NDEBELE ART IN THE DESIGN OF AESTHETIC RESIDENCES ALONG STATE HOUSE, NAIROBI
A case study of Muchilwas Family Home along State House Road, Nairobi.

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Project paper submitted in partial fulfillment of the requirement for the Bachelor of Art in Design Degree submitted to the school of the Arts and Design, University of Nairobi.

18th December 2015
Declaration

I, the undersigned, declare that this research paper is my original work and has not been presented for the award of any degree in any other university

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Dedication

This paper is dedicated to my loving mother Gladys Bosibori and brother Brian Momanyi. May the good Lord shower thy soul with blessing wherever you go mum. There is no way I can pay you back, but the plan is to show you that I understand. Little bro, your love and support are what kept me going when I thought of tapping out. The feeling is mutual. I hope I blazed a positive trail for you to follow and succeed where I might have come short.
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ABSTRACT

This research is aimed at incorporating the long-standing Ndebele art forms and fusing it into Sustainable design practices for application effectively and efficiently into the design of residential spaces through: Interior Architecture, Furniture Design, Exhibition and Display and Landscape Design. The researcher looked into the ability of design to solve environmental challenges through various sustainable design principles at the same meeting demand for functional products in residential spaces resulting in safe, functional, aesthetic and sustainable environments for the current generation and the generations to come.

The researcher’s main aim was investigating how different designers have ventured into sustainability through different themes with major emphasis being on eco design and recycling for development of end products that safeguard the environment and at the same time meet functionality. The researcher therefore reviewed literal publication and productions from renowned designers and authors to develop a scope on what has already been done and what has not. A field study was conducted by the researcher to determine materials currently preferred in designing residential spaces, reasons to these preferences and the impacts resulting from the use of such material. The researcher through the field study also sought to determine the main themes guiding the design of residential spaces so as to discover whether African art forms were being adequately explored. Based on the facts obtained from the field, the researcher then analyzed the data, drew conclusions and finally drafted recommendations towards developing aesthetic and sustainable residential spaces through fusing Ndebele Art and sustainable design principles. In this case the reference was the Muchilwas residence locate along State House Road, Nairobi. The research will be segmented into five main chapters: chapter one will contain the introduction and background, problem statement, objectives, research questions, significance and scope of study. Chapter two will be a critical analysis of theoretical literature on Sustainability as the design philosophy guiding this research project, Ndebele Art as the source of Inspiration and the Kenyan Middle class as the target users. The researcher will also carry an analytical review aimed at identifying gaps to be filled to the existing knowledge. Chapter three will outline the Methodology used by the researcher.
Chapter four will carry the site analysis, presentation and interpretation of findings while chapter five will be summary of the findings, and recommendations on the four major areas of interior design.
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CHAPTER ONE

1.0 INTRODUCTION TO THE STUDY

1.1 Introduction

All men are designers. All that we do, almost all the time, is design, for design is basic to all human activity. The planning and patterning of any act towards a desired, foreseeable end constitutes the design process. Any attempt to separate design, to make it a thing by itself, works counter to the inherent value of design as the primary underlying matrix of life. According to Papanek, 2005, Design is composing an epic poem, executing a mural, painting a masterpiece or even writing a concerto. But design is also cleaning and reorganizing a desk drawer, pulling an impacted tooth, baking an apple pie, choosing sides for a back-lot baseball game, and educating a child. Design is the conscious effort to impose meaningful order.

Designing in a deeper sense is defined as the process of conceiving, creating, inventing, contriving, sketching, or planning by which some practical end maybe effected, or proposing a goal to meet the societal needs, desires, problems, or opportunities to do things better. It is a cyclic or iterative process of continuous refinement or improvement (Hill, 1997). As such design is one of the most powerful problem-solving mechanisms with which man shapes his tools and the environment and, by extension, society and himself.

Interior, Graphic, Product, Illustration and Fashion design constitute the main electives in the design discipline. This study is confined to the specific field of Interior Design. This category of design is packaged into: Interior Architecture, Exhibition and Display, Furniture design and Landscaping.

Interior Architecture explores how interiors of buildings such as office blocks, residential spaces, hospitals etc. are inhabited, used and experienced. The subject also explores how interiors of buildings can be changed to meet different needs and to express different functions, for example from an old warehouse to a restaurant and night club.
An exhibition generally refers to an organized presentation and display of specifically selected items. Exhibitions usually occur in museums, galleries, libraries, private businesses, specialist trade events and conferences, and large commercial public events.

Furniture design encompasses the development and preparation of furniture to serve a specific predetermined function. In developing furniture, designers should consider both functional and aesthetic aspects and pay particular attention to ergonomics: factors that relate to ease of use and human behavior.

Landscaping refers to any activity that modifies the visible features of an area of land, including: living elements, such as flora or fauna; or what is commonly called gardening, the art and craft of growing plants with a goal of creating a beautiful environment within the landscape, natural elements such as landforms, terrain shape and elevation, or bodies of water; and abstract elements such as the weather and lighting conditions.

1.2 Background of the study

Africa is urbanizing fast. Its rate of urbanization soared from 15 percent in 1960 to 40 percent in 2010, and is projected to reach 60 percent in 2050 (UN Habitat, 2010). With these rapid changes, Interior design in Kenyan residential spaces is becoming more and more appreciated as years go by. The case is no longer as it were in the past when the concept was known only to the aristocracy. The main areas experiencing the upward surge include Nairobi, Mombasa, Kisumu and major towns across the country. As such it is the responsibility of local designers to integrate the traditional African ways of life with the realities of the modern world to create beautiful and attractive spaces for the rapidly growing African Market.

1.3 Statement of the Problem

Most homes along State House Road Nairobi have not adequately embraced traditional African art forms as a source of inspiration in their design and construction. A large number of these residential spaces barely have consistent themes running through them. One can hardly tell the source of inspiration for the design of these homes. For example, Muchilwa...
home, one of the homes in the fore-mentioned neighborhood is built on an unrecognizable theme using unsustainable materials that do very little justice to the environment. Furthermore, most furniture in use is made of wooden materials arguably from cut down trees.

Materials such as papyrus and bamboo that are locally available and very renewable are hardly being used in Kenya. *(The daily Nation, 1-29-2013).* Problematic materials such as water hyacinth that have wreaked havoc in major water bodies regionally posing major socio-economic challenges to local communities have also not been put to full use either.

In his book: Design for the real world, Victor Papanek points out that design, if it is to be ecologically responsible and socially responsive, must be revolutionary and radical (going back to the roots) in the truest sense. It must dedicate itself to nature's 'principle of least effort, in other words, minimum inventory for maximum diversity or, doing the most with the least. That means consuming less, using things longer and recycling materials. He adds that design must become an innovative, highly creative, cross-disciplinary tool responsive to the true needs of men. It must be more research-oriented, and human beings must stop defiling the earth itself with poorly-designed objects and structures.

**1.4 Objectives**

**1.4.1 Main Objective**

To determine the use of sustainable design Principles in Kenyan home designs and propose ways through which they can be integrated with Ndebele art to create aesthetic residential spaces.

**1.4.2 Specific Objectives**

a) Determine the extensiveness of the use of sustainable design principles such as use of materials that have high levels of Renewability, Reusability & Durability in the design of residential spaces in Kenya.
b) Identify ways to integrate the sustainable design principles in the design of residential spaces for the middle class in Kenya.

c) Analyze how African art forms such as Ndebele art have influenced home designs in Kenya.

d) Propose ways through which African art forms (Ndebele wall-painting Art) can be incorporated in the design of residential spaces in Kenya.

1.5 Research Questions

a) To what extent has sustainability been incorporated in the design of residential spaces in Kenya?

b) In what ways can sustainable design principles be adopted in the design of residential spaces in Kenya?

c) How have traditional African art forms influenced home designs in Kenya?

d) How can African art forms such as the Ndebele wall-painting art be incorporated in the design of residential spaces in Kenya.

1.6 Scope of the Study

1.6.1 Thematic

The research will confine itself to the field of interior design as it seeks to investigate whether sustainable design principles and inspiration from traditional African art forms have been adequately explored in residential designs in Kenya.

1.6.2 Concept and Content

The study refers to both secondary and primary information. Materials, ideas, and data will be sought out, to have a proposal that will embrace the idea of exploiting opportunities for
use of resources that have high levels of renewability, durability and that require minimal energy to process to promote environmental conservation.

