Public Libraries Going Green:

Environmental Sustainability and Green Information Literacy

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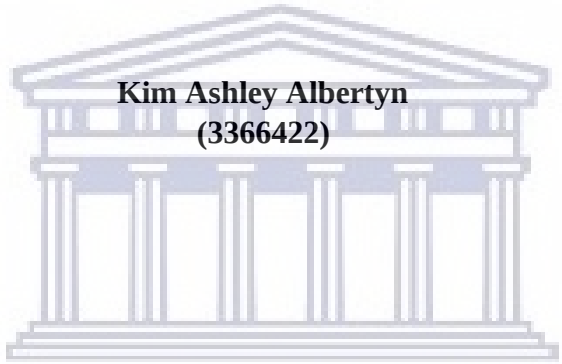
(3366422)



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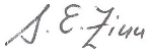
Signed:  Date: 26 February 2021

ABSTRACT

There is a great demand for human beings all over the world to live in a more green way, due to the earth's natural resource scarcity and other environmental issues such as climate change, pollution, emission of greenhouse gases, global warming and depletion of the ozone layer. Librarians, especially public librarians, are seen as the facilitators of access to information. Public librarians are thus in a position to create awareness of the importance of green living and to educate the general public on how to live green.

The study made use of Werner's (2013) sustainable buildings, equipment and management checklist as well as Segarra's (2015) rating system for green libraries, environmental literacy, and environmental education. The aim of the study was to investigate current green practices of libraries and what public libraries can do to educate their users about environmental sustainability and green living, while making them more environmentally literate. The researcher made use of a mixed methods approach. Selected public librarians were interviewed and a checklist tested if the library is truly green. The software package ATLAS TI 7.5.7 was used to analyse the qualitative data, and themes were drawn from the interviews. The researcher made use of Microsoft Excel to tabulate and create graphs for the quantitative analysis (checklists). The findings were triangulated. The findings revealed that library staff was familiar with the majority of the terms. It was found that none of the four City of Cape Town public libraries is green. Only one participant from Meadowridge Library and two participants from Claremont Library had a strategy to make their users green information literate. Adding green information literacy, green living and environmental sustainability programmes to library business plans and Service Delivery Budget Implementation Plan (SDBIP) and partnering with good sustainable partners were suggested to create awareness about green living, environmental sustainability and to make users green information literate. Five out of eight criteria on the checklist were practiced by City of Cape Town public libraries. Library staff are not actually educating users how to live green affordably and staff lack awareness of the subject matter.

Keywords: Green living, green information literacy, environmental education, environmental sustainability, public libraries, ecological literacy, environmental literacy, green libraries.

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Abbreviations and acronyms

ACRL – Association of College and Research Libraries
AFLIA-African Library and Information Associations
ALIN- Arid Lands Information Network
BPERJ- Biblioteca Parque do Estado do Rio de Janeiro
BREEAM -Building Research Establishment Environmental Assessment Method
CNSL- Cutchogue New Suffolk Library
CO_{2-} Carbon Dioxide
CPL- Chicago Public Library
CUHK-Chinese University of Hong Kong
EPWP – Expanded Public Works Programme
ERB- Environmentally Responsible Behaviours
DPL- Denver Public library
GBSCA- Green Building Council of South Africa
GHG- Greenhouse gas
HVAC- Heating, Ventilation and Air Conditioning
ICT- Information and Communication Technology

IFLA – International Federation of Library Associations and Institutions

LCD - Liquid Crystal Display

LED – Light-Emitting Diode

LEED – Leadership in Energy and Environmental Design

LEED NC- Leadership in Energy and Environmental Design, New Construction

LIC – Librarian-in-charge

LIS – Library and Information Services

MSU- Michigan State University

NAEE- North American Association for Environmental Education (NAEE)

ODLIS- Online Dictionary for Library and Information Science

SDBIP – Service Delivery Budget Implementation Plan

SIG - Special Interest Group

SOLINET- South Eastern Library Network

UM - University of Montana

VCO -Volatile Organic Chemical

CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1 Introduction and motivation

Planet Earth is in grave danger because of environmental threats such as air and water pollution, depletion of the ozone layer, deforestation, accumulation and emission of greenhouse gases and climate change, among many others. These serious environmental challenges have been mainly caused by humans (Kurbanoğlu and Boustany, 2014:47). Statistics have shown that the greatest contributors to the emission of greenhouse gases in the city of Johannesburg are the following sectors: transportation (38%), industrial (28%), residential (26%), government (2%) and Commercial (6%) (State of energy South African cities—Urban Energy Support, 2015:22). This proves that environmental challenges are indeed caused by humans, and the only way to save the earth for future generations is by changing people's and institutions' behaviour (Kurbanoğlu and Boustany, 2014:47). These environmental challenges have led many businesses, governments and institutions such as libraries to reduce their carbon footprint over the past few years (Chowdhury, 2012:633).

As a result of libraries' involvement in environmental issues, the Green Library Movement emerged in the 1990s in the United States. However, it only became popular in 2003 (Kumar and KD, 2014: 1). The main aim of the green library movement is to build green library buildings, provide green services, practise sustainability in libraries and make existing facilities in the library green (Kumar and KD, 2014: 1). Public libraries are seen as the gateway to knowledge, and the green library movement enables libraries to equip their communities with resources and the understanding of how to live green (Miller, 2010:viii).

According to Merriam, Courtenay and Cervero (2006:278), the earth's land and water have been environmentally degraded over the years, and many have decried this environmental

destruction since. The plea for environmental sustainability has become more urgent as the earth's climate is currently experiencing changes due to the accumulation of carbon dioxide and other greenhouse gases in the atmosphere. South Africans not only contribute to greenhouse gases, but they are also vulnerable to the effects of climate change on their health, livelihood, water access and food security (South Africa. National Planning Commission Department, n/d: 33). A report published by the World Bank in 2012 estimated that global temperatures would rise above 3º Celsius by 2020. The report also states that a 4º temperature rise would increase aridity, drought and extreme temperatures in many regions in Africa (McElrath and Sutherland, 2015:14).

The current power supplier in South Africa is Eskom (Ferreira, 2017:74). Eskom is currently using non-renewable resources such as fossil fuels, which are known to cause great damage to the environment such as contributing to global warming, photochemical pollution and acid rain (Ferreira, 2017:73). However, an environmentally sustainable form of energy such as solar energy has gained traction in the past few years. Solar energy is clean, low maintenance and does not affect the environment negatively in any way. South Africa has tremendous potential for effective solar generated energy due to the country's ideal climate.

South Africa is currently facing a water crisis. In 2008, the World Future Society stated that water will be scarce in the twenty-first century the way oil was scarce in the twentieth century (McBane Mulford and Himmel, 2010:31). The majority of South Africa's wetlands and river ecosystems are threatened, which is a concern as wetlands make up 2.4% of the country's surface area. There has also been a decline in fresh water from 1970–2010, further indicating that water resources are not doing well (Sanlam, 2016:20). According to Waterwise.co.za (2017), South Africa receives an average of 492 mm of rain each year, whereas the rest of the world

receives an average of 992 mm. Thus, South Africa has been classified as a water-stressed country. Not only does South Africa receive less rain than many parts of the world, but there is an uneven distribution of rain across the country, which can cause droughts and floods. By 2025, 48 countries will be affected by water stress or scarcity, and South Africa is one of these countries. (Hunt, 2004:49).

The South African Statistics Department revealed that the country's population grew from 15,384,557 in 1955 to 57,342,422 by 2018 (Worldometers.info, 2018). In 2016, 83.5% of South African households had access to piped water (StatsSA, 2016), since the bigger the population—the greater the demand for water. Thus, green information literacy is necessary to educate consumers on the dangers of wasting water and how to go about saving it.

In order to improve the situation in South Africa, households, industries and organizations have to reduce their negative impact on the environment and change the way they live and work (National Planning Commission Department: The Presidency Republic of South Africa, (n/d):33). Studies need to be conducted as the environment is deteriorating and the need for environmental sustainability is growing more urgent. Public libraries can serve as ambassadors of environmental sustainability. In leading by example and educating their users about becoming green information literate and living green, libraries can help preserve the earth for future generations. The International Federation of Library Associations and Institutions (IFLA) has an annual Green Library Award that lends credence to this study as it provides insight into what green practices libraries are implementing, it gives libraries an idea of what green practices they could possibly implement and it demonstrates that there is a need for libraries to become green (IFLA, 2016).

1.2 Research problem

According to South African policies such as the National Environmental Management Act (Act 107 of 1998 cited in Rosenberg, 2009), the National Water Act (Act 36 of 1998), and the National Environmental Management: Biodiversity Act (Act 10 of 2004), all sectors that make up our society should give more attention to environmental sustainability, as the environment has been neglected.

Specialists' and South African citizens' concerns about environmental issues such as climate change, water pollution and food security are continuing to grow (Rosenberg, 2009:3). The literature states that educating people about the environment is key to changing their attitudes and behaviour, which the public library can do through environmental education (Miller, 2010:4). Thus, this study's aim was to investigate what public libraries can do to educate their users about environmental sustainability and green living, while making them more environmentally literate.

1.2.1 Research objectives and questions of the study

The following objectives were derived from the aim of the study:

- To identify what librarians' perceptions are of environmental sustainability and green libraries.
- To identify what libraries can do to create awareness of environmental sustainability and promote green living.
- To determine the green living practices public libraries are currently employing.
- To determine how librarians educate users on the importance of green living and increase users' green information literacy.

The following critical questions were generated from the aim and objectives:

- What are librarians' perceptions of environmental sustainability and green libraries?
- What can libraries do to create awareness of environmental sustainability and promote green living?
- Which green living practices are public libraries currently employing?
- What are libraries doing to educate users on the importance of green living and increase users' green information literacy?

1.3 Significance of the research

The study is significant in that it has contributed to the limited literature on green libraries. It has also contributed toward green information literacy, green living, environmental education, ecoliteracy and environmental sustainability in libraries in general, and in South Africa in particular, where the literature is almost non-existent. This research has revealed that there is a need for library staff to be educated on this subject matter themselves, so that they may be able to educate library users. This study is also important because it revealed that City of Cape Town public libraries should implement green information literacy strategies and form partnerships with policy makers.

1.4 Delimitations and limitations of the study

A delimitation of the study is that it is geographically confined to four libraries in two subregions in the City of Cape Town and the results are therefore not generalizable. A limitation of the study is that the envisaged inclusion of library patrons had to be abandoned because the data collected far exceeded the scope of a Masters-level study.

1.5 Definitions of terms

This study uses recurring terms which are explained below. The terms are fully discussed in section 2.2 (conceptual framework).

Environmental sustainability: Using resources and interacting with nature in a way that conserves resources for future generations (Kurbanoğlu and Boustany, 2014:48).

Going green: Leading a lifestyle and making decisions that are environmentally friendly, which can help protect the environment (Kurbanoğlu and Boustany, 2014:48).

Environmental literacy: The ability to perceive and interpret the relative health of environmental systems and to put this knowledge into practice in order to maintain, restore or improve the health of these systems. An environmentally literate person will have a basic understanding of the environment and the concept of sustainability (Kurbanoğlu and Boustany, 2014:49).

Carbon footprint: "The total amount of greenhouse gases produced directly and indirectly in order to support human activities" (Kurbanoğlu and Boustany, 2014:49).

Green IT: The use of Information Technology (IT) resources, systems, initiatives and programmes in an energy-efficient and cost-efficient manner that is environmentally sustainable (Mishra and Akman, 2014:2999).

Green libraries: This is a multifaceted concept with several components, such as green buildings, operations and practices; green programmes and services; green information systems; and green collections (Kurbanoğlu and Boustany, 2014:49). Green libraries are also defined as libraries that apply environmental policies (McElrath and Sutherland, 2015:14).

Green or sustainable building: A structure that is designed, renovated, operated or reused in an ecological way and in a resource-efficient manner (Kurbanoğlu and Boustany, 2014:50).

Green information literacy: A set of conventional skills expanded to include sustainable thinking, which takes into consideration how our information behaviour choices and information actions affect our environment (Kurbanoğlu and Boustany, 2014:54–55).

Eco-literacy: An understanding of the principles of the organization of ecosystems and application of those principles to creating sustainable human communities and societies (McBride et al., 2013:14). As well, it reflects an understanding of environmental realities by identifying their cause and effect relationships (McBride et al., 2013:13).

Sustainability: The total sum of peoples' choices that will have zero impact on the ecosystem (McBane Mulford and Himmel, 2010:3).

1.6 Research methodology and design

A mixed methods research design was used for this study. The mixed methods approach was founded on the notion of pragmatism. The convergent parallel (or triangulation) design was used. The researcher made use of qualitative methods via interviews conducted with librarians and librarians-in-charge. The quantitative portion of the study consisted of a checklist that participants had to fill in.

1.6.1 Population and sampling

The population of the study included librarians at the City of Cape Town public libraries. Purposive sampling, a form of non-probability sampling, was used to select the libraries and librarians. Four public libraries were selected from which ten library staff participated (six librarians and four librarians-in-charge).

1.6.2 Data analysis

The qualitative data was analysed by transcribing interview responses and identifying themes in the data. The software package ATLAS TI 7.5.7 was used to analyse the qualitative data, and Microsoft Excel was used to create graphs and tabulate the quantitative data. Findings from the checklist and the interview responses were later triangulated.

1.6.3 Quality criteria

A pilot study was conducted to test the instruments to ensure the quality of the research. Criterion-related validity was used for the study. Internal criterion-related validity was shown through the checklist that was given to librarians. Validity was achieved by triangulating different data sources, examining their evidence, and building a logical justification for the themes created. An external auditor reviewed the entire project, from the accuracy of the transcription to the relationship between the research questions, as well as the data and level of data analysis. The researcher made use of natural validity. Credibility was ensured by providing evidence of the interview schedule and applying triangulation.

1.7 Organisation of the chapters

The thesis has been divided into six chapters.

Chapter One introduces the topic of the research and provides background information on the current environmental crises that the world and South Africa are facing which motivated the study. As well, it provides a statement of the research problem; the aims and objectives of the study; a brief summary of the research methods used; definitions of key terms; and the delimitations and limitations of the research.

Chapter Two provides the conceptual framework that the study uses and reviews the literature on green libraries and related topics of the study. The chapter identifies what other libraries around the world are doing to address the environmental crises and become green.

Chapter Three presents the research design and methodology, including the pragmatic paradigm; qualitative and quantitative approaches (or mixed methods); population and sampling; data collection tools; instrument validity and reliability; data analysis; and ethical issues of the research.

Chapter Four presents and analyses the data collected in the interviews and checklists. Verbatim quotes were used liberally to present findings from the qualitative interviews and graphs and tables were used to present findings from the quantitative checklists.

Chapter Five discusses and interprets the findings by triangulating the qualitative and quantitative results. Links are made to the conceptual framework and extant literature.

Chapter Six summarizes the major findings from the study by answering the four research questions, draws conclusions and makes recommendations for future research.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The purpose of a literature review is to explore and discuss key research published on the subject of study. The literature review positions this project in the larger field of study and shows how it builds on previous studies. This chapter addresses the literature on green libraries; librarians' promotion of sustainable development and green living; green living practices and green rating tools; green information literacy; and environmental education/literacy.

The conceptual framework will be discussed first. It is composed of a rating system, a checklist, and a model of green operations and practices. A visual representation of the conceptual framework can be seen in Figure 2.1. As well, it reveals conceptual understandings from the literature on environmental sustainability, green living, and green libraries.

2.2 Conceptual framework

A conceptual framework consists of a theory (a set of definitions or interrelated constructs) that helps explain phenomena in the world (Creswell, 2014). Conceptual and theoretical frameworks are important as they guide the questions of the study and provide an interpretive lens for the study's findings (Creswell, 2014:69). The researcher has made use of Segarra's (2015 cited in Hauke, 2015) rating system of green libraries and Kurbanoğlu and Boustany's (2014) green operations and practices items list, as they provided criteria for demonstrating that a library is green. Werner's (2013) sustainable buildings, equipment and management checklist was used to assess a library's potential to become green. These guiding classification tools together with the

conceptual understandings from the literature assisted in identifying the gaps in existing research. It was revealed that there are very few studies on green libraries in South Africa.

The classification tools (Segarra's rating system and Werner's checklist) were developed and have been applied internationally, although not all the criteria were applicable to this study. Thus, the researcher made use of only certain criteria that were relevant to South African public libraries. Other frameworks or guidelines mentioned but not applicable to this research study are Roth's (1992 cited in McBride et al., 2013), three levels of environmental literacy and the North American Association for Environmental Education (NAEE) (2000/2004, 2011) guidelines for learning (see Appendix E).

The former was discarded as it is out-dated and the latter is organisation specific.

This study is therefore informed by the following concepts and guiding classification frameworks from the literature:

- Concepts: environmental sustainability; environmental literacy; environmental education; green information literacy; and green library
- Segarra's rating system of green libraries
- Kurbanoğlu and Boustany's green operations and practices

Werner's sustainable buildings, equipment and management checklist

2.2.1 Environmental and green concepts

Environmental sustainability is the practice of using resources and interacting with nature in a way that will not reduce what is available for future generations (Kurbanoğlu and Boustany, 2014:48). The concept refers to going green which means to pursue knowledge and practices that

will lead to more environmentally friendly and ecologically responsible decisions and lifestyles, which will, in turn, protect and preserve the environment (Kurbanoğlu and Boustany, 2014:48).

Research on using environmental sustainability criteria in green libraries has grown (Dias, 2017:8). The concept of environmental sustainability was practices in public libraries in Portugal by Lisbon University (Dias, 2017:8). The environmental sustainability criteria that the investigation used were: environmental policies, financial management, consumption management, transmitting the message, and acknowledgement of the importance of the subject (Dias, 2017:6–7).

A related but more specific concept is *environmental literacy*, and it refers to having an understanding and appreciation of the environment and people's impact on it (Kurbanoğlu and Boustany, 2014:49). The individual is also able to identify and make sustainable choices (Miller, 2010:3). *Environmental education* is cultivated to foster environmental literacy in a population. This type of education equips people with the knowledge and understanding of the environment, as well as how human actions impact the environment through various programmes (Corvo de Armas, 2008:2). The concept of environmental education was used in the Green Room project of the Ministry of Environment (MMA) in Brazil. The project implemented social and environmental spaces that served as informational and educational centres. The Green Room is a space linked to public institutions such as a public library, engaging in educational programmes related to environmental issues that will raise awareness of the importance of sustainability (Cardoso and Machado, 2015:3).

Simmons (1995 cited in McBride et al., 2013), conducted a thorough and methodical review of relevant literature on environmental literacy up to 1995 in which seven components were identified: (1) affect, (2) ecological knowledge, (3) socio-political knowledge, (4)

knowledge of environmental issues, (5) cognitive skills, (6) environmentally responsible behaviours (ERB), and (7) additional determinants of ERB and it was used as the basis for the North American Association for Environmental Education (NAAEE) (2000/2004, 2011) Guidelines for Learning. However, the seven components were made up from Roth's (1992 cited in McBride et al., 2013), three levels of environmental literacy developed in 1995 and other framework (see appendix E). These seven components are:

1. Affect - having responsible attitudes; towards conserving and protecting the environment.

2. Ecological knowledge- being able to communicate, major ecological concepts.

3. Socio-political knowledge- a clear awareness of how human cultural activity to the environment has an impact on the environment from an ecological perspective.

4. Knowledge of environmental issues- having an understanding of environmental issues and the influence the political or governmental institutions has on these issues. As well, it means having an understanding of air and water quality and quantity.

5. Cognitive skills, or the ability to evaluate information about environmental problems.

6. Environmentally responsible behaviour (ERB) - actively participating in solving problems and issues as well as using methods that will conserve resources.

7. Additional determinants- include an individual's perceptions of his/her ability make a change to their behaviour (McBride et al., 2013:6).

Green information literacy is the integration of sustainability into information literacy (Hauke, 2018:4). It develops a set of skills consisting of sustainable thinking that enables people to make informed information behaviour choices and see how their actions will affect the

environment (Kurbanoğlu and Boustany, 2014:48). For the purpose of this study, green information literacy will refer to how well librarians equip their users to apply green information literacy skills in their everyday life.

The concept of green information literacy was tested on a group of students at the Transylvania University of Badov, Romania. The students were then provided with an online survey which tested their knowledge of green searching prior to the course and whether it can shape sustainable thinking patterns (Repanovici and Landry, 2015:33–34). The Repanovici and Landry study was included in the current research study in order to motivate the reason for public libraries to provide green information literacy sessions to their users.

A framework for green information literacy comprising four categories was developed by Stark (2011). The categories are: 1) sustainability of scholarship and collections; 2) green library operations and practices; 3) green library buildings; and 4) measuring and improving sustainability (Stark, 2011:1). This framework was discarded, as it is used for academic libraries to engage in sustainability using specific and measured approaches to implement sustainability in information literacy (Stark, 2011:2).

The Online Dictionary for Library and Information Science (ODLIS) defines *green libraries* as "libraries that are designed to minimize negative impact on the environment and to maximize indoor environmental quality," by using biodegradable products and conserving resources (2013). The researcher will use this concept to identify what libraries are doing to become green and promote environmental sustainability through their services, education, operations and outreach programmes.

2.2.2 Segarra's rating system and Werner's checklist

The criteria that the researcher used to establish if a library is green are a combination of Werner's sustainable buildings, equipment and management checklist (2013) and Segarra's rating system of green libraries (2015). These frameworks were selected as criteria are provided that can be used to determine if a library is green. The criteria from these frameworks mentioned above were also used for the checklist of this research study. This framework includes four aspects:

The criteria for the building refer to the structure of the building and the materials that are used for the building (interior and exterior).

The Building: 1) Solar energy; 2) Use of daylight and natural ventilation, 3) Light bulb recycling via fluorescent, energy saving, and LED lamps; and 4) Power supply: the proportion of electricity from renewable energy sources (Segarra's rating system cited in Hauke, 2015:3).

Water: 1) Reduction of warm water use, use of grey rain water, and toilet irrigation (Werner's checklist, 2013:399); and 2) Water saving features and equipment (Segarra's rating system cited in Hauke, 2015:3).

Transport: Bicycle racks (Segarra's rating system cited in Hauke, 2015:3).

Workflows: 1) Waste separation and recycling (Werner's checklist, 2013:401); 2) Alternatives to plastic bags (Werner's checklist, 2013:400); 3) Avoidance of chemical cleaning products (Werner's checklist, 2013:400); 4) Switching off lights and electronic equipment at night and in empty rooms (Segarra's rating system cited in Hauke, 2015:3); 5) Ecological quality of materials (Werner's checklist, 2013:348); 6) Awareness training for employees; 7) Libraries leading by example policy (Werner's checklist, 2013:402); 8) Reuse or donation of items instead of

disposing of them; 9) Use of Liquid Crystal Display (LCD) monitors; 10) Use of recycled chlorine-free paper; and 11)

Elimination of kitchen plastics and use of real plates, mugs and utensils (Kurbanoğlu and Boustany, 2014:51).

Segarra's rating system was developed for a thesis which provided criteria for determining the green identity of libraries. The rating tool focused on German public libraries, but the researcher has only used the criteria that will be suitable to South African public libraries (see Appendix F). Stuttgart Public Library was used as a practical example of how the rating system was applied (Hauke, 2015:3–4). Kurbanoğlu and Boustany's green operations checklist was also used as a green library assessment tool (2014:51; see Appendix H). Werner's checklist is a checklist assessing sustainable buildings, equipment and management that was created for libraries that were interested in "greening" their facilities (Werner, 2013:10; see Appendix G).

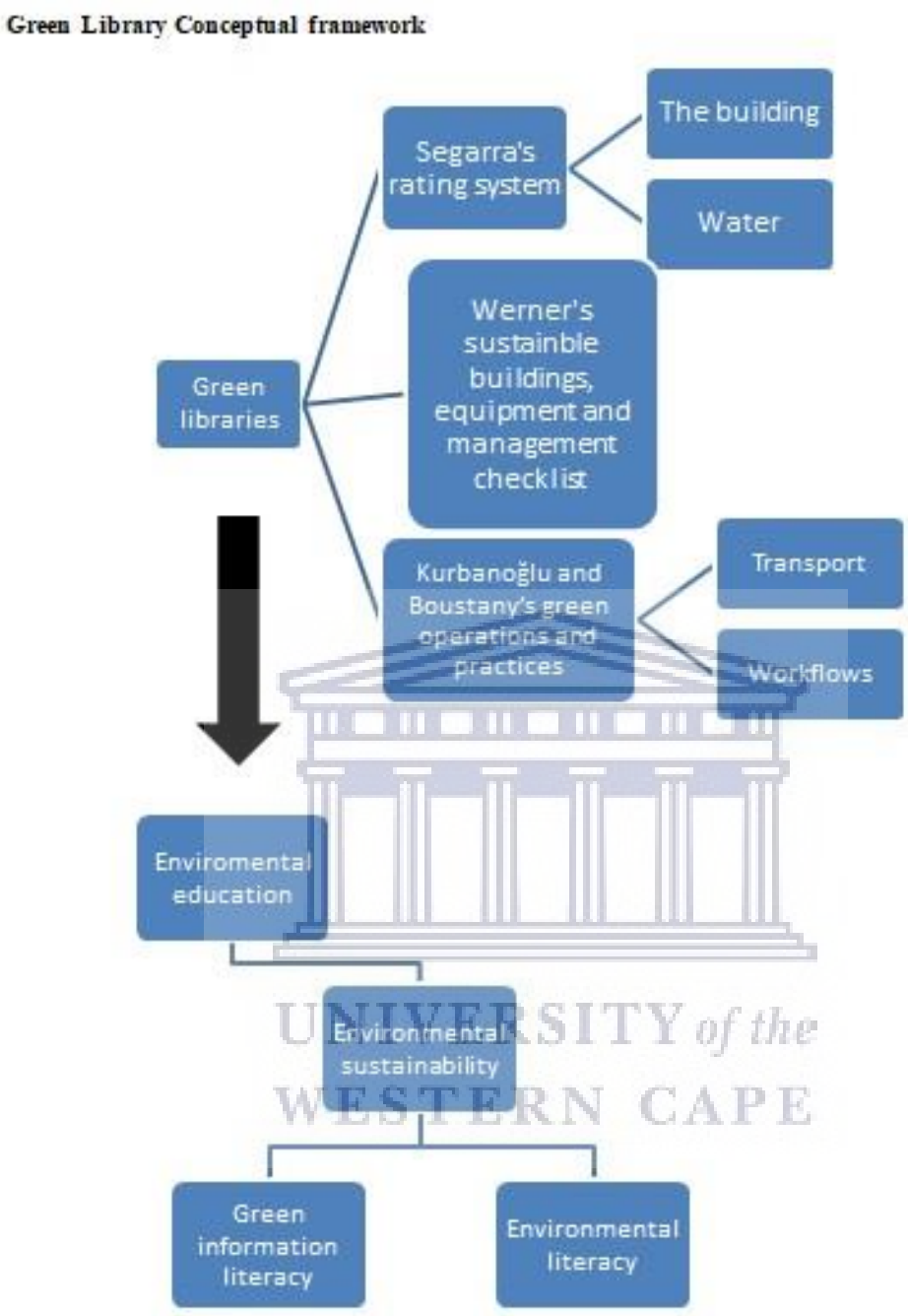


Figure 2.1: Visual depiction of the concepts, Segarra's rating system, Kurbanoğlu and Boustany's green operations, and Werner's checklist

Table 2.1 shows the links between the research questions and the conceptual framework.

Table 2.1 Research questions and conceptual framework

Research questions	**Conceptual frameworks**
What are librarians' perceptions of environmental sustainability and green libraries?	Green libraries
What can libraries do to create awareness of environmental sustainability and promote green living?	Segarra's rating system (2015) : the building and water
Which green living practices are public libraries currently employing?	Werner's sustainable buildings, equipment and management checklist (2013)
What are libraries doing to educate users on the importance of green living and increase users' green information literacy?	Kurbanoğlu and Boustany's green operations and practices (2014) : transport and workflows
What are librarians' perceptions of environmental sustainability and green libraries?	Environmental education
What can libraries do to create awareness of environmental sustainability and promote green living?	Environmental sustainability
Which green living practices are public libraries currently employing?	Green information literacy and environmental literacy

2.2.3 Discarded green library frameworks or checklists

This section provides a brief overview of other frameworks, checklists or rating systems that could be used for research on green libraries. However, these frameworks were discarded as they were not suitable for the study.

