution.

The housing complex is located in a densely built-up southwestern of Khan Younis city. The compound, surrounded by scattered buildings for both citizens and refugees, defines an introvert and exclusive existence. Designed with grace and precision by local engineers and the foreign architect, this housing project is all about smooth and simple design that draws from the modern architecture principles of using simple cubical structures. The architect opted for an enclosed arrangement constructed by 10 blocks creating 3 protected courtyards (Fig. 3.13).

Open Spaces, holes or courtyards were punched into the buildings site plan to create outdoor spaces and to improve opportunities for sustainable passive strategies such as natural

ventilation and day lighting. The courtyards form an interior haven, at night providing common venue for outdoor television viewing and offering protected playground for many kids on the block by day.

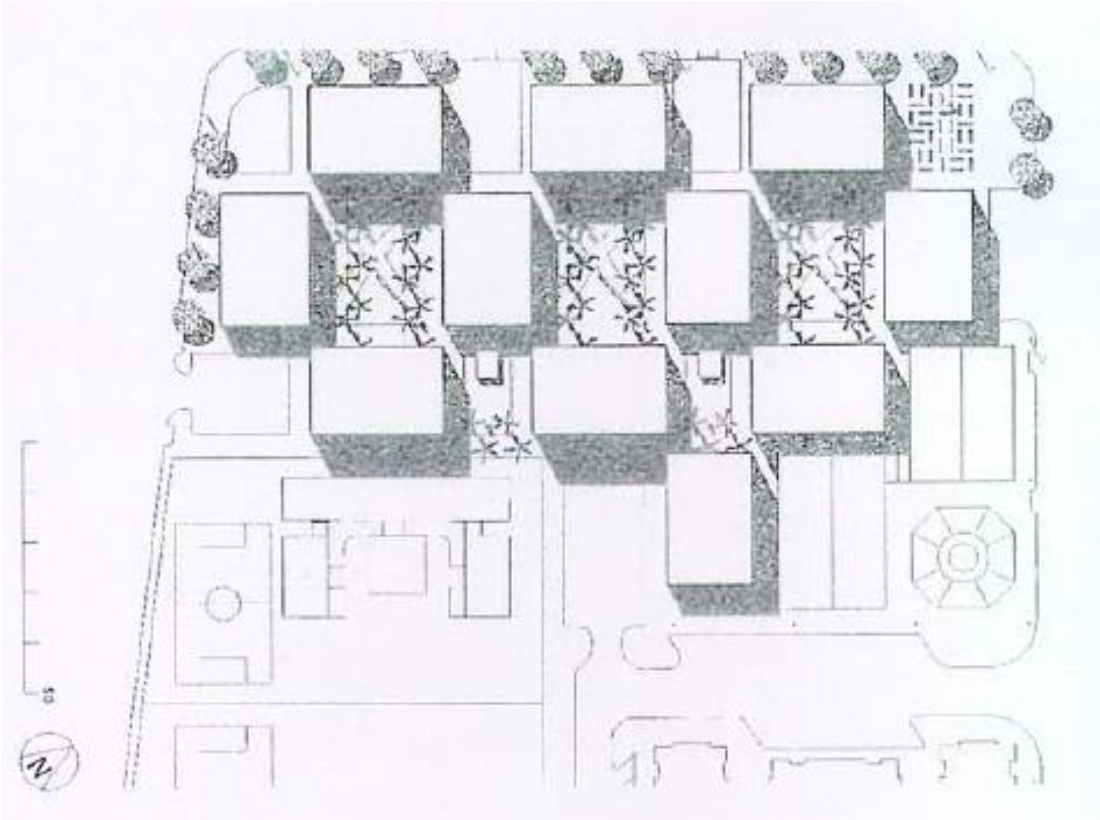

Figure 3.13: Site plan. Source: Fiedler, 1999.

The housing apartments are involving exterior spaces to recycle the existing urban structure through the creation of a "natural platform". Giving plantations on the sides of the structure, defines a modern urban front for the square allowing an exterior design space of leisure in the interior of each block, and also to redesign the passages between different squares.

Created as separate blocks that are integrated into one large unit, the flats sit a level above the streets that surround them and sports an inviting staircase that leads you inside. The interiors also have an unassuming look with flowing white walls and the complemented beauty of a dark flooring. A streamlined pool and coloured patios just add to charm further.

Following these ‘rules’ of composition, orthogonal geometry and regular dimensions invited architecture of simple, repetitive forms, constructed in a logical way. To create a legible comfortable living environment that is not intimidating for people with growing needs. Necessitated functional buildings with logic to organise complex functions and employment of simple architectural language and building geometry.

Figure 3.14: External view. Source: Fiedler, 1999.

Reflecting the pattern of plots on the adjacent allotments, the development of the plan was controlled by a grid that was applied across the site. A simple flat roof building form was repeated across the site, and the section, with its 45° roof pitch containing solar water units and water tanks system, is reminiscent of a typical child's drawing of a house.

- **Floor Plans and Facades**

Supported by a reinforced concrete structure, the five-storey residence comprises a number of four small flats at each floor. The 100 square meters flat comprises an airy open-plan living and a dining room, a minimalist kitchen, a light-flooded bathroom, as well as three bedrooms that has one window and a concrete wall with an adjacent outdoor terrace. These different activities are controlled as a separate nucleus that corresponds to different rooms. Due to the high building density – typical for most of the Gaza Strip residential areas – it is difficult to keep privacy so the architect decided to place almost all openings towards the inner courtyard. By each window the room is connected to the outside environment. Closing the curtains, all symbols as "house" are hidden, and the colour and materials that can be seen are limited, still more, the abstract space is filled calm atmosphere.

Concrete exteriors of this complex fold and overlap creating a dramatic effect reminiscent of a three-dimensional white scale cubist yet minimalist painting backlit by narrow streaks of sharp white light. Developed to echo a 'gallery-like', bare environment where the house's inhabitants are able to display the internal beauty of their houses (Fig. 3.15).

Figure 3.15: External view showing the inspiration facade. Source: Fiedler, 1999.

- **Project's Minimalism**

This minimalist housing project is an inviting oasis in Khan Younis. The project prescribes to the principles of minimalist living, but it does so in sheer style. From the facade, this contemporary style building is so simple that it is exotic. Adopting the "mashrabiya" concept, a pair of white holed walls welcomes residents and guests, overlapping to create a sense of mystery as to what's on the other side. Behind its unadorned exterior, minimalist interiors are played up with high ceilings, open spaces and the interplay of light and shadow. With no lifts for the five storey building, the fundamental is distrust of the mechanical elevator system.

The houses are still much less the demanded number of houses to be built. The Austrian housing compound is a good example in terms of cost effectiveness, construction duration and environmental protection. The minimalist principal may be summarized as follows:

- Orthogonal building geometry and regular dimensions of the master site plan, simple repetitive forms constructed in a logical way.
- Employment of simple architectural language, smooth and simple design that draws from the modern architecture principles of using simple cubical structures.

- Fulfilling complex functions with comfortable living environment that is not intimidating for people with growing needs.
- Sustainable passive strategies such as natural ventilation and day lighting.

The previous building case study described above only present the finished buildings and do not describe the processes by which they were delivered. Difficulties that the architects faced in achieving to build simple architecture are not known. To identify the challenges for minimal buildings in the Gaza Strip, a 'working live' project is followed through need assessment, design, and procurement and construction stages, providing a discussion on each of the themes of the framework. Seeing the application of theory in real design, and then taking back project's data into thesis work; the author was the project architect and coordinator for the second project and he is in depth knowledge of the processes involved in.

B. Rehabilitation of Poor Houses Project, the Gaza Strip, 2010

In remote and marginalized communities, nature of place and house plays a significant role in people's life. One of the best ways to describe furnishing a house at those places is to describe the nature of climate at that remote area: full of light and fresh air, and at the same time concise and simple. This lifestyle is reflected on those houses. Heat of fresh dry air outside is reflected in colours and basic materials used, as well as a sense of where you are: hard gray walls, brown woods, natural fabrics and rough surfaces (Fig. 3.16).

Figure 3.16: Basic materials used for fencing in rural and marginalized areas, Beit Lahia, 2010.

- **Project Description**

Islamic Relief, Palestine (IR PAL) has some projects designed to reach remote and marginalized communities, all focusing on areas that have been largely left behind. IR PAL has started a project for rehabilitation of houses in Beit Lahia and Shouka in Rafah (northern and southern of the Gaza Strip, including damaged houses and houses of poor families with social status) from its own fund, starting with conducting screening and then a detailed needs assessment for damaged houses and cost of reconstruction considering the types of damages the social status of families. 167 unit houses have been built or rehabilitated to accommodate poor displaced and affected people by the war that erupted in December 2008.

- **Need Assessment**

The needs assessment has revealed long waiting lists of damaged houses that belong to poor families with bad social status. A social worker and an architect (the researcher) visited more than 200 individual homes to assess what needs to be adapted to suit the needs of each family and then draw up plans for modifications. Field visits to the area conducting inspections of conditions of a sample of these houses (started on 15th March 2007) confirmed the serious needs of such houses for rehabilitation works at both Beith Lahia and Shouka (Fig. 3.17).

- **Site Atmosphere**

In a hot climate most of the year, a house plays an essential role in containing live in. The soil is sandy or clay, people there are notorious for staying engaged, living simply and using their brains to get the most of the limited resources they have. This way of doing things is the substrate in the quest to keep doing things at the lowest possible cost.

Figure 3.17: Child's drawing on a hot metal panel is reminiscent of a typical child's dream of a good house.

But the quality of housing are not sacrificed in the quest towards the low cost, the homeowner is doing his best for a good home for him and his children (Fig. 3.17) hence this construction is a life time. Most of these families live in scrap-built homes without access to water and sanitation services (Fig. 3.18). Local residents are using local materials, cement, hollow blocks and appropriate technology to rehabilitate or to build their homes.

Figure 3.18: Scrap-built homes without proper access to water and sanitation services.

- **Floor Plans and Facades**

The new unit provides a new experience of view and privacy while still being connected to the rest of the household. Most of the existing houses are too hot in the summer because the un-insulated sheet roofs quickly heat up the interior and poor ventilation does not allow the hot air to escape. They are also too cold in the winter because cold air comes in through the openings and hot air escapes through the roof. Roof thermal masses, insulation, glass windows, and openings designed for cross ventilation assure that the indoor temperature is comfortable.

The new building technologies also significantly increase the durability and lifespan of concrete homes. Local materials were used even more radical in order to reduce costs: foundations with a thin layer of cement and a damp proof course prevent pests from burrowing into the buildings and moisture from seeping up from the ground into the walls.

The research and planning has been carried out in the same place as the buildings were growing, a continuous dynamic and flexible process. Architectural drawings and planning in classical style didn't exist. Only basic drawings are there for the contractor and details were developed on site; concrete and sketchbook were the media of communication (Fig. 3.19).