1.6.3 Geographical

This research will be based and limited to Nairobi Kenya with the main study area being the neighborhood along State House Road. The case study will be Muchilwas home in the fore-mentioned locality.

1.7 Significance of the study

Most Kenyan homes are currently built on foreign themes. Most construction materials and furniture is still made from unsustainable materials like hardwood and plastics. This practice is greatly compromising the environment for future generations. This paper seeks to vastly advocate for the use of sustainable design principles and promote the African culture in residential designs in Kenya in a bid to prevent environmental degradation and erosion of traditional African ways of life.

For other students, the study will serve as a guide in enhancing their knowledge and design skills on the concepts of sustainability and the use of African art as an inspiration in their projects. It will also help students taking related research in future to identify the best way to go about it by having a basis and reference for their research.

1.8 Limitations of the study

The study is limited to data and information mainly gathered from primary sources on the Ndebele Art and Sustainable Design Principles that can be useful in residential interior design. Time is also a limiting factor gauging on the extensiveness of the research. Finances too as some respondents might want to be paid before undertaking the interview.
1.9 Summary

A home ought to be a place of great experiences for those who reside in it. It should be a place that offers comfort and fun and with excellent amenities, well decorated to give a unique experience. The feeling of being at home can't be purchased since it comes from an intimate relationship between us and our most personal place. Just like other love affairs, this one shapes us just as we shape it. Anyone with the ability lavishes not only money but also their time and creativity on their homes, and in return, they provide pleasure, comfort and sanctuary. Life is advancing in all areas, technology and even more in design. Style has become greatly essential and different themes are driving various concepts all over the world. Sustainable design is becoming the centre of most if not all design concepts with an aim to preserve the environment. The researcher’s goal is therefore, with consideration of both sustainability and style, to create great experiences in our homes. This paper seeks to employ Ndebele Art and sustainable design principles to create appealing and aesthetic residential spaces for the middle class in Kenya.
CHAPTER TWO

1.0 LITERATURE REVIEW

2.1 Introduction

Interior design as a discipline is mainly concerned with the function and operation of a space, its safety, efficiency, its aesthetics and sustainability. The main factors that come into play when formulating a design solution are the space itself: the dimensions and construction, then how the space will be used for example leisure activities, commercial purposes, etc. and finally what the space signifies or stands for, say power, authority or what it draws from. Hence, a good design bases itself on proper predetermined themes and design philosophies. This chapter contains a review of literature covering sustainability as a design philosophy, Ndebele art as the source of inspiration for the research project and the Kenyan middle class as the target users. It will include case studies and exemplars from various parts of the world that will provide insight on what has been done both globally and locally in the four branches of interior design. The theoretical literature is reviewed from books, journals, reports, web articles, newspaper articles and other miscellaneous sources. This information will be critically analyzed so as to identify gaps in existing knowledge that ought to be filled and propose solutions to the problems under study.

2.2 Sustainability in Design

“The challenge of sustainability is broad enough that there is no one right place to start. The important part is just to start somewhere. So, just pick a location and dig in.”

Paul Murray, EHS Director and product sustainability innovator at Herman Miller Inc.

The term sustainability is quite malleable in nature. While most people are aware of its intentions, it is often difficult to pin down since it cuts across very many factors. The World Commission on Environment and Development, commonly referred to as the Brundtland Commission, created one of the best-known and often used definitions:
'Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.'

Design is often viewed as a critical enabling factor for sustainability since the design function is a concentration point for decisions about a large set of human and material resource flows. Design specifications usually have significant economic, environmental and social ripple effects. Additionally, design can have a large impact on the materialization or dematerialization of products. Design choices about material weight and packaging have direct impacts on transport costs and fuel use. Choices about energy efficiency directly impact energy consumption in a product’s use phase. And choices about durability, disassembly or re-usability affect the technological challenges and economics of product recovery (White and Stewart, 2008).

Sustainability represents a balanced interaction between the human-built environment and the natural world. This interaction is often expressed as having three components: environment, social equity, and economy. The relationship between each of these elements is often represented as either a Venn diagram, with sustainability at the intersection, or as concentric circles, reflecting a layering of domains. The second case reflects the more realistic perspective that a healthy economy depends on a healthy society, both of which rely on a healthy environment. Sustainability occurs when all three are thriving. (Ruggles, Phansey, Linder-2011)
Designers and other professionals involved in product creation and development bear a great responsibility in pushing the agenda of sustainability so as to preserve the environment for future generations. Many designers are conscious of their complicity in consumerism since so much of their work is intended to coerce the acquisition of more and more goods and products (Campbell 2009) contributing to unsustainable behaviors.

According to Jason F. McLennan, “The Philosophy of Sustainable Design”, 2004, the following constitute the main principles of sustainable design:

1. Learning from natural systems (Biomimicry Principle),
2. Respect for energy & natural resources (Conservation Principle),
3. Respect for people (Human Vitality Principle)
4. Respect for place (Ecosystem Principle)
5. Respect for future (“Seven Generations” Principle)

A perfect example of how nature on its own strives to preserve the environment is in respect to how the sun’s vast energy is contained. Almost all energy on earth comes from the sun or came from the sun at one time. The amount is astonishing to say the least: The sun shines on earth every day enough energy to meet our electrical demand for 27 years! But, solar radiation is dispersed, and some concentrating and storage mechanisms are required. Nature provides numerous examples of energy concentration and storage:

- **physical processes;** hydrologic cycle (providing water elevation → potential energy), winds and currents (movement → kinetic energy)
- **chemical processes**-food calories ↔ ATP in our bodies
- **Biological processes;** solar energy capture by plant leaves (photosynthesis), food web concentration (higher forms of life eating lower forms)

What about us? Instead of doing likewise, we use non-renewable stored forms of energy (chiefly petroleum and coal). We also consume energy at wasteful rates. We extract and heavily process non-renewable materials, and we tend to use much more material than we strictly need (Roisin, April 2015).
There are many facets to design’s potential role in achieving environmentally sustainable outcomes. In proper agreement with the fore-mentioned principles of sustainable design these can be broadly categorized as:

- **Eco-design**: materials efficiency, environmentally-preferred materials, efficiency in use, design for disassembly/recycling, durability/longevity
- **Design for purpose**: this entails matching user needs thus designing the right and subsequently less “stuff”. Less here means strictly enough.
- **Design for behavior**: design that influences user behavior for more sustainable use
- **Systems design**: whole system thinking, designing within context, product service systems, and design of organizations.

### 2.2.1 Eco-Design

#### 2.2.1.1 Introduction

*Eco design* is an approach to designing products with special consideration for the environmental impacts of the product during its whole lifecycle. In a life cycle assessment, the life cycle of a product is usually divided into procurement, manufacture, use, and disposal. Green awareness, overpopulation, industrialization and an increased environmental population have led to the questioning of consumer values. It is imperative to search for new building solutions that are environmentally friendly and lead to a reduction in the consumption of materials and energy. *(Wimmer, Züst, Lee, 2004)*

Wimmer, Züst and Lee, go on to state that an eco-design product has a cradle-to-cradle life cycle ensuring zero waste is created in the whole process. By mimicking life cycles in nature, eco-design is a fundamental concept in achieving a truly economy. Environmental aspects which ought to be analyzed for every stage of the life cycle are:

- Consumption of resources (energy, materials, water or land area)
- Emissions to air, water, and the ground (our Earth) as being relevant for the environment and human health
- Miscellaneous (e.g. noise and vibration)
The concept of eco-design itself has many facets. According to Young (2010) these include:

2.2.1.2 Materials efficiency

This entails reducing the materials required to create a product. A good example is designing packaging that uses less cardboard to achieve the same functional benefit. This includes consideration of the durability and expected life of a product to choose materials appropriate for this use.

2.2.1.3 Environmentally-preferred materials

Designing for use of materials that have a lower environmental impact in manufacture, use or disposal. The use of bio-plastics instead of petroleum-based products when designing perfectly exemplifies this concept.

2.2.1.4 Efficiency in use

Designing products that require less resources during operation. For example, reducing the energy required to run an electrical device.