The Leadership in Energy and Environmental Design (LEED) is a green rating system from the USA Green Building Council used for evaluating green buildings (Aldrich,

2012:74). The rating system has become the standard for what is considered a green building. LEED consists of three potential rating certification for historical buildings—existing buildings, neighbourhood development and new constructions and major renovations/additions (NC) (Aldrich, 2012:74). The framework provides measurement outcomes to ensure that the building will be as green as possible. As well, it gives a clear definition of what meaningfully qualifies as greening a building. The LEED NC (New construction) checklist is comprehensively divided into six areas: sustainable sites; water efficiency; energy and atmosphere; materials and resources; indoor environmental quality; and innovation and design (Aldrich, 2012:74).

The LEED system was discarded because it is based in the USA and the South African Green Building System is based on the Australian Green Star rating system. The LEED framework is purely focused on green buildings and, as stated, having a green building does not necessarily mean a library. The LEED framework has also been said to add complexity and costs to greening projects in certain cases (Aldrich, 2012:74). Thus, the framework has been rejected for this research study.

The evaluation grades framework assesses green libraries according to levels Certified, Silver, Gold and Diamond (Noh and Ahn, 2018:60). The framework consisted of the following areas: land use and traffic; energy and prevention of environmental pollution; materials and resources; water circulation management; maintenance; ecological environment and library management; eco-friendly education programmes and campaigns; employees and operations; and computerization (Noh and Ahn, 2018:55). The framework was determined through a survey that was conducted among libraries in Korea, America, Canada, European countries and Asian countries. The framework was discarded because it was area-specific and the difference between grades was only in increments of 10% (Noh and Ahn, 2018:60).

In summary, concepts of environmental education, environmental sustainability, environmental literacy, green information literacy, and green library were used in the conceptual framework of this study. Measurements including Werner's suitable business equipment and management checklist (2013), Segarra's rating system of green libraries (2015), and Kurbanoğlu and Boustany's green operations and practices (2014) were applied in this study as these frameworks were applicable to the context for South African libraries. The evaluation grades framework and the LEED rating system were discarded as not suitable for this study. The next section examines the literature according to the broad themes of the research objectives.

2.3 Green libraries: A lacuna in Africa's library literature

Despite environmental sustainability being a subject of current interest, there are a limited number of publications on "going green" in libraries (Fourie, 2012:428). There is even less literature about the connection between library instruction and sustainability (Stark, 2011:2). However, the amount of information that is available on green libraries and green practices is growing. Dias (2017:1) states that research on green libraries has shown an increase in libraries that are implementing environmental sustainability as a criterion in their strategic and management actions. Worldwide, library associations are also creating working groups and encouraging debates on environmental sustainability, as well as introducing the concept of the "global library." However, there is still very little research about green information literacy (Kurbanoğlu and Boustany, 2014:47). According to Meschede and Henkel (2019, cited in Beutelspacher and Meschede, 2020), there are quite a few case studies that mention what libraries are doing to become greener and more sustainable, but these studies lack an empirical basis measuring environmental sustainability in libraries. The literature on environmental literacy has been strongest in the education and geography disciplines. This is further confirmed

by Mishra and Akman (2014:3000), who stated that there is very little research on sustainable development in general and the environmental impact of information services in particular. There is a glaring gap in the research literature on any green initiatives or environmental sustainability in libraries in Africa or in South Africa.

In August 2012, a quantitative research study was conducted by Karioja. A web-based descriptive survey method was used to investigate sustainability in libraries. The purpose of using this method was to describe, compare, and explain the phenomenon. Many librarians could participate in the survey, as the questionnaire was conducted at the IFLA World Library and Information Congress in Helsinki in Finland as part of a Finnish national project called Sustainable Development in Libraries (Karioja, 2013:21–22). The aim of this study was to discover the differences and similarities between Finnish and foreign libraries according to how they handled the environmental management, environmental economy, reduction of environmental burden, and increase of environmental awareness and communication. The findings of the survey revealed that the best handled areas were reduction of environmental burden and the worst was environmental communication. The study also revealed that there were not many differences in sustainability between Finnish and foreign libraries, even if the number of respondents in the international survey was low (Karioja, 2013:3). There were only four responses from Asia and Africa, respectively (Karioja, 2013:24). The lack of response may have been an indication that sustainable library issues were not yet important in Africa.

Africa has mainly agricultural communities. Thus, it depends on the environment for sustenance, food security and economic gains (African Library and Information Associations (AFLIA), 2018). The future of Africa might be in great danger if the effects of climate change on the environment become more pronounced. Thus, AFLIA, as the Pan-African Library and

Information Association, has started an initiative through public, community and academic libraries to create awareness among their communities for the need to sustain the environment. Libraries have to improve Africa's preparations for coping with the outcomes of climate change and provide information to the population for better management of the environment. Libraries have to achieve this objective through displays, seminars, workshops, and school visits covering three subjects: environmental challenges, causative factors and probable solutions (African Library and Information Associations, 2018).

Arid Lands Information Network (ALIN) is an International NGO that provides information exchange activities focused on small-scale sustainable agriculture, climate change adaptation, natural resources management and other livelihood issues. This NGO serves communities in Kenya, Uganda and Tanzania that are experiencing threats to their way of life on a variety of levels due to climate change. ALIN's Community Knowledge Centre equipped communities with computers, internet access, publications, newsletters, research reports, electronically stored information, audio-visual material and compendiums as well as providing a social gathering point for community members (Genovese and Albanese, 2011:17–18).

The centres have developed community leadership and possibilities for sustainability through easy access to information and resources; the capacity to develop local knowledge databases/reservoirs; engagement of youth in productive activities; access to IT skills; improved agricultural techniques; minimizing travel time; and students applying to colleges in rural areas (Genovese and Albanese, 2011:18). Thus, the centres' involvement and sustainability education has contributed to improving individuals' livelihoods.

2.4 Environmental education/literacy and green information literacy

In this section the concepts environmental education, environmental literacy and green information literacy are discussed and comparisons between the concepts are made.

2.4.1 Environmental education/literacy

Environmental education is a permanent process that equips people with the knowledge and moral values to understand environmental problems (Corvo de Armas, 2008:2). An ecologically literate person has been defined as a person that understands environmental realities by specifically identifying their cause and effect relationships. It has been suggested that ecological literacy is a subsection of environmental literacy, making environmental literacy a combination of ecological literacy and civic literacy (McBride et al., 2013:13). The main educational objectives of environmental literacy are to cultivate problem solving skills and develop a system of ethics (McBride–et al., 2013:16). Ecological literacy, on the other hand, is focused on acquiring knowledge of ecological concepts and principles, as well as developing skills that are related to the scientific method: observation and experimentation (McBride et al., 2013:16). The main objectives of eco-literacy are to promote and contribute towards economic development that will address social equity and ecological sustainability. As well, eco-literacy develops many dimensions of an individual's interaction with all aspects of the environment (McBride and et al., 2013:16).

The role of the library in environmental education is to create a special collection of materials which consist of fiction, non-fiction and audio-visual resources for community use. The library should provide a pleasant and conducive environment that will attract users and encourage their interest in becoming environmentally information literate. Ultimately, the library

is a source of environmental information, awareness and education, creating and fostering a community of environmentally literate citizens (Abiolu and Okere, 2012:56).

A lot of effort has been invested in environmental education for youth (Merriam, Courtenay and Cervero, 2006:278) and extensive environmental literature and education programmes for children (Merriam, Courtenay and Cervero, 2006: 256). This is evident in the case of the City Library of San Antonia de Los Banõs, in Havana, Cuba. This library runs a successful cultural project for children and young people called Love the Nature, as well as the Marti, a nature project which is in partnership with the Martiano Forest named after the national hero, José Marti, a defender of nature (Corvo de Armas, 2008:3). The Marti project was quite a success, as the library saw a greater number of requests for environmental books (Corvo de Armas, 2008:7).Three months after the project there was a change in the children's opinions— they no longer littered in rivers and persuaded their neighbours to also care for the environment and not litter (Corvo de Armas, 2008:8).

In the USA, the California Academy of Sciences has a public library and resource centre called the Naturalist Centre that is geared toward naturalists, teachers and children (Harrington and Beale, 2010:41). The Naturalist Centre implements green information literacy, as the visitors are taught the correct procedures for selecting scientific data which falls under a citizen science programme (Harrington and Beale, 2010:46).

Across the USA, there are many examples of living roof projects, which represent another type of public environmental outreach that public libraries could implement to promote sustainability and green living such as the Ballard Library in Seattle and the central library of Multnomah County (McBane, and Himmel, 2010:33) and the Naturalist Centre (Harrington and Beale, 2010).

Abiolu and Okere (2012:53) argued that information professionals in developing countries could be more helpful in fostering a sustainable environment by adapting their roles to the various communities that they serve. Environmental education should be developed through integration into the school curriculum, as it improves students' performance in the sciences and other core subject areas. This allows students to link what they have learned in class with real world experience (Abiolu and Okere, 2012:54). At the same time, libraries have to use creative methods to achieve greater environmental information exposure, create awareness events and host collaborative activities to inform their users, in addition to providing background courses in environmental studies (Abiolu and Okere, 2012:57).

There has been much focus on environmental education in schools, but the literature reveals that there is a need for librarians to promote and provide environmental education for their users. This is evident in two of the runners-up of the IFLA 2017 Green Library Award. The first runner-up, Uzice Public Library in Serbia, is creating awareness of sustainable development and environmental protection among youth through educational workshops and handcrafts made from recycled objects such as corn dolls, paper flowers, decorative boxes and puppets (Charney, 2017:3). The second runner-up is a library in Lviv, Ukraine. It offers an "ECOeducation" project aimed at teaching children about eco-thinking, caring for natural resources, and reducing waste. There is an "ECO corner" at the library which offers interactive services. These include planting greenery and a winter garden, as well as a drawing contest, clean ups at a nearby park, and the use of eco packaging for books. Lastly, the library also provides the computer game, "Garbage Hero," which teaches users how to sort garbage and was provided by partners of the library (Charney, 2017:3).

In 2000, the Green Room Project of the Ministry of Environment (MMA) in Brazil began. The aim of the project was to implement social and environmental spaces that can serve as informational and environmental education centres. The Green Room is a space that is linked to a public institution, such as a public library or private institution, that engages in projects or educational programmes that are related to environmental issues. In 2015, there were 363 institutions taking part in Green Room Projects, including universities, city hall facilities, associations, and community and public libraries (Cardoso and Machado, 2015:3).

In 2015, an environmental education project was put in place by the State Department of Culture in Rio de Janeiro. The objective of the project was to make the Biblioteca Parque do Estado do Rio de Janeiro (BPERJ) Public Library a reference centre for environmental education and research; raise awareness of environmental issues among visitors (Collins, 2019), promote school–university–civil society interaction; and supply a reference collection in the field (Cardoso and Machado 2015:10).

There are several levels at which selection of green collection materials takes place. The first level is when librarians educate themselves about green practices and green programming materials. The following are several examples of the first level Metropolitan New York Library council created a green librarian special interest group (SIG) to further educational goals. The University of Wisconsin-Madison graduate programme in Library Science offered *EcoLibrarians: Changing our communities one step at a time* course in 2007. As well, in 2008, the

South Eastern Library Network (SOLINET) offered "The green library'' as an online class.

A second level of selection of green collection materials occurs when libraries gather green information for their patrons. An example of this is ALA (2009 cited in Connell, 2010),

suggested ways to support community needs for green information by building up their green collections. This would be accomplished through open forums for green book clubs; facilities for environmental video viewings or lectures; creating opportunities for children to get excited about ecology through poster competitions or poetry sessions; and selecting setting collection materials that cover organic gardening and composting, green computing and energy conservation (Connell, 2010:3).

Libraries have become creative by adding fiction books to their collections, such as *Seed Folk* by Paul Fleischman, that deals with the topic of green living (Blaine, 2010:26). As well, libraries have been starting relationships with local environmental interest groups. Libraries can work with local schools to support green curriculums and projects (Connell, 2010:13). Lastly, there are a number of review articles that focus on green resources to add to library collections. Examples of such review articles are on Eagon (2008), which is a "beginner set" of titles for a sustainable collection; Sotak and Zeidman-Kapinski (2007) in "Green reading: resources for the sustainability-minded" (Connell, 2010:4). However, not much research is written on what happens to books once libraries remove them from circulation, though Michigan State University (MSU) Library has partnered up with the MSU surplus store where the books are sold or recycled (Granger, 2017:51).

A study was conducted by Beutelspacher and Meschede (2020) in 91 libraries from 81 cities in Germany on the effect of physical books on environmental sustainability. Other environmental sustainability practices in libraries were also investigated (Beutelspacher and Meschede, 2020). An advanced search was conducted on the portal using the keyword 'sustainability' to retrieve any books in the German language. A total of 1388 books could be found in at least one of all 91 participating public libraries' catalogues, and only two libraries did not include these books in their collection (Beutelspacher and Meschede, 2020). More than half

of participating libraries stated that they provide books and other media on environmental sustainability to their users, (Beutelspacher and Meschede, 2020) and topics found in the libraries' catalogues largely coincide with topics available on the shelves (Beutelspacher and Meschede, 2020).

2.4.2 Green information literacy

A new objective for libraries would be to integrate content on sustainability into information literacy courses or sessions. This concept of environmental content integration has been termed 'green information literacy' or 'sustainability literacy.' This type of information literacy suggests having the knowledge and capacity to think, problem-solve, make decisions, and take action in favour of building strong social, economic and environmental systems (Hauke, 2018:4). Different approaches were used by libraries at Auburn University, Alabama, USA, to integrate sustainability into information literacy sessions which included a compulsory English Composition course. This course involved exploring sustainability topics; creating keywords and synonyms; and searching general and subject databases (Hauke, 2018:4–5). Librarians had the option of teaching more sustainability literacy courses at academic libraries that focus on theoretical issues. Another option was teaching sustainability through a more practical approach at public libraries by implementing programmes such as urban gardening and food sharing initiatives (Hauke, 2018:2). Environmental literacy and good sustainability practices allow libraries to develop their own ideology and principles regarding sustainability which serves as an investment for libraries. That investment is strengthened when sustainability practices are put to use and maintained (Dias, 2017:6).

Repanovici and Landry (2015:33) conducted a survey at the University of Brasov,

Romania, to determine students' attitudes towards green libraries, information systems and practices, as well as how the internet and information access impacts the environment. The population was comprised of 402 Masters and PhD students from the Faculty of Product Design and Environment. The data was collected through an online survey that was shared with students after the completion of the information literacy course. The survey contained ten questions, three of which were descriptive questions such as: can an information literacy course reduce carbon emissions, and can it make people think more sustainably. A total of 335 responses was obtained, revealing that 99% of students were not aware that internet searching consumes energy, and 73% of students preferred both printed and electronic documents (Repanovici and Landry, 2015:34). The results showed that 74% of students agreed that information searching skills may help to drastically reduce carbon emissions and electricity consumption, since it decreases the amount of time spent retrieving information. It was also found that 32% of students regarded information literacy as a determining factor in the development of sustainable thinking that can lead to a change of informational behaviour (Repanovici and Landry, 2015:34–35). Lastly, the survey revealed that students have a high interest in green subject matter, and information literacy also contributes to educating young users in sustainable thinking (Repanovici and Landry 2015:36).

Many academic libraries have used the Association of College Research Libraries (ACRL) standards as their framework for delivering information literacy sessions and setting information literacy outcomes (Association of College Research Libraries, 2004). However, the framework lacks a clear connection between critical thinking and applying the skills learned in the world of sustainability (Stark, 2011:6). For example, the Mansfield Library (University of Montana) is proactive in checking energy use, evaluating environmental impact, and taking

corrective action to align its building and service operations with greener practices As well, sustainability is directly integrated into its information literacy instruction (Stark, 2011:6). By adapting the ACRL standards (2004) to the cultural, economic, historical, ecological and local environment of the University of Montana, students will see the importance of sustainable applications when they seek information (Stark, 2011:12). First year students at the university are expected to achieve the learning outcomes outlined in the information literacy rubric (Stark, 2011:12). University of Montana (UM) has added an impact criterion that promotes sustainability to the current information literacy rubric. The impact criterion looks at the importance of integrating information with local knowledge, traditions and culture for future generations. The significance of adding sustainability to the information literacy rubric is to instil sustainable thinking, researching, and to provide a context to the information. Students are encouraged to understand the connection between sustainable thinking and critical thinking (Stark, 2011:14). By integrating sustainability into information literacy standards, librarians help students understand how all their learning, research and scholarship impact the world and the future in a significant way (Stark, 2011:15).

2.5 Librarians' promotion of sustainable development and green living

In order for a library to be green, the staff must pay careful attention to the services that they provide (Cardoso and Machado 2015:12). Thus, libraries need to develop sustainable practices and make them part of the on-going services they offer (Genovese and Albanese, 2011:2). Libraries have used various methods to make their operations more environmentally sustainable and to educate their users on green living and environmental sustainability. One example was an environmental art show held at the University of Scranton, Pennsylvania, USA,

which was open to the public. The art showcased students' art, which piqued the interest of others in learning more about environmental sustainability (Aulisio, 2013:7).

A study conducted by the Melton City Library, Australia, revealed that the library plans to include "green trails" that users follow through the library stopping at key points to learn about environmental sustainability (Binks et al., 2014:308). Web-based programmes were identified by Miller (2010:73). Similarly, the University of Delaware, USA, created a sustainability webpage a few years ago. A study conducted on the Canadian Leadership in Energy and Environmental Design (LEED) certified libraries has found that several among them circulated non-traditional resources. These included bike locks, energy meters, fishing poles, pedometers, thermal leak detectors, walking poles, as well as a seed library (Townsend, 2014:22). Berkley Public Library, USA, has maintained a tool lending service since 1979 in order to facilitate gardening and other do-it-yourself projects (Connell, 2010:3).

According to Beutelspacher and Meschede (2020), partnerships and cooperation are important for public libraries. Beutelspacher and Meschede's (2020) study found that German public libraries collaborated with schools, consumer centres, friends of the library, municipal utilities and waste disposal companies. In Townsend's study (2014:22), libraries had other green initiatives, such as a battery recycling depot; general recycling; bike racks; car pool parking spaces and electronic vehicle charging; using coreless toilet paper rolls; and printing paper made from recycled sources. Two libraries within a few miles of each other in Ames, Iowa have become creative and have put a bike system in place for all their interlibrary loan exchanges

(Connell, 2010:2). The Arlington Public Library in Virginia, USA" (Hauke and Werner, 2013:8), the Biblioteca Parque do Estado do Rio de Janeiro (BPERJ) (Cardoso and Machado 2015:11)

and some librarians in Oregon, USA, (Connell, 2010: 3) have all encouraged their staff to cycle to work and their users to make use of bicycles.

According to Fallik, Soper, and Sparks (2012:44), the current green trend in libraries is the production of zero-emission renewable energy using solar panels or windmills. Public libraries have been called "Green Education Centres" as they are now providing information on growing food and using alternative medicine. Some libraries have even created a community garden to educate their users about small-scale agriculture (Kurbanoğlu and Boustany, 2014:53) such as the San Francisco Public Library, Noe Valley, (Connell, 2010:3) and the Middle Country Public Library in Centereach and Selden, New York, in collaboration with Long Island Collaborative for Kids, landscape architects, and the USA Forest Service (Bohuski, 2020:21).

In 2016 and 2017, IFLA held the Green Libraries Award. The aim of this initiative is to support and promote the worldwide green library movement and to encourage green libraries to present their activities to an international audience. The award demonstrates a library's commitment to environmental sustainability, social responsibility and leadership in environmental education. The winner of the 2017 ENSULIB IFLA Green Library Award was Stadt bibliothek Bad Oldesloe in Germany for their project "Ernte deine Stadt" (harvest your city). It is a three year sustainable project that consists of a combination of urban gardening, makerspaces, and community building efforts. It does a great deal to demonstrate to library users that libraries are more than just books (Charney, 2017:1). One of the runners-up for the 2017 IFLA award was the Sun Yat-Sen Library, China (Guanghzhou), which transformed its building into a green space using concepts of ecological and environmental protection. Green features included big windows that let in more natural light and fresh air, thus conserving energy. These innovative librarians are educating their users about the importance of environmental

sustainability through films, exhibitions, monthly lectures, poetry readings and other media. The library also created an ecological and environmental protection website in 2007 (Charney, 2017:2).

A 2017 runner-up started a library reading tree in the Nakuru region in Kenya—an initiative to introduce children's book clubs to six public primary schools which led to the planting of 50 trees in schools and children learning the importance of conserving the environment and the role that planting trees has in combating climate change. (Charney, 2017:3).

Some of the most creative sustainable efforts, such as carbon reduction, rainwater harvesting, and smart solar land electrical charging, are taking place in American libraries (Granger, 2017:51) such as the Michigan State University (MSU) Library and the Twin Oaks branch of the Austin Public Library in partnership with the city's Harvested Protection Department (Granger, 2017:52).

Berkley, California, residents had a goal to reduce the community's greenhouse gas emissions by 80% below two thousand levels in 2050 (Energy & Sustainable Development, 2009). The Berkley Public Library has been leading the way since its opening in 2014. It has produced more power than it has used owing to solar panels; radiant wasting (heating systems that use 100% of their power without wasting energy) (Radiant Zone Heating, 2019); cooling; windows and skylights; wind chambers; and large ceiling fans. Some of the surplus energy goes to electric vehicle charging in the library parking lot (Granger, 2017:52).

In 2008, the Chicago Public Library (CPL) hosted a green summer reading programme which featured the library's "Read Green, Live Green" programme for children and adults (Miller, 2010:63). The CPL's adult programmes consisted of authors, politicians and dancers that

shared their ideas on how the community could be more environmentally aware. The library also hosted a community programme that focuses on sustainability, creating a platform for helping adults and young adults understand how human behaviour impacts the environment (Miller, 2010:71).

Hauke (2018) mentions another Green Library Project at the Pequeriosol School Library in Chiapas, Mexico. The library was built by the community where the parents and children were engaged in the process from design to funding and construction. The design consists of recyclable materials, integration of landscapes, water capturing, and natural lighting (Hauke, 2018:6).

According to McElrath and Sutherland (2015:21), in order for libraries to become truly social institutions, they would first have to develop a green agenda that incorporates green polices and activities into existing library programming. The plan would also include the mission, vision or strategic plan of the library that will serve to encourage both staff and patrons to participate in developing green initiatives. There are an increasing number of public organizations that are considering adding environmental aspects into their strategic plans (Beutelspacher and Meschede, 2020).

Hong Kong is a highly urbanized city that is vulnerable to the consequences of climate change and struggles to find solutions to environmental issues. In response, the Chinese University of Hong Kong (CUHK) Library has implemented a holistic approach to the issue by embedding sustainability into its library strategy and formulated wider green strategies beyond the green building. (Charney, 2017:2–3).

According to Rodgers (2017, cited in Bohuski, 2020:16) the best types of libraries do not limit themselves to the walls of their building but engage with their community. This is demonstrated in the CUHK Library strategic plan (2013–2016) vision statement. The statement expressed that the library will engage with their students, faculty and the wider university community to design and deliver user-centred, sustainable services and spaces (Jones, 2017:5). One of five strategic themes was sustainability, which had four associated objectives: to advance environmental sustainability in all aspects of life; deliver services that demonstrate value and economic responsibility; improve collection space, storage and preservation; and ensure that staff has the skill needed to deliver the library's mission and keep organizational structure secure (Jones, 2017:6).

One of the CUHK Library's green initiatives to promote behavioural change among staff and students is called GO!—The Green Office Programme. This initiative impacts the daily operations in all university offices, and its fundamental instrument is the GO! Checklist, which lists 32 action items (Jones, 2017:5).

In the Calgary Public Library's environmental plan consisted of principles for improving environmental lifelong learning. This would be supported through library collections and programming, as well as enhanced public services that promote environmental awareness (Griebel, 2012:115). Since then, the library has run over 50 environmental programs across the city every year. The library collaborates with green organizations to promote environmental awareness (Griebel, 2012:117). The environmental plan was a success, and it resulted in the establishment of an eco-themed children's reading programme with 50 000 participating school children. Plastic bags were eliminated, and a reusable bag was offered that was made from

recyclable materials. Thus, the success of this environmental plan highlights the importance of libraries instituting similar plans.

It has been stated that in order to make exiting libraries go green, libraries would have to promote scholarly research on the subject matter in green libraries (Mehta, 2018:238). This will create a green image, promoting libraries' sustainability commitment to their stakeholders and users. Librarians should act as green ambassadors by providing users with information that is suitable, timely, and relevant to green issues and concerns (Mehta, 2018:238–239). Some libraries have educated their users about green living and reducing their carbon footprint through having "green fairs." For example, the Winter Park Public Library (Florida who hosted the 2008 Going Green Fair, and the Altoona Area Public Library's Keep Us Green and Growing Fair in Pennsylvania, USA (Miller, 2010:67). Listing different types of green initiatives was necessary to provide examples of what other libraries are doing, to make comparisons and to draw criteria from the literature. The following section will discuss green living practices from various case studies.

2.6 Green living practices

Various case studies from libraries in the USA and Canada, and Portugal are highlighted below. This section is rounded off with a discussion about the use of space in libraries and the role of print versus electronic materials. The last item discussed is green IT.

2.6.1 American and Canadian Libraries

A case study was conducted from 2007 to 2009 that examined three libraries in Suffolk County, New York: the John Jermain Memorial Library, the Hampton Library, and the Cutchogue New

Suffolk Library (CNSL). These were selected based on their similarities in location, demographics, type of library and stages of construction process (Alberts, 2012:56). The Directors of the above-mentioned libraries were also given an online survey to complete which consisted of six questions on the true state of sustainable construction in libraries in East End of Long Island.

The findings of the survey revealed that the CNSL director found creating a green building not very important because it was considered expensive. The director of the Hampton Library felt that it was important to include as many green concepts in the project as possible, but it was very expensive. The John Jermain Memorial Library director stated that being green is very important and their building is considered green, as it is one hundred years old and represents sustainability in terms of building materials such as bricks, glass, wooden furniture and natural flooring (Alberts, 2012:61). It was also stated at the 2009 Long Island Library Conference that the initial process of going green could be expensive, but creating green facilities will save 25% more water and 40% more energy than what was used in the old building (Alberts, 2012:62).

The findings of the study also showed that buildings that rely solely on LEED certification are not sustainable, even though they are technically green and have a lot of cost saving benefits (Alberts, 2012: 63). This statement was supported by Aulisio (2013, cited in Bohuski, 2020), who argued that green libraries are more than just the design and materials used to build them (Bohuski, 2020:15). However, libraries that practice sustainability and sustainability education are often not deemed green because they are unable to afford environmental certification from a company such as LEED (Bohuski, 2020:15). It was found that buildings are greener and more sustainable when using LEED certification along with the

following elements of sustainability: security, technology and flexibility (Alberts, 2012:63). This finding is supported by Hauke and Werner (2013:4), who asserted that not all green libraries have to have a silver or gold LEED, and there is a lot that librarians can do without focusing on buildings.

For example, the Denver Public library (DPL) invites local area bike dealers and volunteers from Bike Denver, a local bicycling advocacy group, to talk about various types of bicycles, safety and equipment (Lawrence et al., 2012:124). The library's Fresh City Life (FCL) adult cultural programming department promotes environmental sustainability through cooking demos, crafts involving recycling, and living libraries. (Lawrence et al., 2012:124). Living libraries are people that are experts on a variety of topics who are available for a 25-minute "checkout" by library patrons, in this case, looking to learn about sustainability (Lawrence et al., 2012:125).

In 2007, staff and volunteers of the West Vancouver Memorial Library put together a "green team" whose aim was to plan and initiate environmentally sustainable practices (Backer, 2012:105). The green team members also educated the public on environmental issues using visual displays; booklists that feature global warming and saving the planet available through their website; storytelling with an environmental theme; as well as their monthly film series. An energy meter lending program was even developed by the library in partnership with the Power Smart program of British Columbia Hydro. Staff and the public were able to monitor the library's energy usage through its website and suggest databases and recommended websites on environmental topics (Backer, 2012:108–109).

Because public libraries serve as community spaces, it makes them an ideal educational locale. This is confirmed by Beutelspacher and Meschede (2020), who argue that libraries play a vital role is raising awareness in their communities and therefore are ideal places to teach sustainability literacy.

2.6.2 Portuguese libraries

A study was conducted on environmental sustainability practices of Portugal public libraries for the Master's degree in Library and Information Science at Lisbon University (Dias, 2017:1). It focuses on achieving the goals outlined by the United Nations and International Federation of Libraries Association, which created a proposal for libraries and information institutions in the post-2015 agenda for sustainable development (Dias, 2017:1). A questionnaire was distributed to 84 public libraries in Portugal (Dias, 2017:6). The aim of the questionnaires was also to establish if the message of the importance of environmental sustainability was being passed down to staff and to the users of the library (Dias, 2017:9).