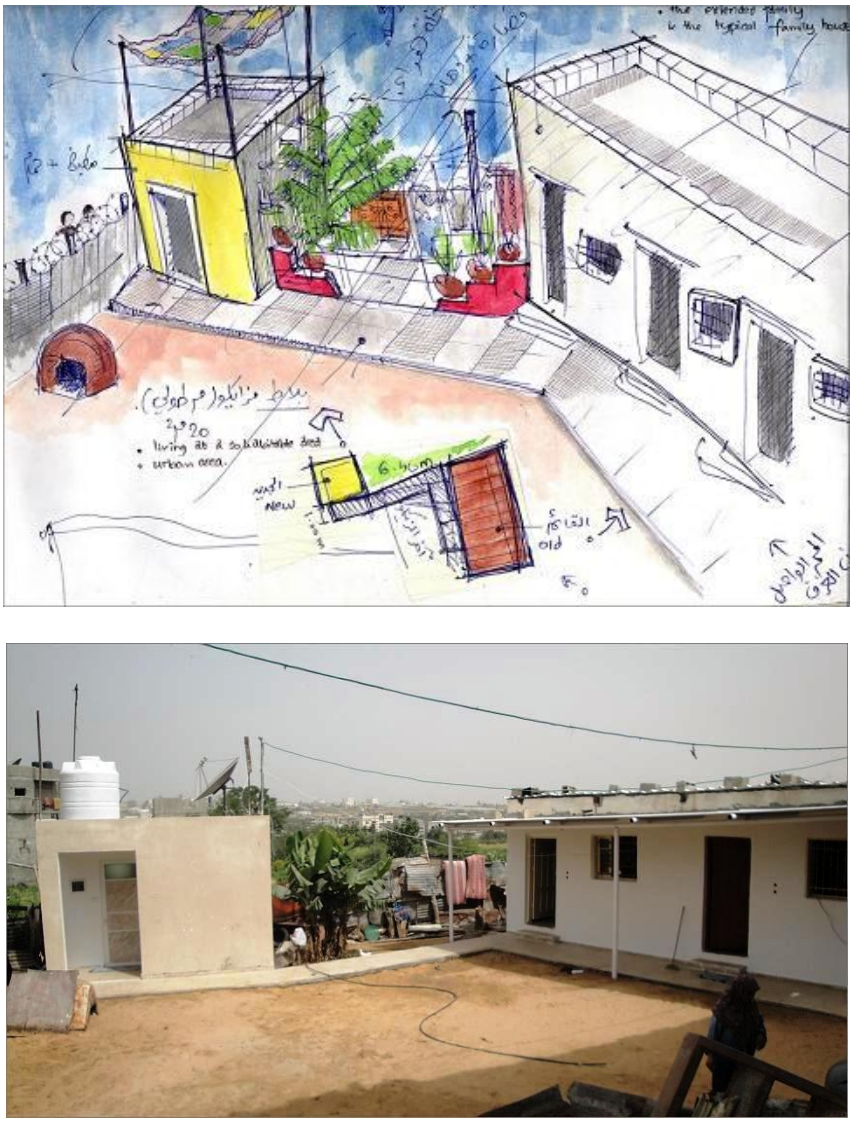

Figure 3.19: Sketch notebook and concrete were the media of communication at site, Beit Lahia, 2010.

As in traditional vernacular architecture, the kitchen and bathroom are still housed in separate structures. The new unit buildings have three options: a bedroom with a bathroom unit, a bedroom with a kitchen unit, and a kitchen bathroom unit (Fig. 3.20). However, these options double the family living area while maintaining the same building footprint. The land saved by adding the new unit at the place of existing poor shelter.

The project offers low-cost housing solutions for poor communities, also environmentally adapted, by using appropriate building material, adopting local building techniques and a participatory community approach. The idea is focused on low-income housing shortages and inhumane living conditions in 'informal' areas, rural and desert locations.

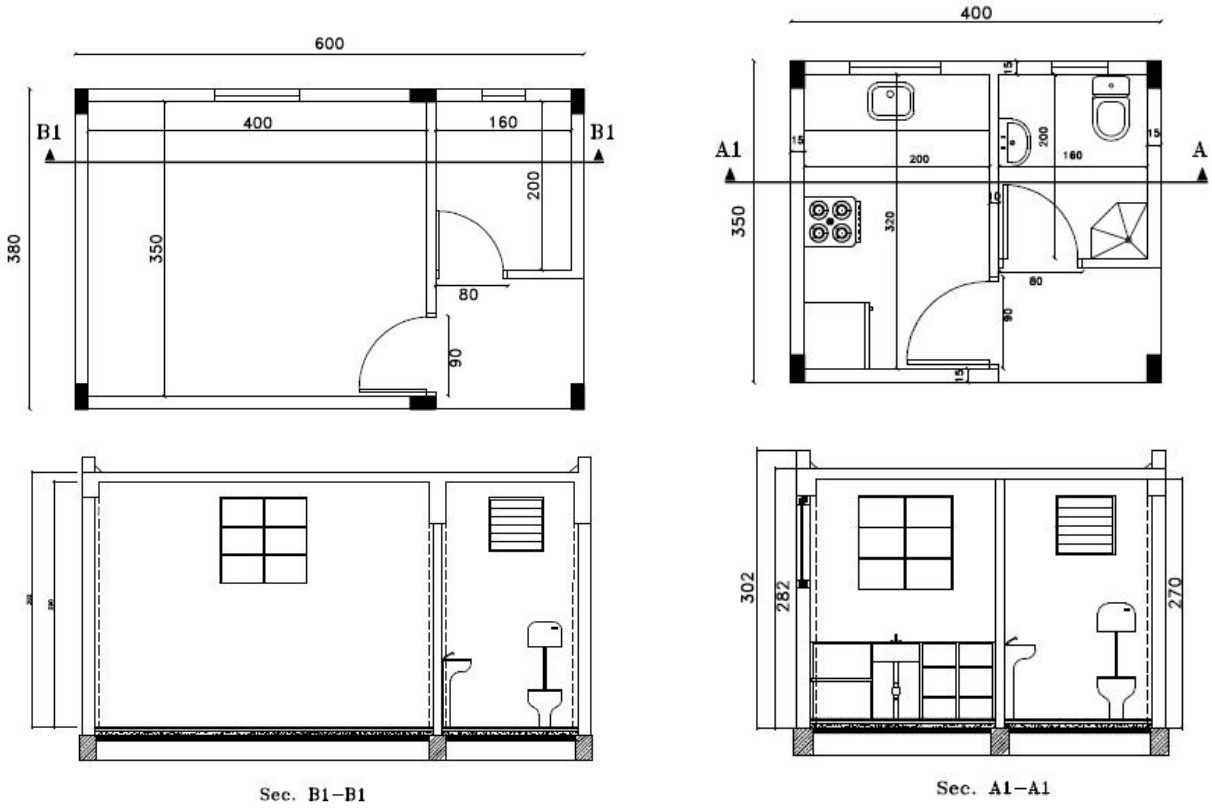

Figure 3.20: Basic architectural plans and sections - A bedroom with a bathroom unit, and a kitchen bathroom unit.

- **Project's Minimalism**

With a tight budget the project attempted to employ some ideas of minimal architecture in its design and construction. Sometimes it seems the human aspect is forgotten in typical building projects. Deadlines, budgets and systems seem to take up most of the architects' attention. The project had been built on a philosophy of architecture of necessity. IR PAL mainly completed work in the humanitarian field, but the core thinking lies in the adaption of situations. The shelters are very basic; cubes, and this can be implemented practically anywhere in the world. This reduced the need for large amounts of expensive materials and time-consuming maintenance.

Because the budget and available materials were limited, the project team was forced to concentrate on the basic needs of their clients (poor families) and create intelligent designs that

made the most of the existing resources, in some ways pushing them to new levels - with adding more rooms. The resulting architecture reflects a pureness of form and material (Fig. 3.21). In this way the concrete buildings of the Gaza Strip might be a good metaphor for architecture as a whole, where the qualities of a great architect are not flash and fancy materials, but humility, sensitivity, and courage. Perhaps instead of focusing on creating "star architecture" and loud structures, young architects should endeavor to create buildings that harmonize with the environment and serve the needs of the people.

Figure 3.21: The project offers low-cost housing solutions for poor communities.

The rehabilitation of houses project in marginalized and poor areas exceeds the imposed siege on the Strip through the use of simple materials which are available in the local markets; also it provided hundreds of jobs for unemployed workers. The estimated cost for the restoration of each residential unit is about 4400 $ (55 % less than normal cost). It just took 7 months to renovate 70 housing units for the first target group. The following (Table 3.1) is a comparison between normal and minimal cost and how much could be saved at each buildin items.

Table 3.1: Cost Estimate for a Housing Unit,
Comparison between Normal Cost and Minimal Cost

Rehabilitation of Poor Houses Project in Marginalized Areas,
the Gaza Strip.

No.	Items	Normal Cost		Minimal Cost			
		Unit price	Total	Unit price	Total	Quantity	Unit
		$	$	$	$		
1	Building cement block 15 cm walls without lintel	0	0	15	1,080	72	m2
2	Building cement block 15 cm walls with lintel	18	1,296	0	0	72	m2
3	Supply and cast reinforced concrete with thickness 10 cm for solid slab	0	0	40	1,000	25	m2
4	Supply and cast reinforced concrete with thickness 20 cm for ribbed slab	55	1,375	0	0	25	m2
5	Plastering	5	850	0	0	170	m2
6	Painting	2	340	0	0	170	m2
7	Plain concrete for ground	0	0	8	200	25	m2
8	Tiling	16	400	0	0	25	m2
9	Concrete for kitchen	0	0	200	800	4	l.m
10	Granite for kitchen	250	1,000	0	0	4	l.m
11	Electrical works	1,100	1,100	500	500	1	l.s.
12	Sanitary works	1,000	1,000	500	500	1	l.s.
13	Doors	150	450	80	240	3	No.
14	Windows	60	180	40	120	3	No.
	Total		**7,991**		**4,440**		

- **Project Sustainability**

Solutions to fundamental challenges call for an architecture where everything serves a purpose, an architecture that follows necessity. By involving the local populace actively in both the design and building of their projects, architects are able to establish a framework for mutual exchange of knowledge and skills. All materials used in projects are collected close to the sites or purchased from local merchants.

These family houses are the results of hands with the local people on a model for a sustainable, modern architecture in a dynamic process. The goal of the project is to improve the living conditions of the local population and to strengthen national identity while maintaining the current high level of sustainability with regard to home construction. This is accomplished by building three model houses for low-income families designed by young local architects and built by local craftsmen who have been trained in the modern building techniques. It is the expectation that the young architects will be able to carry their knowledge and skills to other regions of and the trained labor will be able to use their skills to build other modern homes in the region.

The project is sustainable for two main reasons: first, it is built with readily available resources: cement and aggregates. Second, it saves land for agriculture by building single-story building at the same location of the pre-existed poor shelter. Although these building materials are available, people in rural areas have an increasing desire to build homes out of cement bricks, concrete, and corrugated iron sheet. All family houses conform to both the traditional and contemporary lifestyles of rural low-income families, but have incorporated design and construction features that improve comfort, safety, durability, and privacy.

These were the old, traditional houses of our clients. In generally the houses are only used for sleeping and storing items; most other activities are done outside. Windows are often missing. Society is changing, however: the basic one-room shelters of the past are no longer sufficient to meet the people's increasing demands for privacy and their need for separate, quiet spaces where children can do their homework. The new homes have incorporated design and construction features that improve comfort, safety, durability, and privacy.

In comparison to the old houses where the inside was dark, there is lots of light and cross-ventilation in the new houses.

3.9 Conclusion

This chapter covered the current situation in the Gaza Strip with regard to minimum levels at many aspects of daily life with concentration on the construction sector. Rediscovering or reinventing the existing simplicity was driven by visual analysis to many elements surrounds our daily life. This was followed by a building and working case studies. This is considered as a preliminary evaluation attitude depends on analysis of the researcher.

Many lessons that relate to minimalist architecture can found at the vernacular architecture in the Gaza Strip. There are many useful ideas that can be abstracted from the existing simplicity and can be applied to contemporary architecture. These include using building materials responsibly, constructing in a rational and direct manner. Even with little guidance from urban designers and local architects, people in the Gaza Strip could employ passive design methods to reduce energy demand resulting in a humble simple and economic architecture.