2.2.1.5 Disposal/recycling

Designing using organic or recyclable materials, design for disassembly etc. For example, designing a chair using recyclable plastic parts that allows for quick disassembly into separate components for faster processing at the point of recycling.

The concept of Eco-design can also be achieved through the use of local raw materials. These since they are less costly and reduce the environmental costs of shipping, fuel consumption, and CO₂ emissions generated from transportation of these materials. Certified green building materials, such as responsibly sourced wood from sustainably managed forest plantations, with accreditations from relevant authorities can be used.

Several other types of components and materials can be used in sustainable buildings. Recyclable and recycled materials are commonly used in construction, but it is important that they don’t generate any waste during manufacture or after their life cycle ends. Reclaimed materials such as timber at a construction site or junkyard can be given a second life by reusing them as support beams in a new building or as furniture. Stones from an
excavation can be used in a retaining wall. The reuse of these items means that less energy is consumed in making new products and a new natural aesthetic quality is achieved.

2.2.1.6 Water recycling

Systems such as rainwater tanks that harvest water for multiple purposes have been used in the past. Reusing grey water generated by households are a useful way of not wasting drinking water.

2.2.1.7 Off-grid homes

These are premises that only use clean electric power. They are completely separated and disconnected from the conventional electricity grid and receive their power supply by harnessing active or passive energy systems. These systems use the principle of harnessing the power generated from renewable and inexhaustible sources of energy, for example; solar, wind, thermal, biomass, and geothermal energy.

2.2.1.8 Solar power

This is a widely known and used renewable energy source. Tremendous growth in technology has allowed solar power to be used in a wide variety of applications. Two types of solar panels generate heat into electricity. Thermal solar panels reduce or eliminate the consumption of gas and diesel, and reduce CO₂ emissions. Photovoltaic panels convert solar radiation into an electric current which can power any appliance.

2.2.1.9 Biomass

This refers to the energy source created from organic materials generated through a forced or spontaneous biological process.

2.2.1.10 Geothermal energy

Obtained by harnessing heat from the ground. This type of energy can be used to heat and cool homes. It eliminates dependence on external energy and generates minimum waste. It is also hidden from view as it is placed underground, making it more aesthetically pleasing and easier to incorporate in a design.
2.2.1.11 Wind turbines

A very useful application for areas without immediate conventional power sources such as rural areas with schools and hospitals and homes that need more power. Wind turbines can provide up to 30% of the energy consumed by a household but they are subject to regulations and technical specifications, such as the maximum distance at which the facility is located from the place of consumption and the power required and permitted for each property.

2.2.1.12 Bioclimatic Buildings

Buildings that integrate passive energy systems are heated using non-mechanical methods, thereby optimizing natural resources. The use of optimal daylight plays an integral role in passive energy systems. This involves the positioning and location of a building to allow and make use of sunlight throughout the whole year. By using the sun's rays, thermal mass is stored into the building materials such as concrete and can generate enough heat for a room.

A green roof is a roof partially or completely covered with plants or other vegetation. This creates insulation that helps regulate the building's temperature. It also retains water, providing a water recycling system. It also provides soundproofing.

2.2.1.13 Eco-design in art and decorating

There is a huge demand in worldwide to decorate homes in a "green" style. A lot of effort is placed into recycled product design and the creation of a natural look. This ideal is also a part of developing countries, although their use of recycled and natural products is often based in necessity and wanting to get maximum use out of materials.

Recycling has been used in art since the early part of the 20th century, when cubist artist Pablo Picasso (1881-1973) and Georges Braque (1882-1963) created collages from newsprints, packaging and other found materials. The "Outside Art" movement is recognized as a genuine expressive art form, and is celebrated because of the materials used and not in spite of them. The same principle can be used inside the home, where found
objects are now displayed with pride and collecting certain objects and materials to furnish a home is now admired rather than looked down upon.

2.2.2 Design for purpose

Design for purpose is design that seeks to changes the world and improves life (Hick, 2012). They are simple designs that solve real-world problems.

It is said that the most sustainable product is the one that’s not produced. Matching productive activity to user needs and perceived value is a useful strategy for reducing muda (Hawken, Lovins & Lovins 1999) and by extension increasing business returns (Kumar 2009). Wever, Kuijk & Boks (2008,) call such considerations “functionality matching.”

User engagement in the front end or pre-design phase of the product development process can help to define the fundamental problems and opportunities and to determine what is to be, or should not be, designed and manufactured. (Sanders & Simons 2009) It is at this point in the design process that co-creation is most likely to result in social value being generated (Sanders & Simons 2009).

By taking a human-centred approach and placing the emphasis on user needs and motivations, design thinking has the potential to guide designers away from solutions that, while seemingly good ideas, are less likely to be useful to or adopted by end-users. This is a less documented benefit of design thinking’s contribution; commentary on design thinking tends to focus on the outputs of the process that is, innovations produced rather than the reduction of social and natural capital waste afforded by design processes that steer designers away from sub-optimal solutions that are less likely to support their intended objectives. (Young, 2008)

2.2.3 Design for behavior

Environmental, economic or social impacts are sometimes caused by unintended user behaviour commonly referred to as rebound effects suggesting that technological innovation alone is insufficient to achieve the desired outcomes (Lilley, Lofthouse & Bhamra 2005).
Whereas eco-design and design for purpose focus on “fulfilling functions in a more sustainable way, within a given use-profile” (Wever, Kuijk & Boks 2008), design for behaviour considers how user behaviour can be influenced through product and service features designed to curb unsustainable practices (Campbell 2009; Fabricant, Lockton 2010). Design interventions that take into account user’s behaviour can provide low cost opportunities to prevent undesirable and potentially costly side effects of product use. (Wever, Kuijk & Boks, 2008)

Changing people’s behaviour is a complex challenge, with inter-dependent habits and practices, along with functional and symbolic reasoning influencing individual consumption patterns. Actual behaviour can also differ from intended behaviour or expressed attitudes, as Martiskainen (2008) explains:

Our behaviours are not simple but based on various components, of which habits and routines form the most challenging and complex part. Even though a person’s attitude may be positive towards certain pro-environmental behaviours and the person may have an intention of undertaking that behaviour, his or her habits can get in the way and prevent that behaviour from happening, or the person may act opposite to his or her intention without even realizing it. As such, Martiskainen (2008) suggests that changing people’s behaviour requires consideration of a range of influences which he summarises into three groups:

1. **Internal factors**: personal values, attitudes, beliefs

2. **External factors**: regulations, institutions, cultural settings

3. **Habitual**: habits and routines

In reviewing literature encouraging behaviour change through design, Lilley, Lofthouse & Bhamra (2005) identify three primary methodologies:

- **Scripts and Behaviour Steering**: products or systems that contain scripts or prescriptions for use to encode the designers use intention
• **Eco-Feedback**: those that inform users of their impact in an attempt to persuade them to modify their behaviour

• **Intelligent Products and Systems**: those that circumvent rebound effects by ceding decision making to an intelligent product which mitigates controls or blocks inappropriate user behavior

### 2.2.4 Systems design

To maximise the benefits of design, Hawken, Lovins & Lovins (1999) suggest applying “whole system thinking” in response to sustainability challenges. Rather than simply ‘balancing’ or ‘trading off’ different sustainability objectives, they propose an integrative design approach “at every level, from technical devices to production systems to companies to economic sectors to entire cities and societies,” (Hawken, Lovins & Lovins 1999) observing that:

The greater the degree to which the components of a system are optimized together, the more the trade-offs and compromises that seem inevitable at the individual component level becomes unnecessary. These processes create synergies and felicities for the entire system.

For example, a building that employs passive solar principles and eco-efficient materials in a systematic way can remove the need for expensive cooling or heating equipment that would otherwise be required. Such an opportunity would be missed if only the sustainability (for example, energy efficiency) of that cooling or heating equipment was considered (Hawken, Lovins & Lovins 1999, p. 87).

They further warn that:

Without a fundamental rethinking of the structure and the reward system of commerce, narrowly focused eco-efficiency could be a disaster for the environment by overwhelming resource savings with even larger growth in the production of the wrong products, produced by the wrong processes, from the wrong materials, in the wrong place, at the
wrong scale, and delivered using the wrong business models. (Hawken, Lovins & Lovins 1999)

This suggests that systems-level thinking beyond the scope of individual products is an important consideration in tackling sustainability challenges. Design interventions may thus be retargeted to address underlying conditions that cause unsustainable behaviours or outcomes, rather than trying to alleviate symptoms (Young 2008).