The results from the questionnaire revealed that 63% of libraries that responded claimed to know about the existence of an environmental policy established in their municipal area, which shows that libraries are aware of this issue. It also revealed that 71% of the libraries stated that they have never made any environmental measurement such as energy or water. Of the surveyed libraries, 94% acknowledged the connection between the message of environmental sustainability and the library as an institution that can impact environmental behaviour (Dias, 2017:10). The results also found that 60% of the libraries did not have any exposure to the green library concept or the idea of collaborating with other libraries that are incorporating environmental practices into their daily operations management (Dias, 2017:11).

This section provided various case studies from different geographic areas in order to determine what initiatives are being implemented by other libraries and to establish how far the green library movement has progressed. The following section will discuss library space and whether printed or digital materials are the better option for green libraries.

2.6.3 Space: Print versus digital materials

Libraries' traditional service model is changing due to the impact of digital libraries and green computing. Green computing is comprised of acquisition, processing, storage, and retrieval of digital information in an environmentally friendly way. It includes hardware and software components used with maximum efficiency and minimum energy use, carbon footprint, and emission of heat in production. All hardware should be recyclable and biodegradable for safe disposal (Kalpana and Gopalakrishnan, 2016:2). However, the financial cost, amount of energy required and carbon footprint of digital libraries and green computing have not been researched yet (Jones, 2017:12). Chowdhury (2014, 2016 cited in Beutelspacher and Meschede, 2020) stated that the operation of information and communication technology has a high energy cost.

Nevertheless, number of authors in the library literature work under the assumption that delivering information digitally is greener than using a physical collection (Connell, 2010:9). Many libraries have started digitizing their collections and have incorporated it as a priority in their strategic plan. This can be seen at Texas University, where the priority of the strategic plan is to promote digital resources and to expand research and scholarship that covers society and economy, energy, water, agriculture and the built environment (McElrath and Sutherland, 2015:18). According to McElrath and Sutherland (2015:18), if a digital system is used, there will be less paper, ink, production and transportation used, which will result in a reduction of carbon

emissions. Beutelspacher and Meschede (2020) confirmed that digital services or resources help reduce trips to the library, in turn, contributing to sustainability.

An academic and industry study was conducted in order to establish the carbon footprint of the life cycle of paper production found that the direct emissions from forest landscape impacts, including the release of carbon from trees and forest ecosystems and regrowth of trees post-harvest, contributes to around 11.7% of the climate impact of paper production and consumption. The paper industry uses large quantities of water—more than 10% of all fresh water is used in some nations which cause widespread water pollution (Anderson, 2018:30). Ultimately, there are few studies that deal directly with the comparison of printed and electronic materials adequately addressing the full life cycle of digital devices, which includes, among other factors, their production and the minerals it uses, as well as the impacts of their postdisposal. Thus, it has been recommended that paper saving concepts should be evaluated using both their known and assumed environmental impacts (Haggith, 2018:14)

Publishers are also becoming more conscious of the environmental impact of books and have been implementing consumers' demands for green practices. Book production waste is very close to 100% recyclable, while cover materials and adhesives are in most cases environmentally friendly (Connell, 2010:9–10). The CUHK Library, for example, has put into place a sustainable approach for their printed collection. In 2015, the CUHK library stated in their collection development plan that an electronic preference policy for both journals and books would be implemented to reduce storage space and provide greater access to library resources for its users. The policy also stated that a web-based electronic format will be preferred for all types of information resources since this way, readers can have 24/7 access to the information, it can be used on mobile devices, and it is much easier to manage (Jones, 2017:9).

One of the biggest issues that libraries deal with when going green is using as little space as possible. In 1996, the Library of Congress was replacing most of its enormous collection of late 19th and early 20th century newspapers with microfilms and destroying the originals. Several years later, nearly all university libraries in the United States as well as the majority of larger public libraries followed that example, resulting in some of the rarest periodicals no longer existing except in microfilmed versions. However, the microfilmed versions are faulty in many ways since microfilms suffer from smudges, scratches, and technical inconsistencies such as cut off text at the margins and entire sections skipped (Manguel, 2008:73). It has been stated that the argument for electronic reproduction in order to preserve the lifespan of paper is false as tools of electronic media are not immortal, as can be seen with microfilm (Manguel, 2008:75). Today's high-tech gadgets will not be cutting-edge forever, and in a few years' time, they will be replaced by newer more effective technology, which means that information could be lost as digitization is not as permanent as it appears to be.

Current studies conducted in the USA, UK and Europe raise a major concern about the difficulty of preserving digital information which electronic equipment would be needed to access. There are three challenges in terms of sustainability: digital services which use electronic equipment that requires more energy than books; production and use which result in heat and the release of toxic materials; and changes in digital services which affect storage and dissemination of the archival documents (Afacan, 2017:376). Thus, electronic resources are not always the most energy-efficient and going paperless does not necessarily represent the greenest or most environmentally friendly option.

Libraries have been forced to change the format of services due to the changing format requirements of users. However, this evolution has had a negative impact on the environment as

it causes e-waste (Kalpana and Gopalakrishnan, 2016:1). If libraries want to decrease their electronic usage, they can use Energy Star compliant computer components. Energy Star is a labeling program for energy efficiency in electronic products. Libraries can purchase devices labelled with an Energy Star logo, as it will reduce carbon footprint (McElrath and Sutherland, 2015:19). According to Singh and Mishra (2019), libraries are implementing green practices such as green printing and copying that can help preserve natural resources. Green printing entails recycling, reducing and reusing through the use of recycled paper; low VCO (Volatile Organic Chemical) inks; energy-efficient computers and equipment; remanufactured laser toner cartridges for printers; and allowing information to be disseminated electronically (Singh and Mishra, 2019). Libraries could also find reputable recyclers of e-waste, recycle toner cartridges, use green ink, consolidate servers at large institutions and have old computers repaired (Connell, 2010:9). Libraries can also minimize the effect of e-waste through cloud computing and visualization as it serves as centralized storage (Kalpana and Gopalakrishnan, 2016:2).

2.6.4 Green IT

Libraries have been reported to have a large energy footprint. Green IT refers to environmental initiatives, reducing energy costs and achieving sustainability for Infrared systems (IR) systems (McElrath and Sutherland, 2015:16). Libraries have begun to move towards cloud based IT on the assumption that it is green, but there is little concrete evidence to support this (Jones, 2017:13). Cloud computing might contribute to CO_2 emissions and greenhouse gas (GHG) problems. Instead, green open cloud technology should be used because it allows users to specify requests in terms of energy targets and it switches on and off based on its predictions of usage patterns, resulting in users saving energy (McElrath and Sutherland, 2015:17). It was recommended that public libraries should be revitalized and training in information and communication technology skills should be implemented (Abiolu and Okere, 2012:53).

A study was conducted to find out what Library and Information Services (LIS) professionals know about sustainable technologies and environmental sustainability, as well as their awareness of green libraries, green computation and green ware. A questionnaire was distributed to 60 LIS professionals in ten higher education institutions in Chennai, India, and surrounding areas (Kalpana and Gopalakrishnan, 2016:3). Findings revealed that LIS professionals are aware of technological sustainability, and the majority of the respondents have shown a positive approach to implementing it in libraries. A majority (99.4%) of LIS professionals stated that cloud computing and visualization will reduce e-storage. It was found that LIS professionals need to initiate green computing to bring about green libraries and their positive effect on the environment (Kalpana and Gopalakrishnan, 2016:10). The significance of this section was to discuss green IT, the positive and negative impact of cloud-computing and LIS awareness about sustainable technologies and green computation.

2.7 Green rating tools

As this study is examining librarians' perceptions of green libraries, it is pertinent to review green building practices, international green rating tools and South African green rating tools for buildings.

2.7.1 Green libraries: Buildings and shape

A green library is a building that generates its own electricity through renewable resources, purifies wastewater and makes wildlife habitat on its site regenerative. Since libraries function as buildings that offer meetings and activities for the community, they are the ideal place to create a green neighbourhood (McElrath and Sutherland, 2015:15). Existing libraries can implement environmental practices such as controlling their interior through air handling units and data loggers that show readings of temperature and humidity in a graph (McElrath and

Sutherland, 2015:15).

A number of articles found in the literature on architectural design suggested that if green buildings are developed, it can reduce energy consumption and create a healthier and more enjoyable environment (Afacan, 2017:376). Libraries are often not associated with climate change and global warming. However, they consume large amounts of energy which contributes to the problem (McElrath and Sutherland, 2015:14). As well, the structure of library buildings is large not designed with sustainability in mind (Barbakoff and Barbakoff, 2012:232), since many libraries were built before the knowledge of global warming and climate change became common sense (McElrath and Sutherland, 2015:14).

The literature about green library buildings has focused mainly on new buildings. For a building to be considered green, it should have a structure that is environmentally sustainable and resource-efficient throughout a building's life-cycle, from the location of the building to the design, construction, operation, maintenance, renovation and deconstruction (Genovese and Albanese, 2011:2). It has also been found that renovating a building may actually reduce waste more than razing one and building from scratch (Clark, 2013:23). However, librarians can do much more without focusing just on the building (Hauke and Werner, 2013:4).

It has been stated that a green building on its own does not necessarily promote a sustainable community, but if the library space is designed to intentionally situate the library within its human and environmental ecosystem, they will enhance each other. Sustainability is about cultivating an attitude of sustainability in ourselves and our communities which will, in turn, bring about long-term solutions (Barbakoff and Barbakoff, 2012:226–227).

A study was done at Bilkent University, Ankara, in the Department of Interior

Architecture and Environmental Design to explore students' views on sustainable library buildings. The Bilkent University Library is not green and the Halil Inalcik special collection does not have sustainable design features, but the university has a vision of an ecologically and socially sustainable library.

A survey was distributed to 240 undergraduate students. The study found that 145 students rated sustaining physical and social relationships between users and social relationships between users and rare documents as the most important goal of a green special library. Of the 145, 135 also stated that managing and preserving digital materials in a sustainable way was the second most important goal. Sixty students highly rated better ventilation, lighting conditions for indoor environments and help to access primary sources digitally. However, saving energy, protecting the environment and reducing pollution was rated the least important for special collections (Afacan, 2017:378). Four green factors were discovered in the exploratory factor analysis: 1) energy efficient lighting, 2) improved indoor air quality, 3) adequate thermal comfort, and 4) focus on the role of technology (Afacan, 2017:378–379).

An example of a green Library is Roseville Public Library in Minnesota, USA. The library has many green features such as water conservation and reuse of storm water. Library construction used local materials resulting in the reduction of transportation costs and support of the local economy and labour. The design of the Roseville Library (Genovese and Albanese, 2011:4) and the Daniel Ruiz Library in Austin, Texas, USA library both incorporated the extensive use of natural lighting (Genovese and Albanese, 2011:15–16). The Daniel Ruiz Library is another example of a green library that also made use of sustainable features such as water efficient plumbing fixture and heating, ventilation and air conditioning (HVAC) commissioning, which exceeds the City of Austin Sustainability Guidelines and specifications.

These examples were provided to demonstrate libraries that factored environmental sustainability into their building designs and incorporating green features that will conserve water and energy, which will give libraries an idea about what to strive for when applying green library designs and green features.

2.7.2 International green building rating tools

Leadership in Energy and Environmental Design (LEED) in the USA provides a guide for the design and construction of buildings. It is the most commonly accepted standard for eco-friendly buildings. It also offers certification for new construction, renovated and existing buildings. LEED offers four levels of certification: Certified, Silver, Gold, and Platinum, which are used to measure a building's performance in areas such as its location, the awareness and familiarity of the building systems amongst other areas (Genovese and Albanese, 2011:2).

Several public libraries in America have achieved LEED certification such as Darien Public library, Connecticut, the Bronx Library in New York, the New York Public Library and the Hillside public library in Multnomah County, Oregon (Miller, 2010:10).

In the United Kingdom the Building Research Establishment Environmental Assessment Method (BREEAM) is used to assess green buildings (Genovese and Albanese, 2011:2). BREEAM consists of five levels that range from Pass to Outstanding (Genovese and Albanese, 2011:3). The main categories are location and transportation; sustainable sites; integrative process; water efficiency; indoor environmental quality; energy and atmosphere; material and resources; and innovation and regional priority (Bohuski, 2020:18).

A study was conducted in order to develop indicators for eco-friendly libraries such as library materials, services and resources—a first in green library development (Noh and Ahn, 2018:54).

The researchers collected examples of green libraries from 29 libraries in Korea, 39 in the USA, five in Canada, two in Europe and five in other Asian countries. All of the examples of green libraries listed above were selected, analysed and green elements determined (Noh and Ahn, 2018:55). Eleven evaluation areas were identified: land use and traffic; energy and prevention of environmental pollution; materials and resources; water circulation management; maintenance; ecological environment and library management; eco-friendly education programmes and campaigns; employees and operations; and computerization.

The results revealed that the evaluation areas with the highest scores of eco-friendliness were energy and prevention resources with a score of 510, library resources with a score of 415 and the indoor environment with a score of 320 and the least green area was employees and operations with a score of 16.38 (Noh and Ahn, 2018:61). It was also found that educational programmes and campaigns were lacking in eco-friendly libraries (Noh and Ahn, 2018:62).

The LEED framework, examples of LEED certified green libraries, BREEAM assessment method were provided to depict the various guidelines that are being used in the other parts of the world such as the USA, the UK and to reveal the similarities in the evaluation areas or criteria that each green building evaluation guide consists of. The work by Noh and Ahn (2018) was included as the evaluation areas that were created pertained specifically to green libraries and not just green buildings in general.

2.7.3 South African green rating tool

The rating tool for evaluating the environmental design and performance of South African buildings is called Green Star SA-Office v1. This comprehensive rating system was developed by the Green Building Council of South Africa (GBCSA) (Goosen, 2009:3). South Africa's

Green Star SA rating tool was created from the Green Building Council of Australia's Green Star-Office Design v3 and As-Built v3 rating tools. The GBCSA compiled a team who evaluated each credit and adapted them to suit South African standards, conditions and needs. GBCSA then added five new credits which were created in order to match the South African context (Goosen, 2009:21). Green Star SA is a voluntary green building rating system that consists of nine categories: energy, water, materials, emissions, management, indoor environmental quality, transport, land use and ecology, and innovations for which individuals can be awarded points (Goosen, 2009:18).

The City of Cape Town launched their first green building guidelines called Draft 1 Green Building Guidelines in 2008. The aim of the guidelines is to promote resource-efficient renovation and construction of buildings in Cape Town. The city has implemented this strategy to ensure access to affordable, clean and secure sources of energy and protect the environment. These guidelines are in line with the global mission to reduce greenhouse gas emissions and manage the effects of climate change. They have been created to design, manufacture and construct affordable buildings that save energy and have less environmental impact. The Green Building Guidelines document is aligned with the Green Building Council of South Africa and will implement the Green Star Rating system in the future (Goosen, 2009:49). There is no evidence of any public libraries in South Africa using a green star rating system.

2.8 Summary

This chapter presented a review of the literature on the conceptual framework applied in the study, namely Segarra's rating system, Werner's checklist, and Kurbanoğlu and Boustany's green operations. As well, key terms and concepts from the literature were identified and defined. These included green libraries; green information literacy and environmental

education/literacy; librarians' promotion of sustainable development and green living; green living practices; and green rating tools. The literature presented in this chapter was from countries all over the world, but very few studies have been conducted in South Africa. The literature revealed that libraries do not have to have a green building to be considered green. On the other hand, a green building on its own without education and awareness does not necessarily constitute a green library. The various initiatives that libraries and information centres from all over the world are implementing to promote environmental sustainability to educate their users were outlined. The next chapter, the research design and methodology that the study used, will be discussed.

CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

Chapter two presented the conceptual framework of the study and showed how the literature discussed incorporates the aspects of the framework. This chapter focuses on explaining and justifying the methodology used for the research study in relation to the research paradigm, tools, sample, population and methods used to obtain data.

3.2 Research Paradigm

A research paradigm has been defined as a set of conceptual frameworks that explain a particular approach to research (Morgan and Sklar, 2012:70). According to Creswell and Creswell (2018: 6), there are four major paradigms: post-positivism, constructivism, transformative (paradigm) and pragmatism. Other authors such as Gray (2018) include positivism as a paradigm. By choosing a pragmatic paradigm or worldview it allowed the researcher to use "what works" to address the questions being investigated without too much concern of having to conform to a single (one) philosophy or reality (Creswell and Creswell, 2018:10). The pragmatic paradigm is a rejection of needing to locate one's study using a positivist (post-positivist) paradigm, (Kivunja and Kuyini, 2017:36) Pragmatic research is aimed at understanding the subjective world of human experience (Kivunja and Kuyini, 2017:36).

Exponents of pragmatism state that the focus of researchers should be on the research question itself and not on the methodological considerations. Thus, an approach that will best suit a particular research question and its investigation process should be selected (Morgan and Sklar, 2012:76). Pragmatism has been considered the best philosophical foundation for mixed methods studies, as it combines qualitative and quantitative research methods in one investigation.

Research questions are seen as more important than the methods that are used to answer them. Qualitative and quantitative methods are seen as compatible and both approaches have enough similarities to allow a combination of the two within one study (Ivankova, Creswell and Clark, 2007: 263).

Pragmatism allows researchers to use mixed methods approaches also known as a third alternative approach which is open to social researchers if it is decided that neither quantitative or qualitative research on its own can provide adequate findings for the researcher's particular piece of research (Denscombe, 2008: 273-274).

Pragmatism is treated as a new orthodoxy that not only allows researchers to mix methods but, if it is desirable, to do so because good social research will almost inevitably require the use both quantitative and qualitative approaches in order to provide adequate answers to one's research questions (Denscombe, 2008:274).

3.3 Research design

Research design can be defined as a procedure or guideline for conducting a study. It serves as a plan and informs the researcher which theories, methods and instruments the study will use (Seabi, 2012:81). This study used a mixed methods research design. The mixed methods approach was founded on the notion of pragmatism. For the purpose of this research the convergent parallel design (also called triangulation) was used. Both quantitative and qualitative data were collected simultaneously and the results from both sets of data were used to understand the research problem (Creswell, 2012: 540).

This design combines the advantages of each form of data. Quantitative data provides themes and generalizations, and qualitative data offers information about the context and the setting

(Creswell, 2012: 542). The researcher analysed each set of data separately as well as made a comparison to see whether the sets of results supported one another. The challenge of the convergent parallel design was that the researcher needed both qualitative and quantitative expertise to merge the two types of data (Bian, (n/d): 25).

3.4 Research methods

The researcher used a mixed methods approach. Mixed methods refers to research in which researchers collect and analyse data, integrate findings and draw inferences using both qualitative and quantitative methods in a single study (Pickard, 2013:18–19). Quantitative research is investigating a research problem through trends or collecting numeric data such as through the use of a questionnaire or checklist (Creswell, 2012: 13) and qualitative research is developing an understanding of a central phenomenon and collecting data from a small group of people (Creswell, 2012: 16), for example through interviews. A mixed methods approach has helped to better understand the research problem, because the problem was looked at from different perspectives. The interviews with the librarians allowed the researcher to discover what the library is doing to become greener and how they will go about educating their users on environmental sustainability. The checklist data collection tool allowed the researcher to establish in a different way if the libraries are truly green as it contained criteria from three different frameworks for green libraries. The checklist data was then compared with the data from the interviews.

3.5 Data collection procedures

The researcher used interviews (qualitative method) and a checklist (quantitative method) to collect data. Interviews are generally either structured or semi-structured, the latter allowing for more open-ended questions. Interviews can take place either face-to-face, telephonically, in

focus groups (Creswell and Creswell, 2018:187–188), and electronically using online meeting tools. In this study the researcher conducted in-depth interviews with the librarians and the librarians-in-charge by making use of semi-structured interview questions (see Appendix A). Semi-structured questionnaires were used as the researcher wanted rich data, and to allow the researcher to ask more open ended questions to discover the participant's insights on the subject matter and about what their libraries are implementing. Interview questions were formulated through using the literature, green terminology and the research objectives and terms. The librarians were contacted by telephone and meeting dates, times, and places established. Appendix I provides the interview schedule.

The researcher also used a checklist which consists of Segarra's rating system (2015), Werner's, checklist (2013), and Kurbanoğlu and Boustany's green operations and practices (2014) indices (Appendix B). This is a quantitative tool for corroborating the library's actual green status and practices. The checklist was shared with the librarians and librarians-in-charge and completed after the interview. The checklist was a way for the researcher to verify interviewees' responses using the checklist criteria. The checklist was developed by taking various criteria from Segarra's rating system (2015); Werner's, checklist (2013), and Kurbanoğlu and Boustany's green operations and practices items list applicable to the South African Library context and then grouped into suitable categories. The checklist measures greenness less subjectively than an interview response as it does not require participants' personal responses but just a tick whether their libraries are implementing the criteria. The drawback is that there could be contradictions in participants' responses and the checklist, there could be contradictions between the participants at the same library and participants could misrepresent their practices.

3.6 Research sites

The research was conducted at the City of Cape Town public libraries. The public libraries are divided into four geographic areas. Four libraries were studied in Area D (Area South): Subregion sections 13 and 14. In sub-region 14, two libraries were selected, Ottery and Retreat. The Ottery Library has a clear divide between low/no income and mid-to-high income community groupings that makes use or the library. However, the library is situated near low income dwellings where the majority of low or no income community lives and where there are high gang-related issues, crimes, drugs, violence and poverty. The Retreat Library serves a community that is impoverished and struggling with crime and violence. Both the Retreat and Ottery communities are predominantly so-called Coloured. Both communities are predominantly Afrikaans and English- speaking. The other research sites are the Meadowridge and Claremont libraries in sub-region 13, an affluent Southern suburb. These libraries service predominantly white English speakers of a mid-to-high income bracket. These libraries were selected for their different demographic and socio-economic levels in order to determine whether there is a difference in the level of green services and practices provided by the libraries in the affluent areas and in the low and working class income areas.

3.7 Population and sampling

The term population refers to the entire set of individuals that will be investigated (Pickard, 2013:60). The population targeted in this study was librarians at the City of Cape Town public libraries. Sampling is the process where a researcher selects a few participants from a large population in order to carry out empirical research (Pickard, 2013:59). There are two major sampling methods, which are probability and non-probability methods. Each element in the population has a chance of being selected with probability sampling as it is random. There are

four methods within the probability sampling method: simple random, systematic, stratified and cluster sampling (Pickard, 2013). However, the researcher used non-probability sampling. There are several types of non-probability sampling methods including quota, snowball, sequential, and purposive sampling (Pickard, 2013). Purposive sampling was selected for choosing the libraries and librarians as it is most suitable for qualitative studies. Purposive sampling is when participants are selected with a specific purpose in mind (Maree and Pietersen, 2007: 178). However, the drawback of this research is that it only includes a few participants.

3.7.1 Sample size

The research focused on Area D containing 29 libraries and divided into four sub-regions. Two libraries selected were from sub-region 13, namely Meadowridge and Claremont, and two libraries were from sub-region 14, namely Ottery and Retreat. Fraenkel and Wallen (2006:104) state that there is no set guideline for the correct sample size and that the sample size should be as large as the researcher is able to manage. Hence, only four libraries were selected to ensure a manageable Masters-level study. Ten librarians were chosen from the library sample: two librarians each from Meadowridge and Claremont (these are larger libraries); one librarian each from Ottery and Retreat (these are smaller libraries), and the librarians-in-charge each of the four libraries. The same sample completed the checklist.

3.8 Data analysis

The researcher analysed the qualitative data by transcribing interview responses and identifying themes in the data. The software package ATLAS TI 7.5.7 was used to analyse the qualitative data. This software is a qualitative analysis tool that helps to arrange, reassemble and manage large amounts of data of all formats in creative ways (ATLAS TI, 2019). Microsoft Excel was used to tabulate and create graphs of the quantitative data (checklist). The findings from the

checklist were triangulated with the findings from the interview responses. The researcher analysed both the checklist data and the interview data separately in the data analysis chapter. In the findings chapter the researcher manually triangulated the checklist findings with the interview findings (by doing a comparison with each other).

3.9 Quality criteria of research

In this section this researcher explains the approaches and methods such as triangulation and pilot studies that the researcher made use of to ensure the quality and the credibility of both quantitative and qualitative research.

3.9.1 Quantitative approaches

There are four concepts that are used by researchers to ensure the quality and trustworthiness of the research which are truth value, applicability, consistency and neutrality (Pickard, 2013:20). Since this study used a mixed methods approach, the applicable truth value criteria are validity and credibility. Validity refers to the researcher's success at measuring the concepts the study set out to measure (Writing@CSU, n/d: 4). There are two types of validity: internal and external. Internal validity refers to the way a causal relationship is demonstrated (Pickard, 2013:22). In order for a relationship to be causal it must have two characteristics: a particular direction as well as the exclusion of external factors (Di Fabio and Maree, 2012:137). Internal validity also refers to the degree to which the research results differ due to experimental intervention and not due to other factors that may have interfered with the research process (Di Fabio and Maree, 2012:137). There are also several types of internal validity. The researcher used criterion-related validity. Criterion-related validity is also referred to as instrumental validity, and it is used to demonstrate the accuracy of a measure or procedure by comparing it with another measure or procedure

which is valid. (Writing@CSU, n/d: 4). The researcher proved internal criterion-related validity through the checklist that was given to librarians.

3.9.2 Qualitative approaches

Trustworthiness is also referred to as validity in qualitative research in terms of determining the credibility, confirmability, transferability, dependability and authenticity of a study (Di Fabio and Maree, 2012:140). Qualitative validity refers to the process in which the researcher checks for the accuracy of the findings by making use of certain strategies (Creswell, 2014: 201). Validity is considered to be one of the strengths of qualitative research as it determines the accuracy of findings from the standpoint of the researcher, participants or readers (Cresswell, 2014:201). The validity of a qualitative design relies on the interpretations of the data and the shared meaning it has for both the participants and the researcher (Di Fabio and Maree, 2012:140). The researcher achieved validity by triangulating different data sources. This was achieved by examining evidence from the sources and building a logical justification for the themes created from interview responses and outcomes of research.

Rich or "thick" description has also been used as a data gathering method to convey the findings because it adds validity to the findings (Creswell, 2014:202). The biases that the researcher might bring to the study are clarified via self-reflexive analysis. The researcher self-reflected by providing comments on how the interpretation of the findings could have been shaped by the researcher's own background, which created an open narrative that readers would be able to relate to and judge for themselves (Creswell, 2014: 202). Other information or perspectives that contradict the themes were also provided by the researcher, as this made the findings more realistic and valid (Creswell, 2014:202). Lastly, an external auditor, who is

someone not familiar with the researcher or the study, reviewed the entire project from the accuracy of the transcription to the relationship between the research questions and data analysis.

The external auditor provided an objective assessment of the project and it enhanced the overall validity of the qualitative study (Creswell, 2014:202–203). An external unbiased perspective provides an objective insight without judgements on the research as the external person does not know the researcher.

3.9.3 Credibility

Credibility refers to the ability of a researcher to demonstrate that the object of study is accurately identified and described based on the way in which the study was conducted. Audit trails provide necessary evidence (Pickard, 2013:320). It also refers to the significance and perceived legitimacy of study results to participants as well as readers, and the credibility of the data to the participants or readers. Appendix I provides evidence that interviews were undertaken on specific dates, at specific times, and with specific participants. This schedule lends credence to the study. The researcher double-checked transcripts to ensure there were no mistakes made during transcription and no consequential drift in the definition of codes. This was achieved by frequently comparing the data and codes, as well as writing memos about the codes and the definitions (Creswell, 2014:203). Lastly, the researcher cross-checked codes that were developed by different researchers by comparing results that are derived independently (Creswell, 2014:2013). This was achieved by using a reliability subprogram in ATLAS TI in order to determine the consistency of coding. The researcher ensured credibility by applying triangulation, which involved a combination of research techniques within a single study in order to produce a more accurate account of the phenomenon that is being investigated (Pickard,2013:327).

3.9.4 Triangulation

Triangulation refers to research that involves the process of corroborating evidence from different methods, different sources of information or sources namely: people; time or setting; types of data such as text and recordings (Creswell, 2012:629). Triangulation increases the validity of both the qualitative and quantitative research methods. It also reduces the risk of faulty associations and systematic errors because data is collected from a variety of individuals, groups, or contexts through the use of different methods (Di Fabio and Maree, 2012: 141). In this study two different methods of data collection were used: interviews and a checklist.

3.9.5 Pilot study

A pilot study was conducted to test the instruments and ensure the quality of the research. One librarian each from Grassy Park and Plumstead libraries was interviewed and given a checklist to complete. These libraries were selected because they have similar demographics and socioeconomic levels as the libraries selected for the study. Grassy Park Library has a similar demographic and socio-economic level as Retreat and Ottery, and Plumstead Library has a similar demographic and socio-economic level as Meadowridge and Claremont.