The researcher concluded that it should not be an evaluation through external features or only formal aesthetic as usually it is the case with some architects, but that includes the evaluation aspects of both functionality, internal environment of the house, as well as by economic simplicity, savings and overall impression for simple housing with its end users. Next chapter, the researcher uses statistical manner through an assessment questionnaire to assess the simple and economic architecture in the Gaza Strip with suggestions of applying minimalist architecture principles.

Chapter 4

Evaluation of Minimalist Architecture In the Gaza Strip

4.1 Introduction

The importance of this thesis is to investigate minimum standards of buildings design and construction through using humble materials, basic to building, manufacture and construction in accordance with the design principles of minimalist architecture. The thesis aims to demonstrate that it is beneficial to construct simple buildings in the context of the current construction situation. The major concern is how a minimal language could help in the existing situation in the Gaza Strip, to get use of the current situation by trying to assemble together design and construction techniques to make a good piece of design.

The unstable economic situation and shortages in construction materials, often forces families to build back lower quality homes. The so mentioned points are some of the related problems prevalent in the Gaza Strip which necessitate using minimization principles. Minimum building standards in the Gaza Strip are applied as a result of the economic situation and can be developed from negative to a positive attitude for building design approaches.

The aim of this chapter is to evaluate the existing situation's aspects of visual appearance, functionality and the internal environment of the house, as well as the economic simplicity, savings possibilities and overall impression for minimalist housing with its end users. The researcher uses statistical manner through an assessment questionnaire to assess the potentials of minimalist architecture in the Gaza Strip.

4.2 Methodology

A questionnaire was designed and revised many times in order to get some clear outputs that will help the researcher to evaluate the current building situation. The questionnaire contains different type of questions; some questions require specific information about the dwelling. All questions allow the selection of one from more than one option (see the questionnaire in Arabic and English at Annex A). The aim of this questionnaire is to measure the attitude of people towards minimal living and minimalist architecture.

- **Respondents to the Questionnaire**

The target groups for this questionnaire are normal people from different backgrounds living in the Gaza Strip. The distribution of questionnaires was as followed:

- The first group (sample) consists of 30 questionnaires distributed among ordinary people from different scientific backgrounds and disciplines, such as: social workers, accountants and engineers, where all of them were at the same place where the researcher was working.
- The second group consists of 30 questionnaires distributed among ordinary people and employees living at residential buildings and independent houses.
- The last group consists of 40 questionnaires distributed among architects, urban designers, research students, civil engineers, mechanical and electrical engineers working at the field of construction.

Out of 100 distributed questionnaires 80 people responded fully to all of the questions.

- **Components of the Questionnaire**

The questionnaire consists of the following eight fields:

1. General information.
2. Vicinity of the house.
3. Form of housing block.
4. Environmental design for the house.
5. Assessment of the internal spaces of the house.
6. Finishing and quality of materials used.
7. The possibility of savings for the production of simple and economical architecture.
8. The general impression from a simple dwelling.

Under each field are some related points

- **Questionnaire Relationship to Research Objectives**

The main objective of this thesis is to determine the current buildings construction situation in the Gaza Strip and then to present the best design parameters of minimal buildings in term of materials and construction methods. The questionnaire and in order to achieve the goals of this research is used as a comparative analysis methodology tool.

The questionnaire will be analyzed to propose recommendations related to this issue.

The researcher would use data analysis both qualitative and quantitative data analysis methods. The data analysis will be made utilizing SPSS (Statistical Package for Social Science, version 20). The researcher would utilize the following statistical tools:

1. Kolmogorov-Smirnov test of normality.
2. Pearson correlation coefficient for validity.
3. Cronbach's Alpha for reliability statistics.
4. Frequency and descriptive analysis.
5. Parametric tests (one sample T test).

T test is used to determine if the mean of a paragraph is significantly different from a hypothesized value 3 (middle value of Likert scale). If the P-value (Sig.) is smaller than or equal to the level of significance $\alpha = 0.05$, then the mean of a paragraph is significantly different from a hypothesized value 3. The sign of the test value indicates whether the mean is significantly greater or smaller than hypothesized value 3. On the other hand, if the P-value (Sig.) is greater than the level of significance $\alpha = 0.05$, then the mean a paragraph is insignificantly different from a hypothesized value 3.

- **Data Measurement**

In order to be able to select the appropriate method of analysis, the level of measurement must be understood. For each type of measurement, there is/are an appropriate method/s that can be applied and not others. In this research, ordinal scales were used. Ordinal scale is a ranking or a rating data that normally uses integers in ascending or descending order. The numbers assigned to the important (1, 2, 3, 4, 5) do not indicate that the interval between scales are equal, nor do they indicate absolute quantities. They are merely numerical labels. Based on Likert scale we have the following:

Item	Very much	Significantly	Moderately	A low degree	Very few degree
Scale	**5**	**4**	**3**	**2**	**1**

- **Test of Normality for Each Field**

Table (4.1) shows the results for Kolmogorov-Smirnov test of normality. From Table (4.1), the P-value for each field is greater than 0.05 level of significance, then the distribution for each field is normally distributed. Consequently, parametric tests will be used to perform the statistical data analysis.

Table 4.1: Kolmogorov-Smirnov test of normality for each field of questionnaire

Field	Kolmogorov-Smirnov	
	Statistic	**P-value**
Vicinity of house's building.	0.831	0.494
Form of house building block.	1.087	0.188
Environmental design for the house's building.	0.904	0.388
Assessment of the internal spaces of the house.	1.292	0.071
Finishing and quality of materials used.	0.791	0.559
The possibility of savings for the production of simple and economical architecture.	0.953	0.324
The general impression from a simple dwelling.	1.171	0.129
All paragraphs of the questionnaire	**0.620**	**0.836**

- **Internal Validity of Questionnaire**

Validity refers to the degree to which an instrument measures what it is supposed to be measuring. Validity has a number of different aspects and assessment approaches. Statistical validity is used to evaluate instrument validity, which include internal validity and structure validity.

Internal validity of the questionnaire is the first statistical test that used to test the validity of the questionnaire. It is measured by a scouting sample, which consisted of 30 questionnaires (distributed among ordinary people from different scientific backgrounds and disciplines, such as: social workers, accountants and engineers) through measuring the correlation coefficients between each paragraph in one field and the whole filed.

Table (4.2) clarifies the correlation coefficient for each paragraph at each field and the total of the field. The P-values (Sig.) are less than 0.05, so the correlation coefficients of this field are significant at $\alpha = 0.05$, so it can be said that the paragraphs of this field are consistent and valid to be measure what it was set for.

Table 4.2: Correlation coefficient of each paragraph at each field and the total of this field

Vicinity of house's building			
No.	**Paragraph**	**Pearson Correlation Coefficient**	**P-Value (Sig.)**
1.	The form of my house fits with other buildings at surroundings streets.	.734	0.000*
2.	The size of the house fits with other buildings surrounding it.	.641	0.000*
3.	Shape of exterior building is similar with the surrounding boxes buildings.	.736	0.000*
4.	The house and its function fit with the type and use of adjacent building.	.693	0.000*
5.	Public and private areas are visually interconnected together.	.685	0.000*
Form of house building block			
No.	**Paragraph**	**Pearson Correlation Coefficient**	**P-Value (Sig.)**
1.	Housing building indicates from the outside its inner function.	.707	0.000*
2.	Entrances and exits are easily access.	.654	0.000*
3.	Parts of the building are integrated well with each other to form simple appearance.	.724	0.000*
4.	Harmony and homogeneity between the parts of the building gives visual comfort to the eye.	.809	0.000*
5.	Buildings' openings are thoughtful linked to planning of interior spaces on each floor to provide light, vision, privacy, and to prevent noise.	.670	0.000*
Environmental design for the house's building			
No.	**Paragraph**	**Pearson Correlation Coefficient**	**P-Value (Sig.)**
1.	Building is thoughtfully prompted with movement of sun, prevailing winds and natural lighting.	.605	0.000*
2.	Windows are designed to reduce sunlight penetration inside the dwelling spaces.	.634	0.000*
3.	Wideness of windows openings is enough for natural lighting of the building without the need for artificial lighting.	.595	0.000*

4.	External walls of the building are sufficient to isolate the external characteristics (heat, cold, noise) inside the housing spaces.	.563	0.000*
5.	There are solar water units on the roof of the building to heat water during daylight hours.	.609	0.000*
6.	The building is surrounded by trees to block the sun's rays and reduce glare from windows lighting.	.703	0.000*
7.	Green elements reside within the housing and spaces on the windows.	.587	0.000*
8.	There is integration between green areas and the building.	.797	0.000*
9.	The building is surrounded by the elements and green spaces.	.728	0.000*
Assessment of the internal spaces of the house			
No.	**Paragraph**	**Pearson Correlation Coefficient**	**P-Value (Sig.)**
1.	Our houses need to be simple and manifest from inside.	.649	0.000*
2.	Simplicity within the house is reflected positively on its users.	.594	0.000*
3.	The simple dwelling plan is easy to understand by visitors.	.554	0.000*
4.	There are additional decorative and architectural elements and have no need to exist within the house.	.692	0.000*
5.	House efficiency is affected by the existence of some excess stuff (during the cleaning process, arrangement, etc.).	.601	0.000*
6.	The house is considered boring due to lack of furniture inside the spaces.	.160	0.079
7.	Ceilings and walls free of decoration and hanged frames increases the visual comfort.	.570	0.000*
8.	Simple house helps its users to rest and relax after a work day.	.420	0.000*
Finishing and quality of materials used			
No.	**Paragraph**	**Pearson Correlation Coefficient**	**P-Value (Sig.)**
1.	Without any external finishing (only concrete brick).	.436	0.000*

2.	Finishing and facade of the building using natural stone.	.575	0.000*
3.	Finishing with external plastering and paint (coloured plastering, Italian plastering).	.494	0.000*
4.	Finishing with smooth external plastering only.	.588	0.000*
5.	Visual appearance of the building exterior is eye-catching.	.316	0.002*
6.	Our homes need to be simple and manifest from abroad.	.425	0.000*
The possibility of savings for the production of simple and economical architecture			
No.	Paragraph	**Pearson Correlation Coefficient**	**P-Value (Sig.)**
1.	Simplify the plan of the building and ease of implementation.	.623	0.000*
2.	Efficiency and quality of construction implementation work by craftsmen and skilled workers.	.676	0.000*
3.	The use of imported building materials.	.265	0.009*
4.	The use of building materials available at local markets.	.598	0.000*
5.	Recycling and re-use of some non-consumed materials, for example: Wood pallets to make furniture.	.689	0.000*
6.	Building's excess cost arises as a result of the implementation of unnecessary elements.	.617	0.000*
7.	Savings in electrical energy can be adopted through natural lighting of house spaces and water heating by solar water heaters.	.542	0.000*
The general impression from a simple dwelling			
No.	**Paragraph**	**Pearson Correlation Coefficient**	**P-Value (Sig.)**
1.	The design of residential units in this simple and economic method is accepted by people.	.554	0.000*
2.	The simple house meets the diverse human needs.	.602	0.000*
3.	The simple house commensurate with the economic status of its residents.	.614	0.000*
4.	The simple house helps to regulate the lives of its users.	.727	0.000*

5.	The simple house provides aesthetic values of the building at the lowest cost.	.743	0.000*

* Correlation is significant at the 0.05 level.

With regard to point 6 at under "Assessment of the internal spaces of the house": The house is considered boring due to lack of furniture inside the spaces; the correlation coefficient was low and the P-value was greater than 0.05. This point was hidden among other points at that field in order to measure the concentration given by each person while filling the questionnaire with regard to his feelings towards internal spaces of house.