2.2.5 Exemplars in design

![Fig 2. 3 Reuse of an electric reel. Source: Wikipedia 2015](image)

An electric wire reel reused as a center table in a Rio de Janeiro decoration fair. The reuse of materials is a sustainable practice that is rapidly growing among designers in Brazil.

Heath Nash a South African product designer is best known for turning waste materials into covetable designs. Heath Nash is a designer and maker from Cape Town. Heath started by using the paper-skills developed there to make lights, eventually leading to the exploration of local craft materials and techniques wire, binding, recycled materials. This led to a range he calls other people’s rubbish made from old used plastic bottles. In recent years, Nash has exhibited worldwide, including Tokyo, Milan, London, Vienna, New York, Los Angeles, Helsinki and Stockholm. He was the South African Elle Decoration designer and lighting designer of the year in 2005/6, and won the British Council title of South African Creative Entrepreneur of the Year in 2006/7 (Artistaday.com, 2015). Heath Nash’s products could easily be classified into product design, their utilization and application takes effect in interior design and therefore instrumental to the theme. Critics have described the designer as one concerned with exploring the often unrecognized beauty in everyday objects and materials, notably plastic waste.
2.2.5.1 The Mirra chair by Herman miller Inc.

Herman Miller, a leading global producer of office furniture, has a remarkable vision for the future. By 2020 the company strives to have a zero ecological footprint from its products. It recognizes that sourcing alternative materials and closing manufacturing loops will be hard to obtain amidst current gaps in technology, supply chains and markets. What gives the company confidence and helps maintain its commitment to this ambitious goal is its past progress in sustainable design.

The Mirra Chair was launched in 2003, it was co-developed with a design protocol rooted in recyclability, renewability and reduced toxicity. The result: well-selling task seating that is 96-percent recyclable, contains no PVC and can be disassembled in 15 minutes using simple tools. Building on this as a learning experience, Herman Miller has now used its new protocol to (re)design 27 percent of its product line.
Noteworthy Features of the Mirra Chair

- Contains no polyvinyl chloride (PVC)
- 96% recyclable
- Takes 15 minutes to disassemble with simple tools

Key Features of the Mirra Chair

**However You Sit on It, It Fits:** Mirra does what you need a task chair to do, does it beautifully, does it easily, and is very affordable. No wonder it's won a slew of awards! You get support and flexibility from the one-piece backrest, which is elastic so that it accommodates individual sizes, sitting positions, and the movements you make while you sit. The Posture Fit feature keeps your lower back properly aligned. And the AireWeave suspension seat distributes your body pressure evenly and keeps you cool.

**The Hole Story:** The 567 holes in the backrest in different geometric shapes create flex zones, each of which provides an appropriate level of flexibility for ergonomic support and natural adjustment. The durable material maintains its strength and responsiveness over many years.

**Designed to Support You and Your Work:** The TriFlex backrest supports your back. Pliable and elastic, it conforms to individual sizes, postures, and micro movements. The passive Posture Fit feature keeps your lower back properly aligned, so you stay relaxed and alert and don't slouch when you're working at a computer.
Get a Good Seat: The AireWeave suspension seat distributes your body pressure evenly and keeps you cool. And it adjusts itself as soon as you sit. The Flex Front seat edge ensures that there's never a gap between the seats and back it adjusts the depth of the seat without moving the seat pan your spine is always supported.

Comfortable Ride: The patented Harmonic tilt mechanism keeps resistance consistent throughout the recline range, which means you always have a smooth and balanced ride and are always in control. It also allows your body to pivot naturally at the ankles, knees, and hips.

2.3 The Ndebele

2.3.1 A Brief History of the Ndebele

The Ndebele are descended from the Nguni settlers who, it is believed, arrived in Southern Africa around 200 AD. In the early 1600s, King Msi settled among the low hills around which present day Pretoria is built. After his death, his two sons Manala and Ndzundza fought over the chieftainship and the Ndebele split into two main factions. Manala and his followers went northwards, towards present day Pietersburg. Ndzundza and his followers, who today are known as the Southern Ndebele, went east and south and they have remained distinctly Ndebele and culturally independent of their neighbors.

In 1849 and 1863, the Ndebele successfully warded off attacks by the white Boer invaders and settlers. However, in 1883 they were defeated and the tribal structure of the Ndzundza Ndebele was broken up and all of their tribal lands confiscated and divided among the Boers.

From the early to mid-20th century, the Ndebele were in the wilderness, and as a result, maintained a strong tribal identity in the face of the government forces that sought to destroy them. Their mural art and beadwork and their strict adherence to culturally based rules of personal adornment maintained their cultural unity and reinforced their distinctive Ndebele identity. These expressive symbols were used as a type of communication between sub groups of the Ndebele people. They stood for their continuity and cultural resistance
to their current circumstances. The Boer farmers did not understand the meaning and only viewed it as cultural art that was not harmful, so it was allowed to continue. Ndebele artwork is impressive because of the designs and colours used.

2.3.2 Wall painting Traditions and Techniques

For over a hundred years, the Ndebele have decorated the outside of their homes with designs. Before the mid-19th century, the Ndebele lived in grass huts. During the years of the Difaqane (scattering of the people during the Boer wars), the Ndebele mixed with their Sotho and Pedi neighbors, which resulted in the Ndebele switching from grass to mud walls in their house construction. They also integrated their cultural traditions, adopting the originally Sotho practice of decorating their walls with finger painting.

One form of early design was made with earth pigments, ranging from bright yellow to brown. The pigments were ground up and mixed with liquid to form a "paint" that was used to decorate door and window frames, bordered with charcoal.

The second form of early designs were made by dragging the fingers through wet plaster, usually cow dung, to leave a variety of markings, from squiggles and zigzags to straight lines. In this form of painting, the entire wall was divided into sections, and each section was filled in with contrasting finger paint patterns. In the Ndebele belief system, it is only this older form of painting that has any spiritual significance, and is believed to be demanded by the ancestors to create cultural continuity. Some Ndebele claim that sickness and bad luck would come to those who did not recognize the ancestors. This form of decoration is still acknowledged by contemporary painters, who decorate the ground in
The contemporary form of wall painting is a surprisingly recent phenomena, and is linked to the history of the people themselves. After the indenture of the Ndebele in 1888, many of the freed Ndebele migrated to Hartebeesfontein. In 1923, they became separated from their King, and again found themselves in exile from the symbols of their tribal identity.

It is women who have been the practitioners of the artistic forms that are such striking Ndebele cultural markers. In beadwork and wall painting, women have an outlet for the expression of their experience of the world, of their aspirations, and of their identity as individuals and as part of a group. The first paintings' imagery came primarily from the women's beadwork traditions that go back hundreds of years. The early paintings were geometric and primarily decorative. Over the decades, the painters' style quickly developed and the artists began to incorporate imagery from their lives, particularly the details drawn from their work as domestic servants in white households in the cities. Electric lights, swimming pools, multistory houses, telephones, airplanes, and water taps all appear prominently in Ndebele paintings. Artists have been quoted as saying that because they want these things for themselves, they paint them on their homes. Read literally, the symbols and designs in Ndebele wall painting reflect the aspirations of the painter, and ultimately, the community.
Then, the black outline is filled in with color, and white spaces offset painted areas. After the color has been applied, the final step is to repaint or touch up the black outlines. The earliest paintings were done with earth pigments, whitewash and laundry bluing. Although commercial paints have replaced the older pigments, the artists still use chicken feathers as paintbrushes. Ndebele painters distinguish styles and origins among different forms of mural decoration.

Ndzundza (Southern) Ndebele art also tends to be open, less busy and more geometrically disciplined than that done by the Ndebele elsewhere.
Like the Ndebele culture itself, the style of wall painting is in a constant state of becoming: assimilating and appropriating from the long-held spiritual beliefs of the Ndebele people as well as influences from the more and more culturally dominant and technology driven west. Through their bold, geometric designs, the women artists of the Ndebele affirm the identity of the group, and proclaim their uniqueness to all who see their art.