From the pilot study, the researcher determined if the librarians were able to understand what was asked of them in the interview and if they were able to answer the checklist questions. On the basis of the responses, certain questions were rephrased. Similarly, obscure wording was changed and aspects of the checklist rearranged into a more logical order.

3.10 Ethics statement

In this study, the researcher adhered to the ethical guidelines of the Senate Research Committee of the University of the Western Cape. The researcher obtained ethical clearance from the university's Research Ethics Office (see Appendix J) and permission from the City of Cape

Town's Library Services to conduct the study at the four libraries (see Appendix K). The researcher obtained the consent (see Appendix C) of the research participants, treated them with human dignity, and respected their privacy and confidentiality. The anonymity of the participants was assured as no identifying information was required for study participation. The participants were informed (see Appendix D) beforehand that participation in this research study was on a voluntary basis and that they could withdraw at any time if they wished to do so. Their identities would remain confidential irrespective of their decision. In addition, participants were informed that they could decline to answer certain questions if they so wished.

3.11 Summary

The chapter discussed the pragmatic research paradigm governing the study's approach. The study made use of a mixed methods research design and both quantitative and qualitative data were collected and used to validate each other. Purposive sampling was used to select libraries and librarians for interviews. Quantitative data was collected from librarians-in-charge and librarians using a checklist, and semi-constructed interview questions were used to conduct interviews with participants. Quantitative research was analysed using ATLAS TI 7.5.7 and analysed graphically in Microsoft Excel was used to create graphs and tables to present quantitative data. Research reliability, validity and ethical issues were also discussed. Chapter Four will present the data and analysis.

CHAPTER 4: DATA PRESENTATION AND ANALYSIS

4.1. Introduction

The previous chapter provided a detailed discussion of the research methodology and design used in the study. This chapter presents the findings from the data collected in the form of interview and checklist responses. Creswell (2014:195) defines data analysis as the intent to make sense of text and image data by taking the data apart and putting it back together. Data analysis and presentation speak to a number of steps that researchers undertake to identify themes from the study that would conclude with a discussion of the findings (Creswell, 2008). The mixed methods approach consists of both qualitative and quantitative types of analysis.

The aim of the study was to investigate what public libraries can do to teach their users to be more environmentally literate by educating them about environmental sustainability and green living. Data was collected from four City of Cape Town public libraries (hereafter referred to as City Libraries). Interviews were conducted with six librarians and four librarians-in-charge (LICs). Checklists were given to these library staff members to complete after the interview to ascertain how green their libraries really are.

Qualitative data is presented as an outline of prevalent themes, and the quantitative data is presented using tables and graphs. The following four objectives were used to help to obtain responses to the research question:

- To identify what librarians' perceptions are of environmental sustainability and green libraries

- To identify what libraries can do to create awareness about environmental sustainability and promote green living
- To determine the green living practices public libraries are currently employing
- To determine how librarians educate users on the importance of green living and increase users' green information literacy.

The chapter consists of two parts:

Part 1: Presentation and analysis of the interview responses (qualitative data)

Part 2: Presentation and analysis of checklist responses (quantitative data)

4.2. Presentation and analysis of interviews with library staff

A total of ten interviews were conducted with the library staff. Six librarians and four librarians-in-charge from four City Libraries, namely Ottery, Retreat, Meadowridge, and Claremont libraries were interviewed. Library staff are referred to by numbers to maintain anonymity, i.e. Librarian 1 or LIC 3. The data presented in this section looked at respondents' understanding of the following concepts: green libraries; environmental education; environmental sustainability; green buildings and environmental literacy; carbon footprint; green living; eco-literacy; green information literacy; a green information literate strategy; and green living awareness. See Appendix A for the interview guide.

4.2.1 Understanding of green libraries

Librarian 1 defined green libraries as buildings that are designed to be cool in the summer and warm in the winter that do not need any added electrical equipment such as air conditioning as air flows freely through the building. A different view came from Librarian 2 and LICs 2 and 4 who regard libraries as green if they recycle or promote recycling.

Librarians 2, 5, and 6 suggested that green libraries do not use the printed format or too much paper, thus saving paper and trees. Librarians 5 and 6 both stated that green means getting people to read resources online such as newspapers and magazines. Librarian 5 even referred to the PressReader app used by the City of Cape Town public libraries for online resources such as newspapers. LIC 4's response was similar to Librarians 2, 5 and 6, that green libraries are digital libraries saving paper and not printing unnecessarily. However, Librarian 4 had the opposite opinion, stating that green libraries are libraries that provide materials to their patrons using printed materials such as books instead of making it available on computers, tablets and iPads.

LICs 3 and 4 both refer to green libraries as libraries that save water and have a lot of plants around the building or have a garden. LIC 3 stated that it means not allowing smoking around the library and keeping the library clean. Librarian 3 referred to green libraries as libraries that save electricity and engage in issues such as climate change and doing practical things to make people understand the importance of conserving nature. Librarian 2 used the words "environmentally friendly" to describe green libraries. LIC 1 was quite honest in stating that she was not sure about what green libraries were, but she thinks it has to do with buildings and whatever people do that affects the environment.

4.2.1.1 Ottery as a green library

The responses from Librarian 1 and LIC 1 from Ottery Library contradicted each other. Librarian 1 stated that Ottery was a green a library while LIC 1 indicated that it was not. When asked the reason for their answers, Librarian 1 said "Well, we recycle a lot of paper." Librarian 1 also claimed that Ottery is green because they re-use things such as plastic bottles for their holiday programmes. LIC 1 declared that they do not have a recycling centre, but that staff re-uses the back side of paper if they make an error on the front. This is another reference to recycling and how library staff link recycling to a green library. Librarian 1 claimed that Ottery library is green because they re-use things such as plastic bottles for their holiday programmes.

LIC 1 mentioned that a community member had spoken to the staff at Ottery Library about starting a recycling centre for the community but they have not followed through with it.

LIC 1 stated: "If you look in the community and how we are, the Expanded Public Works Programme (EPWPs) will clean now and the next day there is just [a] dump all over; it is actually quite scary." This statement raises some concern and it justifies LIC 1's argument that Ottery Library is not green. Librarian 1 went on to suggest that the library does not have any plants, but if they did, Ottery library would be even greener. LIC 1 expressed that the reason Ottery Library is not green is because its greenness is not something that was thought about, but it is something that libraries should be thinking about.

4.2.1.2 Retreat as a green library

Librarian 2 and LIC 2 from Retreat Library both stated that Retreat is not green. The reason given by LIC 2 was: "I think we haven't thoroughly looked at the options available, because I know in the City you can apply for bins where you can recycle your different materials."

Librarian 2 provided the same reason, but added that all the newspapers and magazines are still in print which justified the respondent's reason why the library is not green.

4.2.1.3 Meadowridge as a green library

There was a contrast in responses among participants at Meadowridge Library. Librarian 4 and LIC 3 both stated that Meadowridge Library is green, whereas Librarian 3 indicated that it is not. The reason LIC 3 gave was that they do not allow people to smoke near the library or inside the premises, and they pick up papers and keep the library clean. LIC 3 indicated that they encourage patrons to save water: "We had special taps fitted in the bathroom to save water and we have hand sanitizer to encourage clean hands." To further strengthen her argument, LIC 3 referred to the plants around the building which had died due to the water restrictions, an indication that the library has been saving water.

Librarian 4 gave a very different reason for why Meadowridge Library is green. Librarian 4 said that the library is green because it provides printed materials, as well as specifically those on environmental issues in their displays, posters and pamphlets. Librarian 3, on the other hand, stated that "there is a lot of waste of paper and printed materials which I feel are a problem because if you add up all the libraries and everything…" This contradicts Librarian 4's reason for why Meadowridge Library is green. Librarian 3 maintained that there should be less printing and everything should be done electronically. Librarian 3 added that there are no programmes that deal with the environment and that libraries do not have gardens or gardeners; money is not being spent on these things which would improve the environment of the library.

4.1.2.4 Claremont library as a green library

The responses from Claremont Library were mixed, but most leaned towards Claremont being a green library except Librarian 5 and LIC 4 who both agreed that the library is not fully green.

For Librarian 6, the library is green because the building itself is environmentally friendly. It was built with board and not bricks, and the structure of the building allows air to circulate in the building that accommodates both winter and summer. Librarian 6 also mentioned that the library has recycling bins.

LIC 4 used recycling and the saving of paper as reasons, also stating:

> We don't have control over how lighting gets in here and stuff like that cos it is already predetermined. I don't have any power to say 'OK, use an eco-friendly material.' You know that is not my call to make, so as far as what is under our control and within our control. I would say yes, we are.

Thus, for LIC 4, Claremont Library is not fully green because there are certain aspects of building operations that they cannot control.

Librarian 5, on the other hand, stated that the library is not fully green because most of the material is hard copies and requires people to physically visit the library instead of borrowing items online on their smartphone. The reasons given by Librarian 5 correspond with those given by Librarians 2 and 3, but they contradict Librarian 4's reason that the library is green because it makes use of printed materials.

4.2.2 Familiarity with terms

The third interview question asked the respondents about their familiarity with terms such as environmental education, environmental sustainability, green buildings, green living, environmental literacy, carbon footprint and eco-literacy.

4.2.2.1 Environmental education

When participants were asked if they were familiar with the term environmental education, all the LICs and librarians except Librarian 3 stated that they were familiar with the term. However, although Librarian 3 claimed that he does not have much exposure to that term, he does understand the term but was not prepared to define it, as he specified that he feels environmental education is something that is not really taken seriously and that the only initiative given some attention by City Libraries was the water crisis.

Librarian 1 stated that she is familiar with the term, but she was unable to define it and said: “I don’t think that I have come across anything like that happening in libraries; it is more environmental groups or structures within the City that is geared towards environmental education.” Librarian 5, on the other hand, indicated that environmental education is when the library has regular sessions to make the patrons environmentally aware of the consequences of using hard copies instead of digital copies of documents.

Most of the participants (LIC 1, 2, 3, 4; L1, 2, 4, 6) defined environmental education as educating users about looking after the environment. This can be seen in LIC 4's response: "Well that is educating people about the environment”. LIC 2 added to the definition, stating that environmental education also has to do with sustainability and being environmentally conscious.

Librarian 2 suggested that environmental education refers to what the library can do to promote environmentally friendly usage of materials.

Another theme that came up in the definitions on environmental education is keeping the environment clean. According to LIC 3, keeping the environment clean means “not to pollute it; not to get pollution into our rivers, our sea; not to litter.” Librarian 6 added that environmental

education is showing people how their actions, such as burning tyres, can impact the environment and teaching them how to treat it because this will affect the climate.

4.2.2.2 Environmental sustainability

While Librarian 2 and LIC 3 were not familiar with the term environmental sustainability, the other eight participants were familiar with the term. However, Librarian 1 was unable to define environmental sustainability, which is an indication that Librarian 1 is not really familiar with the term.

Librarian 3 responded by saying that today's society is generally not environmentally friendly, the reason being that " people drive cars. People don't think about, for example, like, if you could walk to work. If you lived closer to where you worked, you would be saving a lot of… petrol." Librarian 3 also mentioned that political issues cloud people's choices, referring to the ineffective public bus and train services which force people to drive cars.

A common definition that participants provided for environmental sustainability was consistency in conserving the environment, or using long-term conservation methods that will protect the environment for future generations. Librarian 5 stated: "It's when we take steps to make sure that the environment is not harmed which… is beneficial in the long run." LIC 4

agreed: "If your library can keep on doing it, is it workable, will it actually last for a longer term or is it not just short term?"

LIC 1 and 2 both affirmed that environmental sustainability is a way to conserve the environment, making people environmentally aware or pursuing practices that will ensure that resources can be adequately reproduced for future generations are sustainable. Both LIC 1 and 2 referred to consistent recycling as a way to obtain environmental sustainability.

The theme of consistently keeping the environment clean reoccurred as an explanation for environmental sustainability among participants' responses.

4.2.2.3 Green buildings

All the participants indicated that they are familiar with the term green buildings except LIC 1, who stated that she was not especially familiar but provided a book definition. The definition that LIC 1 defined green buildings as those "where they use materials that are safe for the environment." She also described safe materials as "not harmful." LIC 3 was familiar with the term and had read about it, but was unable to define it.

A common definition of green buildings given by the remainder of the participants was that green buildings use less electricity and water, and are made of materials that will cause the least harm to the environment. This is evident in Librarian 6's response: "It doesn't use bricks or the traditional materials—stuff such as chemicals and cement." Librarian 2's response expanded the definition: "my understanding is saving not only water but electricity as well and having the building basically like 'environmentally proof.'" LIC 2's response continued in the same vein was: "a Green building is where everything makes very little impact on the environment: your lighting, your water, few usage of resources."

LIC 4 also provided a similar response but referred to Dunoon Library, a new City Library that was built. She states that this library would be a green building and that it should be built with more environmentally friendly materials. LIC 4 referred to older buildings, such as the Rondebosch Library, suggesting that their mould problems might be a result of the materials that were used before. Overall, the theory that LIC 4 presented was that newer buildings would be green since they were built with green, non-toxic and non-polluting materials.

Librarians 1, 4 and 5 all referred to green buildings as buildings that make use of solar energy or solar power as opposed to electricity. This is evident, for example, in the response of Librarian 1, that a truly green building: "uses maybe solar power instead of electricity." Librarian 5 pointed out that "instead of using… what you call the normal electricity, there are solar systems for buildings here that use solar energy."

Librarian 1 also added that green buildings are buildings where there have a structure that ensures produces a free flow of air with no obstructions. This was confirmed by Librarian 3, who stated that a green building is built to use less air conditioning and with wider widows to allow more natural light in during the day. Librarian 3 also suggested that a green building should have a garden area around the library for growing plants and vegetables.

4.2.2.4 Environmental literacy

The majority of participants were not familiar with the term environmental literacy, except for Librarian 5 and LIC 2. Both their responses defined environmental literacy as awareness of environmental issues and what to do about them. This is demonstrated by LIC 2's response: "I think it is an awareness of your impact on your environment and the impact [of] our activities generally, industrially, personally: driving a car and so on." Librarian 5 had a similar response: "When people are aware of what it is, they need to take steps in order to save the environment," adding that environmental literacy has to do with eliminating pollution. Some of the participants were not familiar with the term but attempted to define it. LIC 3 speculated "that it would be like being literate and looking after the environment," while Librarian 6 said that "it means putting more emphasis on environmental literacy, teaching them (the users) how to treat the environment."

Training and education came up as themes in participants' responses to this question. LIC 1 mentioned that "it will most probably be hooked up to the education department," and Librarian 4 thought that environmental literacy would be something similar to teaching literacy. LIC 4 at first wondered how environmental literacy differs from environmental education and then began breaking the term down to formulate a definition. LIC 4 then supposed that environmental literacy would be "teaching people, giving them all the tips and the tools to be green and to live green." LIC 4 also expressed that she had never thought about these things before.

4.2.2.5 Carbon footprint

Only two of the participants, Librarians 4 and 6, were not familiar with the term carbon footprint. Librarian 1 had heard of the term, but she was unable to define it. LIC 4 also had trouble explaining the concept. She stated that the carbon footprint has to do with how the things that we do affect history, the environment and the air, as well as how this is all going to affect our chances of survival as a human race. LIC 3 also could not define the term, saying instead that she was more familiar with the term years ago because she was assisting school children with their projects on environmental issues. LIC 3 has not received queries on this subject matter in years, and she wondered if schools are still dealing with this subject matter or if learners are just googling the information.

A common theme in the definitions provided by the remainder of the participants was the idea of impacting the environment negatively either through emitting a large amount of carbon dioxide or other forms of air pollution. This is evident in the response of Librarian 3, who stated: "It means how much carbon dioxide you are responsible for emitting" and "what you consume, stuff

you consume and… driving cars and things like that." Librarian 5 said "that it is emissions that harm our grounds, the ecosystems," while Librarian 2 added more detail: "So that is all the pollution that creates a carbon footprint on the earth from the smoke of industrial areas as well as water pollution."

LIC 1 and 2 supported what was said by other respondents. LIC 1 said that the carbon footprint was "the footprint that we leave as individuals with what we do… driving of our car." LIC 2 added: "It's to do with perhaps making a small impact in terms of the carbon footprint in travelling, food production, food sourcing, that type of thing," also stating that she learned the definition of this term from something she had read.

What is interesting to note is that both Librarian 3 and LIC 2 referred to food consumption and food production in their explanation of the term carbon footprint. At the same time, Librarian 3 and LIC 1 referred to driving cars, while LIC 2 referred to travelling as a cause of carbon footprint in their definitions.

Librarian 3 correctly stated that it is how much carbon dioxide that we emit, but all the library staff explained that the carbon footprint is a result of activities caused by humans and it is harmful to the environment.

4.2.2.6 Green living

All of the interviewees indicated that they are familiar with the term green living. A common theme that occurs in the definitions provided by participants is saving and recycling. This is evident in the response of Librarian 4: "Make sure you don't waste water; make sure you don't waste electricity." LIC 1 responded similarly:

> It is to do with the environment and ensuring that we play our role in conserving our environment, be it saving water, saving electricity, reusing paper, recycling, reducing our carbon footprint, etc.

However, LIC 1 also mentions that green living has to do with the environment and about conserving the environment.

Librarian 2 said: "Green living. It is that living at home as well, not only at work but at home, saving and recycling.". Librarian 2 highlights that it is not just practices that should be implemented at work but at home too. This is also seen in the response of LIC 2, who stated that green living included "domestic resources that you use, where we practice recycling at home." LIC 2 then went on to mention water conservation and waste recycling as examples.

LIC 4 provides an example: "I don't do something with my plastic bottles, so I just put it into my bin and I am kind of not being green, but if I take paper, yes, that I will go and have recycled." This example also has to do with recycling, but LIC 4 adds that green living is all about your natural state of living, which is the second prevalent theme in the respondents' definitions of green living. This can also be seen in LIC 3's response that green living has to do with "living healthily," though the respondent admitted that this is "a little bit vague."

The theme of the "natural state of living" linked to the idea of plants and food also reoccurred in the interviewees' responses. Librarian 6 explained:

> It : "Yes. It means to plant food, vegetables and not having to source it. Planting trees, eliminate things such as making fires that cause pollution that mess up our climate. Try to go the organic way that is green.

Librarian 1 agreed with their colleague, saying "I suppose we should all try to live that way. Grow your own vegetables and that kind of thing." Librarian 5 also focused on food-related environmental practices, stating that: living green is "when you don't use genetically modified or

processed food.". Librarian 1: "I suppose we should all try to live that way. Grow your own vegetables and that kind of thing".

Both Librarians 1 and 6 mentioned growing one's own food, and Librarian 1 even states that everyone should live that way. Librarians 5 and 6 both mention that living green means to go the organic way and not to use genetically modified or processed food.

Librarian 3 provided a different response. At first, Librarian 3 stated that green living reminded him of vegetarians and eating vegetables and plant-based instead of meat-based diets. He then went on to say that green living should be a broader economic response, and the change should be on a bigger scale in which libraries can play a huge role through information access and their programmes. Librarian 3 said: "I don't think it is about whether you recycle your cardboard," and he feels that in the manufacturing industry fundamental economic principles needs to be changed. This suggests that the manufacturing industry is the one that is creating the materials that are contributing to the pollution. However, Librarian 3 stated that green living "is more like having a vision for a world where the environment is protected."

LIC 2 provides a similar response regarding products and manufacturing:

> Using products that are less, or [as] close to the original as possible. Not wrapped in too many artificial plastics and things like that… it's an approach to life that says 'I will use products that are close to origin in nature' and not making a lot of waste.

This response echoes Librarians 3's statement about changing the manufacturing industry, much like LIC 2's suggestion that green living means using products that are close to nature and do not produce so much artificial waste.

This section provided participants' understandings of green libraries and the following themes came out of the responses: saving and recycling, natural state of living and changing the manufacturing industry.

4.2.2.7 Eco-literacy

The majority of participants were not familiar with the term eco-literacy except for Librarian 4 and LIC 2. However, neither of these participants was able to provide an explanation for the term. Librarian 4 admitted that she is familiar with the term but she forgot what it is. LIC 2 stated that she has heard of the term and she even acknowledged that it is a new term. LIC 4, on the other hand, inferred that "eco" has got to with systems, but she was unable to describe it and for this reason she had to say that she is not familiar with the term. LIC 1 also affirmed that she had not heard the term eco-literacy, but she still attempted to describe what she thought eco-literacy was. In her opinion, eco-literacy has to do with how the ecosystems are affected by human actions. She used the analogy of people throwing papers in a pond and how this will affect the pond's ecosystem as an example to explain the term.

The majority of the participants were not familiar with the term. LIC 2 and Librarian 4 were familiar with the term but were unable to define it. LIC 4 stated it had to do with systems and LIC 1 indicated that it had to do with how the ecosystems are affected by human actions.

4.2.3 Green information literacy

A separate question asked participants if they could define green information literacy. They provided answers such as educating users about green living; disseminating information; and creating awareness of green issues. This is evident in the response of Librarian 1, who indicated that green information literacy is "giving people information on how to be more friendly to the environment…Or maybe even teaching them certain aspects of green environment." Librarian 2 responded that it is characterized by "how people access information and how people access green information and how to do certain things for the environment." Librarian 3 defined it as "teaching people about the environment" with emphasis on the natural environment, while Librarian 4 said: "It is where you are teaching the people how to live green." For Librarian 6 it means: "It is anything educational about treating your environment."

LIC 3 stated her understanding of green information literacy would be educating the public and students on how to take care of the environment and how to make things more green- friendly. However, she also admitted that she is not very knowledgeable, but she thinks that students and library users should be made aware of it.

Librarian 5, on the other hand, specified that his understanding of green information literacy goes back to a previous term, environmental literacy, which means the same thing. LIC 4 suggests that green information literacy means encouraging users to make use of green methods to find information. Both LIC 2 and LIC 1 refer to green information literacy as a means of sharing information on food gardens, recycling, conserving energy and water, or about any other way of looking after the environment with their users. Through giving talks and through

distributing pamphlets, these respondents hope to persuade users to become “eco warriors,” as LIC 1 terms it.

4.2.4 Green information literate strategy

The library staff was asked whether their library had a strategy to make people green information literate, and only three of the participants indicated that their library has a strategy in place. There were different interpretations of strategy at Meadowridge Library. Librarian 3 and LIC 3 from Meadowridge maintained that the library has no strategy in place, but Librarian 4 claimed that it does. Librarian 4 claimed: “We put [up] displays on how to go green. We have posters from the City of Cape Town that they give us about teaching people how to be green.” Librarian 4 added that their strategy also includes people coming from Waterworks coming in to give talks about living green. LIC 3 confirmed the latter statement by saying that “the last few years it has been water saving”. LIC 3 then adds that the above measures are as far as they have gone to institute a green literacy strategy.

At Claremont Library, both LIC 4 and Librarian 6 agreed that Claremont does have a strategy in place, but Librarian 5 disagreed. Librarian 6 specified “we have posters about tips providing green information” and “recycling bins” as the strategy that Claremont Library implemented. LIC 4 identified that their strategy includes “advertising with posters.” LIC 4 also explained that Claremont Library does not have recycling bins for users, because she had tried implementing a recycling program at a previous library where she had worked, and it became a messy “nightmare.” and messy. For LIC 4, the best way is for libraries to create awareness of recycling practice and recycling centres and direct the public to the places where they can “go and dump in

a legal manner," as LIC 4 puts it. Once again there is a contradiction in responses. Librarian 6 indicated that their strategy consists of having recycling bins, while LIC 4 said that they do not have recycling bins for their users; they only create awareness of it and direct people.

Both Librarian 1 and LIC 1 agreed that Ottery library does not have a strategy in place to make people green information literate. LIC 1 added that the reason why there is no strategy was because library staff had never thought about it before. Librarian 2 and LIC 2 from Retreat Library were also in agreement, but LIC 2 added that "We basically only use our displays." LIC 2 proposed that a strategy could include colleagues from the Department of Environmental and Health Services to collaborate with public library programmes. When asked what the reason is for their public library not having a strategy, LIC 2 said "We are not thinking out of the box enough." LIC 2 implied that libraries are traditionally bound in terms of programmes (doing crafts and book related activities) and not thinking out of the box, but she felt that green themes could be included.

Librarian 2, LIC 1 and 3 brought up a very important point as to why libraries do not have a green information literacy strategy as it is something that they have not thought about, implying that library staff does not see environmental education as a priority. The reason that LIC 3 provided was that they were "too busy trying to make the users literate and to encourage a love of reading."

Librarian 3 suggested that the reason his library did not have a green information literacy strategy was political and elaborated that because the state does not have a policy that effectively deals with environmental issues, therefore, library policies do not reflect any priorities related to environmental education. He also indicated that librarians as educators have not been encouraged

or trained, thus the skill level of librarians in researching issues is limited. A key obstacle is that librarians are being swamped with administrative work. However, Librarian 3 felt that programmes like these are needed and they require time, resources, and the librarian to be an educator. Librarian 5 indicated that the reason why Claremont Library does not have a strategy is because, besides having made use of PressReader and World Book online, they have never actually planned anything. Librarian 5 said that "if [the] City can make an awareness or the libraries at large, Library and Information Services (LIS) can maybe have a month where it is dedicated to making awareness around the issue." Librarian 5 felt that if awareness is given to the LIS and some time is dedicated to environmental issues, this would encourage staff to implement a strategy on how to increase library users' green information literacy.

4.2.5 Green living awareness

When asked if their libraries were doing enough to create awareness of green living, the majority of the participants indicated that this was not the case. Their libraries are not doing enough to create awareness of green living and this is evident in the following responses:

4.2.5.1 Retreat Library

LIC 2, the library's effort: "No it "is very basic. It is just doing the Arbor Day display, water display, that type of information."

4.2.5.2 Meadowridge Library

Librarian 3: "No, I don't. I don't think. I don't think so at all."

Librarian 4 was somewhat more optimistic, saying: “We can [raise awareness]. I believe we can never do enough of something.” This implies that there is always room for libraries to do more to create awareness.

4.2.5.3 Claremont Library

LIC 4 expressed: “We are not really proactive in it. So if an organization approaches us, then we will probably have a programme on it or advertise it.”

Librarian 5 supported the responses of LIC 2 and 4 by affirming that “even if they do [try to raise awareness]… but it’s not in the manner that it is supposed to.”

4.2.5.4 Ottery Library

LIC 1 voiced concerns that her library is not doing enough to create awareness, and her eyes have now been opened to the problem. She also added: “I think that we know about the concept, but we have not implemented the practice.” She also mentioned that her library reuses paper and has made one display to encourage their community to live green, but specified that she feels that her library could do more. Examples she provided include making their community aware through talks, displays and holiday programmes about the effects of litter on the earth as the community litters a lot.

4.2.5.5 Participants that agreed

Unlike most other respondents, Librarian 6 mentioned that her library is doing enough to create awareness of green living. “We have posters and three sets of recycling bins, so that patrons will know what to throw and where to throw it, as well as displays on living green,” she explained.

4.2.5.6 Reasons for libraries not doing enough to create green living awareness

Librarians 3 and 4 indicated that libraries are not doing enough to create awareness as they do not have enough resources. Librarian 1 added that the main reason could be that libraries do not have enough time to create awareness. LICs 3 and 4 raised an interesting point that libraries do not do enough to create awareness because they do not view it as part of their core function, and they are busy focusing on reading, educational and recreational aspects programming. To that end, but LIC 3 added: "But we can't do everything." Librarian 5 suggested that libraries do not see the importance of creating awareness of green living. Librarian 2 added that libraries are not informing patrons and they are not creating an urgency.

LIC 2, on the other hand, expressed that she thinks it has to do with partnerships. If libraries partner with good and sustainable partners that will provide them with information, then they could create awareness of green living.

Thus, is can be determined from the responses above that City of Cape Town public libraries are not doing enough to create awareness of green living due to a lack of resources, lack of time and due to lack of urgency.