With regard to point 5 under "Finishing and quality of materials used": Visual appearance of the building exterior is eye-catching; the correlation coefficient was low and the P-value nears the value of 0.05. This point explains that everyone is considering his house as an eye catching.

With regard to point 6 under "the Possibility of savings": The use of imported building materials; the correlation coefficient was low and the P-value was nears 0.05. This point shows the more trust of the public in imported materials with regard to quality and time durability.

- **Structure Validity of the Questionnaire**

Structure validity is the second statistical test that used to test the validity of the questionnaire by testing the validity of each field and the validity of the whole questionnaire. It measures the correlation coefficient between one filed and all the fields of the questionnaire that have the same level of liker scale.

Table (4.9) clarifies the correlation coefficient for each filed and the whole questionnaire. The P-values (Sig.) are less than 0.05, so the correlation coefficients of all the fields are significant at $\alpha = 0.05$, so it can be said that the fields are valid to be measured what it was set for to achieve the main aim of the study.

Table 4.3: Correlation coefficient of each field and the whole of questionnaire

No.	Field	Pearson Correlation Coefficient	P-Value (Sig.)
1.	Vicinity of house's building.	.368	0.000*
2.	Form of house building block.	.515	0.000*
3.	Environmental design for the house's building.	.597	0.000*
4.	Assessment of the internal spaces of the house.	.387	0.000*
5.	Finishing and quality of materials used.	.537	0.000*
6.	The possibility of savings for the production of building simple and economical.	.584	0.000*
7.	The general impression from a simple dwelling.	.375	0.000*

* Correlation is significant at the 0.05 level.

4.5 Reliability of the Questionnaire

The reliability of an instrument is the degree of consistency which measures the attribute; it is supposed to be measured. The less variation an instrument produces in repeated measurements of an attribute, the higher its reliability. Reliability can be equated with the stability, consistency, or dependability of a measuring tool. The test is repeated to the same sample of people on two occasions and then compares the scores obtained by computing a reliability coefficient (Polit & Hunger, 1985).

- **Cronbach's Coefficient Alpha**

This method is used to measure the reliability of the questionnaire between each field and the mean of the whole fields of the questionnaire. The normal range of Cronbach's coefficient alpha value between 0.0 and + 1.0, and the higher values reflects a higher degree of internal consistency. The Cronbach's coefficient alpha was calculated for each field of the questionnaire.

Table (4.10) shows the values of Cronbach's Alpha for each filed of the questionnaire and the entire questionnaire. For the fields, values of Cronbach's Alpha were in the range from 0.291 and 0.817. This range is considered high; the result ensures the reliability of each field of the questionnaire. Cronbach's Alpha equals 0.763 for the entire questionnaire which indicates a good reliability of the entire questionnaire.

Table 4.4: Cronbach's Alpha for each filed of the questionnaire

No.	Field	Cronbach's Alpha
1.	Vicinity of house's building	0.729
2.	Form of house building block	0.748
3.	Environmental design for the house's building	0.817
4.	Assessment of the internal spaces of the house	0.647
5.	Finishing and quality of materials used	0.291
6.	The possibility of savings for the production of building simple and economical	0.630
7.	The general impression from a simple dwelling	0.761
	All paragraphs of the questionnaire	**0.763**

The Thereby, it can be said that the researcher proved that the questionnaire was valid, reliable, and ready for distribution for the population sample.

- **Data Analysis and Discussion**

It was assured that the data provided by the respondents shall be used only for ascertaining and evaluating the aim of this thesis. After data gathering through filling out the questionnaire by the population sample (80 people from different backgrounds, identity of the respondents was kept confidential), data was then furnished and analyzed using data analysis tools. Based on the given data an analysis for each field was carried as followed:

1. General Information: Type of Dwelling and Area of Living Space

General information had been asked in order to categorize the respondents according to type of dwelling they live at: residential building, house or family house and the area of the living area.

According to the results obtained from table (4.5-a), figure 4.1-a, and due to the scarcity of land in the Gaza Strip which limits the alternatives for housing projects to multi story building, most of the respondents (46.3 %) are living at apartments at multi story residential buildings.

Table (4.5-a): Type of dwelling

Type of dwelling	Frequency	Percent %
Apartment at residential building	37	46.3
House	19	23.8
Family apartment house	24	30.0
Total	80	100.0

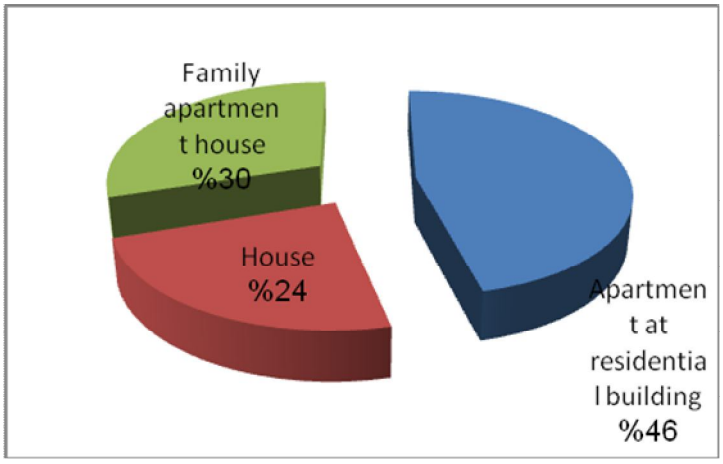

Figure (4.1-a): Proportional mean for "Type of dwelling"

According to table (4.5-b) and figure 4.1-b, majority of the respondents (50 %) are still living at living areas that exceed their real needs with a living area more than 150 square meters. Reducing the surplus areas is the suggested solution.

Table (4.5-b): Area of living space

Living space area	Frequency	Percent
Less than 100 m2	9	11.3
between 100 – 150 m2	31	38.8
150 m2 and more	40	50.0
Total	80	100.0

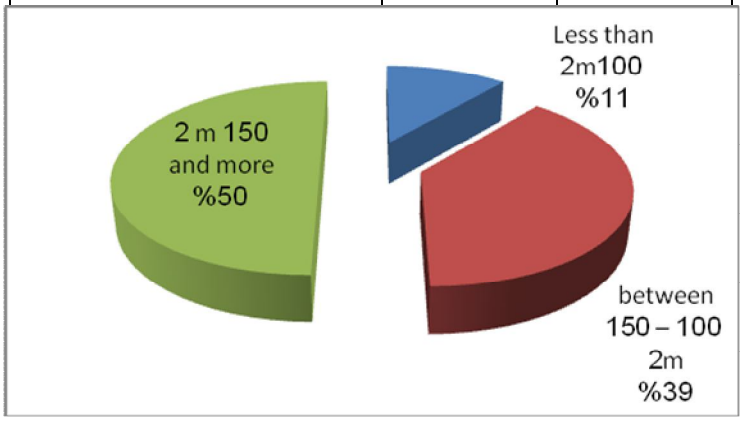

Figure 4.1-b: Proportional mean for "Area of living space"

2. Vicinity of House's Building

This field is mainly to examine the building with its surroundings in regards to visual appearance such as: form, size, shape (box like), function and spatial relation between open and closed areas.

Table (4.6) shows the following results:

The mean of paragraph #4 "The house and its function fit with the type and use of adjacent building" equals 3.91 (78.25%), Test-value = 9.18, and P-value = 0.000 which is smaller than the level of significance α = 0.05. The sign of the test is positive, so the mean of this paragraph is significantly greater than the hypothesized value 3. We conclude that the respondents agreed to this paragraph.

The mean of paragraph #5 "Public and private areas are visually interconnected together" equals 2.81 (56.20%), Test-value = -1.42, and P-value = 0.080 which is greater than the level of significance α = 0.05. Then the mean of this paragraph is insignificantly different from the hypothesized value 3. We conclude that the respondents (Do not know, neutral) to this paragraph.

The mean of the filed "Vicinity of house's building" equals 3.51 (70.13%), Test-value = 6.73, and P-value = 0.000 which is smaller than the level of significance α = 0.05. The sign of the test is positive, so the mean of this field is significantly greater than the hypothesized value 3. We conclude that the respondents agreed to field of "Vicinity of house's building".

Table (4.6): Means and Test values for "Vicinity of house's building"

Q.	Item	Mean	Proportional mean (%)	Test value	P-value (Sig.)	Rank
1.	The form of my house fits with other buildings at surroundings streets.	3.51	70.25	5.45	0.000*	4
2.	The size of the house fits with other buildings surrounding it.	3.66	73.25	6.92	0.000*	2
3.	Shape of exterior building is similar with the surrounding boxes buildings.	3.63	72.50	5.33	0.000*	3
4.	The house and its function fit with the type and use of adjacent building.	3.91	78.25	9.18	0.000*	1
5.	Public and private areas are visually interconnected together.	2.81	56.20	-1.42	0.080	5
	All paragraphs of the filed	3.51	70.13	6.73	0.000*	

* The mean is significantly different from 3.

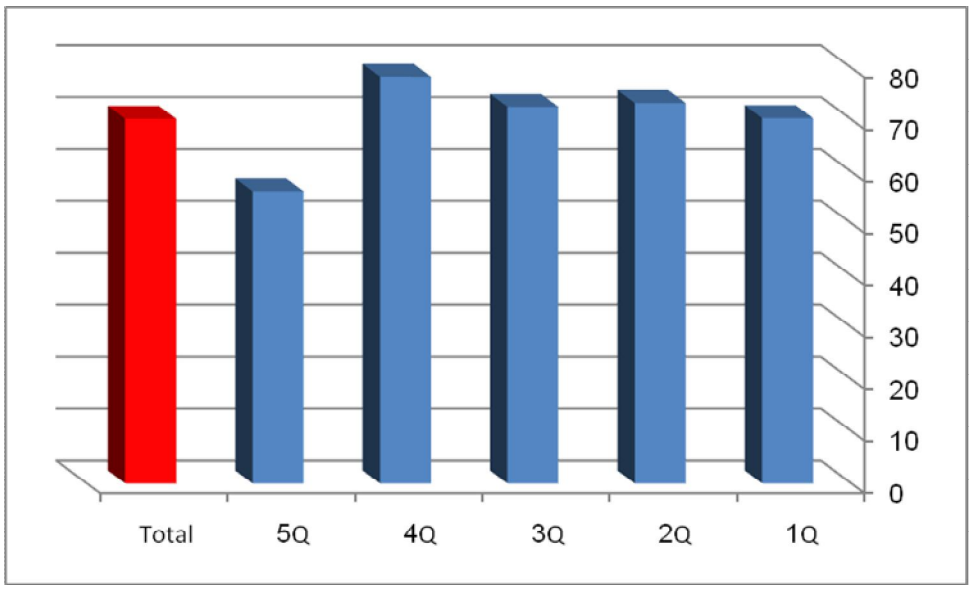

Figure 4.2: Proportional mean for "Vicinity of house's building"

According to table (4.6) and figure (4.2), majority of the respondents (72.5 %) agreed that their residential buildings are similar as a box-like shape with flat roofs. Lack of urban planning and management of constructed properties in the Strip can be noticed easily where spatial relationships are dictated by lifestyle and the needs of the occupants.

3. Form of House Building Block

This field is mainly to examine the form of building with itself related components: inner function, access, general appearance, building's visual comfort and buildings' openings.

Table (4.7) shows the following results:

The mean of paragraph #1 "Housing building indicates from the outside its inner function" equals 4.16 (83.25%), Test-value = 12.47 and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this paragraph is significantly greater than the hypothesized value 3. We conclude that the respondents agreed to this paragraph.