2.3.3 Symbolism

Normally the walls outlining the perimeter of an Ndebele homestead will not be built, and hence decorated, until approximately two years after the birth of a woman's first child. Thus wall decoration is symbolic of women's fertility and serves to indicate her status in the community as a mother, head of homestead and responsible adult. By giving birth to a child a woman also gains for her husband full participation in the community's council of men as a family head. Her work therefore is symbolic of how her fertility has given her family a voice in the public affairs of the group. The application of wall decoration is usually also indicative of times of transition in the life of a woman, such as the marriage of a daughter, or the period when her son attends initiation school.

Ndebele homes are painted with bright colors: pinks, blues, yellow, oranges, and greens. Bold colorful designs are specific to a family and it is up to the women to design and paint them with the children. Enclosures are a sign of wealth as they keep in animals owned by the family. The village has a main meeting hall used for meeting with visitors or for celebrations like weddings.
Colors used in Ndebele artwork have cultural meaning. Designs can be read like a newspaper headline when you understand the code:

<table>
<thead>
<tr>
<th>Colour</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>Marriage, rebirth</td>
<td>Death, sadness</td>
</tr>
<tr>
<td>Blue</td>
<td>Faithfulness, request</td>
<td>Hostility, dislike</td>
</tr>
<tr>
<td>Yellow</td>
<td>Wealth, garden</td>
<td>Badness, thirst, withering</td>
</tr>
<tr>
<td>Green</td>
<td>Contentment</td>
<td>Discord, illness</td>
</tr>
<tr>
<td>Pink</td>
<td>Promise, high status</td>
<td>Poverty, laziness</td>
</tr>
<tr>
<td>Red</td>
<td>Love, strong emotion, anger</td>
<td>Heartache</td>
</tr>
<tr>
<td>White</td>
<td>Spiritual love, purity</td>
<td>(None)</td>
</tr>
</tbody>
</table>

*Fig 2. 12 color coding. Source: sahistory.com 2015*

This home in Karen Nairobi by Designer Suzanne Kasler incorporates both sustainability as a philosophy and heavily borrows from traditional African heritage in its design. Furniture for use is made of wood entirely sourced from fallen trees. Artist Sue Fusco made the ostrich-egg chandelier. Across the dining table an antique crewelwork bench evokes Kenya's British Colonial past. The roofing is wooden and mimics traditional grass thatched houses.

*Fig 2. 13 practical exemplar Source: www.housebeautiful.com 2015*
2.4 The Kenyan Middle Class

DREAM: Complete apartments for sale and renting in Nakuru. Home ownership is one of the goals of the middle class.

In October last year, Kenya was declared a middle-income country having achieved the per capita income of $1,160 and surpassed the World Bank threshold of $1,036 after the economy was rebased. The new status is a pointer to a growing economy, which has accelerated in the last two decades as witnessed in several sectors of the economy such as telecommunications, financial services and real estate. *(The Star Newspaper, Sunday, 11 October 2015)*

The progress made in development also means a sizeable middle class is emerging. The middle class is not only crucial to the country’s economic and democratic development, but it is this class of citizens that is likely to shape the culture, values and entire future of the country. Basically the middle class is that group of people that does not live in poverty but cannot be regarded as wealthy either. It ranges from what has been regarded as the “floating class” which lives at subsistence level but is vulnerable to slipping back into poverty in the event of external shocks such as loss of job or during sickness for instance. Then there is the “lower middle class” who live above subsistence level and are able to
save and consume non-essentials. The third category is the “upper-middle class” that in addition to saving can also afford some luxury items and investment (The Star Newspaper, Sunday, 11 October 2015)

Christine Lagarde, managing director of the International Monetary Fund, dubbed Kenya’s economic gains over the last few years “nothing short of remarkable”. And few are benefiting more from this progress than the country’s burgeoning middle class. The middle-class population in Kenya now stands at 44.9% of the total population, translating to 19.9 million people. These millions form a powerful purchasing block. According to the African Development Bank, the middle class spends between US$2 and US$20 a day, on average (Kapchanga, 2015).

2.5 Summary

The literature reviewed is important and it provided the researcher with pertinent information on culture and the design concepts, theories and philosophies to be employed in the research project. The exemplars explored gave the researcher an idea of what had been undertaken elsewhere to curb similar problems. This helped the researcher in his attempt to propose solutions to the problems in the case study. Through studying published documents it was also discovered that home ownership is arguably the biggest goals for the middle class in Kenya. This further justified the need to undertake this project so as to propose ways to develop constructions that reflected and represented the African ways of life and that did not compromise the environment for future generations.
CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction

This chapter covers the research methods intended for use to acquire information necessary about the problem under study in order to use this information to propose possible solutions.

3.2 Research Design

The aim of the proposal was to investigate the use of sustainable design principles in home designs in Kenya and how they can be integrated with traditional African art forms. The researcher therefore used the investigative research method since it was adequate to answer questions on whether or not sustainable design principles are being used in residential designs. The researcher also used descriptive design. This is so because it offered the best opportunity of collecting information that demonstrated the thoughts and feelings of the sample population as they exist.

3.3 Sources of data

The researcher used two types of data to articulate the research problem: primary and secondary data. Primary data was derived from answers respondents gave during engagements with the researcher. This types of data was acquired through interviews, questionnaires, photography, and observation. On the other hand, secondary data was derived from the findings stated in published documents and literatures related to the research problem. The researcher also reviewed information from tertiary sources mainly the internet.
3.4 Sample and Sampling Procedure

The sample size was primarily determined by that which was realistically achievable to the Researcher. The sample constituted a homogeneous population consisting of home owners perceived to belong to the middle class by African Standards, professional involved in the design and construction of homes such as architects, construction managers and interior designers and also workers involved in day to day maintenance of residential spaces.

*Table 1 Sample Population Source: Author’s Construct 2015*

<table>
<thead>
<tr>
<th>Population category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home owners</td>
<td>10</td>
<td>50%</td>
</tr>
<tr>
<td>Architect</td>
<td>1</td>
<td>5%</td>
</tr>
<tr>
<td>Construction Managers</td>
<td>1</td>
<td>5%</td>
</tr>
<tr>
<td>Interior Designer</td>
<td>3</td>
<td>15%</td>
</tr>
<tr>
<td>Maintenance staff (grounds men, cleaners etc.)</td>
<td>4</td>
<td>20%</td>
</tr>
<tr>
<td>Local Authority (chief)</td>
<td>1</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>20</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

It was essential that the responses from the sample population provide adequate information for meaningful conclusions to be drawn from the study. The researcher used the following sampling methods:

**3.4.1 Random sampling**

The researcher divided the sample population into mutually exclusive groups and the random samples were drawn from each group.
3.4.2 Convenience sampling

The researcher selected the easiest population members from which to obtain information from. This was applied when taking interviews, where the population will tend to vary from time to time.

3.5 Research Instruments

The researcher employed the following data collection instruments:

3.5.1 Observation

Observation was selected as an appropriate method of data collection as it enabled the acquisition of accurate information required to draw up conclusions. The researcher developed and used observation guides. This method of collection of data involved writing relevant notes and sketching diagrams. These prevented loss of information or distortion before analysis. The ergonomics of some the furniture, lighting of the vicinity and traffic flow were some of the issues examined by observation. Some respondents lacked the necessary information about the case study condition while some failed to provide the objective information about the research and as such observation greatly complemented the other methods of data collection that were also used.

3.5.2 Photography

Photography provided the best visual representation of the site and therefore the researcher used this instrument to point out the problem statement explicitly as it was at the site. The photos taken facilitated the researcher to argument the main eye raisers and therefore enhanced the analysis of the site as at that moment.
3.5.3 Interviews

The researcher used unstructured interview guides. This were used to get in-depth information on selected matters and opened up discussions on personal viewpoints. This also allowed room for formulation of more questions that sought clarity on unclear responses. Interviews were also be important because the language of the interview was adopted based on the ability or educational level of the interviewee.

3.5.4 Questionnaires

This entailed issuing questionnaires with short simple questions that did not require much thought or literacy. Use of questionnaires was an appropriate method because it was free from bias of the interviewer. Respondents also had more time to give well thought answers and finally because they were cheaper and quicker to administer to a large group of people. They were also less time-consuming.

3.6 Data Analysis

The analysis of the data was done manually, and commenced when all interviews and observational data had been transcribed by the researcher. After the researcher had read through the transcribed materials, dominant points were identified, using a comparative approach. This involved examining, comparing and categorizing data until no new categories emerged.