4.2.6 Public libraries raising green living awareness and increasing green information literacy

When asked what more public libraries can do in general to promote awareness of green living and make patrons more green information literate, librarians' responses varied. LIC 1 suggested that "it starts with children," when asked what more public libraries can do in general to create

awareness about green living and to make people more green information literate. Children were a common theme throughout most of the participants' responses. Participants indicated that more children's programmes should be done organized for children dealing with the green living subject matter. This is evident from the response of Librarian 2, who pointed out that libraries should create a special programme when they do school visits. Their library should inform the children from the weekly Kids' Club how to take care of and have a positive impact on the environment. Both LICs 1 and 3 specified that the subject it should be included in holiday programmes. LIC 3 added that libraries could find someone that is knowledgeable on the topic such as a representative from an environmental conservation organization or the Environmental Department to come and talk about it. This is similar to LIC 2's response that libraries should partner with people in the field and link up with schools to do joint projects. as well as LIC 1's response: "Have talks on that as well". LIC 4 also suggested that it should be integrated as part of libraries' normal programmes, while LIC 1 suggested that these libraries should have integrated programmes should focus more on going green than on water. Librarian 6 summarized that libraries should do more programmes "that will involve children, young adults and adults, that will dwell on green environmental literacy and get organizations in and speakers that will promote environmental literacy and green living." Both LIC 1 and Librarian 6 indicated that green information should be included in story-telling. LIC 1 recommended that libraries should "start putting those seeds in the young ones' minds." Librarian 6 provided a similar response by stating: "The children will grow up knowing how to treat the environment.'" Thus, the focus was largely on educating children on green literacy.

Librarian 4, on the other hand, argued that libraries should take a more hands- on approach. This includes going out into the community and teaching them members how to live

green using practical demonstration of green habits, since people do not always know what living green concretely entails, but then do practical things because people do not always know how to do it, so libraries should be more hands on in their approach. Librarian 5 stated that green literacy instruction should be made part of the library business plan and Service Delivery and Budget Implementation Plan (SDBIP)—a set of targets that City Libraries need to meet. It should be done on a quarterly basis, when children visit the library, and with any other programmes that are being held to ensure that the issue is being touched on regularly.

Librarian 5 also suggested that staff awareness campaigns should be held regularly. LIC 3 agreed, indicating that "the staff of the library services in general needs to be made more aware of green living because then we will be able to make our public more aware if we understand it better."

Librarian 3 proposed that in order to organize proper green programmes, librarians need to invest time as well as human and material resources into outreach programmes. The process needs to be formalized by staff doing proper research. They need to do plan, execute, and evaluate each programme in order to measure the impact libraries are making on the community.

Participants also recognized that more posters and pamphlets should be made use of to create awareness. This is evident with LIC 3, and Librarian 1 said: "I suppose through displays you can educate them" and LIC 4 adds: " get more posters". LIC 4 elaborated that if libraries contact the right people for posters, organizations would offer to come out and do a talk at the library. Lastly, Librarian 1 recommended that if the library has space, it can obtain recycling bins. However, Librarian 1 suspected that this will not work in her community, as people will empty the bins and sell the recycling. This confirms a statement made earlier by LIC 4 about recycling bins, although she indicated that it is definitely something that certain libraries can have.

The responses suggest that the participants feel that it green literacy should be implemented in their programmes, and they should start educating the visiting children on how to care for the environment. Participants also commonly argued that libraries should form partnerships and make use of posters to create more awareness on green living. Lastly, recommendations included regular awareness campaigns for staff so that they could be familiar with the subject and be able to communicate it to their users.

4.2.7 Public libraries becoming greener in general

This question looks at what libraries can do in their daily practices to become greener, and what librarians can do as green ambassadors for their patrons. One recurring theme that arose from this question was recycling. Librarian 1 proposed that libraries should recycle more. Librarian 2 also stated that libraries should separate their waste, and there should be a recycling point or centre where the public can drop off their materials such as magazines or newspapers to be recycled. LIC 1 also suggests that libraries should have a recycling centre. LIC 3 specified that libraries should recycle grey water and use it for their gardens. LIC 2 also referred to recycling when she mentioned that libraries should have a standard for greenness, such as all libraries having recycling bins.

Another recurring theme that arose was to cutting down on paper use, which was recommended by Librarians 3, 4 and 6. Librarian 1 also agreed that “libraries should do less printing,.” while Librarian 6 added that libraries have “too much paperwork, it; needs to be reduced.” Librarian 3 that digitizing needs to be increased.

Both Librarians 6 and 1 proposed that libraries should make use of hand sanitizers to conserve water in addition to LIC 3’s suggestion on grey water recycling. This is confirmed by LIC 3 who

indicates that libraries need to recycle grey water. Librarian 1 added that libraries should not make use of air fresheners and instead keep the building clean to prevent pest infestations. Librarian 6 argued that libraries should not make use of air conditioners but use natural ventilation instead, and this will also eliminate some noise. LIC 3 supported this suggestion when she specified that "air needs to circulate better."

LIC 3 and Librarian 3 both mentioned plants as part of their green library concept. LIC 3 stated that library staff should plant water sustainable plants around the library building, while Librarian 3 suggested that library gardens should be maintained and developed into reading spaces as this will allow direct engagement with the environment.

LIC 1 identified that green living starts at home, and a professional in-house talk should be held where the topic can be discussed should be held to discuss and how staff members individually can take on that challenge. LIC 1 also suggested that the researcher present the concept at a public library seminar. LIC 2 also mentioned the award that the library service is offering for the greenest library and suggested that this will would be used as a motivation to get libraries to become greener.

Librarian 6 recommended that library staff should wear clothing such as caps and t-shirts that will promote green living to patrons, since this would show patrons that librarians are aware of environmental issues. This could also make patrons curious and get them to read up on it.

Lastly, the majority of the participants felt that staff awareness is needed to make public libraries greener. This can be seen in LIC 1's specification suggestion that environmental literacy needs to be introduced., Librarian 5 who additionally stated that experts, such as NGOs,, who know more about green living and(the field) who can provide knowledge on this matter . Librarians 5 also

proposed that bulletins should be given to the staff on the subject matter. LIC 2 said that it would be helpful to "have awareness campaigns for staff on conserving water and how it impacts the environment.". LIC 3 indicated that it starts with education, and staff should be better educated on green literacy so that the building will become more green friendly. LIC 4 recommended that the green aspect should be made part of the libraries' regular programmes, including events such as a monthly training seminar for staff on green awareness and have a green programme once a month as it will make staff more aware.

It was found that overall, the participants indicated that libraries should recycle more, cut down on paper use, conserve water and maintain plants and gardens. Participants also suggested that more awareness should be created amongst the staff through talks on the subject matter, NGO presentations, campaigns and bulletins because if staff are better informed, they will be able to educate their patrons on the subject.

This section analysed the interview responses. The following themes emerged from the responses:

- green living - recycling and natural state of living;
- environmental sustainability conserving the environment for future generations;
- carbon footprint - impacting the environment negatively;
- green buildings - buildings that save resources and posters for marketing of any environmental issue.

Research question two about green libraries needs to be validated using the quantitative data. The next section of this chapter will provide a graphic presentation and analysis of the

quantitative data from the checklists that the ten participants had to complete after the interviews were conducted.

4.3 Presentation and analysis of the checklist data

Ten checklists were given to the librarians and the librarians-in-charge to complete once the interviews were done. The checklist contains the aspects that a green library should possess in order to be considered green. Participants' answers were tested with the checklist in order to establish how green their libraries really are. The checklist consisted of the following features: project planning and finance; building structure; green materials; building climate; water; green information communication and technology; user services; facilities management; green library office; and marketing and promotion.

Table 4.1 presents the participants who filled out the checklist. There was a total of ten participants, six Librarians and four LICs. There were two participants each at Ottery library and at Retreat libraries. There were three participants each at Meadowridge and Claremont libraries.

Table 4.1. Libraries and positions **N=10**

Libraries	Position		Total
	Librarian Frequency	LIC Frequency	
Ottery	1	1	2
Retreat	1	1	2
Meadowridge	2	1	3
Claremont	2	1	3
Total	6	4	10

4.3.1 Project planning and finance

The majority of participants indicated that their library "sets a high level of comfort and provides a healthy environment for users," with two participants from each library agreeing. One participant each from Meadowridge library and Claremont each specified that their library "sets sustainable goals;" with one participant each and they indicated that they provides a "definition of a green building to users;," with one participant each and one participant each for "sets an example to users and practices green operations." Both Meadowridge and Claremont libraries had one participant each who marked "established environmental goals for patrons;." and One participant each from Meadowridge and Claremont libraries also identified that their library has "expertise with in dealing with environmental issues and to implementing green library practices." Two Claremont Library participants indicated that their library "formulates criteria for sustainability." However, participants from Ottery and Retreat libraries left the majority of the criteria un-ticked. See Table 4.2.

Table 4.2 Project planning and finance **N=10**

Project planning and finance	**Libraries**			
	Ottery	**Retreat**	**Meadowridge**	**Claremont**
	Frequency	**Frequency**	**Frequency**	**Frequency**
Sustainable goals	0	0	1	1
Definition of a 'green building' to users	0	0	1	1
Sets a high level of comfort and provides healthy environment for users	2	2	2	2
Established environmental goals for patrons	0	0	1	1
Sets an example to users and practices green operations	0	0	1	2

Formulated criteria for sustainability	0	0	0	2
Expertise in dealing with environmental issues and to implementing green library practices	0	0	1	1

Figure 4.1 below is a visual depiction of the proportion of responses by library criteria for project planning and finance responses across the four libraries. It portrays that eight of the participants indicated that their library "sets a high level of comfort and provides a healthy environment for users." Three participants ticked that their library sets an example to users and practices green operations. Two participants marked the remainder of the criteria, as seen in the Figure 4.1.

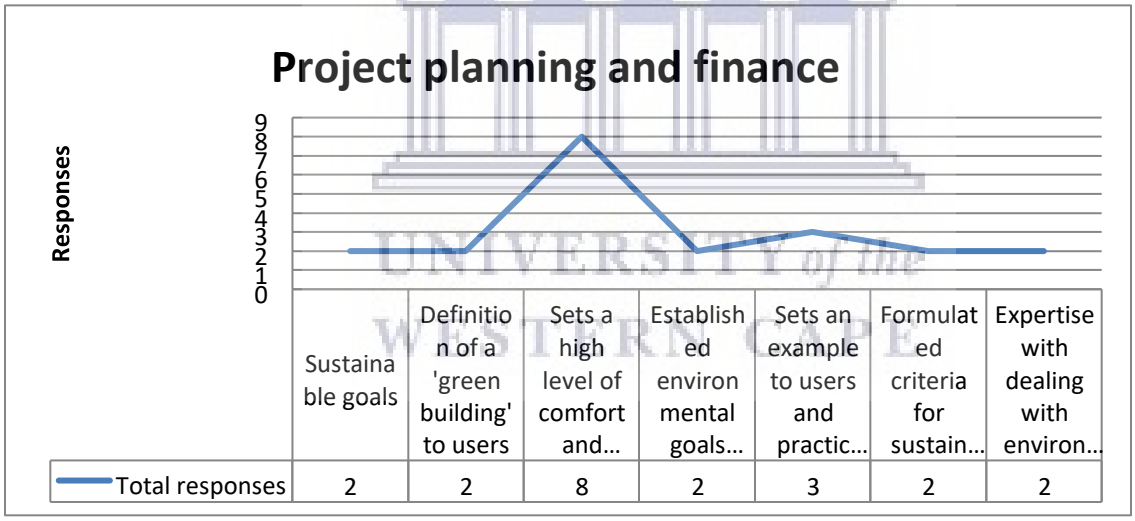


Figure 4.1 Project planning and finance N=10

4.3.2 The building structure

Participants were asked if their library uses minimal space wisely, to which nine agreed. Of the nine, two responses came from Ottery, Claremont and Retreat libraries respectively, while three

responses came from Meadowridge library. One participant from Claremont Library disagreed with the statement.

Table 4.3 The building structure **N=10**

Libraries	Library uses minimal space wisely		Total
	Not ticked Frequency	Ticked Frequency	
Ottery	0	2	2
Retreat	0	2	2
Meadowridge	0	3	3
Claremont	1	2	3
Total	1	9	10

4.3.3 Green materials

Figure 4.2 shows that eight of the participants ticked that their library maintains building services. Seven participants marked that their library uses materials that are repairable. Five participants each indicated that their library uses hazardous materials and that their library uses materials that are durable and long-lasting. The criterion "The library uses ecological, quality material" was ticked by only two participants, and was therefore the least selected.

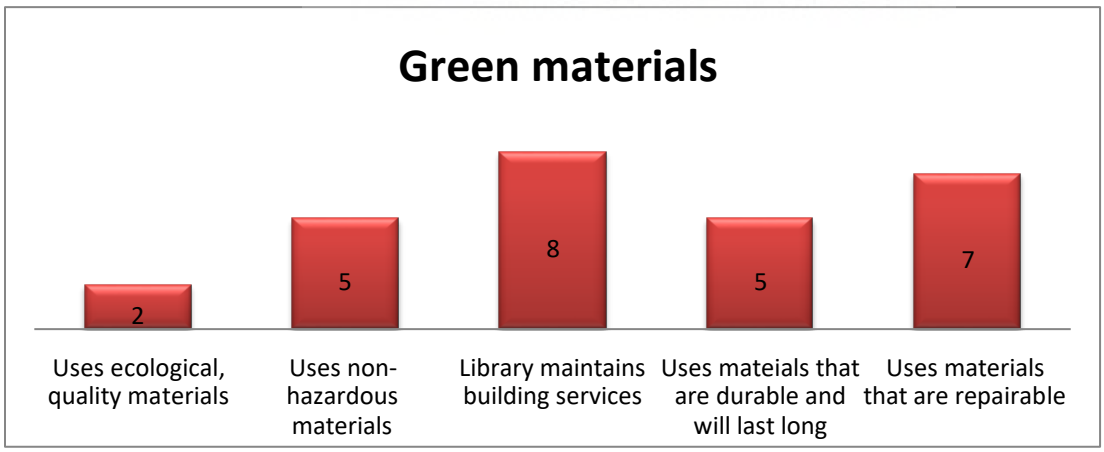


Figure 4.2: Green materials N=10

Responses from individual libraries to the aspect factor of "green materials" are available in Table 4.4. The "Libraries maintain building services" criterion received the most ticks, with three coming from Claremont Library, two each coming from Ottery and Retreat libraries and one from Meadowridge Library. The second highest score went to the criterion "The library uses materials that are repairable." All the participants (3) from Claremont Library and (2) Ottery Library agreed, as well as one participant each from Meadowridge Library and Retreat Library.

When it came to the criterion "The library uses materials that are durable and that will last long," all of the Ottery Library participants (2) ticked yes, while one participant each from Retreat, Meadowridge and Claremont libraries agreed. For the use of non-hazardous materials, none of the Ottery Library participants agreed, with one from Retreat Library and two each from both Meadowridge and Claremont libraries agreeing. Lastly, participants from neither Ottery nor Retreat libraries ticked that their libraries use ecological, quality materials while at both Meadowridge Library and Claremont Library one participant each agreed.

Table 4.4 Green materials and libraries **N=10**

Green materials	Libraries			
	Ottery	**Retreat**	**Meadowridge**	**Claremont**
	Frequency	**Frequency**	**Frequency**	**Frequency**
Uses ecological, quality materials	0	0	1	1
Uses non- hazardous materials	0	1	2	2
Library maintains building services	2	2	1	3
Uses materials that are durable and will last long	2	1	1	1
Uses materials that are repairable	2	1	1	3

4.3.4 Building climate

Table 4.5 is the depiction of the first criterion for the building climate factor: "Does not use a lot air conditioning." Two Retreat and two Ottery libraries' participants ticked that their library does not use a lot of air conditioning. However, LIC 1 from Ottery Library also wrote on the checklist that Ottery library does not have air conditioning. Two Meadowridge and two Claremont libraries' participants identified that their library does not use a lot of air conditioning. Overall, there were eight participants who ticked that their libraries do not make use of a lot of air conditioning. Four participants across the four libraries ticked the second criterion of building climates: - "Library saves electricity." The four participants consisted of two Meadowridge and two Claremont libraries' participants.

Table 4.5 Building climate **N=10**

Criteria	Libraries			
	Ottery	Retreat	Meadowridge	Claremont
Building Climate	Frequency that agree			
Does not use a lot of air conditioning	2	2	2	2
Library saves electricity	0	0	2	2

4.3.5 Water

The majority (8) of participants from the four libraries ticked the criterion that their library reduces the use of warm water. Two participants ticked that their library uses water saving features (equipment) and only one participant indicated that his/her library uses grey and rainwater. See figure 4.3.

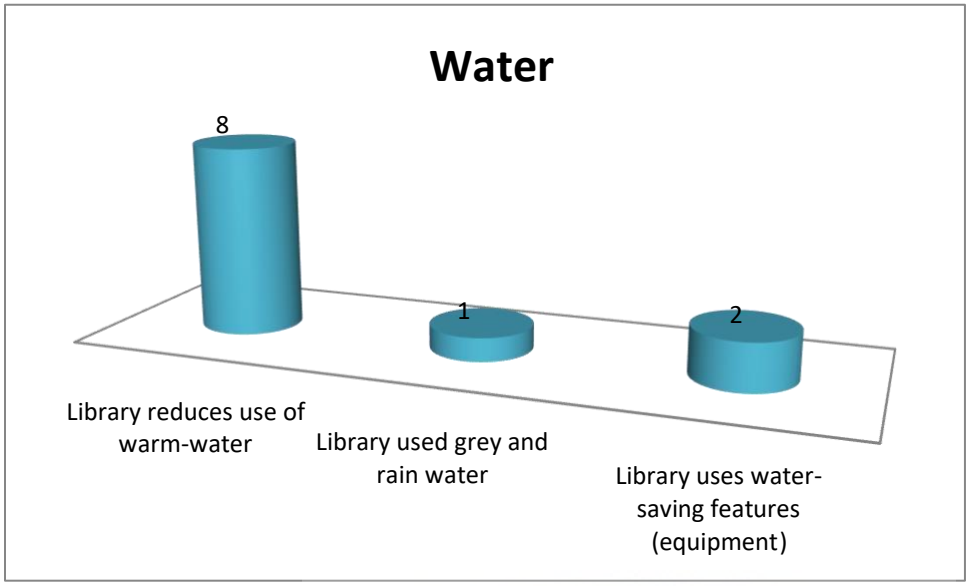


Figure 4.3: Water **N=10**

Table 4.6 shows the distribution of responses across the four libraries. All of Claremont (3), Retreat (2) and Ottery (2) libraries' participants agreed that their libraries reduce the use of warm water, while only one participant from Meadowridge Library agreed. A single participant from Ottery Library identified that the library uses grey and rainwater. This participant from Ottery Library commented on the checklist that they the grey water is used for their food garden. Only one participant from Claremont Library and Meadowridge Library indicated that their respective library uses water saving features (equipment).

Table 4.6 Water and Libraries **N=10**

Libraries	Library reduces use of warm water	Library uses grey and rainwater	Library uses water saving features equipment
Ottery	2	1 (grey water for food garden)	0
Retreat	2	0	0
Meadowridge	1	0	1
Claremont	3	0	1

4.3.6 Green information communication and technology

Table 4.7 portrays the distribution of responses from the four libraries on criteria relating to green technology use. Five participants out of the four libraries agreed that their library uses switchable sockets for computers and printers. All of the participants from Claremont Library (3) agreed that their library uses switchable sockets for computers and printers. None of the participants from Meadowridge Library ticked that they use switchable sockets. One Ottery and one Retreat Library participant affirmed that their libraries make use of switchable sockets for computers and printers. Five participants from the four libraries ticked that their library does make use of the software solution to optimize energy consumption (standby mode). All three Claremont Library participants confirmed that their library uses the software solution to optimize energy consumption. None of the participants from Ottery Library marked this criterion. Both Meadowridge library and Retreat Library had one participant each that ticked that their respective library uses software that optimizes energy consumption.

Table 4.7 Green information communication and technology **N=10**

Criteria	Ottery	Retreat	Meadowridge	Claremont
Green information communication and technology	Frequency that agree			
Uses switchable sockets for computers and printers	1	1	0	3
Uses software solution to optimize energy consumption (stand by)	0	1	1	3

4.3.7 User services

Table 4.8 shows that two Claremont Library participants ticked that their library makes use of scanning instead of printing. None of the participants from Meadowridge Library stated that they made use of scanning instead of printing. Both Ottery and Retreat Libraries had one participant each that selected that they made use of "scanning instead of printing" mistakenly but meant that they provide both scanning and printing due to comments written on the checklists. None of the participants from Ottery, Retreat and or Meadowridge libraries indicated that their library has alternatives to plastic bags. Two Claremont Library participants had ticked that their library has an alternative to plastic bags.

Table 4.8 User services **N=10**

Libraries	The library makes use of scanning instead of printing	The library has alternatives to plastic bags in the library
Ottery	1 (Both)	0
Retreat	1 (Both)	0
Meadowridge	0	0
Claremont	2	2

4.3.8 Facilities management

The majority of participants (8) ticked that their library vacuum cleans during closed times. See Table 4.9. The use of sanitary supplies was identified by seven participants. The use of environmentally friendly cleaning products and natural lighting and ventilation was marked by five participants each.

Table 4.9 Facilities management N=10

Facilities management Criteria	Total
Library uses solar energy	0
Library has installed energy efficient lighting	3
Library separates and recycles waste	3
Uses environmentally friendly cleaning products	4
Uses cost effective cleaning products	5
Use green cleaning methods	3
Does not make use of chemical products for cleaning the building	1
Uses non-toxic water- based rather than oil-based products	2
Uses perfume free biodegradable products	3
Library has sanitary supplies (towels, etc.)	7
Library recycles containers and packaging	4
Library recycles batteries electrical devices and components	1
Makes provision for noise during vacuum cleaning routines	8
Recycles light bulbs and uses fluorescent and energy saving lamps	4
Has bicycle rack for staff and users	0
Library uses natural lighting and ventilation	5

Table 4.10 depicts two participants each from Ottery, Retreat, Claremont and Meadowridge libraries ticked that they do make provision for the noise during vacuum cleaning sessions. None of the participants indicated that their library has a bicycle rack for staff and users and that their library uses solar energy. Only participants from Claremont Library (3) pointed out that their library has installed energy efficient lighting and that their library separates and recycles waste. One participant from Claremont Library ticked that the library does not make use of chemical products for cleaning the building and recycles batteries, electrical devices and components. Two Ottery and three Claremont participants, as well as one participant each from

Retreat and Meadowridge libraries, ticked that their libraries have sanitary supplies. Two Ottery Library participants, and one Claremont and one Meadowridge Library participant specified that their library recycles containers and packaging. Two Retreat Library participants, and one

Ottery, one Meadowridge and one Claremont Library participant identified that their library uses natural lightning and ventilation.

Table 4.10 Facilities management and libraries **N=10**

Facilities management Criteria	Libraries			
	Ottery	Retreat	Meadowridge	Claremont
Library uses solar energy	0	0	0	0
Library has installed energy efficient lighting	0	0	0	3
Library separates and recycles waste	0	0	0	3
Uses environmentally friendly cleaning products	0	1	1	2
Uses cost effective cleaning products	0	1	2	2
Use green cleaning methods	0	0	1	2
Does not make use of chemical products for cleaning the building	0	0	0	1
Uses non-toxic water- based rather than oil-based products	0	1	0	1
Uses perfume free biodegradable products	0	0	1	2
Library has sanitary supplies (towels, etc.)	2	1	1	3
Library recycles containers and packaging	2	0	1	1
Library recycles batteries electrical devices and components	0	0	0	1
Makes provision for noise during vacuum cleaning routines	2	2	2	2
Recycles light bulbs and uses fluorescent and energy saving lamps	0	1	1	2
Has bicycle rack for staff and users	0	0	0	0
Library uses natural lighting and ventilation	1	2	1	1

4.3.9 The green library office

The majority (7) of participants indicated that their library shuts down the computers when the library is closed. Refer to Figure 4.4. None of the participants ticked the following criteria: Library refills toner; Library sends staff for green awareness training; or Library uses recycled chlorine-free paper. Only one participant marked that the library repairs older computers. Six participants each affirmed that they eliminate the use of plastics, and encourage real using metal utensils, and that they reuse or donate items instead of disposing of them. Four participants each

pointed out that their library turns the heating system down during periods of absence or non-business hours, the library has energy saving electrical appliances and that the library uses electronic administrative forms that can be used electronically.

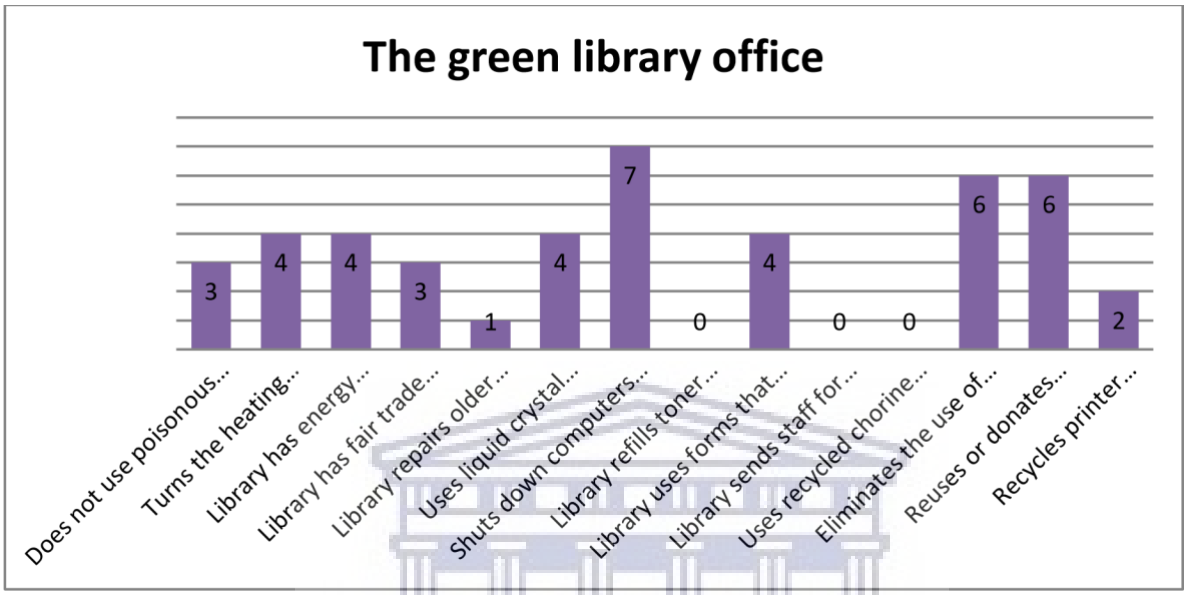


Figure 4.4: The green library office N=10

Both of the Ottery Library participants ticked that the library: shuts down computers when closed; eliminates the use of plastics and encourages use of real utensils; and reuses or donates items instead of disposing of them. Two participants from Meadowridge Library and two participants from Claremont Library specified that their library shuts down computers when the library is closed. One of the participants from Retreat Library indicated that they shut down computers when the library is closed. Two participants from both Meadowridge Library and Claremont Library indicated that their library eliminates the use of plastics and encourages the use of metal utensils. Both Meadowridge Library and Claremont Library have two participants that marked that their library reuses or donates items instead of disposing of them. One participant from Claremont Library ticked that their library repairs older computers. One Ottery and one Retreat Library participant identified that their library uses forms that are electronic.

Refer to Table 4.11.

Table 4.11 The green library office and libraries **N=10**

The green library office	Libraries			
	Ottery	Retreat	Meadowridge	Claremont
	Frequency	Frequency	Frequency	Frequency
Recycles printer cartridges and chooses green inks	0	1	0	1
Does not use poisonous harmful non-recyclable content products	0	0	1	2
Turns the heating system down during periods of absence	0	1	2	1
Library has energy saving electrical appliances	0	1	1	2
Library has fair trade products in their staff kitchens	0	0	1	2
Library repairs older computers	0	0	0	1
Uses liquid crystal display (LCD) monitors	0	1	1	2
Shuts down computers when library is closed	2	1	2	2
Library refills toner cartridges rather than buying new ones	0	0	0	0
Library uses forms that can be completed electronically	1	1	0	2
Library sends staff for green awareness training	0	0	0	0
Uses recycled chorine free paper	0	0	0	0
Eliminates the use of plastics and encourages use of real utensils	2	0	2	2
Reuses or donates items instead of disposing of them	2	0	2	2

4.3.10 Marketing and promotion

Eight of the participants ticked that their library makes displays or posters on environmental issues which can be seen in Figure 4.5. The following other criteria of marketing and promotion criteria were selected by three participants each: for "embeds sustainable thinking in information literacy instruction," "co-operates with sponsored initiatives" and "tries to persuade users to embrace sustainability." Four responded positively to the item "Library has organizes ecological activities in its library."