The mean of paragraph #5 "Buildings' openings are thoughtful linked to planning of interior spaces on each floor to provide light, vision, privacy, and to prevent noise" equals 3.30 (66.00%), Test-value = 2.42, and P-value = 0.009 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this paragraph is significantly greater than the hypothesized value 3. We conclude that the respondents agreed to this paragraph.

The mean of the filed "Form of house building block" equals 3.83 (76.50%), Test-value = 11.81, and P-value = 0.000 which is smaller than the level of significance α = 0.05. The sign of the test is positive, so the mean of this field is significantly greater than the hypothesized value 3. We conclude that the respondents agreed to field of "Form of house building block ".

Table (4.7): Means and Test values for "Form of house building block"

Q.	Item	Mean	Proportional mean (%)	Test value	P-value (Sig.)	Rank
1.	Housing building indicates from the outside its inner function.	4.16	83.25	12.47	0.000*	1
2.	Entrances and exits are easily access.	4.13	82.50	13.68	0.000*	2
3.	Parts of the building are integrated well with each other to form simple appearance.	3.85	77.00	9.73	0.000*	3
4.	Harmony and homogeneity between the parts of the building gives visual comfort to the eye.	3.69	73.75	6.67	0.000*	4
5.	Buildings' openings are thoughtful linked to planning of interior spaces on each floor to provide light, vision, privacy, and to prevent noise.	3.30	66.00	2.42	0.009*	5
	All paragraphs of the filed	3.83	76.50	11.81	0.000*	

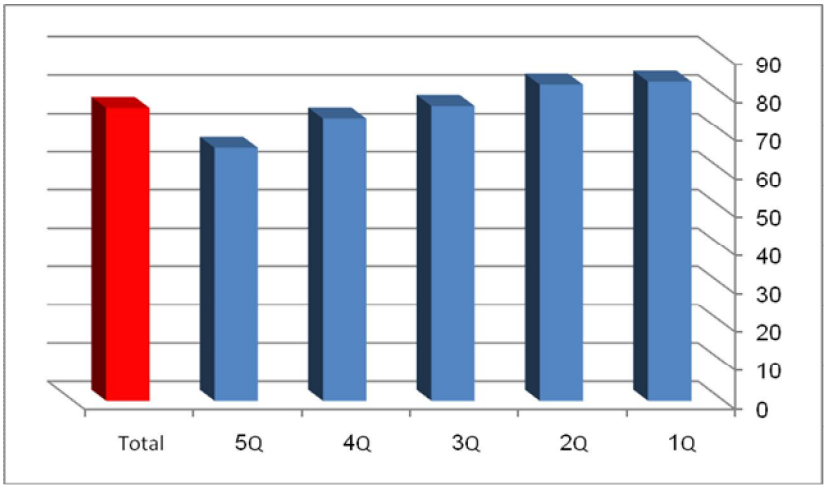

Figure 4.3: Proportional mean for "Form of house building block"

According to table (4.7) and figure (4.3), majority of residential buildings in the Gaza Strip employ a simple architectural language and building geometry (77 %), where the basic elements are clearly distinguishable, elevations are easy to read giving visual comfort (74 %) and can be understood simply. (66 %) of the respondents agreed that the ability to control natural light, vision and provide optimal privacy for interior spaces are poor due to lack of good design of their building's openings.

4. Environmental Design for the House's Building

This field is mainly to examine the environmental design related issues such as: building orientation towards sun and wind, sunlight penetration, natural lighting, isolation, heating water by using solar units and availability of green elements inside and outside the building.

Table (4.8) shows the following results:

The mean of paragraph #3 "Wideness of windows openings is enough for natural lighting of the building without the need for artificial lighting" equals 3.41 (68.25%), Test-value = 3.47, and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this paragraph is significantly greater than the hypothesized value 3. We conclude that the respondents agreed to this paragraph.

The mean of paragraph #7 "Green elements reside within the housing and spaces on the windows" equals 1.86 (37.25%), Test-value = -11.01, and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is negative, so the mean of this paragraph is significantly smaller than the hypothesized value 3. We conclude that the respondents disagree to this paragraph.

The mean of the filed "Environmental design for the house's building" equals 2.57 (51.41%), Test-value = - 5.34, and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is negative, so the mean of this field is significantly smaller than the hypothesized value 3. We conclude that the respondents disagree to field of "Environmental design for the house's building".

Table (4.8): Means and Test values for "Environmental design for the house's building"

Q.	Item	Mean	Proportional mean (%)	Test value	P-value (Sig.)	Rank
1.	Building is thoughtfully prompted with movement of sun, prevailing winds and natural lighting.	3.06	61.25	0.54	0.295	3
2.	Windows are designed to reduce sunlight penetration inside the dwelling spaces.	2.80	56.00	-1.95	0.028*	4
3.	Wideness of windows openings is enough for natural lighting of the building without the need for artificial lighting.	3.41	68.25	3.47	0.000*	1
4.	External walls of the building are sufficient to isolate the external characteristics (heat, cold, noise) inside the housing spaces.	2.75	55.00	-2.11	0.019*	5
5.	There are solar water units on the roof of the building to heat water during daylight hours.	3.16	63.29	0.90	0.186	2
6.	The building is surrounded by trees to block the sun's rays and reduce glare from windows lighting.	2.01	40.25	-8.14	0.000*	7
7.	Green elements reside within the housing and spaces on the windows.	1.86	37.25	-11.01	0.000*	9
8.	There is integration between green areas and the building.	1.94	38.75	-9.18	0.000*	8
9.	The building is surrounded by the elements and green spaces.	2.14	42.75	-6.12	0.000*	6
	All paragraphs of the filed	2.57	51.41	-5.34	0.000*	

* The mean is significantly different from 3.

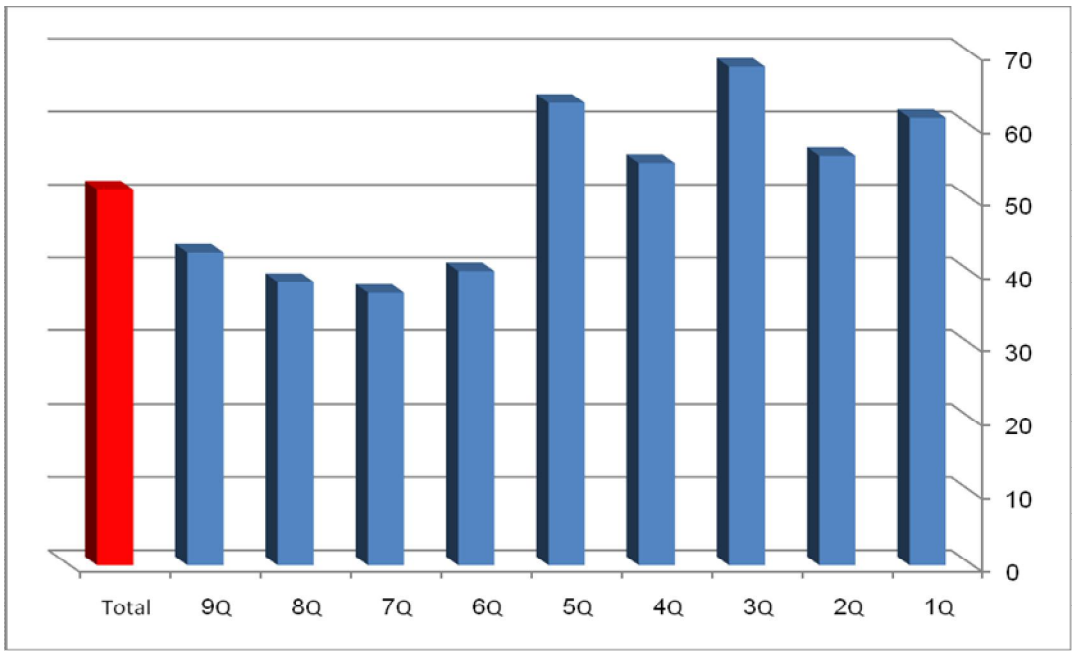

Figure 4.4: Proportional mean for "Environmental design for the house's building"

According to table (4.8) and figure (4.4), some buildings (61 %) are with good orientation toward sun and wind. (68 %) of those houses are getting enough natural lighting. Orienting the house correctly and using glass as appropriate for lighting and heat control can create a clean look with a comfortable feel. Some adjacent buildings may limit the amount of light coming in through a window and the level of light inside falls below the accepted level.

Solar water units are available for (63 %) of the roofs of the building to heat water during daylight hours which saves energy.

Environmental and climatic impacts design parameters are not fully taken into consideration for the house's building. No green elements available as so many people still considering them as aesthetics for their living space.

5. Assessment of the Internal Spaces of the House

This field is mainly to examine the quality of minimal internal spaces of the house in regards with: simplicity within the house, presence of additional decorative and architectural elements, excess stuff, furniture, visual comfort, rest and relaxation. This field is considered to be the turning point where respondents have to show their reaction towards minimalist houses.

Table (4.9) shows the following results:

The mean of paragraph #8 "Simple house helps its users to rest and relax after a work day" equals 4.03 (80.50%), Test-value = 10.35, and P-value = 0.000 which is smaller than the level of significance α = 0.05. The sign of the test is positive, so the mean of this paragraph is significantly greater than the hypothesized value 3. We conclude that the respondents agreed to this paragraph.

The mean of paragraph #4 "There are additional decorative and architectural elements and have no need to exist within the house" equals 2.75 (55.00%), Test-value = -1.76, and P-value = 0.041 which is smaller than the level of significance α = 0.05. The sign of the test is negative, so the mean of this paragraph is significantly smaller than the hypothesized value 3. We conclude that the respondents disagree to this paragraph.

The mean of the filed "Assessment of the internal spaces of the house" equals 3.49 (69.85%), Test-value = 8.60, and P-value = 0.000 which is smaller than the level of significance α = 0.05. The sign of the test is positive, so the mean of this field is significantly greater than the hypothesized value 3. We conclude that the respondents agreed to field.