3.7 Data Presentation

This was the representation of the findings obtained from the actual research, conclusion and transferability of the findings. The overall representation was narrative in nature. Diagrammatic representations were inevitable in representing illustrations. The researcher significantly relied on photographic data accompanied with appropriate explanations on the actual nature of the study.
3.8 Conclusion

The researcher mainly employed an investigative approach in this research. The researcher attempted to be extensive and cover much of the areas of interest. Random and convenience sampling were used because the researcher predicted the respondents to be diverse in nature and he was justified in the end the sampling methods were also appropriate since the researcher had no prior acquaintances with most of the respondents.
CHAPTER FOUR

4.0 SITE ANALYSIS AND INTERPRETATION OF FINDINGS.

4.1 Introduction
The Muchilwas residence is located along State house Nairobi. The compound features a four bedroom maisonette, a three room servant’s quarter, a garage/parking area that can accommodate two cars and a chicken house. It is a vast property with ample outdoor space that could be used for various outdoor activities.

From research, the residential design of the maisonette does not adequately exhibit any cultural authenticity from any recognizable African form of art through its interiors, furniture, landscaping, exhibition and display. Sustainability as a design philosophy has not been adequately been incorporated as well. Throughout the property, one can hardly spot any item made out of recycled material. Most of the interior aspects such as flooring material, ceilings, cabinets and furniture are old and worn out. Little has been done to repair broken and worn out items. The choice of color for most items in this residence is poor leading to spaces that are not aesthetically appealing.

4.2 Qualitative Analysis (Pictorial and Narrative)

4.2.1 Site Location
The space under consideration in this research, the Muchilwas home, is located along state house road Nairobi. The premise can be accessed by taking State House Road from University Way. It is a residential space and features a 4 bedroom maisonette, a separate 2 room servant’s quarter, an old garage that has over time been rendered useless and a chicken house. It is home to a small family of four, all adults aged between 19 and 48. The main building, like many in the neighborhood is a concrete design with tile roofing. Both the garage/parking and the chicken house are made of wood and iron sheets.
4.2.2 Landscaping

The premise has one main gate that serves as the only way into and out of the compound for people, cars and anything that might warrant being taken in and out of the compound. The gate is old, shaky and unstable a testament of no maintenance procedures over a long period of time. Often locked from the inside, the gate usually leaves a huge space in between the two gate doors leaving one to wonder whether it serves the main purposes for which it was installed: to provide security and a feeling of safety and privacy. It is a shock that the image above shows the gate when completely under lock and key.

From this photo, it is clear that there are drainage issues as manifested by the pool of stagnant water constantly present on the sideways. This besides being a disgusting site, is a health hazard as it provides a conducive environment for the breeding of mosquitos that can cause and spread various illnesses. The plants next to the wall, due to lack of
proper pruning and care, vary in size thus terribly failing in their sole function: aesthetic purposes.

**Fig 4. 3 Driveway from the gate. Source: Author 2015**

Despite being located in a posh suburb of Nairobi, mainly occupied by luxurious offices and foreign embassies, the residence lacks proper organization and orientation. The landscape is rough touch with loose rock pebbles being the access road finish material as seen in the photos above. The loose pebbles not only pose a danger but also make litter collection difficult for the cleaner. The trenches on the side of the main path leading to the main building from the gate are not properly positioned with a suitable gradient. During rainy seasons they fill up with rain water as they basically lead the water nowhere. This again poses a health risk.

**Fig 4. 4 Lack of proper groundcover. Source: Author 2015**

Most of the back side of the compound is filled with small trees that provide good shades. However, the spaces lacks proper ground cover such as grass and most of the ground
surface is irregular with slight crests and depressions. This makes the space unsuitable for outdoor activities such as family gatherings and outdoor parties. The lack of proper ground cover also leads to a lot of dust being generated during windy days. This can cause respiratory complications and when the dust escapes into the main building, makes general cleaning tougher and affects movable parts of machines.

Fig 4.5 Vast but largely bare outdoor space. Source: Author 2015

Despite the vastness of the outdoor space at the Muchilwas compound, it has absolutely no furniture. It is just bare land punctuated with randomly positioned shrubs, trees and other pieces of vegetation. This is shocking to say the least. The space as it is does not provide the necessary ambience for comfort and relaxation that an outdoor space in a residential setting should. It simply doesn’t complement the main building like it’s supposed to.
The garage/parking area besides being old, unattended to, and basically out of use is made of unsustainable material and too much of it at that. There is no clearly demarcated way that leads from the main entrance/gate to the parking/garage and even if it had been before, it must have been poorly constructed and maintained leading to it being eventually covered by grass. The garage, originally constructed using corrugated iron sheets has since been rendered useless leading to the only vehicles in use by the residents of this compound being parked behind the main building. What a shame.

The compound even though punctuated with many types of beautiful plants and other types of vegetation: potted plants, low shrubs and other forms of vegetation leave very little to be desired. In most cases these have been allowed to overgrow without pruning and proper
care. The plants have not been manicured well so as to grow in specific shapes and sizes and guided to follow certain directions so as to add beauty and glamour to the compound.

4.2.3 Interior Architecture

The general materials used in the construction of the building are stone, ceramic tiles, wood, metal and glass.

*Fig 4.9 wooden floor. Source: Author 2015*

The floor in the living room and what is supposed to be the dining and study is originally made of hard wood pieces arranged beautifully to form a pattern that is appealing to the eye. However, due to lack of proper maintenance such as polishing and application of necessary paint materials, the floor that seems to once have been a beauty to behold has succumbed to serious discoloration, wear and tear. In some spots, the wood pieces have over time come off and have not been replaced, consequently making the floor lose both its functional and aesthetic value.

*Fig 4.10 kitchen flooring. Source: Author*

The synthetic tiles installed on the kitchen floor have non slide components added onto them to prevent skidding and sliding have not been properly taken care of, thus coming off. Even then, they haven’t been replaced either. The end result is an unsightly and dangerous scene.
Most of the ceiling material besides being old, outdated and unattractive has large patches caused presumably by leaking roofs and general wear and tear due to time. These patches inside spaces that are supposed to provide comfort and sanctuary are disgusting to look at.

This photo of the site’s interior taken by the author at around midday reveals that lighting is a problem. The window in the room is not positioned properly so as to take advantage of daylight, an important aspect of eco-design. Through proper orientation and positioning, dependence on electrical energy during the day can be minimized saving it to be used later on in the day or for other functions. The photo also reveals a poor choice and installation of curtains. Surely, one would not want to look twice at these curtains.
The general painting of the whole space is wanting to say the least. This is manifested by the uninspired painting of the kitchen cabinets and counter tops. This is further compounded by the floors’ red color. The complete and boring application of the blue and red color without harmony leave little to be desired and hardly encourage the activities that ought to be undertaken in the kitchen. It simply isn’t the right place to prepare a sumptuous meal after a long day.

Most of the paint on many walls of the Muchilwas home has over time come off. This is mainly due to poor choice of paints and hardly any maintenance. This presents the residents of this premise and visitors alike with unsightly scenes needing urgent attention.

Congestion is a huge problem at the Muchilwas. Despite the main building having room large enough to actually accommodate more furniture, poor arrangements make most of
the rooms feel squeezed when they actually aren’t. Most of the storage spaces are not well arranged the end result being the aesthetic qualities of most of the rooms being limited. Movement and circulation around the rooms is also greatly compromised.

4.2.4 Exhibition and display

Fig 4. 16 various display units on site. Source: Author 2015

Most of the cabinets in the Muchilwas home are roughly made from wooden materials presumably from cut down trees, an unsustainable behavior. The display shelves show signs of very little or no maintenance. Items displayed on them are loosely placed with no systematic arrangement. This presents a sight far from nice. Retrieval of items from these display units must be difficult and tiresome due to the poor arrangements.
The kitchen cabinets besides being painted a shouting and unpleasant blue need repairs on the hinges so as to return to full functionality. Despite the numerous storage spaces in the kitchen, water is stored on small plastic bottles. This again boils down to organization and arrangement.

4.2.5 Furniture

Most of the furniture at Muchilwas home is made of wood, plastic, wrought iron, synthetic fabrics and complemented by upholstery. It is difficult to spot recycled materials in any of the furniture.