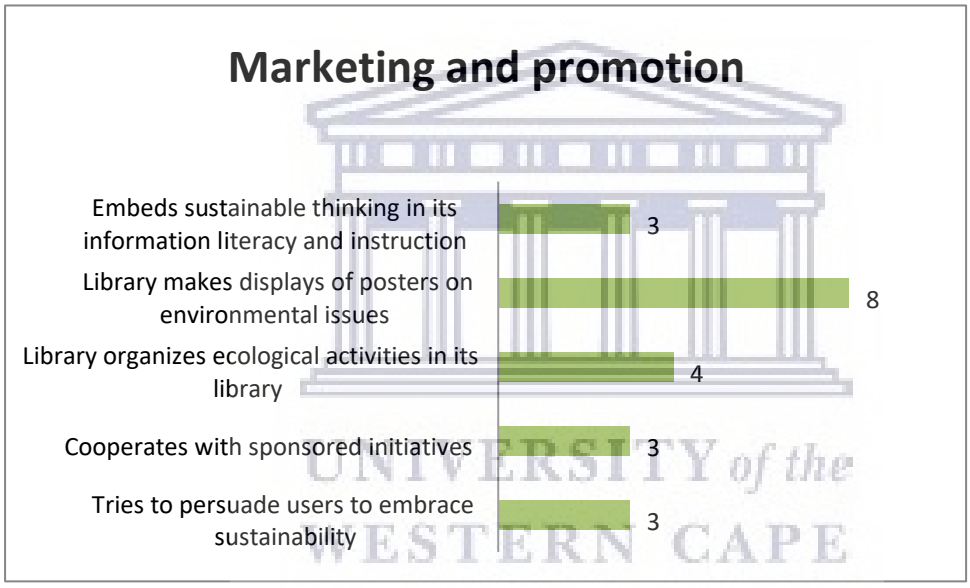


Figure 4. 5 Marketing and promotion N=10

The libraries make displays or posters on environmental issues according to the respective participants: Retreat (2), Meadowridge (3), Ottery (1), and Claremont (2). See Table 4.12. Two Claremont and one Meadowridge Library participants affirmed that their library cooperates with sponsored initiatives. None of the participants from Ottery and Retreat libraries ticked this category. Two Claremont and two Meadowridge Library participants indicated that their libraries host ecological activities. Once again, none of the participants from Ottery and

Retreat libraries ticked this item. Two Claremont Library participants and one Meadowridge Library participant identified that their libraries try to persuade users to embrace sustainability and they embed sustainable thinking in information literacy instruction.

Table 4.12 Marketing, and promotion and libraries **N=10**

Marketing and promotion	Libraries			
	Ottery	Retreat	Meadowridge	Claremont
	Frequency	Frequency	Frequency	Frequency
Tries to persuade users to embrace sustainability	0	0	1	2
Co-operates with sponsored initiatives	0	0	1	2
Library has ecological activities in its library	0	0	2	2
Library makes displays or posters on environmental issues	1	2	3	2
Embeds sustainable thinking in information literacy instruction	0	0	1	2

4.5 Summary

Chapter four has presented the data that investigated what public libraries can do to educate their users about environmental sustainability, green living, and making people more environmentally literate at four City of Cape Town public libraries. Part one presented the data analysis of the interviews with the librarians and librarians-in-charge (LICs). Part two presented the data collected from the checklists completed by the librarians and the LICs.

The data presented was based on themes derived from interviews that were conducted with the library staff. The focus of the data was: participants' understanding of green libraries,

environmental education; environmental sustainability; green buildings and environmental literacy; carbon footprints; green living; eco-literacy; green information literacy; green information literate strategy; green living awareness; what more public libraries can do to create awareness about green living and to make people more green information literate; and what more public libraries can do in general to become greener.

Data from the checklists centred on responses to the following components: project planning and finance; building structure; green materials; building climate; water; green information communication and technology; user services; facilities management; green library office and marketing and promotion.

The next chapter discusses the findings by weaving together the responses from the interviews and the checklist. The findings are also interpreted using through the lens of the conceptual framework and by links to the literature reviewed in Chapter 2.

CHAPTER 5: DISCUSSION AND INTERPRETATION OF THE FINDINGS

5.1 Introduction

The final phase of the data analyses is the interpretation of the findings or the results of the research. According to Lincoln and Guba (1985 cited in Creswell, 2014), the essence of findings is asking what lessons have been learned, which could be based on the researcher's personal interpretation or on the understanding that the researcher brings to the study. These interpretations could be determined by personal culture, history and experience (Creswell, 2014:200). Findings could consist of making a comparison of the data to the information from the literature or theories (Creswell, 2014:200). According to Williams (2007: 66) findings of quantitative research could be predictive, explanatory and confirming. This chapter discusses and interprets the findings of the qualitative and quantitative data presented in Chapter four. The researcher triangulated the qualitative data from the interviews with the quantitative data that were in the form of a checklist.

The aim of the study was to investigate what green operations and practices or environmentally sustainable practices are being used or can be used to educate users about environmental sustainability, green living and making them more environmentally literate at four City of Cape Town libraries. Four research objectives were created in order to guide the study: namely, to identify what librarians' perceptions are of environmental sustainability and green libraries; to identify what libraries can do to create awareness of environmental sustainability and to promote green living; to determine the green living practices public libraries are currently employing; and to determine how librarians educate users on the importance of green living and make users green information literate.

In this chapter the researcher assigns meaning to the results reported in the previous chapter by referring to the conceptual framework consisting of 1) environmental sustainability; 2) environmental literacy; 3) environmental education; 4) green information literacy; and 5) green library. This framework was informed by, with reference to Werner's (2013) sustainable buildings, equipment and management checklist; Segarra's rating system of green libraries (Hauke, 2015:3); and Kurbanoğlu and Boustany's (2014) green operations and practices. The researcher will also contextualize the findings by referring to the research objectives mentioned above and the literature, as well as indicating how this research study relates to the gaps in the literature.

5.2 Demographic characteristics

Four libraries, two from affluent areas and two from lower middle- and working-class areas were targeted in order to determine whether the economic levels of a community play a role in their people's understanding of green living and environmental sustainability and the extent to which it is being practiced in libraries. The study found that the two libraries from the affluent areas– Claremont and Meadowridge libraries are carrying out more green practices than the libraries from the lower middle and working class areas. The libraries in the more affluent areas also had access to green materials which the two libraries from the lower middle and working class – Ottery and Retreat libraries did not have. However, certain aspects such as staff training, solar energy and bicycle racks in libraries had no difference between the libraries in the affluent areas and the lower middle and working class areas as all four libraries did not implement these green practices.

5.3 Understanding of green libraries

Green libraries have been defined as libraries that include components such as green buildings; green operations and practices; green programmes and services; green information systems; and green collections (Kurbanoğlu and Boustany, 2014:49). Green libraries have also been defined as libraries those that apply environmental policies (McElrath and Sutherland, 2015:14).

Miller (2010) stipulated that, in order for a library to be considered green, the staff needs to pay careful attention to the services that they provide (Cardoso and Machado, 2015:12). Therefore, it is necessary for libraries to develop sustainable services and make them part of the ongoing library services that they offer (Genovese and Albanese, 2011:2).

Green libraries were variously defined by interview participants as buildings that: are designed to be cool in the summer and warm in the winter, save water, and are environmentally friendly; have a lot of plants around the building or have a garden; and saves electricity. Green libraries do not allow smoking around the building; they are kept clean, and engage in issues such as climate change, and organize doing practical hands-on things initiatives to make show people understand the importance of preserving nature. Participants linked green libraries to recycling, as can be seen with in the responses of Librarian 2, and LIC 2's and LIC 4's responses.

Interview participants also defined green libraries as libraries digital, meaning that they do not use the printed format, or too much paper, encourage reading resources online, and thus save paper and trees.; as digital libraries – encouraging people to read resources online, not printing pages unnecessarily thus saving paper and trees. These definitions contradicted Librarian 4's definition of green libraries which was the opposite of most definitions. Librarian 4

maintained that green libraries provide printed materials such as books to their patrons instead of making it available on computers, tablets and iPads, which brings in the debate about which format is the most environmentally friendly.

The researcher got a sense that some of the participants were not really aware of what a green library was, such as Librarian 4. LIC 1 also admitted that she was not sure about what green libraries were, but she thought that it had to do with buildings and how, whatever people do, it affects the environment.

Thus, considering the definitions of a green library, participants only included some of the components of a green library in their explanation. Not all of the components from Kurbanoğlu and Boustany (2014), McElrath and Sutherland (2015), and Miller (2010) were mentioned. Respondents excluded factors such as environmental policies, or green programmes and green information systems that make up a green library.

5.3.1 Ottery library as a green library

Librarian 1 stated that Ottery library is a green because library staff re-uses things such as plastic bottles, and they recycle a lot of paper, which LIC 1 confirmed. This statement is corroborated on the checklist, as both Ottery Library participants specified that their library recycles containers and packaging.

However, other responses between Librarian 1 and LIC 1 of Ottery Library contradicted each other. Whereas Librarian 1 stated that Ottery Library does not have any plants, it was contradicted by LIC 1 who selected the checklist item *on the checklist that the library uses grey and rainwater* for their food garden, indicating that Ottery library does have plants.

On the checklist, Ottery library participants left the majority of criteria blank, including project planning and finance, facilities management, the green library office, and marketing and promotion blank. However, both participants stipulated on the checklist that the Ottery Library implements the following criteria: *sets a high level of comfort and provides a healthy environment for users*; *library uses minimal space wisely*; *library does not use a lot of air conditioning*; *library makes provision for noise during vacuum cleaning routines*; *library has sanitary supplies*; and *library shuts down computers when the library is closed.*

None of the Ottery Library participants marked electricity saving on the checklist. LIC 1 was of the opinion that Ottery library is not green because they do not have a recycling centre. In an interview statement, LIC 1 raises some additional concerns justifying the too and it justifies LIC 1's argument that Ottery Library is not a green library. For example, the library is not doing its part to educate its community and the library did not follow through on a request for a recycling centre from a community member. Further strengthens LIC 1's argument that Ottery library is not a green library. LIC 1 said that the reason why Ottery Library is not a green library is because this was something that was not previously considered but admitted that it is something that libraries should be thinking about.

Librarian 1's reasons for Ottery Library being a green library did not meet all the criteria of Kurbanoğlu and Boustany's (2014:49) definition of green libraries as including components such as green buildings; green operations and practices; green programmes and services; green information systems; and green collections and McElrath and Sutherland's (2015:14) definitions of green libraries as libraries that apply environmental policies. Ottery Library participants did not mention their green collection, information systems or green policies However, some of the green programmes were mention and some green practices. Ottery Library met 33% of the

checklist criteria but did not meet as the criteria of the framework for a green library that was provided by Segarra's rating system, Werner's checklist and Kurbanoğlu and Boustany's green operations and practices checklist such as have sustainable goals or using ecological quality materials. Therefore, considering the overwhelming findings from the checklists, the interview responses and the definitions in the literature, the researcher would have to deduce that Ottery Library is not yet a green library.

5.3.2 Retreat library as a green library

Librarian 2 and LIC 2 from Retreat Library were both in agreement that Retreat library is not a green library. They agreed that Retreat library is not green because options certain factors have not been thoroughly considered, such as applying for recycling or digitizing the newspaper and magazine section of their collection. Librarian 2 added that all the newspapers and magazines are still in print format. On the checklist, Retreat Library participants left the bulk of the criteria blank, including project planning and finance, the green library office, and marketing and promotion blank. Both participants agreed that their library implemented the following checklist criteria: *sets a high level of comfort and provides a healthy environment for users*; *library uses minimal space wisely*; *library maintains building service*; *library does not use a lot of air conditioning*; *library reduces the use of water*; *library makes provisions for noise during vacuum cleaning routines*; *uses natural lighting and ventilation*; and *makes displays or posters on environmental issues*. Retreat Library met 44% of the checklist criteria.

It was concluded that Retreat Library is not a green library from the interview responses and very few of the criteria for greenness were selected on the checklist. After considering the findings from the interviews, the checklist, and the literature definitions of of green libraries, the

researcher would have to conclude that Librarian 2 and LIC 2 were correct in saying that Retreat Library is not a green library as they do not have sustainable goals, green policies, green collection or ecological quality materials.

5.3.3 Meadowridge library as a green library

The data on Meadowridge Library showed contrasting views from all three participants. Librarian 4 and LIC 3 both indicated that Meadowridge Library is a green, library but Librarian 3 stated the opposite. This contrast in responses was also depicted showed in the checklists. The reasons that Librarian 4 and LIC 3 gave for Meadowridge Library being green differed from each other. LIC 3 said that the library is green as because they pick up papers; keep the library clean; do not allow people to smoke near the library or inside on the premises; and they have plants. LIC 3 stated that they have special water- saving devices fitted in on the taps to save water and provided hand sanitizer but did not select *library uses water saving features (equipment*) in the checklist, causing a contradiction between the two sets of data. All three participants indicated that the library *uses minimal space wisely,* but none of the participants ticked that their *library uses switchable sockets for computers and printers* on the checklist. It is possible that the discrepancy occurred because participants did not read the checklist properly or some initiatives are no longer taking place.

Librarian 4 stated that Meadowridge library is a green library because it the library provides printed materials to their patrons, as well as materials on environmental issues and through their displays, posters and well as pamphlets. This is evident from the checklist, as all the Meadowridge Library participants indicated that their library uses displays or posters on environmental issues.

Librarian 3, on the other hand, felt that Meadowridge Library is not a green library because there is a lot of wasted paper and printed material which should be made available electronically. This can be seen in the responses from the checklist, whereas none of the Meadowridge participants selected *library makes use of scanning instead of printing* and or *library uses forms that can be completed electronically*, —an indication that the library services are still print based. Librarian 3 added that there are no environmental programmes or gardens and no money to improve the environment of the library.

LIC 3 mentioned that Meadowridge Library has installed water saving equipment, does not pollute, and has grown plants around the building (in contradiction to Librarian 3); and Librarian 4 stipulated that information on environmental issues is being communicated to patrons. However, Librarian 3's response in the interview was that there are no programmes creating awareness and he contradicts himself, since he is one of the two Meadowridge Library participants who indicated on the checklist that his library has ecological activities on the checklist. Meadowridge Library met 68% of the checklist criteria. The researcher took into account that the LIC and another librarian indicated that the library is not green as well as the literature was taken into account to solve the discrepancies.

After considering the definition of green libraries by Kurbanoğlu and Boustany (2014) and McElrath and Sutherland (2015), the responses from the interviews and the findings from the checklists, it can be said that Meadowridge Library is not a green library. This is because as the reasons given by Librarian 4 and LIC 3 did not include all the elements such as green collections, green policies or green IT and green strategies of a green library. As well, participants contradicted each other and some of their answers from the interviews and checklists did not correspond, thus making the data untrustworthy and thus making it void. Therefore, the researcher concluded that Meadowridge Library is not a green library.

5.3.4 Claremont Library as a green library

The participants' responses from Claremont Library also contradicted one another. Librarian 6 contended that Claremont Library is green, but Librarian 5 and LIC 4 felt that the library is not fully green yet. The responses from the checklist also revealed a contradiction in responses views amongst the participants.

Librarian 5 stated that Claremont Library is not yet fully green as most of the materials are still in printed format and people still have to come to the library instead of borrowing items online. This was also evident in the literature indicating that digital systems will lessen the use of paper, ink and transportation, which will result in the reduction of carbon emissions (McElrath and Southerland, 2015:18). LIC 4 stated that Claremont Library staff recycle and save paper but argued that the library is not yet green. She maintained that certain aspects such as how light enter the building and the use of eco-friendly materials that are out of her control. The checklist responses revealed that all three Claremont Library participants ticked that their *library has installed energy efficient lighting.* LIC 4 brought up an important point that libraries are using what is given to them by the City of Cape Town and libraries do not have much of a say in resource allocation, which has had an impact on public libraries not being green. All of the Claremont Library participants ticked the criteria: *library reduces the use of water*; *uses switchable sockets for computer and printers*; and *uses software solution to optimize energy consumption (stand-by)*, which corroborates LIC 4's response that Claremont Library is green as far as what is under their control.

Librarian 6 indicated that Claremont Library was a green library because the building itself is environmentally friendly and built with board and instead of bricks, which means that the structure of the building allows air to circulate in the building. This is confirmed in the

checklist by all the Claremont Library participants. They specified that the library maintains building services and uses materials that are repairable. Librarian 6 also mentioned that Claremont Library provides recycling bins. However, the researcher is not aware if the green service is being used successfully. The checklist confirms Librarian 6 and LIC 4's response that their library recycles, as all three participants selected *the "library separates and recycles waste* criterion, which none of the other participants from the other three libraries ticked.

Although the participants ticked 91% of the criteria on the checklist, it can be concluded that Claremont comes close to being a green library, but it is not yet fully green. The researcher arrived at this conclusion because the extensive practices that were coming out from checklist responses were not reflected in the interview responses and elements such as green policies and green collections, that were included in Kurbanoğlu and Boustany's (2014)indices, green vision and goals were lacking, so after considering the findings from the checklists, the interviews and the definitions of green libraries by Kurbanoğlu and Boustany (2014); McElrath and Sutherland (2015); Miller (2010); and Genovese and Albanese (2011), it can be concluded that Claremont library comes close to being a green library but it is not yet a green library. Claremont library is not green because the responses did not include all the elements from the definition of green libraries Even though Claremont library has a very high percentage of implemented green practices from the checklist, not all the interview responses corresponded with the checklist responses and the interview responses were not detailed enough as participants did not mention all of the green practices that their library was practicing that they had indicated on the checklist and participants' responses contradicted each other. The researcher turned to the literature to deal with discrepancies as Jones (2017: 6) states that a green library strategy includes: advancing environmental sustainability in all aspects of life; delivering services that demonstrate value and

economic responsibility; improving collection space, storage and preservation; and ensuring that staff has the skills needed to deliver the library's mission and keep the organizational structure is secure, all of which were missing from Claremont Library.

5.3.5 City of Cape Town libraries as green libraries

Interview participants were given a checklist to tick off if their library adhered to specific green operations and practices. The criterion on the checklist that had the highest number of participants (nine out of ten) selecting it was: *library uses minimal space wisely* (under building structure) with only one Claremont Library participant disagreeing. No participants' ticked *library uses solar energy* and or *has bicycle racks for staff and users'* items. In the literature, Arlington Public Library in Virginia has created a successful sustainable programme called "Bikes, Buildings and Broccoli." This programme allows the library to promote the city's status as a bike-friendly community by encouraging staff to bike to work (Hauke and Werner, 2013:8). The Biblioteca Parque do Estado do Rio de Janeiro (BPERJ) gained points for their environmental certification by encouraging their users to use bicycles as a means of transportation and providing a bike rack with forty spaces for users (Cardoso and Machado 2015:11). Some librarians in Oregon have encouraged their staff to set an example and travel by bike to work (Connell, 2010: 3).

Solar energy, which was one criterion on the checklist, has gained popularity over the years (Ferreira, 2017:73). Fallik, Soper, and Sparks (2012:44) confirm that the current trend in libraries is creating renewable energy that has no emissions by making solar panels or windmills. This is evident in American libraries that have implemented smart solar land electrical charging (Granger, 2017:51). An example is Berkley Public library's West branch that has been producing more power than it uses, through using solar panels and, radiant wasting heating systems that

uses 100% of their power without waste energy (Radiant Zone Heating, 2019). According to Ferreira (2017:74), South Africa has a great potential to produce effective solar generated energy due to the country's ideal climate. However, South African libraries have yet to implement the use of solar energy in their libraries possibly because public libraries are an unfunded mandate that do not generate an income and it could be that libraries and the organizations that run the libraries do not see the importance of libraries using solar energy.

None of the participants selected the following criteria on the checklist: *library refills toner cartridges rather than buying new ones*, *uses recycled chlorine- free paper*; and *library sends staff for green awareness training*. This was evident from the interviews as participants suggested that staff should be made aware of environmental sustainability. None of the participants from Ottery, Retreat and Meadowridge libraries identified that their libraries have alternatives to plastic bags. A study conducted in German public libraries by Beutelspacher and Meschede (2020) indicated that 23 cases in libraries and cafes are replacing plastics bags and other containers with alternatives. In this study only two participants from Claremont Library indicated that they have alternatives to plastic bags.

There were two Claremont and two Meadowridge Library participants that identified the *library uses water saving features (equipment)* item, but no Ottery or Retreat library participants agreed. No Ottery or Retreat Library (working class areas) participant ticked *library uses ecological, quality materials*, while both Meadowridge and Claremont Libraries (affluent areas) had one participant each that agreed. This raises the question of why libraries in more affluent areas are using water saving features as well as ecological quality materials, while smaller libraries in working class communities are not using these environmental practices. Possible reasons could be that the bigger libraries in more affluent area have a bigger budget than the

smaller libraries in working class areas, or the libraries in more affluent areas have friends of the library that could purchase these materials, to the disadvantage of smaller libraries in lower- or working-class areas.

Under the marketing and promotion subheading of the checklist, three participants, one from Meadowridge and two from Claremont Library selected: *tries to persuade users to embrace sustainability*; *co-operates with sponsored initiatives (*i.e., other departments, Friends of the library or other organizations); and *embeds sustainable thinking in information literacy instruction*. None of the Ottery and Retreat Library participants ticked these criteria.

Some of the participants (Claremont, Retreat and Meadowridge libraries) stated that their libraries are not green because most library resources or materials are not available in digital format. The assumption, that delivering information digitally is greener than using printed texts in the collection, is also evident in the literature (Connell, 2010:9). According to McElrath and Southerland (2015:18), if a digital system is used then less paper, less ink, less production and transportation would be used, which will reduce carbon emissions. On the other hand, Manguel (2008:75) asserts that media formats are not immortal, as can be seen with microfilm. Afacan (2017:376) maintains that changes in digital services will affect storage and, require more energy that creates heat containing toxic materials that are bad for peoples' health. However,

Chowdhury (2014, 2016 cited in Beutelspacher and Meschede, 2020) mentions that there is a high energy cost in the operation of Information Communication Technologies (ICT) (Beutelspacher and Meschede, 2020). Repanovici and Landry (2015: 34) found that 90% of students were not aware that internet searches consume a lot of energy. Their study revealed that information searching research skills may help to reduce carbon emissions and electricity consumption drastically, as the amount of time people spend to retrieving information will be reduced (Repanovici and Landry, 2015:34). Librarian 4 (Meadowridge Library), on the other

hand, said her library is green because the library makes use of printed materials. Connell (2010:9–10) stated that book waste is close to 100% recyclable, and publishers have been implementing greener practices because of consumers' demands for green practices. Therefore, paperless does not necessarily mean green. However, very few studies have been conducted on printed verses electronic materials and information retrieving skills, indicating that more research should be done on this matter.

Thus, none of the libraries in the study is green. Claremont Library is leaning closer to being green, but it is not yet completely green as libraries have not yet implemented solar energy and have not provided bicycle racks which some libraries in America have already implemented.

5.4 Familiarity with terms

All interviewees were asked to define different environmental terms to establish if they are familiar with them. In all likelihood, if they could define them, they would most likely be able to educate their users about them. The overall synopsis follows.

5.4.1. Environmental education

All interview participants except Librarian 3 were familiar with the term environmental education. Librarian 3 seemed to be familiar with the term but was unwilling to define it. Librarian 1 was unable to define environmental education.

A common definition of environmental education provided by interview respondents was educating users about looking after the environment. According to Corvo de Armas (2008:2), environmental education means to equip people with knowledge and understanding of the

environment as well as how human's actions impact the environment. Thus, the majority of participants' answers were in line with the Corvo de Armas (2008) definition, as most of the participants referred to educating users about the environment and how their actions can positively or negatively affect it.

5.4.2 Environmental sustainability

Eight out of ten participants specified that they were familiar with the term environmental sustainability, while Librarian 2 and LIC 3 were not. However, Librarian 1 was unable to define environmental sustainability. The common definition of environmental sustainability provided by participants was consistency in conserving the environment or using long term methods that will conserve the environment for future generations. Environmental sustainability has been defined as using resources or interacting with nature in a way that ensures that resources will be saved for future generations (Kurbanoğlu and Boustany, 2014:48). Thus, the participants were on the right track. Librarian 3 commented that the today's society is not environmentally friendly as because people are driving cars instead of walking. LIC 1 and 2 referred to recycling, and another recurring theme was keeping the environment clean.

5.4.3 Green buildings

According to Goosen (2009:7), a green building incorporates design, construction, and operational practices that will reduce the negative impact on the environments and the living beings that live in the building. All the interview participants except LIC 1 indicated that they were familiar with the term green buildings. However, LIC 1 did attempt to provide an explanation that it would be a building that uses materials that are safe for humans and not

harmful to the environment. LIC 3 was also unable to define green buildings but said that she read about green buildings in a book. The remainder of the participants defined green buildings as buildings those that use less electricity and water, and the buildings are made of materials that will cause the least harm to the environment. LIC 4 suggested that newer buildings, such as the new City of Cape Town Dunoon Library, are green buildings and that are built with green (environmentally friendly, non-toxic) materials that would not give off any toxins. This is in line with the City of Cape Town's Draft 1 Green Building Guidelines for the design, construction and operation of which aims to design, manufacture and construct buildings that save power and energy, have less environmental impact and which are affordable to build (Goosen, 2009:49). Barbakoff and Barbakoff (2012:232) and as well as McElrath and Sutherland (2015:14) confirm that, in the past, the structure of library buildings was not designed with sustainability in mind as they many were built before knowledge of global warming and climate change. Nonetheless, the John Jermain Memorial Library in New York is one 100 years old and is considered green because it was built using sustainable building materials (Alberts, 2012:61). Clark (2013:23) indicates that renovating a building may actually reduce waste more than razing and building from scratch However, the literature about green library buildings has focused mainly on new buildings.

Some interview participants referred to green buildings as buildings those that make use of solar energy or solar power instead of electricity; have a free flow of air and have no obstructions; use less air conditioning; have wider windows to let more light in; and have a green area where plants as well as vegetables can be grown. According to Kurbanoğlu and Boustany, (2014:50), "green buildings are structures that are designed or renovated, operated or reused in an ecological way and in a resource efficient manner." Thus, the participants' responses were in

line with the definitions provided by Kurbanoğlu and Boustany (2014:50) as the participants all mentioned resources such as solar energy and a free flow of air and indicated that it should be used in a more efficient way.

5.4.4 Environmental literacy

Kurbanoğlu and Boustany (2014:49) defined environmental literacy as a means to have an understanding and appreciation of the natural world and our place in it.

The majority of interview participants were not familiar with the term environmental literacy except for LIC 2 and Librarian 5. LIC 2 defined environmental literacy as having an awareness of one's impact on the environment and how one's activities in general, for example driving a car, can impact the environment. Librarian 5 described the term as people being aware and taking steps in order to save the environment such as eliminating pollution. Other interview participants attempted to define environmental literacy as people being literate and looking after the environment (LIC 3); teaching people how to treat the environment (Librarian 6); something similar to teaching literacy (Librarian 4); teaching people and providing them people with tips and skills on how to be green and to live green (LIC 4). LIC 4 admitted that she had never thought about these things before. Therefore, taking into consideration the definition of environmental literacy provided by Kurbanoğlu and Boustany (2014: 49), LIC 2's response came the closest to this definition. Yet, most of the interview participants were not familiar with term.

5.4.5 Carbon footprint

Carbon footprint has been defined as the total amount of carbon dioxide dispersed into the atmosphere as a result of the activities of a particular individual or organization (Good Energy, 2017). Only two participants, Librarian 4 and 6 indicated that they were not familiar with the term carbon footprint.

LIC 3 mentioned that the library used to get a lot of queries on this subject matter for school projects years ago, and she was more familiar with the term at that time when assisting the students with their school projects. However, she has not received any queries on this subject matter in years and wondered if schools are still dealing with the topic teaching it or if students are just googling the answers.

Ottery and Retreat libraries had no participants who were unfamiliar with the term. The idea of impacting the environment negatively, either through emitting a large amount of carbon dioxide, emissions or other forms of pollution, was mentioned by the remainder of the participants. Both Librarian 3 and LIC 2 referred to food consumption and food production when explaining the term carbon footprint. Librarian 3 and LIC 1 in their definitions mentioned driving cars, and LIC 2 referred to travelling as a cause of carbon emissions. The definition of carbon footprint provided by Good Energy (2017), the participants' responses were in line with this the Good Energy (2017) definition of a carbon footprint. Librarian 3 who was spot on when he defined carbon footprint as the amount of carbon dioxide that we emit. All participants that were familiar with the term explained that a carbon footprint is the environmentally harmful result of carbon-emitting human activities caused by humans (emitting a large amount of carbon dioxide), and that it is harmful to the environment.

5.4.6 Green living

According to Kurbanoğlu and Boustany (2014:48), going green means leading a lifestyle and making decisions that are environmentally friendly which can help protect the environment. Another term for green living is sustainable living, which has been defined by Brundle (2020) as reducing the amount of waste and pollution in order to ensure that the world has enough natural resources such as water, air and materials to build with in order to support ourselves and future generations.