Table (4.9): Means and Test values for "Assessment of the internal spaces of the house"

Q.	Item	Mean	Proportional mean (%)	Test value	P-value (Sig.)	Rank
1.	Our houses need to be simple and manifest from inside.	4.00	80.00	10.96	0.000*	3
2.	Simplicity within the house is reflected positively on its users.	4.01	80.25	10.53	0.000*	2
3.	The simple dwelling plan is easy to understand by visitors.	3.77	75.38	9.22	0.000*	4
4.	There are additional decorative and architectural elements and have no need to exist within the house.	2.75	55.00	-1.76	0.041*	8
5.	House efficiency is affected by the existence of some excess stuff (during the cleaning process, arrangement, etc.).	3.25	65.00	2.02	0.023*	6
6.	The house is considered boring due to lack of furniture inside the spaces.	2.84	56.71	-1.68	0.048*	7

7.	Ceilings and walls free of decoration and hanged frames increases the visual comfort.	3.34	66.75	2.86	0.003*	5
8.	Simple house helps its users to rest and relax after a work day.	4.03	80.50	10.35	0.000*	1
	All paragraphs of the filed	3.49	69.85	8.60	0.000*	

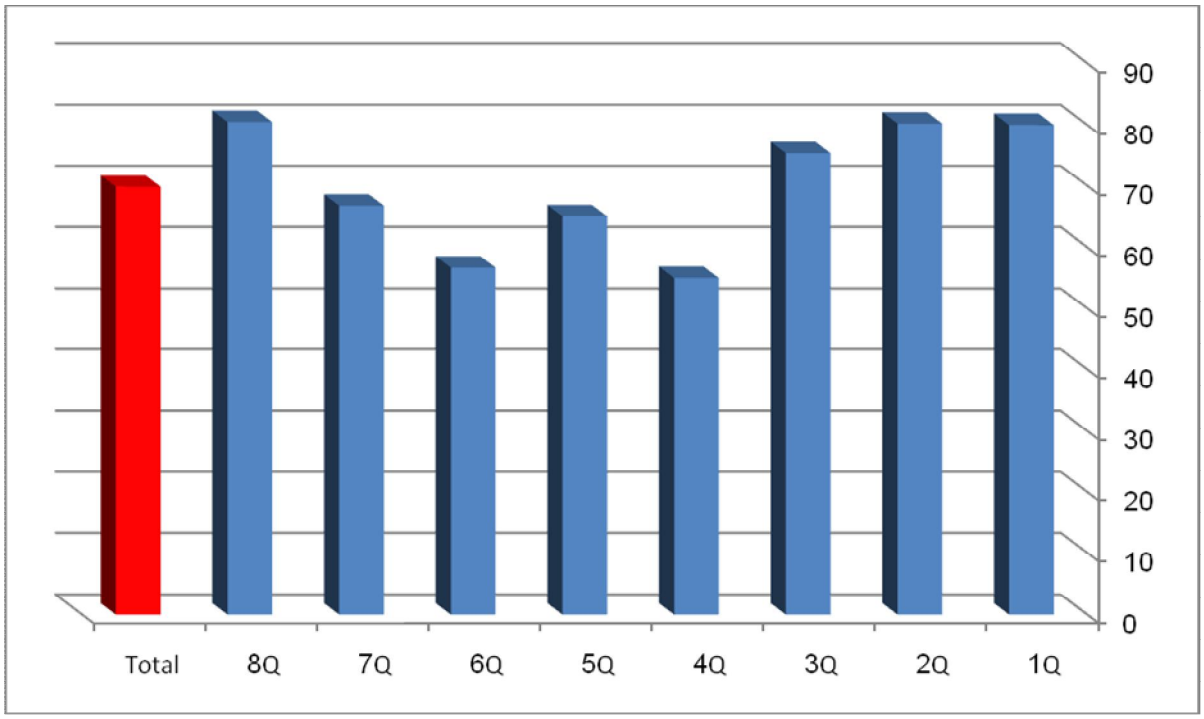

Figure 4.5: Proportional mean for "Assessment of the internal spaces of the house"

In general, most of the respondents (80.50%) believe in living at simple houses for more comfort and relaxation, where dwelling plans are easy to read and can be understood simply (75 %).

According to table (4.9) and figure 4.5, respondents agreed that there are no additional decorative or architectural elements at their house (55 %). Only the basic elements are there and the required furniture which increases the visual comfort inside their houses (67 %).

6. Finishing and Quality of Materials Used

This field is mainly to examine the possibilities of saving at exterior finishes using: only concrete blocks, plastering only, plastering and paint, natural stone. This field is misleading to some respondents since both parameters are used: economic and the aesthetics aspects.

Table (4.10) shows the following results:

The mean of paragraph #6 "Our homes need to be simple and manifest from abroad" equals 3.75 (75.00%), Test-value = 6.88, and P-value = 0.000 which is smaller than the level of significance α = 0.05. The sign of the test is positive, so the mean of this paragraph is significantly greater than the hypothesized value 3. We conclude that the respondents agreed to this paragraph.

The mean of paragraph #1 "Without any external finishing (only concrete brick)" equals 2.08 (41.54%), Test-value = - 6.44, and P-value = 0.000 which is smaller than the level of significance α = 0.05. The sign of the test is negative, so the mean of this paragraph is significantly smaller than the hypothesized value 3. We conclude that the respondents disagree to this paragraph.

The mean of the field "Finishing and quality of materials used" equals 3.02 (60.33%), Test-value = 0.26, and P-value = 0.398 which is greater than the level of significance α = 0.05. The mean of this field is insignificantly greater than the hypothesized value 3. We conclude that the respondents agreed to field of "Finishing and Quality of Materials Used".

Table (4.10): Means and Test values for "Finishing and quality of materials used"

	Item	Mean	Proportional mean (%)	Test value	P-value (Sig.)	Rank
1.	Without any external finishing (only concrete brick).	2.08	41.54	-6.44	0.000*	6
2.	Finishing and facade of the building using natural stone.	3.08	61.52	0.49	0.312	3
3.	Finishing with external plastering and paint (coloured plastering, Italian plastering).	3.51	70.25	4.29	0.000*	2
4.	Finishing with smooth external plastering only.	2.77	55.44	-1.77	0.040*	5
5.	Visual appearance of the building exterior is eye-catching.	2.83	56.50	-1.56	0.061	4
6.	Our homes need to be simple and manifest from abroad.	3.75	75.00	6.88	0.000*	1
	All paragraphs of the filed	3.02	60.33	0.26	0.398	

* The mean is significantly different from 3.

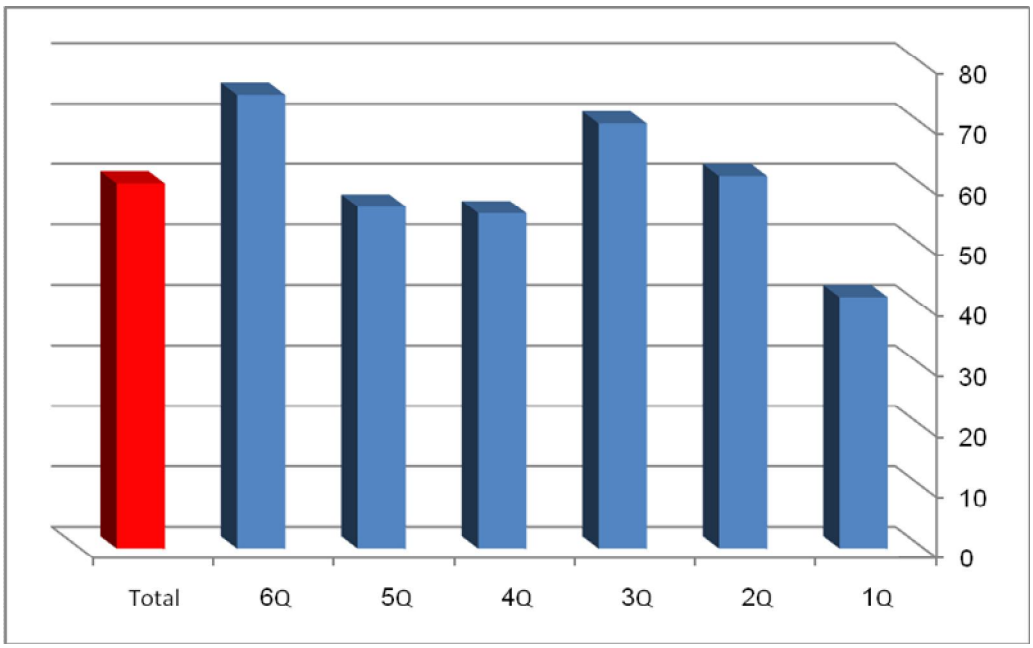

Figure 4.6: Proportional mean for "Finishing and quality of materials used"

Most of the respondents (75 %) agreed that their houses should be simple at exterior. At the same time they refused using concrete bricks only for external finishing. Many people (70.25 %) prefer using coloured plastering. Some other people (61.52 %) still prefer to use natural stone for exterior cladding which is a sign of their wealth. Some people prefer grandiose architecture.

7. The Possibility of Savings for the Production of Simple and Economical Architecture

This field is mainly to examine the possibilities of savings in order to produce more simple and economical architecture, focusing on: implementation of plans, skilled workers and materials.

Table (4.11) shows the following results:

The mean of paragraph #7 "Savings in electrical energy can be adopted through natural lighting of house spaces and water heating by solar water heaters" equals 4.38 (87.50%), Test-value = 15.66, and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this paragraph is significantly greater than the hypothesized value 3. We conclude that the respondents agreed to this paragraph.

The mean of paragraph #3 "The use of imported building materials" equals 2.77 (55.44%), Test-value = - 2.20, and P-value = 0.015 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is negative, so the mean of this paragraph is significantly smaller than the hypothesized value 3. We conclude that the respondents disagree to this paragraph.

The mean of the filed "The possibility of savings for the production of building simple and economical" equals 3.67 (73.44%), Test-value = 10.89, and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this field is significantly greater than the hypothesized value 3. We conclude that the respondents agreed to field of "The possibility of savings for the production of building simple and economical".

Table (4.11): Means and Test values for "The possibility of savings for the production of simple and economical architecture"

	Item	Mean	Proportional mean (%)	Test value	P-value (Sig.)	Rank
1.	Simplify the plan of the building and ease of implementation.	3.96	79.24	10.80	0.000*	4
2.	Efficiency and quality of construction implementation work by craftsmen and skilled workers.	4.11	82.25	11.06	0.000*	2
3.	The use of imported building materials.	2.77	55.44	-2.20	0.015*	7
4.	The use of building materials available at local markets.	3.72	74.43	6.34	0.000*	5
5.	Recycling and re-use of some non-consumed materials, for example: Wood pallets to make furniture.	2.81	56.25	-1.35	0.091	6
6.	Building's excess cost arises as a result of the implementation of unnecessary elements.	3.96	79.25	8.96	0.000*	3
7.	Savings in electrical energy can be adopted through natural lighting of house spaces and water heating by solar water heaters.	4.38	87.50	15.66	0.000*	1
	All paragraphs of the filed	3.67	73.44	10.89	0.000*	

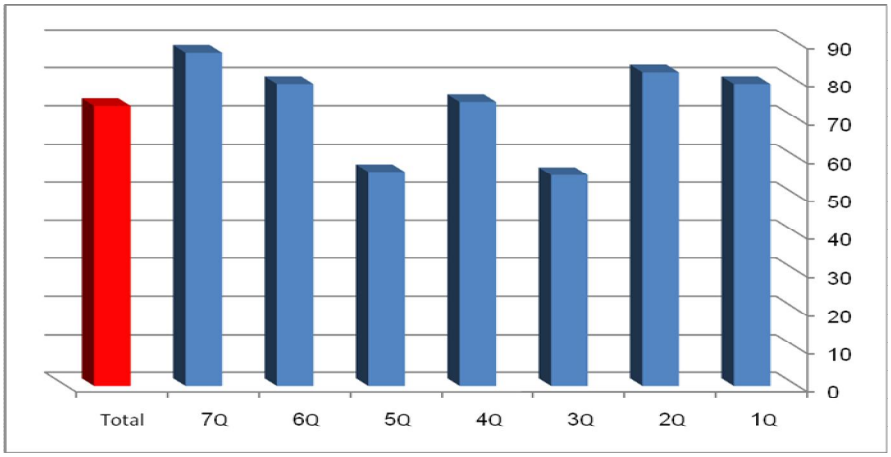

Figure 4.7: Proportional mean for "The possibility of savings for the production of simple and economical architecture"

Most of the respondents (87.5 %) agreed on adopting natural lighting through openings and water heating by solar water heaters in order to save electrical energy. (79 %) agreed that using imported building materials and implementation of unnecessary elements will increase the cost of construction. Simplifying the architectural plan will ease project implementation and reduces cost. Hiring construction skilled workers and using building materials available at local markets will reduce cost also. Still many people do not believe in recycling, general awareness is needed.