There is inconsistency in furniture in terms of use i.e. different types of furniture say chairs for a similar use creating a sense of confusion. Most of the furniture like the display units before are under designed and lack an aesthetic appeal. This is further compounded by lack of proper cleaning and maintenance.
Furniture arrangement in most of the spaces is done with little consideration to movement and circulation. Arrangement in the living room, shown in the adjacent figure for example leaves very little space for human movement.

4.3 Quantitative Analysis
A population of 30 participants was thoughtfully selected so as to, by and large, represent all the characteristics in the population and the end target users. Questionnaires were issued to them and in some cases the researcher opted for unstructured interviews so as to obtain more detailed information. The researcher hoped to know and understand the main factors that influence the choice of furnishings in their homes and their source of inspiration. The pie chart below shows the results the research obtained.

The results from the pie chart above were not surprising at all. A staggering Half of the Home owners along state house road Nairobi mostly draw inspiration for their interior design and décor from Western and European Cultures. 20% employ various African cultures in their furnishings while 15 percent draw their inspirations from Kenyan Cultures. Consequently, the researcher sought to establish in what ways the various culture inspirations were applied in the different parameters of interior design: interior architecture, landscaping, exhibition and display and finally furniture design. Most home owners, it was found out are only familiar with the application of cultural influences in exhibition and display. Any of them hardly applied it in landscape architecture.
During the interviews, the researcher also sought to find out specifically how the culture inspiration was being applied in residential homes along state house road, Nairobi. The results revealed the main items that were used to be sculptural items, wall hangings, furniture, carpets/rugs, display items such as vases, lampshades, accessories and others. The results were as shown below in the bar graph.

The researcher also sought to find out the familiarity of home owners with sustainability. The researcher then explained the basics of sustainability to those who were not fully aware of what it meant and then sought to find out whether the home owners were willing to incorporate sustainable practices in their homes. The results were as follow.
4.4 Presentation of Findings

One of the main objectives of the researcher was to ascertain whether African cultural influence characteristics have been displayed in the interiors of the residential home. The indoor dining area of the Muchilwas residence depicted a number of design problems. The residential interior design does not exhibit any cultural inspired characteristics from any known community. The home is furnished based on inconsistent themes that are even difficult to trace. The wooden floor has visible grouting marks and the paint on the wall. The ceiling is plain and white and lacks any form of design inspiration. The lighting is inadequate and does not create a refreshing mood in the residential space. The furniture layout is plain and boring. The furniture is old and does not exhibit any African cultural characteristics and inspirations.

4.4.1 Materials used

Most of the materials used in interior architecture especially in the kitchen include: synthetic tile evidenced by their crackle effect and permeability although they are covered with slip. The tiles are presumably Chinese imports to Kenya. Synthetic Formica and wood finishes have also been
used to laminate exposed wood parts. These materials are industrially manufactured and are non-biodegradable hence unsustainable. The cheap imports further hinder the use of locally available materials such as marble and quartzite rocks. Looking at sustainability in a bigger picture, this has implications on transport mechanisms. A lot of energy is utilized to transport these materials to Kenya. This is unsustainable. The wood used to design most of the furniture in the house is not reclaimed, pointing to cut down trees. The problem of deforestation is rampant in Kenya as caused by overspread immature logging and accelerated by the increasing demand for cheaply acquired timber. Some of the furniture in the living room, kitchen and dining area is designed from PVC material whose manufacture is greatly linked to the emission of chlorofluorocarbons into the environment worsening the already alarming rate of global warming. The material is also non-biodegradable.

Decorations in most parts of the house is all wrong. It is hard to believe that any systematic thought process went into the décor. There’s no proper theme guiding the furnishings in this house. Use of different materials and different colors for various rooms in the house creates confusion and is unsustainable as it’s wastage of materials. The poor lighting makes some sections unnecessarily dark and this could cause injuries through unnecessary accidents. The poor drainage system has had profound effects on the general landscape through the unsightly sceneries created by the stagnant water from the rain. The water has become a breeding ground for disease causing organisms and microorganisms. The loose rock pebbles making up the drive ways have caused injuries and the dust generated due to lack of proper groundcover poses health challenges to occupants.

4.5 Conclusion

The Muchilwas residence has not drawn from African inspiration in its construction and furnishing. In fact it follows no recognizable theme. Most of the materials used for furnishing are unsustainable hence compromising the environment for future generations. This requires urgent attention.
CHAPTER FIVE

5.0 SUMMARY FINDINGS CONCLUSIONS AND RECOMMENDATIONS.

5.1 Introduction

In relation to the research questions, the researcher summarized the findings so as to develop an appropriate conclusion and recommendations. All data is based on the facts found by the researcher after implementing the research methodology as stated in the third chapter of this research paper. This section will provide the summary of findings from the research, the researcher's conclusions and recommendations on the way forward to spearhead design that is sustainable and borrows inspiration from the vast African culture.

5.2 Summary of data findings

From the results portrayed in the previous chapter, it is obvious that African art forms and heritage has not been adequately explored as a source of inspiration in the design and construction of residential spaces in Kenya. Quantitative results reveal that most homes are built and furnished based on Western/European themes although there is inconsistency even in the application of these. The belief that these foreign themes portray a sense of class and that they are superior to the traditional and indigenous Art forms is a mere fallacy and should be rooted out of society. This can only be achieved through bringing forth aesthetic designs that draw from these African art forms such as the Ndebele art.

The researcher found out that very many unsustainable materials have been utilized in design due to their easy availability caused by recent industrial developments. Interviewing professionals in the design and construction industry revealed that most home owners resort to unsustainable materials due to their cheap price. It is also obvious that some professionals purchase cheap unsustainable materials in order to maximize on profits. Advocated by the idea that materials from western nations are superior and portray a sense of class and status, home owners have also moved away from the utilization of locally
available, recyclable materials in the name of contemporary design. Some of the most harmful and unrecyclable materials include PVC, synthetic fabrics, artificial fibre boards used in ceilings and artificial ceramic tiles that pose environmental hazards.

The excessive use of immature timber cut down from local forests also poses a danger. This trend is based on the belief that furniture from reclaimed, recycled or repurposed wood looks old and unfashionable hence preference of fresh timber, which is greatly untrue. The research therefore revealed that there was need to provide beautifully designed items that were based on repurposed and recycled wood as well as other recycled materials. Most occupants of the locality where the study was conducted are working class individuals hence there is need to create for them environments that provide sanctuary and shift their moods from the office/work environments and relax their minds from the overworked conditions by providing a calming effect.

5.3 Conclusion

It is no secret that there is dire need for a design revamp of the premise as advocated by the research findings and confessions by the occupants themselves. The existing design and the choice of materials are unsatisfactory and unsustainable to the users and the environment at large. There is a limitation on the strengths but a lot of Opportunities as discovered through the participatory SWOT analysis conducted by the researcher. The demand for a more sustainable interior architecture, furniture, exhibition and display and landscaping is the only solution towards keeping the premise environmental friendly. Aesthetic appeal is also significant and should be the point of focus so as provide relaxing environments to the residents. The concept of recycling and application of eco-design principles were overwhelmingly found out to be the best ways to go about the revamp. The researcher discovered that there was need for design to be an agent of the recycling activism as it is a better tool of enhancing aesthetics, functionality and contemporary themes into the forms developed from recycled materials. The researcher could therefore proceed to recommend appropriate concepts and material that could be applied in the design process towards the solution of the main problems under study.
5.4 Recommendations

The researcher gathered information on Ndebele art and the principles of sustainability mainly from secondary sources. In reference to the research questions, the researcher collected valuable information on how sustainability in residential design can be integrated with inspiration from Ndebele art to fulfill the purpose of this research paper as per the title and proposed recommendations in the four fields of interior design: interior architecture, exhibition and display, furniture design and landscaping as follows

5.4.1 Interior Architecture

**Lighting**: the researcher proposes use of recycled beer, wine bottles that would otherwise be useless to develop beautiful lighting features for areas that do not require too much light. This combined with Ndebele branded lampshades and chandeliers made from responsibly sourced materials would uplift most of the rooms in the Muchilwas home to give them more aesthetic appeal.