All the participants said they were familiar with the term green living. Common themes that came out of the definitions of green living provided by participants were resource-saving activities, recycling and conserving electricity and water. Other definitions included green living being a natural or healthy state of living or healthy living; going organic and not using genetically modified or processed food; growing vegetables and plants; using products that are close to nature and do not use excessive plastic packaging not wrapped in so many artificial plastics or that do not produce a lot of to reduce waste.

The definitions of green living by Kurbanoğlu and Boustany (2014:48) and Brundle (2020), the majority of participants' explanations of green living are consistent with the definitions given by Kurbanoğlu and Boustany (2014:48) and Brundle (2020). Respondents' prevailing view of green living was in line with these definitions and included the main idea that green living is reducing one's carbon footprint, about protecting and conserving the earth and natural resources, as well as leading a natural lifestyle that will not harm the environment. However, it was also evident that some participants were genuinely not aware of what green living was.

5.4.7 Eco-literacy

Garcia Chua (2018: 101) defined eco-literacy as "a way of thinking about the world in terms of its interdependent natural and human systems as well as the consequences of human actions and interactions."

The majority of participants were not familiar with the term eco-literacy except for LIC 2 and Librarian 4, although neither of these participants was unable to define it. Librarian 4 stated that she had forgotten what it is, and LIC 2 acknowledged that she had not heard the term and thought that it must be a new term. LIC 4 attempted to define eco-literacy but was unable to accurately describe it. LIC 1 also suggested that eco-literacy has to do with how the ecosystems are affected by human actions and used an analogy of how people throwing papers in a pond will change the pond's ecosystem was provided. Thus, considering the Garcia Chua's (2018:101) definition of eco-literacy, LIC 4 was partially correct when stating that it has to do with systems and the example provided by LIC 1 described the consequences of human actions. However, the responses from the participants reveal that they are mostly not unfamiliar with eco-literacy.

5.4.8 Green information literacy

Participants perceived green information literacy as educating, sharing and accessing information and teaching users about green living, as well as disseminating information and creating awareness of green issues. Librarian 5 specified that green information literacy is the same as environmental literacy. LIC 3 admitted that she is not very knowledgeable but stated that school students and library users should be made aware of it.

Green information literacy has been defined as “a set of conventional skills which is expanded to include sustainable thinking, which takes into consideration how our information behaviour choices and information actions affect our environment” (Kurbanoğlu and Boustany, 2014:54–55). Therefore, using Kurbanoğlu and Boustany’s (2014:54-55) definition, It was evident from all the respondents’ prevailing view of the term was consistent with Kurbanoğlu and Boustany’s (2014:54-55) definition, since it understandings of the term that were provided by participants that the perceptions had to do with teaching environmental literacy and sustainable information behaviour which ties in with the “set of conventional skills,” and information behaviour choices and actions which was referred to in the definition.

5.5 Green living awareness

The majority of the participants indicated that their public libraries are not doing enough to create awareness of green living. However, Librarian 6 indicated that her library is doing enough, since they use posters and displays on living green and three sets of recycling bins so that users can separate their waste accordingly. LIC 4 admitted that libraries have not really been proactive in creating awareness, and LIC 2 confirmed this by stating the awareness is very basic. Reasons for this included: provided were libraries not having enough resources or time to create awareness; staff not necessarily seeing it as part of their core function; staff not understanding the importance of creating awareness and thus are not creating a sense of urgency around the issue; and librarians having other priorities— library staff are busy focusing on reading, educational, and recreational aspects and libraries programming cannot do everything. LIC 1 felt that staff know about the term but have not implemented it, while she herself has become more environmentally aware and but now she is aware and needs to raise awareness within the community. Collaborating with good and sustainable partners was suggested to help libraries

would be able to raise awareness effectively. Therefore, it was concluded that City of Cape Town public libraries are not doing enough to create awareness of green living and promoting environmental sustainability due to a lack of resources, time, and perceived urgency around environmental issues.

5.6 What libraries can do to create awareness of environmental sustainability and promote green living

A common response, that participants gave for what public libraries can do to create awareness of green living and make people more green information literate, was to target children's education. As well, it was suggested that green environmental programmes should be part of libraries' regular activities, and organizations should be invited to promote environmental literacy and green living among children, adults and young adults [LIC 6].

Suggestions of Frequent awareness campaigns would help staff understand the information better and educate users better. Green living and green information literacy programmes should be made part of the Service Delivery and Budget Implementation Plan (SDBIP) and as well as the business plan of public libraries, which would ensure that these programmes are held on a regular basis [Librarian 5]. Green living and green information literacy programmes should be made part of libraries' normal programmes [LIC 4]. For public libraries to conduct proper green programmes, librarians would need to invest time and, human and material resources such as human and material resources into the planning, execution, and evaluation of outreach programmes, in order to measure the impact that libraries are making on the community [Librarian 3]. Libraries should partner with people in the field and link up with schools to do joint projects [LIC 2]. According to a study conducted by Beutelspacher and Meschede (2020), partnerships and cooperation are important for public libraries. The study

mentioned that public libraries collaborated with schools, consumer centres, and friends of the library, municipal utilities and waste disposal companies (Beutelspacher and Meschede, 2020). Librarian 4 suggested that libraries should apply a more practical and hands- on approach by going out into the communities and teaching people how to live green. Rodgers (2017) also argues that the best type of libraries does not limit themselves to their own four walls, but engage with their communities too (Bohuski, 2020:16).

A common approach mentioned to creating awareness was using more posters and pamphlets. Posters and displays were also a criterion of the marketing and promotion section on the checklist.

If libraries have space it can obtain recycling bins provided that space was available, was a common suggestion [Librarian 1 and LIC4]. However, it was seen by some as unlikely to succeed in Librarian 1's community as people will empty the bins and sell the recycling. Librarian 1's library is in a more impoverished community which statement shows the differences in economic levels amongst the libraries as Librarian 1's library is in a more impoverished community. Recycling bins would work better in a more affluent area such as Meadowridge or Claremont [Librarian 1].

It can be deduced from the responses given by participants that libraries should create awareness of green living and make users green information literate by implementing integrating environmental issues and sustainable lifestyles into green living and green information literacy in their programmes. As well, several recommended that librarians and that they should start educating children on how to care for the environment. Libraries should form partnerships and make use of posters and pamphlets to raise more awareness of green living. It was suggested by participants that green living programmes should be included in municipal policy and library business plans. Additional government allocation of human and material resources of libraries

that librarians would need aid in time and resources (such as human and material resources) in order to execute proper green programme executions. It was recommended that libraries should implement a more hands- on and practical approach to teaching green living and making their communities green information literate. Recycling bins at libraries were also proposed, but due to the variability in economic circumstances it would not be possible for certain libraries, revealing the effect of social stratification on an important public resource as it would not work in particular areas revealing an interesting point regarding the economic levels between the libraries. Lastly, regular staff awareness campaigns should be held so that they could help librarians become familiar with the environmental issues that they could, in turn, communicate to library users.

5.7 Strategies to make users green information literate

According to McElrath and Sutherland (2015:21), libraries have to develop a green agenda by creating a plan that would incorporate green policies and activities in order to become good social institutions. The plan should consist of the mission, vision or strategic plan of the library that will be used to encourage both staff and library users to participate in developing green initiatives. The Chinese University of Hong Kong (CUHK) Library strategic plan is an example of a plan where sustainability was governed by four objectives: to advance environmental sustainability in all aspects of life; to deliver services that demonstrate value and economic responsibility; to improve collection space, storage and preservation; and lastly, to ensure that staff has the skills needed to deliver the library's mission and keep the organizational structure is secure (Jones, 2017: 6). Digitization has also been incorporated into many libraries' strategic plans. and in some cases, the promotion of digital research dealing with society, and economy,

energy, water, agriculture and the built environment was also included in the strategies (McElrath and Sutherland, 2015: 18).

Participants were asked whether their library had a strategy to make their users green information literate, but only three participants responded in the affirmative. Librarian 3 and LIC 3 said that Meadowridge Library does not have a strategy. However, Librarian 4 claimed that Meadowridge Library does have a green information literacy strategy for making users green information literate, which consists of putting up posters and displays in the library as well as getting the Department of Waterworks to give talks about living green. In the past few years, the library has been focusing on water saving, but that is as far as they have gone [LIC 3]. Meadowridge library does not, in fact, having a green information strategy because most libraries are too busy making their users literate and instilling a love for reading [LIC 3]. The state does not have a policy that effectively deals with environmental issues, therefore, library policies have not transformed into environmental education institutions for the public. Thus Meadowridge Library does not have a green information literacy strategy [Librarian 3]. However, the state does have the National Development Plan 2030 (South Africa, n/d) which includes environmental sustainability. In order for libraries to provide programmes to educate their users, librarians as educators need time and resources [Librarian 3].

Both Librarian 6 and LIC 4 agreed that Claremont Library does have a green information strategy in place. However, Librarian 5 disagreed. Claremont Library's strategy is to have in place posters advertising the subject matter or providing tips about green information living and boxes with the available information [Librarian 6 and LIC 4]. Recycling bins are also part of the library's green information literacy strategy [Librarian 6]. However, LIC 4 contradicted this statement, saying that the library does not have recycling bins and suggests creating awareness of

recycling and recycling centres. For Librarian 5, Claremont Library does not have a strategy in place because, besides having PressReader and World Book online, they have never actually planned for anything. Library and Information Services (LIS) should be able to dedicate time to environmental issues; this would encourage staff to implement a strategy on how to get library users to become green information literate [Librarian 5].

Ottery Library does not have a strategy in place to make users green information literate [Librarian 1 and LIC 1]. There is no strategy because the library staffs have not thought about it before [LIC 1].

Retreat Library does not have a green information literacy strategy in place [Librarian 2 and LIC 2]. Only displays are used [LIC 2], and the staff does not see the significance of it [Librarian 2]. Public libraries do not have a green information strategy in place because they are fairly traditional (focus on book related activities and crafts) and not thinking out-of-the-box, but green themes could be included according to [LIC 2]. A strategy for green information literacy could include colleagues from the Department of Environmental and Health Services to work transversally with public library programmes [LIC 2].

It can be determined that City Libraries do not have a strategy to put green information literacy in place. However, Librarians 4, 5 and LIC 4 claimed that their libraries do have a strategy, in place but these strategies do not include green policies and other elements such as green programming or green collections mentioned by McElrath and Sutherland (2015) that would constitute a legitimate green information literacy strategy which should be included in the strategy.

5.8 Public libraries becoming greener in general

Participants were asked what libraries can do in general to become greener, and to become green ambassadors for their patrons through greening their daily practices. One theme that reoccurred in the responses was recycling. Some of the participants mentioned that libraries should be recycling centres. A standard for greenness, such as all libraries having recycling bins, was suggested. Cutting down on paper was also brought to light as libraries do too much printing and have too much paperwork and an increase in digitization was suggested, which will decrease libraries carbon footprint. Libraries should make use of less of air conditioning and use natural ventilation instead, use hand sanitizers to conserve water, and recycle their grey water. The majority of the participants felt that greater staff awareness is needed in order for libraries to become greener. None of the participants ticked the category: *Library sends staff for green awareness training*, on the checklist which was evident in the interviews as participants suggested initiatives such as staff awareness campaigns, bulletins or talks provided by NGOs, so that staff can acquire the skills and awareness needed to educate their users.

Water sustainable plants needs planting around the library and library gardens could be maintained and developed into reading spaces as this will allow direct engagement with the environment according to [Librarian 3 and LIC 3]. Literature showed that some libraries in America are creating outdoor spaces for people to learn through educational programmes and community gardens (Bohuski, 2020:15).

A promotional strategy that would pique patrons' curiosity to read up on the subject matter was suggested. An incentive was suggested to be given to libraries that participate in green initiatives as a motivation for libraries to become greener such as the City Library Services

award for the greenest library. It is important to persuade staff because they would be able to convince the users.

Libraries can become greener by recycling more, cutting down on paper, conserving water, using natural ventilation and hand sanitizers, and maintaining plants and gardens. Libraries should have a standard for greenness. Participants also suggested that more awareness should be created amongst the staff through talks on the subject matter and staff campaigns. If staff is better informed, they will be able to educate their patrons on the subject. Staff motivation was raised, and incentives were suggested to be given to libraries that do participate such as the award for the greenest library that Library Services offers.

5.9 How findings relate to gaps in literature

The findings of this study filled the gap in the literature on libraries and green living as well as environmental sustainability as very few studies have been done on libraries in relation to the green movement in South Africa. The South African context is especially under researched when it comes to green public libraries, according to Fourie (2012). The dearth of South African literature on green libraries is also seen in Merriam, Courtenay and Cervero's (2006) study that touches on environmental education in Latin America, the USA and Southern Africa and in which only four responses from Africa were received on a survey on green libraries. Thus, this research was conducted on four City of Cape Town South African public libraries, as to date there have been very few research studies conducted, dealing with green libraries in a South African context. This study's findings indicate public libraries are not doing enough to make users green information literate. Possible ways to encourage green information literacy among users was addressed which has also been lacking in the literature.

5.10 Summary of chapter

Chapter five discussed, interpreted and triangulated the quantitative and qualitative results presented in Chapter four. Findings from related literature and conceptual framework were used to contextualize the study and to provide meaning to the findings. Differences and similarities of the findings such as City public libraries not having solar energy or bicycle racks were also compared and related literature was emphasized throughout the discussion.

The bulk of participants were familiar with most of the environmental terms. Explanations of the various terms provided by participants were in line with their literature definitions of the terms. None of the four City of Cape Town public libraries studied are not truly green libraries, but Claremont Library comes closest. There were demographic differences between the libraries in affluent areas and lower middle and working class areas in some aspects such as libraries in the more affluent areas implemented more green practices and had more access to green materials than libraries in the lower middle and working class areas. Libraries are not doing enough to create awareness about green living. Only three participants (one from Meadowridge and two from Claremont Libraries) stated that their library had a strategy in place to make users green information literate. Themes such as recycling, natural living state, buildings that conserve resources and posters for marketing were mentioned Partnerships were also mentioned as an important way to create awareness. Participants suggested that libraries should provide recycling bins and become recycling centres. Staff awareness training and incentives to motivate libraries to become much greener was recommended, which is possible to achieve.

The next chapter will provide a summary of the study findings, conclusions and recommendations for future research.

CHAPTER 6: SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This study consisted of an investigation into the green operations and practices or environmental sustainability practices that four Cape Town public libraries are currently using in order to determine whether or not they could be considered green. The public libraries investigated are namely, Ottery, Retreat, Meadowridge and Claremont libraries. The study also examined whether public libraries are creating awareness about environmental issues and the importance of environmental sustainability, as well as how users are being equipped to become green information literate. The research explored how libraries could possibly educate their users about green living and, environmental sustainability and how users could be made while teaching users green information literate. The conceptual framework the study made use of included concepts from the literature: (environmental sustainability, environmental literacy, environmental education, green information literacy, and green library). As, well as, the following environmental indexes informed the analytical framework: as Werner's (2013) sustainable buildings, equipment and management checklist; Segarra's rating system of green libraries (found in Hauke, 2015:3); and Kurbanoğlu and Boustany's (2014) green operations and practices. The study collected and analyzed data from semi-structured interviews and checklist responses of ten library staff members.

This chapter provides a summary, conclusion, and some recommendations for future research on the topic.

6.2 Summary and conclusion

The findings speak to the research objectives and questions: 1) To identify what librarians' perceptions are of environmental sustainability and green libraries; 2) To identify what libraries can do to create awareness about environmental sustainability and promote green living**;** 3) To determine the green living practices public libraries are currently employing; and 4) To determine how librarians educate users on the importance of green living and increase users' green information literacy.

In relation to the research objective one the evidence can be seen in the responses of the library staff that defined environmental sustainability as the consistency and use of long-term interventions in conserving the environment or using long term methods that will conserve the environment for future generations. This which was in line with Kurbanoğlu and Boustany's (2014) definition. Librarians and Librarians-in-charge viewed green libraries as buildings that: are designed to be cool in the summer and warm in the winter; save water; are environmentally friendly; have a lot of plants around the building or have a garden; saves electricity and is linked to recycling, However, but perceptions excluded other components such as green policies or green programmes and green information systems.

In relation to the research objective two, it is evident with responses from library staff that suggested that green living programmmes should be added to libraries' Service Delivery and Budget Implementation Plan and be made part of their normal regular programming that libraries provide. Partnering with experts in the field and connecting with schools to do joint projects was mentioned. Posters and pamphlets were also mentioned in the marketing and promotion section of the checklist as a common approach to create environmental awareness by library staff which was evident in the marketing and promotion section of the checklist.

Findings that speak to research objective three are evident from the checklist responses, where the majority of the library staff indicated that their libraries *set a high level of comfort and provides a healthy environment for users*, and *library uses minimal space wisely*. Library staff has also indicated that their libraries do recycle. However, libraries have not implemented solar energy use like American public libraries (Granger, 2017).

Findings are also in relation to the research objective four, in evidence to the responses of three of the library staff responses. These that indicated that their library's strategy had to with putting up posters or having boxes containing environmental tip pamphlets. None of the other participants indicated that their library has a strategy in place of for how to educate their users on the importance of green living and to make users green information literate.

It was evident from the findings that librarians and LICs were familiar with most of the terms including environmental sustainability, which participants defined as using long term methods or consistently conserving the environment for future generations. Participants were able to define green libraries; however, some components of green libraries such as green policies or green programmes were omitted from the participants' definitions. It can be deduced from the study that none of the four public libraries are green libraries because none of the libraries mentioned that their libraries implemented certain environmental criteria that were mentioned in the literature by other libraries from other parts of world as something that they have already implemented initiatives such as the library has bicycle racks for staff and users, as well as libraries using solar energy. Despite South Africa's ideal climate to produce effective solar generated energy, libraries have not made use of this sustainable technology (Ferreira, 2017:74).

However, Claremont Library comes close to a being fully a green library as they have ticked the majority of the green practices on the checklist and it was evident from the interviews. There were Five out of eight criteria on the checklist were selected by the City of Cape Town public libraries. The most selected item practices in which one criteria that came up tops was utilizing space well, since the majority of the participants (nine out of ten) indicated that their library uses minimal space wisely. The research revealed that libraries are not doing enough to create awareness about environmental sustainability and educating their users on the importance of green living, but public libraries have been highlighting mostly the water crises. Posters and displays have been mentioned in the checklists and interviews by participants as the medium to promote and market any environmental issue. Participants have suggested that public libraries can create awareness about green living, environmental sustainability and make their users green information literate by adding these programmes to their business plans of public libraries. This would ensure that these initiatives will be executed on a regular basis.

One of the reasons Ottery and Retreat libraries gave for not being green libraries is that they do not offer recycling. Results revealed that participants recommended that libraries should supply recycling bins and become recycling centres. It was found that only three out of ten participants (one from Meadowridge and two from Claremont libraries) stipulated that their libraries have a strategy in place to make their users green information literate. Both strategies consisted of using informative posters, as well as providing tips, getting Waterworks to give talks presentations, and setting up recycling bins, which were not detailed and did not include all the necessary green elements such as a green policy or strategy that contains a vision, mission, goals and green collections.

Public libraries have also not been demonstrated how to live green affordably, thus not doing much to dispute the misconception that living green is expensive. However, Ottery Library had a garden project that taught children how to plant their own vegetables and plants and how to look after them. Claremont Library also had a programme on how to plant trees and take care of them, while how to take care of it and Meadowridge Library indicated that they are doing a lot through children's programmes and educating people how to save water. It was also found from both the interviews and checklist data that there is a lack of staff awareness or training on the subject of green living and environmental sustainability. Meanwhile and raising staff awareness was strongly recommended by participants in order for librarians to educate users on environmental issues and for public libraries to become greener. Awards and incentives such as the Green Library Award were also brought up as a way to encourage public libraries to become green.

6.3 Implications of findings for the discipline and recommendations to address issues

The implications that the findings have for the LIS discipline include the identified need for library staff to go for green living and environmental sustainability training. This would better position them to educate library users on environmental issues and they would need to be made aware and educated on green living and environmental sustainability so that they would be able to educate their users. The researcher recommends that perhaps universities should start including green living and green information literacy in their LIS courses. City Libraries would need to formulate strategies to make their users green information literate, partnerships need to be made between the relevant people fostered with environmental organizations and agencies, and environmentally sustainable practices need to be implemented in public libraries.

6.4 Recommendations for future research

The following recommendations emerged from the research:

- Further research should be done on comparing digital services and digital materials versus to printed materials and to identify which format is truly greener, taking into consideration the equipment used and its disposal of the items.
- An investigation should also be done to determine whether there is an impact on energy consumption and people's way of living after green information literacy sessions are being conducted by public libraries.
- This study only focused on the perceptions of library staff. Thus, it recommends that library users' perceptions of green living; and environmental sustainability; as well as whether users think that their libraries are green and creating awareness about environmental issues, should be researched.
- Only City of Cape Town public libraries' green operations, and practices and library staff perceptions were only investigated in this study; therefore, other South African public libraries' green practices should also be investigated.
- Research could be conducted on the effectiveness of posters and displays as a way of promoting or creating awareness about environmental sustainability and green living.
- Lastly, future research could be done on the impact of community gardens and plant growing programmes in libraries on the lives of the library users.

6.5 Summary of chapter

This chapter summarized the crucial findings from the discussion in Chapter five. The four research questions (objectives) were answered. The study investigated the perceptions of Librarians and LICs; and green operations or practices; and environmental sustainability practices of four City of Cape Town libraries. The interviews and checklists developed for the study were based on Segarra's rating system (found in Hauke, 2015:3), Werner's checklist (2013), and Kurbanoğlu and Boustany's (2014) green operations and practices. The geographic area, small sample size, and lack of library user perspectives balancing out librarian perspectives are the main limitations of this study.

The fact that the study only consists of ten library staff members and no library users' perceptions were mentioned is a limitation. The significance of the research for the limited amount of literature on the topic, especially in South Africa, was pointed out. As well, the study identified the need for Cape Town public libraries to raise staff awareness, develop green information literacy strategies, and foster meaningful partnerships with environmental agencies and educational institutions needs to implement by City of Cape Town public libraries. Global implications of research allow libraries to help communities especially in disadvantaged areas to educate their users to live green affordably, provide a skill to users that will make information accessible and reduce carbon emissions. Lastly, implications of the findings and recommendations to address issues were discussed. Staff awareness of green issues was recommended and City Libraries would need to formulate strategies to make their users green information literate and form partnerships between the relevant environmental organizations.

recommendations for future research was stated such as 1) investigating the effectiveness of posters and displays as a way of promoting or creating awareness about environmental sustainability and green living; 2) determining exploring whether there is an impact of library green information literacy sessions on public energy consumption and people's way of living; after green information literacy sessions are being conducted by public libraries and 3) examining comparing digital services and digital materials versus to printed material to determine which format is truly greener, taking into consideration the equipment used and its disposal, of the items amongst other recommendations were also mentioned.

References

Abiolu, O. and Okere, O. 2012. Environmental literacy and the emerging roles of information professionals in developing economies, *IFLA Journal*, 38(1) 53–59.

Afacan, Y. 2017. Sustainable library buildings: Green design needs and interior architecture students' ideas for special collection rooms. *The Journal of Academic Librarianship*, 43(5) 375–383.

African Library and Information Associations. 2018. Call to action - African libraries & effects of climate change: the African environment: Our wealth, our health, our future. 2018. Accra, Ghana: AFLIA.

Alberts, S.J. 2012. Sustainable library design: a case study of library construction on the East end of Long Island, N.Y from 2007–2009. In: M. Antonelli, and M. McCullough, *Greening Libraries*, Los Angeles: Library Juice Press, 55-66.

Aldrich, R.S. 2012. Greening libraries in historic buildings In: M. Antonelli, and M. McCullough, *Greening Libraries*, Los Angeles: Library Juice Press, 67–78.

Anderson, P. 2018. Ensuring social responsibility. In: J. Martin and M. Haggith, ed., *The state of the global paper industry: shifting seas: new challenges and opportunities for forests, people and the climate*. Environmental Paper Network, 26-32.

Association of College & Research Libraries (ACRL). 2004. *Information literacy competency standards for higher education.* [online]. Available at: https://alair.ala.org/bitstream/handle/11213/7668/ACRL%20Information%20Literacy%20Competency%20Standards%20for%20Higher%20Education.pdf?sequence=1&isAllowed=y/ [Accessed 21 September 2020].

Atlas.ti. 2019. *Using ATLAS.ti archives | atlas.ti*. [online] Available at: https://atlasti.com/category/using-atlas-ti/ [Accessed 30 Mar. 2019].

Aulisio, G.J. 2013. Green libraries are more than just buildings. *Electronic Green Journal*, 1(35) 1–7.

Backer, J. 2012.West Vancouver memorial library: green by nature. In: M. Antonelli, and M. McCullough, *Greening Libraries*, Los Angeles: Library Juice Press, 105-112**.**

Barbakoff, A. and Barbakoff, B. 2012.Building on green: sustainable thinking goes beyond green to unite library space and community .In: M. Antonelli, and M. McCullough, *Greening Libraries*, Los Angeles: Library Juice Press, 225-240**.**

Beutelspacher, L. and Meschede, C., 2020. Libraries as promoters of environmental sustainability: Collections, tools and events. *IFLA Journal*, 46(4): 347-358.

Bian, H. (n/d). Mixed methods research. Slide, 25. [online]. Available at: http://core.ecu.edu/ofe/statisticsresearch/mixed%20methods%20new.pdf [Accessed 09 Sep 2017].

Binks, L. Braithwaite, E., Hogarth, L, Logan, A. and Wilson, S. 2014. Tomorrow's green public library. *Australian Library Journal*, 63 (4) 301–312.

Blaine, A.S. 2010.Creating a lean, green, library machine: easy eco-friendly habits for your library. *Library Media Connection*, 28 (4) 24–26.

Bohuski, L. 2020. What if your library can't go green?: Promoting wellness in libraries. In: A. Kaushik, A. Kumar, & P. Biswas (Eds.), *Handbook of research on emerging trends and technologies in Library and Information Science*. Hershey, PA: IGI Global, 13–26.

Brundle, H. 2020. *Sustainability living*. New York: Kid Haven Publishing.

Cardoso, N. and Machado, E. 2015. *Sustainable and green libraries in Brazil: Guidelines for local governments*. IFLA WLIC 2015. Cape Town: IFLA, 1–13. http://library.ifla.org/1207/1/095-cardoso-en.pdf

Charney, M. 2017. ENSULIB announces the winner of the 2nd IFLA Green Library Award 2017. In: *Environmental sustainability and libraries special interest group*. IFLA, 1-3.

Chowdhury, G. 2012. Building environmentally sustainable information services: a green is research agenda'. *Journal of the American Society for Information Science & Technology*, 63 (4) 633–647.

Clark, A. 2013. Greening the library: easy sustainability. *ALKI*, 22–24.

Collins. 2019. *Multiplier definition and meaning | Collins English Dictionary*. [online] Collinsdictionary.com. Available at: https://www.collinsdictionary.com/dictionary/english/multiplier [Accessed 27 Mar. 2019].

Connell, V. 2010. Greening the library: collection decisions. *The Journal of the new members round table*, 1(1) 1–15.

Corvo de Armas, L. 2008. Cuban public libraries for an environmental culture in the community. Its influence in children and young people. In: *World library and information congress: 74th IFLA general conference and council*. Québec, Canada: IFLA, 1–10.

Creswell, J. 2012. Educational research: planning, conducting, and evaluating quantitative and qualitative research .4th ed. Boston: Pearson.

Creswell, J. W. 2014. *Research design : qualitative, quantitative, and mixed methods approaches.* 4th ed., Internat. Student ed. Los Angeles: SAGE.

Creswell, J.W. and Creswell, J.D. 2018. *Research design: qualitative, quantitative and mixed methods approaches*. 5th ed. London: SAGE.

Denscombe, M. 2008. Communities of practice: A research paradigm for the mixed methods approach. *Journal of mixed methods research, 2*(3) 270–283.

Dias, S. 2017. Environmental sustainability for public libraries in Portugal: a first approach. *Electronic Green Journal*, 1(40) 1–15.

Di Fabio, A. and Maree, K. 2012. Ensuring quality in scholarly writing. In: J. Athanasou; A. Fabio, M. Elias, R. J Seabi, R. Sklar, L. Theron and M. Watson, *Complete your thesis or dissertation successfully: Practical guidelines.* Claremont: Juta, 137–143.

Energy & Sustainable Development. 2009. Berkeley Climate Action Plan-City of Berkeley. [online] Available at: https://www.cityofberkeley.info/climate/ [Accessed 21 September 2020].

Fallik, S., Soper, D, and Sparks, K. 2012. Green libraries on the cheap. *PNLA Quarterly*, 77(1) 42–49.