Table (4.12): Rank of the factors "The saving potentials in the use of water inside the dwelling"

factors	Rank
The use of special water taps	1
Take advantage of rainwater	2
Gray water recycling	4
Combining of health utilities	3

Table (4.13): Rank of the elements "The saving potentials"

elements	Rank
Outside finishing	3
Interior finishing and decoration works	1
Home furniture and electrical appliances	4
Reduce the surplus areas	2

8. The General Impression from a Simple Dwelling

This field is mainly to conclude the whole analysis and to get the final impression from respondents about minimalist dwelling and simple life within.

Table (4.20) shows the following results:

The mean of paragraph #3 "The simple house commensurate with the economic status of its residents" equals 4.08 (81.50%), Test-value = 11.68 and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this paragraph is significantly greater than the hypothesized value 3. We conclude that the respondents agreed to this paragraph.

The mean of paragraph #1 "The design of residential units in this simple and economic method is accepted by people" equals 3.39 (67.75%), Test-value = 3.88, and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this paragraph is significantly greater than the hypothesized value 3. We conclude that the respondents agreed to this paragraph.

The mean of the filed "The general impression from a simple dwelling" equals 3.88 (77.63%), Test-value = 15.81, and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this field is significantly greater than the hypothesized value 3. We conclude that the respondents agreed to field of "The general impression from a simple dwelling".

Table (4.14): Means and Test values for "The general impression from a simple dwelling"

	Item	Mean	Proportional mean (%)	Test value	P-value (Sig.)	Rank
1.	The design of residential units in this simple and economic method is accepted by people.	3.39	67.75	3.88	0.000*	5
2.	The simple house meets the diverse human needs.	3.96	79.25	14.24	0.000*	3
3.	The simple house commensurate with the economic status of its residents.	4.08	81.50	11.68	0.000*	1

4.	The simple house helps to regulate the lives of its users.	3.95	79.00	11.41	0.000*	4
5.	The simple house provides aesthetic values of the building at the lowest cost.	4.04	80.76	11.65	0.000*	2
	All paragraphs of the filed	3.88	77.63	15.81	0.000*	

According to table (4.14), the general impression of respondents from simple dwelling is very good where most of them (77.63 %) accepted living within minimalist simple architecture.

4.3 Results of Data Analysis

The following are the main outcomes linked with the research main objectives and hypothesis:

Type of Dwellings

- Due to the scarcity of land in the Gaza Strip which limits the alternatives for housing projects to multi story building, most of the people are living at apartments at multi story residential buildings.
- Majority of the people are still living at living areas that exceed their real needs with a living area more than 150 square meters.

Gaza Spatial Minimalist Forms

- People agreed that their residential buildings are similar with a box-like shape with flat roofs. Lack of urban planning and management of constructed properties in the Strip can be noticed easily where spatial relationships are dictated by lifestyle and the needs of the occupants.
- Majority of residential buildings in the Gaza Strip employ a simple architectural language and building geometry, where the basic elements are clearly distinguishable, elevations are easy to read giving visual comfort and can be understood simply.

Un-Sustainable Minimalism

- Environmental and climatic impacts design parameters are not fully taken into consideration for the house's building.
- Most of the people agreed that the ability to control natural light, vision and provide optimal privacy for interior spaces are poor due to lack of good design of their building's openings.
- Some buildings are with good orientation toward sun and wind. Some of those houses are getting enough natural lighting. Some adjacent buildings may limit the amount of light coming in through a window and the level of light inside falls below the accepted level.

- Solar water units are available for some of the roofs of the building to heat water during daylight hours which saves energy.
- No green elements available as so many people still considering them as aesthetics for their living space.

Gaza People and Simple Living

- People agreed that there are no additional decorative or architectural elements at their houses. Only the basic elements are there and the required furniture which increases the visual comfort inside their houses.
- In general, most of the people believe in living at simple houses for more comfort and relaxation, where dwelling plans are easy to read and can be understood simply.
- The general impression of people from simple dwelling is very good where most of them accepted living within minimalist and simple architecture.

Minimization in the Gaza Strip

- Most of the people agreed that their houses should be simple at exterior. At the same time they refused using concrete bricks only for external finishing. Many people prefer using coloured plastering. Some other people still prefer to use natural stone for exterior cladding.
- Most of the people agreed on adopting natural lighting through openings and water heating by solar water heaters in order to save electrical energy.
- Most of the people agreed that using imported building materials and implementation of unnecessary elements will increase the cost of construction.
- Simplifying the architectural plan will ease project implementation and reduces cost.
- Hiring skilled construction workers and using building materials available at local markets will reduce cost also.
- Still many people do not believe in recycling.

4.4 Conclusion

Examining the existing building situation throughout the research, interpretation from phrases and feedback and a questionnaire analysis, minimalist and simple architecture fits within the Gaza Strip context. Lack of urban design and planning management of constructed properties in the Gaza Strip can be noticed easily. Majority of residential buildings in the Gaza Strip are composed of basic elements which relate both to function and material construction. Those buildings are similar to each other and they have a gray box-like shape. Those minimalist houses, their simplicity and aesthetics are based on a deep cultural understanding of the existing situation in the Gaza Strip, Palestine.

Minimum building standards in the Gaza Strip are applied as a result of the economic situation and can be developed from negative to a positive attitude for building design approaches. Adopting minimalist architecture in the Gaza Strip will effectively lead to more economic, easier to build, more simple and livable buildings with better attitude. Applying minimalist architecture principles could be a guideline for producing elemental construction through using more humble building materials and finishes with respond to the community's needs.

The research approaches the problem by main hypothesis which is that: simple and economic buildings – that emerges from existing situations in the Gaza Strip – seek to adopt the principles of minimalist architecture. Minimalist architecture simplifies residential and living spaces and presents them in their essence.

In addition to this hypothesis which discussed, many open questions remain about the results of this analysis. As briefly mentioned above, to what extent are the challenges that minimalism approach would face in the case of the Gaza Strip for other type of buildings? How well would the community adopt it if the situation changes?

Chapter 5

Conclusion and Recommendations

5.1 Introduction

Minimalist ideology is about the search of the essence of human condition, place, materials, texture, space and light. The process of stripping down, the need to get down to the bones is coinciding with construction technique. A void in which to listen to figures with a pure and unconstrained eye in order to rediscover how many universal qualities are contained in the simplest and most common place objects.

In the Gaza Strip minimal architecture is not an alternative paradigm, but is a consequence for the current situation with regard to material resources, building techniques and form making process. In terms of cost effectiveness, construction duration and environmental protection, it beneficial to use minimalist architecture within the context of contemporary construction industry.

5.2 Conclusion

After introducing minimal art and minimalist architecture, examining three minimalist buildings designed by architects at those countries, where each project is informed first by its practical use, then by its natural environment, resources, and technology to define clearly articulated, visually stunning spaces. And after reinventing the existing simplicity in the Gaza Strip driven by visual analysis to many elements surrounds our daily life, a presentation for a building and working case studies, which is considered as a preliminary evaluation attitude, depends on analysis of the researcher. In addition to the thesis hypothesis which discussed, the outcome presents a profusion of images detailing the innovative synthesis of functionality, light, mass, space, and aesthetics that merge in minimalist designs.

Adopting minimalist architecture in the Gaza Strip will effectively lead to more economic, easier to build, more simple and livable buildings with better attitude. Applying minimalist architecture principles could be a guideline for producing elemental construction through using more humble building materials and finishes with respond to the community's needs.

Justification for using minimalist and simple architecture in the Gaza Strip had been analysis and explained throughout the research depending on the current situation in the Gaza Strip. The main findings of this theoretical study are classified into the following points:

- Minimalist architecture is a great thing in today's busy world. It is simple and clean, which means that homes and buildings that are designed in this style become refuges and havens, a place where you can go to quiet your mind. Used correctly, it is warm and inviting, and far from being cold.

- Buildings in the Gaza Strip employ a simple architectural language and building geometry, where the basic elements are clearly distinguishable, plans and elevations are easy to read and can be understood simply.

Sticking to the standards simplifies life and offers protection against liability claims. Increased demands on the performance of building components lead to standardized construction. Economical, financial and cost benefits can be appreciated throughout the whole building process by carrying out an analysis of the life cycle costs. No limitation can be considered for what designers could achieve through adopting such minimalist principles.

What the researcher hope is that to be able to set a trend in a fresh and regional architectural style that motivates people to bring their traditional construction methods (without the touch of being rustic) into a contemporary modern architecture. Believing that architecture (if we use it wisely) has the potentials to contribute in a significant scale to the development of the Gaza Strip's economic independence and facilitate a process of self-discovery and identification in architecture and culture.

5.3 Recommendations

Common buildings in the Gaza Strip that draws minimization strategies should be employed by the Government, construction firms and contractors, local and international NGOs in order to construct more economical and simple buildings. General recommendations are:

- Adding the necessary academic weight to the passion of simplicity.
- Support the development of a better urban design and regional planning in the Gaza Strip, including offering technical assistance to relevant ministries, and encourage using minimalist principles in the housing sector.
- Promote environmental and sustainable approaches in housing construction.
- Holding exhibitions and events to raise awareness of the importance of simple design as a stimulus for the economy.

The role of the architect is to envision another world, a different world. Palestinian architects, should deal with tangible things to formulate a proper form from it. Every building project has its own particular needs and design aspirations. Local architects need to think about a number of influences for vision and daylight control, what the building is for, who will use it, how it will be used, climatic impacts and much more.

In order to reinvent the link between minimalism as an architectural trend with the existing situation, applying more opportunities for minimizing construction projects; with references from its resource base to various stages of design, fabrication and use; all this can be achieved as follows:

A. Structure and Geometry

Simple architecture is understandable and it clarifies its structure. It can talk and it is self-explanatory through:

- Using basic shapes (simple and clear geometrical shapes).
- Using a modular pattern for floors and walls.
- Reducing the surplus areas is a suggested solution.

B. Material Economy and Construction

- Architects should pay more attention to dimensioning of materials, their components and details during design.
- To determine an accurate schedule (bill of quantity) for project executive.
- Ordering of materials that fulfill project requirements defined on design documents.
- Contractors to assign qualification staff and workforce in construction projects.
- Conversion waste from cutting, using industrial material such as tubes, pipes and wood pallets.
- General awareness is needed for recycling.

C. Environment and Sustainability

- Orienting the house correctly and using glass as appropriate for lighting and heat control can create a clean look with a comfortable feel.
- Rethinking approaches for vision and daylight control: it's about reducing the impacts of solar heat and related air conditioning costs, optimizing daylight design to leverage natural light and reduce artificial lighting costs, and providing flexible options for privacy.

- Once the domain of interior designers, shading and privacy have now become a key architectural design element for progressive architects who want to create sustainable and livable buildings that will stand the test of time.
- Plants or trees in homes are more than an architectural improvisation.

D. Material Expression

As beauty is in everything especially still life and inspiration comes from simple everyday things. Ordinary people can take some amazing pictures by looking at everyday objects, inspiring objects and destinations. The researcher had taken many pictures which are rich in concrete aesthetics and dimensions of high quality.

Some people still prefer grandiose architecture. But by such works, the meaning of beauty is made closer to our souls. Such works offer us a glimpse into our lives as a never-satisfied aesthete. Even it is a way for others to travel to those poor areas of the Strip.

- To develop concrete aesthetics, where it serves a goal to introduce economic buildings with raw beauty, especially that almost all of poor houses do not plaster their walls either from outside or inside. The creativity of the designer is the greatest limit to the beauty of concrete.
- To arrange art and architectural photographic images exhibitions. With picturesque description of simple things surroundings in the space, such works are worth to have area on public level.

Residential buildings were the main focuses of this research. Non-residential buildings such as governmental, schools and masjeds in the Gaza Strip were not taken into consideration. Further research on minimalist architecture could be conducted with other types of buildings.