![Lighting features from reused beer/wine bottles. Source: recyclenation.com](Fig 5.1)

![Ndebele inspired chandeliers. Source: pinterest.com](Fig 5.2)
**Flooring:** the researcher proposes proper and timely renovation of the wooden floors when need arises. Proper cleaning and maintenance is also recommended. The synthetic tiles in the kitchen with a monotonous red color, most of which are worn out could however be replaced with beautiful ceramic tiles with bright Ndebele prints on them. These besides adding glamour to the room are also sustainable.

![Fig 5. 3 Ndebele inspiration for ceramic tiles. Source: www.atelierfiftyfive.com](image)

The researcher also proposes use of rags and carpets beautifully designed and or printed Ndebele style.

![Fig 5. 4 Ndebele inspired carpets. Source: tasteafrica.com 2015](image)

Color schemes: the plain white and blue painting in most of the rooms at the Muchilwas is boring and needs immediate retouch. The researcher recommends incorporation of warm colors blended carefully to create a refreshing mood in the spaces.
The Muchilwas living room features an unused fire place. This due to many years of neglect. The researcher recommends renovation of this feature as it not only serves to provide warmth during cold seasons but also adds beauty and glamour to the room.

**Fig 5. 5 beautifully painted walls add glamour. Source: www.lifestyle.com**

**Fig 5. 6 functional fire places add aesthetic appeal. Source: www.avatexwool.com**

### 5.4.2 Exhibition and display

As revealed by the analysis in chapter four of this paper, the Muchilwas lack adequate display units to display and store items like books leading to major congestion. The few that exist are generally under designed and use too much materials, a practice that’s unsustainable.
The researcher also recommends beautifully crafted decoration items such as artefacts, wall hangings and paintings to beautifully adorn the room.

Furniture Design

The researcher recommends use of reclaimed wood in the design of furniture as opposed to cut down trees. It is also recommended that certain aspects of furniture such as pillows be crafted with Ndebele inspirations to give the spaces a cultural identity.
5.4.4 Landscaping

The researcher recommends the following groups of plants/vegetation to cover the vast outdoor space that has been left bare and not properly taken care of and maintained.

5.4.4.1 Groundcovers

Ground cover plants are useful in the garden for covering bare patches of soil beneath trees or shrubs or for covering steep banks where access is difficult. Their roots also help to stabilize soil on steep slopes. Ground cover plants brighten up otherwise dull areas and will suppress weeds, making them ideal for a low-maintenance garden. Suitable groundcovers for the case study include the following.

**Thyme:** This aromatic groundcover or upright plant excels in beds, borders, and containers. The woody-stem plant features tiny, fragrant leaves and flowers that can be used fresh or dried. Creeping varieties can handle moderate foot traffic. Tuck plants between the stepping-stones of a garden path.
**brass buttons** (*Leptinella squalida* 'Platt's Black') grows no taller than 3 inches with textured, feathery foliage in shades of bronze-black to purple-gray and small, buttonlike yellow-green blooms. This versatile groundcover plant grows in full sun to partial shade and moist but well-drained soil.

![Fig 5. 13 brass buttons Source: http://www.bhg.com 2015](image)

**Sweet woodruff** is one of those rare plants that flourishes in dense shade. Planted below trees and shrubs where its tiny white spring flowers will bloom about the same time as crabapples. Reaching 6-12 inches tall, sweet woodruff (*Galium odoratum*) behaves nicely, forming well-behaved clumps of deciduous green foliage on upright stems.

![Fig 5. 14 sweet woodruff Source: http://www.bhg.com 2015](image)

### 5.4.4.2 Grasses

Grass is an important part of most landscape plans due to its versatility. While some gardeners question the need for a lawn at all, grass does have advantages. It provides a safe and inviting surface for children and pets and for recreational activities that other surfaces can't handle. Ornamental grasses are also important in providing wildlife habitats, easy-care landscapes as well as erosion control.
5.4.4.3 Climbers and Creepers

Climbers and creepers is a group of plants or vines which need support of some kind in your garden. Because climbers and creepers grow vertically in the garden they are great space savers and can be used to provide masses of foliage so are useful to cover walls, trees or a fence. Climbers and creepers can also provide great privacy but they do need a bit of attention and care.

![Variety of climbing plants](www.bhg.com)

Fig 5. 15 variety of climbing plants. Source: [www.bhg.com](http://www.bhg.com) 2015

5.4.4.4 Shrubs

Shrubs are often placed at the base of a home to hide the foundation. These plants are used to cover the unsightly area. In some modern-day houses, the foundation is not covered by facade materials (e.g., brick, siding) as the rest of the house. Thus, foundation plants cover the non-facade areas. Suitable examples include

![Rockspray Cotoneaster](www.diynetwork.com)

Fig 5. 16 Rockspray Cotoneaster Source: [www.diynetwork.com](http://www.diynetwork.com) 2015

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5.4.4.5 Hard landscapes

The researcher recommends outdoor benches made of reclaimed wood. Repurposed bricks can also be used for demarcations. The researcher also recommends digging of proper trenches to aid in drainage.

Fig 5. 17 Quartz Rose Verbena Source: www.diynetwork.com

Fig 5. 18 outdoor bench from reclaimed wood. Source: qualitydecoration.blogspot.com

Fig 5. 19 walk paths from repurposed bricks Source: www.houzz.com 2015
5.5 Suggestions for further studies

The search for inspiration when sourcing for ideas in cultures is never exhausted. Moreso in Africa where it is estimated 3000 different tribes reside. More extensive research should be done into the fusion of various distinct cultures in design and specifically interior design and find out more ways on either complementing the similarities or differences of cultures under study.

It's is clear that numerous gaps pertaining recycling and the challenges involved in material acquisition, reclamation procedures and how the material can blend in with other themes such as sustainable design, contemporary design, and the fast growing and changing design trends warrant further investigation to fill in the gaps. To add unto the existing knowledge, the following gaps need to be filled:

1. There is need to carry out a research on the challenges facing recycling in the Kenya and Africa in general

2. A study on the impacts of technology and industrial development on recycling should be conducted.

3. A research on how to enhance the quality of products designed from recycled materials.
REFERENCES


Benoit Cushman-Roisin, *Sustainable Design*, 2015

Jason F. McLennan, “The Philosophy of Sustainable Design”, 2004

Lena L. Kroeker, “Kenya’s emerging middle class(es)”


Sabine Marschall- *Sites of Identity and Resistance: Urban Community Murals and Rural Wall Decoration in South Africa* (Autumn, 2002), Published by: UCLA James S. Coleman African Studies Center


Dr. Sam C. M. Hui, *Principles of Sustainable Building*, Department of Mechanical Engineering-The University of Hong Kong


The star newspaper (Sunday, 11 October 2015) *Emergence Of Middle Class In Kenya Requires Friendly Policies*
Mark Kapchanga, Kenya’s middle class is growing how you can cash in (http://www.akilah.net/news-trends/March 12, 2015)

Campbell, E 2009, 'You know more than you think you do: Design as resourcefulness & self-reliance',


Chad White with Emma Stewart Aligned for Sustainable Design: An A-B-C-D Approach to Making Better Products may 2008
Appendix i

QUESTIONNAIRE GIVEN TO HOME OWNERS

1. Is your interior design and decor inspire by culture?
   Yes ☐ No ☐

2. Which of the cultures mentioned below does your interior design and decor reflect?
   African ☐ Kenyan ☐ European ☐ Asian ☐ Other ☐

3. Does your interior design and decor include African cultural items (please tick the appropriate choices)
   Sculptures ☐ Wall hangings ☐ Display items ☐ Lampshades ☐
   Furniture ☐ Carpets/Rugs ☐ Accessories ☐ Others ☐

4. Given the opportunity, would you consider incorporating African material culture in your home’s design and decor?
   Yes ☐ No ☐

5. What inspires the choice of furnishings in your home?

6. In your opinion, do you think African culture is explored to a great extent? Give two reasons for your answer.
   Yes ☐ No ☐
Appendix ii

Observation guide

Main items observed and noted include the following:

- Main theme upon which the site is designed and built
- Construction materials employed in the site
- Design philosophies used
- The ergonomics of the furniture
- Lighting of the vicinity
- Traffic flow
- How well the place is maintained

The researcher to also necessary measurements of the site and sketch down key features.