Much of the debate about this type of architecture is about "modernity vs. tradition" and culture vs. technology. The research provides a statement about the state of minimalist architecture within the context of a developing country such as Palestine. This minimal design, geometry and beauty in contrast, transcend this debate to create its own modernity and plant the seeds for a new tradition. Within the current architectural practice and low quality of the urban fabric, some people prefer grandiose architecture while some prefer simple and clean styles. Good design and good architecture can only come from an understanding of people. The current situation in the Gaza Strip will cause future generations to shudder at the thoughtlessness in the way in which we today fill our homes, our cities and our landscape with a chaos of assorted junk. It is the mission of local architects, urban designers to be aware of such negative attitude. Adopting minimalist architecture in the Gaza Strip could help towards a positive one.

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الجامعة الإسلامية - غزة
عمادة الدراسات العُليا
كلية الهندسة
قسم الهندسة المعمارية

الموضوع: استبيان لبحث علمي – ماجستير هندسة معمارية
A Questionnaire for Scientific Research - Master of Architecture

First. General information

1.1 Name (optional):

1.2 Scientific degree and specialization / working field:

1.3 Type of dwelling: Apartment at residential building – House – Family apartment house.

1.4 Living space: Less than 100 m2 / between 100 – 150 m2 / 150 m2 and more.

Very few degree	A low degree	Moderately	Significantly	Very much	العبارة	الرقم
Secondly - Vicinity of house's building					**ثانياً – حيط مبنى المسكن**	
					اسب شكل مبنى المسكن الذي أقطنه نمط المباني بالشوارع المـ حيطة. The form of my house fits with other buildings at surroundings streets.	2.1
					م مبنى المسكن يـ ناسب أحجام المباني المـ حيطة به. The size of the house fits with other buildings surrounding it.	2.2
					المظهر الخارجي للمبنى يتشابه والشكل صندوقي للمباني المـ حيطة. Shape of exterior building is similar with the surrounding boxes buildings.	2.3
					يتناسب مبنى المسكن ووظيفته مع نوع واستخدام المباني المجاورة. The house and its function fit with the type and use of adjacent building.	2.4
					ترابط المناطق العامة والخاصة حول المبنى ببعضها بصرياً . Public and private areas are visually interconnected together.	2.5
					كتابة أي تعليقات قد تكون لديك حول الطريقة التي تجعل مبنى المسكن يتناسب مع المنطقة المـ حيطة به، أو لا يتناسب (مواد التشطيب، اللون، عدد الطوابق، شكل الفتحات،...). Write any comments you have about making the house fit with the surrounding area or not (finishing materials, colours, number of story, openings shape,...).	2.6
Third - Form of house building block					**ثالثاً – شكل كتلة مبنى المسكن**	

					تُشير مبنى المسكن من الخارج إلى وظيفته الداخلية. Housing building indicates from the outside its inner function.	3.1
					تُمكن الوصول للمداخل والمخارج بسهولة. Entrances and exits are easily access.	3.2
					أجزاء المبنى تتكامل مع بعضها البعض بشكل جيد لتشكيل مظهر بسيط. Parts of the building are integrated well with each other to form simple appearance.	3.3
					لانسجام والتجانس بين أجزاء المبنى يُعطي راحة بصرية للعين. Harmony and homogeneity between the parts of the building gives visual comfort to the eye.	3.4
					ترتبط فتحات مبنى المسكن من الخارج بتخطيط مدروس للفراغات الداخلية في كل طابق لتوفير الضوء، الرؤية، الخصوصية، ومنعاً للضوضاء. Buildings' openings are thoughtful linked to planning of interior spaces on each floor to provide light, vision, privacy, and to prevent noise.	3.5
Fourth - Environmental design for the house's building						
رابعاً – التصميم البيئي لمبنى المسكن						
					المبنى وجه بشكل مدروس مع حركة الشمس والرياح السائدة والإضاءة الطبيعية. Building is thoughtfully prompted with movement of sun, prevailing winds and natural lighting.	4.1
					تم تصميم شبابيك المسكن لتقليل اختراق أشعة الشمس داخل فراغات المسكن. Windows are designed to reduce sunlight penetration inside the dwelling spaces.	4.2
					اتساع فتحات الشبابيك كافي للإضاءة الطبيعية للمبنى دون الحاجة للإضاءة الصناعية. Wideness of windows openings is enough for natural lighting of the building without the need for artificial lighting.	4.3
					دران المبنى الخارجية كافية لعزل الخصائص الخارجية (حرارة، برودة، ضوضاء) عن داخل فراغات المسكن. External walls of the building are sufficient to isolate the external characteristics (heat, cold, noise) inside the housing spaces.	4.4
					توجد حمامات شمسية فوق سطح المبنى لتسخين المياه خلال ساعات النهار. There are solar water units on the roof of the building to heat water during daylight hours.	4.5
					مبنى مُحاط بأشجار لحجب أشعة الشمس وتقليل وهج الإضاءة من الشبابيك. The building is surrounded by trees to block the sun's rays and reduce glare from windows lighting.	4.6
					تتواجد العناصر الخضراء داخل فراغات المسكن وعلى نوافذه. Green elements reside within the housing and spaces on the windows.	4.7
					وجد تكامل بين المناطق الخضراء والمبنى. There is integration between green areas and the building.	4.8

4.9	مبنى مـُحاط بعناصر وِ ُسطحات خضراء. The building is surrounded by the elements and green spaces.					
خامساً – تقييم الفراغات الداخلية للمسكن **Fifth - Assessment of the internal spaces of the house**						
5.1	مساكننا بحاجة إلى أن تكون بسيطة وغِ مـُتكلفة من الداخل. Our houses need to be simple and manifest from inside.					
5.2	البساطة داخل المسكن ُعكس إيجاباً على مـُستخدميه. Simplicity within the house is reflected positively on its users.					
5.3	سهـُل فهم المسقط الأفقي للمسكن البسيط من قبل الزوار. The simple dwelling plan is easy to understand by visitors.					
5.4	هناك عناصر معمارية ِزخرفيه زائدة وليس لها ضرورة تتواجد داخل المسكن. There are additional decorative and architectural elements and have no need to exist within the house.					
5.5	تـتأثر كـفاءة المسـكن بوجـود بعـض الأشـياء الزائـدة (أثـناء عـملية التنـظيف، ترتـيب الأغراض، إلخ...). House efficiency is affected by the existence of some excess stuff (during the cleaning process, arrangement, etc.).					
5.6	يكون المسكن ًملاً بسبب قلة قطع الأثاث داخل الفراغات. The house is considered boring due to lack of furniture inside the spaces.					
5.7	خلو الأسقن ديكورات الجبس والجـُدران من الإطارات المـُعلقة (البراويز) يزيد من الراحة البصرية. Ceilings and walls free of decoration and hanged frames increases the visual comfort.					
5.8	يـُساعد المسكن البسيط مـُستخدميه على الراحة والاسترخاء بعد عناء يوم العمل. Simple house helps its users to rest and relax after a work day.					
5.9	حـدّد الأشياء الزائدة داخل المسكن وترغب في التخلص منها: Name things inside the house and want to get rid of them:					
سادساً – شطيب ونوعية المواد المـُستخدمة **Sixth - Finishing and quality of materials used**						
6.1	تحقق طرق التشطيب الخارجي التالية النواحي الاقتصادية والجمالية لمبنى المسكن: • بدون أي تشطيب خارجي (فقط الطوب الإسمنتي). The following outer finishing methods meet the economic and aesthetic aspects of a housing building: • Without any external finishing (only concrete brick).					
6.2	• تشطيب وتكسية المبنى باستخدام الحجر الطبيعي. • Finishing and facade of the building using natural stone.					
6.3	• التشطيب بقصارة خارجية مع دهان (رشقة ملونة، شلختة ايطالية). • Finishing with external plastering and paint (coloured plastering, Italian plastering).					
6.4	• التشطيب بقصارة خارجية ملساء فقط.					

					• Finishing with smooth external plastering only.	
					ظهر البصري للشكل الخارجي للمبنى الذي أسكنه مـُ لفت للانتباه. Visual appearance of the building exterior is eye-catching.	6.5
					منازلنبلحاجة إلى أن تكون بسيطة وغير مـُ تكلفة من الخارج. Our homes need to be simple and manifest from abroad.	6.6
					ادة التشطيب و اللون الغالب على المباني في المنطقة التي أسكنها هو: Finishing material and colour mostly on buildings in the area I am living by is:	6.7
Seventh - The possibility of savings for the production of simple and economical architecture **سابعاً – إمكانية التوفير لإنتاج عمارة بسيطة واقتصادية**						
					يمكن التوفير في التكلفة الإجمالية للمبنى مع عدم التأثير على الجودة من خلال: • تبسيط مسقط المبنى وسهولة التنفيذ. Savings can be in the total cost of the building with no impact on quality through: • Simplify the plan of the building and ease of implementation.	7.1
					• الكفاءة وجودة تنفيذ أعمال البناء من قبل الحرفيين والعمال المهرة. • Efficiency and quality of construction implementation work by craftsmen and skilled workers.	7.2
					• استخدام مواد بناء مستوردة. • The use of imported building materials.	7.3
					• استخدام مواد بناء متوفرة في الأسواق المحلية. • The use of building materials available at local markets.	7.4
					• ويرو إعادة استخدام بعض المواد الغير مـُ ستهلكة، مثال: خشب المشاطيح لعمل قطع أثاث. • Recycling and re-use of some non-consumed materials, for example: Wood pallets to make furniture.	7.5
					تنشأ التكلفة الزائدة للمبني نتيجة تنفيذ عناصر لا لزوم لها. • Building's excess cost arises as a result of the implementation of unnecessary elements.	7.6
					يمكن التوفير في الطاقة الكهربائية باعتماد الإضاءة الطبيعية لفراغات المسكن وتسخين المياه عبر السخانات الشمسية. Savings in electrical energy can be adopted through natural lighting of house spaces and water heating by solar water heaters.	7.7
• The use of special water taps. • Take advantage of rainwater. • Gray water recycling. • Combining of health utilities.					رتب العوامل التالية (تصاعدياً بوضع رقم من 1 إلى 4) من حيث إمكانية التوفير في استخدام المياه داخل المسكن: Arrange the following factors (Ascending put No. 1 to 4) in terms of the saving potentials in the use of water inside the dwelling:	7.8
• Outside finishing. • Interior finishing and decoration works. • Home furniture and electrical appliances.					رتب العناصر التالية (تصاعدياً بوضع رقم من 1 إلى 4) من حيث إمكانية التوفير فيها: Arrange the following elements (Ascending put No. 1 to 4) in terms of the saving potentials:	7.9

• Reduce the surplus areas.						
					يمكن التوفير في التكلفة الاقتصادية من خلال تقليل العناصر الزائدة مثل: Savings in economic cost can be by reducing excess elements such as:	7.1
Eighth - The general impression from a simple dwelling **ثامناً – الانطباع العام عن المسكن البسيط**						
					يتقبل الناس تصميم وحدات سكنية بهذا الأسلوب البسيط والاقتصادي. The design of residential units in this simple and economic method is accepted by people.	8.1
					المسكن البسيط يُلبي الاحتياجات البشرية المتنوعة. The simple house meets the diverse human needs.	8.2
					يتناسب المسكن البسيط مع الوضع الاقتصادي لساكنيه. The simple house commensurate with the economic status of its residents.	8.3
					المسكن البسيط يُساعد على تنظيم حياة مُستخدميه. The simple house helps to regulate the lives of its users.	8.4
					المسكن البسيط يوفر القيم الجمالية للمبنى بأقل التكاليف. The simple house provides aesthetic values of the building at the lowest cost.	8.5