Ferreira, J., 2017. Going solar and the current SA solar industry. *Natural Medicine*, (149) 73-75.

Fourie, I. 2012. A call for libraries to go green: an information behaviour perspective to draw interest from twenty-first century librarians. *Library Hi Tech*, *30*(3) 428–435.

Fraenkel, J. R. and Wallen, N. E. 2006. How to design and evaluate research in education. 6th ed. Boston: McGraw-Hill.

Garcia Chua, R. 2018. The germination of ecological literacy in a third world nation. In: Viakinnou- Brinson, L., *Environment and Pedagogy in Higher Education*, London: Library: Lexington Books, 97-113**.**

Genovese, P. and Albanese, P. 2011. Sustainable libraries, sustainable services: a global view. In: *77th IFLA general conference and assembly*. Puerto Rico: IFLA, 1–22.

Good Energy. 2017. What is a carbon footprint? *Good energy*. Available at: https://www.goodenergy.co.uk/blog/2017/11/20/what-is-a-carbon-footprint/ [Accessed 16 Nov. 2019].

Goosen, H. 2009. *Green star rating is it pain or glory?* Degree of BSc (Hons) (Quantity Surveying). University of Pretoria.

Granger, L. 2017. Libraries inspire their communities through green initiatives. *American Libraries 48 (11/12)*, 50–53.

Gray, D.E. 2018. *Doing research in the real world*. 4th ed. London: SAGE.

Griebel, R. 2012.Greening a library, greening a community: the Calgary public library's eco action plan. In: M. Antonelli, and M. McCullough, *Greening Libraries,* Los Angeles: Library Juice Press, 113-224**.**

Haggith, M. 2018. Reducing paper consumption & ensuring fair access. In: J. Martin and M. Haggith, ed., *The state of the global paper industry: shifting seas: new challenges and opportunities for forests, people and the climate*. Environmental Paper Network, 8-15.

Harrington, E. and Beale, H. 2010. Natural wonders: implementing environmental programming in libraries. *Children & Libraries* 8(1), 41–46.

Hauke, P. 2015. *How to become / How to identify a green library? Standards for Certification*. Paper presented at the IFLA World Library and Information Congress, 27 July 2015, Cape Town.

Hauke, P. 2018. *From Information Literacy to Green Literacy: Training Librarians as Trainers for Sustainability Literacy. In: IFLA WLIC. Kuala Lumpur: IFLA, 1–8.*

Hauke, P. and Werner, K.U. 2013. Going green as a marketing tool for libraries: environmentally sustainable management practices. In: *IFLA WLIC*. Singapore: IFLA, 1–12.

Hunt, C. 2004. *Thirsty planet*. London: Zed Books.

IFLA 2016. *IFLA Green Library Award 2016*. [online] Available at: http://www.ifla.org/node/10160 [Accessed 7 Sep. 2016].

Ivankova, N.V., Creswell, J.W. and Plano Clark, V.L. 2007. Foundations and approaches to mixed method research. In: K. Maree, ed., *First steps in research*, 1st ed. Pretoria: Van Schaik.

Jones, L. 2017. *More than just a green building – developing green strategies at the Chinese University of Hong Kong Library*. IFLA Green Library Award 2017. IFLA, 1–14.

Kalpana, T. and Gopalakrishnan, S. 2016. Technological sustainability and green libraries: a study among library professionals working in select higher education institutions in and around Chennai. *Journal of Advances in Library and Information Science*, 5(1) 1–11.

Karioja, E. 2013. *Sustainability in libraries: a comparative study of ecological sustainability in IFLA WLIC 2012* (Bachelor's Degree Programme in Library and Information Services, Oulu University of Applied Sciences), 3-35.

Kivunja, C. and Kuyini, A. 2017. Understanding and Applying Research Paradigms in Educational Contexts. *International Journal of Higher Education*, 6(5) 26-41.

Kumar, P.S. and KD, S.A., 2014. Greening the library for sustainable development. *Bangalore: LISCOM. Retrieved*, 2(4) 1.

Kurbanoğlu, S. & Boustany, J. 2014. From green libraries to green information literacy. *Communications in Computer and Information Science*, 492, 47-58. DOI: 10.1007/9783-319-14136-7_6.

Lawrence, K., Groene-Sackett, S., Kensington, L.A. and Kleft, E. 2012. Library sponsored sustainable living outreach in Denver. In: M. Antonelli, and M. McCullough, *Greening Libraries*, Los Angeles: Library Juice Press, 119-126.

Manguel, A. 2008. *The library at night*. New Haven, Conn: Orchard.

Maree, K. and Pietersen, J. 2007. *First steps in research*. Pretoria: Van Schaik.

McBane Mulford, S. and Himmel, N. 2010. *How green is my library?* Santa Barbara, Calif.: Libraries Unlimited.

McBride, B. B., Brewer, C.A., Berkowitz, A.R. and Borrie, W.T. 2013. Environmental literacy, ecological literacy, ecoliteracy: What do we mean and how did we get here? *Ecosphere*, 4(5) 1-20.

McElrath, E. and Sutherland, S. 2015. Environmental sustainability and libraries. *International Journal of Humanities and Social Science*, 5(12) 13–23.

Mehta, S. 2018. Green libraries. *"Knowledge librarian" an international peer reviewed bilingual e-journal of Library and Information Science*, [online] (Special edition), 235– 240. Available at: http://www.klibjlis.com [Accessed 6 May 2019].

Merriam, S. B., Courtenay, B. C. and Cervero, R. M. 2006. *Global issues and adult education: perspectives from Latin America, Southern Africa, and the United States*. San Francisco: Jossey-Bass.

Miller, K. 2010. *Public libraries going green*. Chicago: American Library Association.

Mishra, A. and Akman, I. 2014. Green information technology (GIT) and gender diversity. *Environmental Engineering and Management Journal*, *13*(12) 2999–3007.

Morgan, B. and Sklar, R.H. 2012. Writing a research proposal. In: J. Athanasou; A. Fabio, M. Elias, R. J Seabi, R. Sklar, L. Theron and M. Watson, *Complete your thesis or dissertation successfully: Practical guidelines.* Claremont: Juta, 69–76.

Noh, Y. and Ahn, I. 2018. Evaluation indicators for green libraries and library ecofriendliness. *International Journal of Knowledge Content Development & Technology*, 8(1) 51–77.

Online Dictionary (ODLIS).2013. ABC-CLIO > ODLIS > odlis_about [ONLINE] Available at: https://products.abc-clio.com/ODLIS/odlis_about.aspx [Accessed 21 September 2020].

Pickard, A. 2013. *Research methods in information*. Chicago: Neal-Schuman.

Radiant Zone Heating. 2019. *Radiant heating is environmentallyfFriendly | Radiant Zone Heating*. [online] Radiant Zone Heating. Available at: https://radiantzoneheating.com/why-radiant-zone-heating/environmentally-friendly/ [Accessed 15 Apr. 2019].

Repanovici, A. and Landry, A. 2015. Information literacy and environmental sustainability correlation in using and communicating information. In European Conference on Information Literacy, 31–37. Springer, Cham. https://doi.org/10.1007/978-3-31928197-14.

Rosenberg, E. 2009. *Teacher education workbook for environment and sustainability education*. Rhodes University Environmental Education and Sustainability Unit, Grahamstown. Distributed through Share-Net, Howick.

Sanlam. 2016. *Water: facts and futures rethinking South Africa's water future*. [online] Available at: http://wsassets.wwf.org.za/.../wwf009_waterfactsandfutures_report_web__lowres_.pdf [Accessed 25 Mar. 2017].

Seabi, J. 2012. Research designs and data collection techniques. In: J. Athanasou; A. Fabio, M.Elias, R. J Seabi, R. Sklar, L. Theron and M. Watson, *Complete your thesis or dissertation successfully: Practical guidelines.* Claremont: Juta, 80-93.

Singh, P. and Mishra R. 2019. Environmental sustainability in libraries through green practices/services. *Library Philosophy and Practice (e-journal) 2312*. Available at: https://digitalcommons.unl.edu/libphilprac/2312.

South Africa. National Planning Commission Department. (n/d) *National Development Plan 2030 Our Future-make it work*. p.33.

Stark, M.R. 2011. Information in place: integrating sustainability into information Literacy Instruction, *Electronic Green Journal*, 1(32) 1-16.

State of energy South African cities - Urban Energy Support. 2015. [ebook] Westlake: State of energy South African cities - urban energy support, Available at: http://cityenergy.org.za/uploads/resource_322.pd [Accessed 29 Aug 2016].

StatsSA. 2016. *StatsSA*. [online] Available at: http://cs2016.statssa.gov.za/ [Accessed 25 Mar. 2017].

Townsend, A. 2014. Environmental sustainability and libraries: facilitating user awareness, *Library Hi Tech News*, 31(9), 21–23.

Waterwise.co.za. 2017. *Water wise-water situation in South Africa*. [online] Available at: Water Wise - Water Situation in South Africa [Accessed 14 Feb 2021].

Werner, K.U. 2013. Sustainable buildings, equipment, and management. In: Werner, K. U., Hauke, P. and Latimer, K., *The green library*= Die Grüne Bibliothek*: the challenge of environmental sustainability*. München: de Gruyter Saur (IFLA publication series, 161). Berlin: IFLA, 395–402.

Williams, C. 2007. Research methods. *Journal of Business & Economic Research*, 5(3) 65–72.

Worldometers.info. 2018. South Africa population (2018) - *Worldometers*. [online] Available at: http://www.worldometers.info/world-population/south-africa-population/ [Accessed 03 June 2018].

Writing@CSU Writing Guide. (n.d.). *Reliability and validity*. [online] Available at: https://writing.colostate.edu/guides/guide.cfm?guideid=66 [Accessed 13 Jun. 2018].

Appendix A: Interview questions for librarians and librarians-in-charge

Public libraries going green: environmental sustainability and green information literacy.

Interview questions for librarians and librarians- in -charge

1. What is your understanding of a green library?
2. Do you consider your library a green library? If yes, what green practices is your library implementing? If no, why not?
3. Are you familiar with the terms: environmental education, environmental sustainability, green buildings, green living, environmental literacy, carbon footprints and Eco literacy? Can you define or explain the terms?
4. What is your understanding of green information literacy?
5. Does your library have a strategy in place of how to go about educating your users to become green information literate? Elaborate if either yes or no.
6. Do you feel that your library is doing enough to create awareness of green living? If Yes, what is your library doing to create awareness and to promote the importance of green living amongst your users? If no, why not?
7. What more can your library and public libraries in general do to create awareness of the importance of green living and to make users more green information literate?
8. What more can your library and public libraries do in general do to become greener?

Appendix B: Checklists

Public libraries going green:

Environmental sustainability and green information literacy

Checklist adapted from Segarra's rating system, Werner's checklist, and Kurbanoğlu and Boustany's green operations and practices.

Please tick the right-hand column for those green practices that your library is implementing.

Project Planning & Finance	
The library has sustainable goals	
The library provides a definition of a 'green building' to users	
The library sets a high level of comfort for users, and provides a healthy environment	
The library has established environmental goals for patrons	
The library sets an example to users and practises green operations	
The library has formulated criteria for sustainability	
The library has expertise in terms of dealing with environmental issues and implementing green library practices	
The Building Structure	
The library uses minimal space wisely	
Green Materials	
The library uses ecological, quality materials	
The library uses non-hazardous materials	
The library maintains the building services	
The library uses materials that are durable and will last long	
The library uses materials that are repairable	
Building Climate	

The library does not use a lot of air conditioning	
The library saves electricity	
Water	

The library reduces the use of warm water	
The library uses grey and rain water	
The library uses water saving features (equipment)	
Green Information Communication and Technology	
The library uses switchable sockets for computers and printers	
The library uses software solutions to optimize energy consumption (stand-by)	
User Services	
The library makes use of scanning instead of printing	
The library has alternatives to plastic bags	
Facilities Management	
The library separates waste and recycles	
The library uses environmentally friendly cleaning products	
The library uses cost-effective cleaning products	
The library uses 'green cleaning' methods	
The library does not make use of chemical products for cleaning the building	
The library uses non-toxic water-based rather than oil-based products	
The library uses perfume-free biodegradable products	
The library has sanitary supplies (towels, etc.)	
The library recycles containers and packaging	
The library recycles batteries, electrical devices and components	
The library makes provisions for noise during vacuum cleaning routines such as vacuuming before the library opens to the public	
The library recycles lightbulbs and uses fluorescent and energy-saving lamps such as light-emitting diodes (LED)	
The library has a bicycle rack for their users and staff	
The library uses solar energy	
The library has installed energy efficient lighting	
The library uses natural lighting and ventilation	
The Green Library Office	

The library recycles printer cartridges and chooses green inks	
The library does not use products with poisonous, harmful or non-recyclable contents	
The library turns down the heating system during periods of absence	
The library has energy-saving electrical appliances, energy efficient hot water production	
The library has fair trade product in their staff kitchens	
The library repairs older computers	
The library uses liquid crystal display (LCD) monitors	
The library shuts down computers when the library is closed	
The library refills toner cartridges rather than buying new ones	
The library uses forms that can be completed electronically	
The library sends staff for green awareness training	
The library uses recycled, chlorine-free, FSC (FSC is an independent, nongovernmental, not-for-profit organization established to promote the responsible management of the world's forests) certified paper	
The library eliminates the use of plastics and encourages the use of real plates, mugs and utensils	
The library reuses or donates items instead of disposing of them	
Marketing and Promotion	
The library tries to persuade library users to embrace sustainability	
The library co-operates with sponsored initiatives	
The library has ecological activities	
The library displays posters on environmental issues	
The library tries to embed sustainable thinking in its information literacy concepts and instruction into users.	

Many thanks for completing the checklist!

Appendix C: Consent form

Consent Form University of the Western Cape

"Public libraries going green: Environmental sustainability and green information literacy."

Researcher: Kim Albertyn

Please initial box

1. I confirm that I have read and understand the information sheet explaining the above research project and I have had the opportunity to ask questions about the project. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without there being any negative consequences. In addition, should I not wish to answer any particular question or questions, I am free to decline. (If I wish to withdraw, I may contact the lead research at any time.) ☐
3. I understand my responses and personal data will be kept strictly confidential. I give permission for members of the research team to have access to my anonymised responses. I understand that my name will not be linked with the research materials, and I will not be identified or identifiable in the reports or publications that result for the research. ☐
4. As a participant of the discussion, I will not discuss or divulge information shared by others in the group or the researcher outside of this group. ☐
5. I agree that the data collected from me can be used in future research. ☐
6. I agree to take part in the above research project. ☐

_____	_____	_____
Name of Participant (*Or legal representative*)	Date	Signature
_____	_____	_____
Name of person taking consent *from lead researcher)*	Date *(If different*	Signature
_____	_____	_____
Lead Researcher	Date	Signature

(*To be signed and dated in presence of the participant*)

Copies: All participants will receive a copy of the signed and dated version of the consent form and information sheet for themselves. A copy of this will be filed and kept in a secure location for research purposes only.

Researcher: Kim Albertyn	**Supervisor:** Dr. Sandy Zinn	**HOD:**

Appendix D: Letter of Information

Letter of information

UNIVERSITY of the
WESTERN CAPE

University *of the* Western Cape
Department of Library and Information Science
Private Bag X17, Bellville, 7535, Cape Town, South Africa

Dear Sir/ Madam,

My name is Kim Albertyn. I am a student from the Department of Library and Information Science at the University of the Western Cape. I am distributing checklists to librarians and librarians-in -charge of Ottery, Retreat, Claremont and Rondebosch City of Cape Town public libraries in order to verify their interview responses according to the checklist criteria and to establish how green the library truly is. The checklist is part of my research for my Masters of Library and Information Studies (MLIS) thesis at the University of the Western Cape. The topic of my research project is **"Public libraries going green: environmental sustainability and green information literacy."**

The objectives of my research are to:

- To identify what librarians' and users' perceptions of environmental sustainability and green libraries are.
- To identify what libraries can do to create awareness about environmental sustainability and to educate users on the importance of green living.
- To analyze users' and librarians' responses on their perceptions of environmental sustainability and green libraries.
- To determine how librarians will make users'' green information literate and educate them on the importance of green living.

I am therefore requesting users of Ottery, Retreat, Claremont and Rondebosch City of Cape Town public libraries to please participate in this survey. As no names are required, your identity will remain anonymous. If you agree to participate, please read and confirm your participation by ticking the consent box. As the consent form indicates, your participation is completely voluntary, your identity remains anonymous, and your responses will be kept confidential.

If you have any questions or concerns or wish to know more about this study, please contact me, or Kim Albertyn at 3366422@myuwc.ac.za or you could contact my supervisor Dr Sandy Zinn at szinn@uwc.ac.za .Your participation in this study is greatly appreciated.

Kind regards,
Kim Albertyn

Appendix E: Frameworks for environmental literacy (McBride et al., 2013)

Table 2. Continued.

Year	Author(s)/ Organization	Description of framework:
1991	Marcinkowski	Nine items comprising EL: (1) awareness and sensitivity toward the environment; (2) attitude of respect for the natural environment and of concern for the nature of magnitude of human impacts on it; (3) knowledge and understanding of how natural systems work, as well as of how social systems interface with natural systems; (4) understanding of the various environmentally related problems and issues across multiple scales, local to global; (5) skills required to analyze, synthesize, and evaluate information about environmental problems using primary and secondary sources and to evaluate a select problem on the basis of evidence and personal values; (6) sense of personal investment in, responsibility for, and motivation to work individually and collectively toward the resolution of environmental problems; (7) knowledge of strategies available for use in remediating environmental problems; (8) skills required to develop, implement and evaluate single strategies, and composite plans for remediating environmental problems; and (9) active involvement at all levels in working toward the resolution of environmental problems.
1992	Roth	Three levels of EL, nominal, functional, and operational: (1) a nominally environmentally literate person is able to recognize and provide rough working definitions of many of the basic terms used in communicating about the environment, and is developing awareness, sensitivity, and an attitude of respect and concern for natural systems; (2) a functionally environmentally literate individual has a broader understanding of the interactions between natural systems and human social systems and is aware and concerned about negative interactions between those systems; he or she has developed the skills to analyze, synthesize, and evaluate information about environmental issues, and evidences a personal investment and motivation to work toward remediation; (3) an operationally environmentally literate person has moved beyond functional literacy in both the breadth and depth of his or her understandings and skills. The individual demonstrates a strong, ongoing sense of investment in and responsibility for preventing or remediating environmental degradation, and routinely advocates action positions and takes action that work to sustain or enhance a healthy environment.
1992/1997	Wisconsin Center for Environmental Education	Four general EL outcomes: (1) cognitive—knowledge of ecological principles (individuals, populations, and communities, change and limiting factors, energy flow, biogeochemical cycling, ecosystems and biodiversity), knowledge of environmental problems and issues, knowledge of issue investigation strategies, knowledge of appropriate action strategies for prevention or resolution of environmental issues, (2) affective—environmental sensitivity and awareness, positive attitudes and values for the prevention and remediation of environmental issues; (3) determinants of ERB—locus of control, assumption of personal responsibility; and (4) ERB—ecomanagement, economic action, persuasion, political action, legal action.

Appendix F: Segarra's rating system of green libraries (2015)

Theme	Original items	Research Study's items
Building	Solar energy • Window glazing quality (thermal insulation) • Use of daylight • Light bulb recycling: fluorescent and energy saving lamps, also LED • Structural protection from sunlight • Lighting system with movement sensors • Power supply: proportion of electricity from renewable energy sources.	**The Building:** 1) Solar energy, 2) 2) Use of daylight and natural ventilation, 3) 3) Light bulb recycling: fluorescent and energy saving lamps also LED, 4) 4) Power supply: proportion of electricity from renewable energy sources
Water	• Water saving features (WCs, wash basin equipment)	**Water:** 2) Water saving features (equipment)
Transport	• Bicycle rack • Connection to public transport	**Transport:** Bicycle racks
Workflows	• Waste separation • No more plastic bags • Library café: china and glass bottles instead of plastics, fair trade products • Switch off light and electronic equipment at night and in empty offices	**Workflows:** 4) Switch off light and electronic equipment at night and in empty rooms

Appendix G: Werner's sustainable buildings, equipment and management checklist (2013)

Research studies items	Original items
	1. Project planning, finance
	2. Tendering
	3. Site / location
	4. Construction
	5. The building 5.1 Structure
	5.2 Facades
Ecological quality of materials (Werner's checklist, 2013:348);	5.3 Building materials • Ecological quality of the materials. • Materials and construction conducive to good health (non-hazardous materials) • Maintenance characteristics, building servicing • Durability / Longevity • Repairability • Ease of recycling and cleaning • Proportion of recycled material used, e. g. aluminum, steel

	5.4 Building climate
Reduction of warm water, use of grey rain water, toilet irrigation.	**5.5 Energy, light** • Daylight / artificial light • Power supply: proportion of electricity from renewable energy sources • Energy-efficient heating • Electricity saving – electricity generation (photovoltaic) • Make energy use visible in order to reduce usage levels: energy meters • Heat recovery • Solar or geothermics • District heating • Cooling: night cooling, the thermal activation of building structures • Heat exchangers • Ventilation: natural ventilation • Bring natural light into the building • Translucent materials for light transmission • Efficient lighting controls (control panels) • Lighting system with movement sensors • Individual light control of reading places • Electric light switches, also for reader places • Light as needed: step switching, dimmer switches • Light source (energy-efficiency, life cycle costing, recycling) • Reduction of warm water use • Use of grey and rainwater (toilets, irrigation) • Water saving features (WCs, wash basin equipment)
	6. Interior fittings: source, durability, cleaning capabilities, recycling
	7. Green information and communication technology (Green IT)
Alternatives to plastic bags	**8. User services** • Reprographic services (scanning instead of printing), the primacy of digital, double-sided printing. • Hot desking (flexible information desks usable as workplaces outside of information desk times) • Alternatives to plastic bags in the library • Library café: china not plastic, Fair-trade products etc. • Lending of „other" non-book-materials: things not needed daily (from laptops to garden tools)
	9 Library management

	9.1 Environmental management certificates (ISO 14000)
Waste separations and recycling Avoidance of chemical cleaning products	**9.2 Facilities management** • Waste separation and recycling • Cleaning firms • Cleaning materials: economic usage • Cleaning („Green Cleaning": floors, sanitary facilities) • Avoidance of chemical products for cleaning the building • Use of non-toxic, water-based rather than oil based, products; perfume-free, biodegradable • Sanitary supplies (towels, etc.) • Recycling of containers and packaging • Recycling of batteries, electrical devices and components • Noise during cleaning routines – vacuum cleaning • Light bulb use • Light bulb recycling: fluorescent and energy saving lamps, also LED
6) Awareness training for employees;	**9.3 The green library office** • Green procurement • Green shipping • Use of local bookbinders (CO_2 balance re transport) • Office supplies and equipment (origin, energy consumption, recycling) • Local suppliers • Certified suppliers • Book suppliers and delivery (CO_2balance, packing materials) • Hot-desking • Reduction in use of paper • Digital archiving • Green office supplies • Waste reduction and separation of waste (paper, plastic, glass, batteries, digital storage media) • Recycling printer cartridges • Avoidance of products with poisonous, harmful, or difficult to recycle contents • Heating that can be turned down during periods of absence • Staff kitchens: energy-saving electrical appliances, energy-efficient hot water production, fair-trade products etc. • Awareness training for employees
	10. Strategic goals
Libraries should lead by example	**11. Marketing and PR** • Sustainability and corporate identity • Motto: "A green image is a good image" • Libraries should lead by example (proactive and exemplary) • Win library customers / users over to sustainability • Win wider stakeholders over to sustainability (supporting / funding agencies, Friends of the Library etc.) • High multiplier effect • The energy performance certificate displayed at the library entrance (PR) • PR with and for the ecological activities of the library • Co-operation with sponsor initiatives • Environmental news e.g. a green section in annual reports
	12. Certificates 12.1 Green building certificates
	12.2 Environmental management
	12.3 Product certificates

Appendix H: Kurbanoğlu and Boustany's green operations and practices (2014)

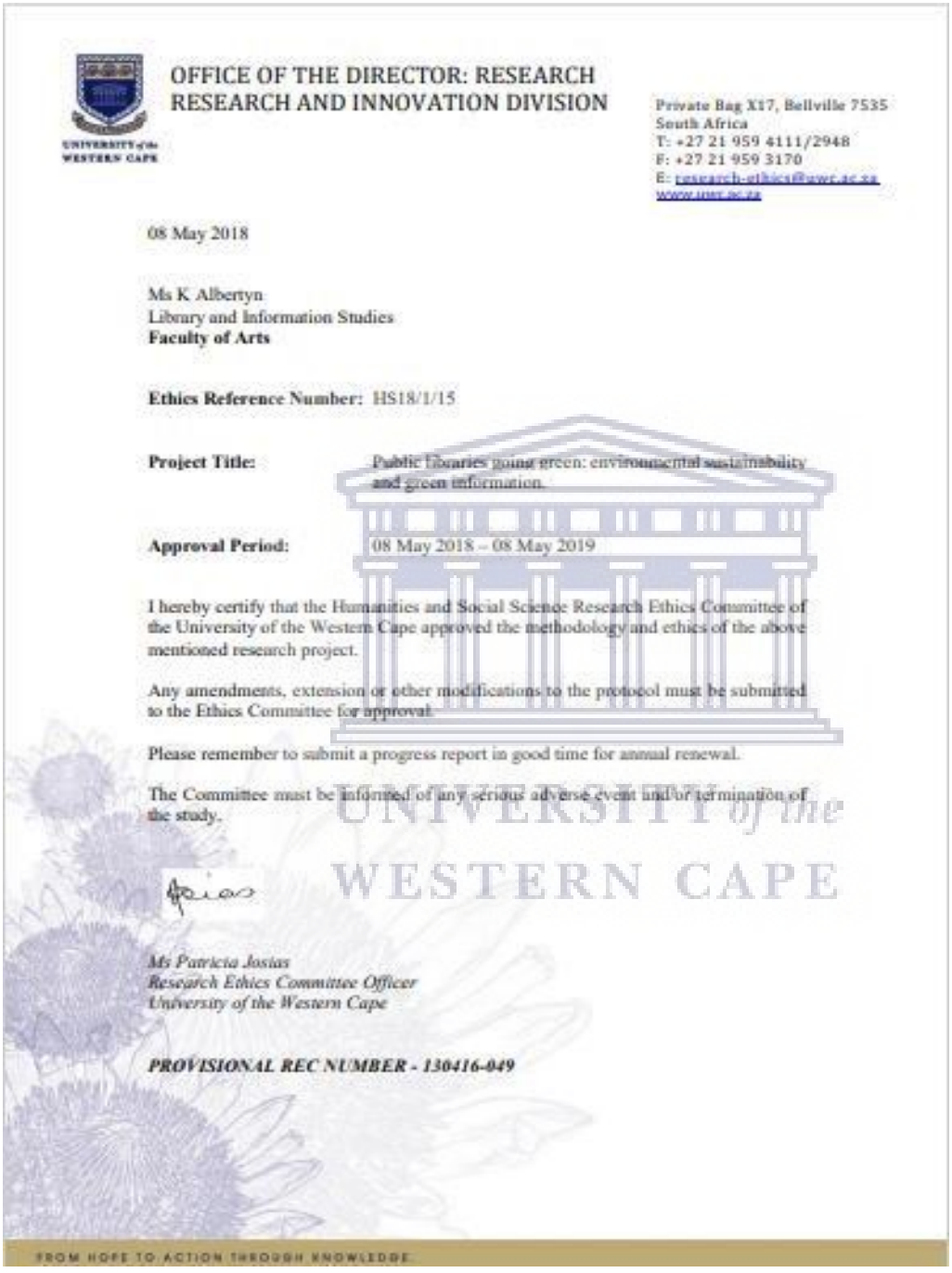
Research study's items	Original item list
Green library office Library reuses instead of donates instead of disposing them.	• reusing or donating the items instead of disposing of them,
Facilities management The library separates and recycles	• separating waste and providing onsite-recycling collection
	• reducing or reusing paper
Green library office The library eliminates the use of plastics and encourages the use of real plates/mugs and utensils.	• eliminating use of plastics and instead providing and encouraging use of real plates/mugs. Utensils
Green library office The library uses recycled chlorine-free FSC certified paper.	• using recycled, chlorine-free, FSC certified paper
	• setting the copier/printer default to duplex
	minimizing printing
	• routing print materials rather than making multiple copies
	• using shared network and public e-mail folders as searchable repositories for information and content
Green library office Library uses forms that can be completed electronically.	• using electronically completed/submitted forms
	• using electronic/digital communication
	• using products/consumables with recyclable content
	• procuring refurbished items when possible
	• purchasing locally
Facilities management The library uses environmentally friendly cleaning products The library does not make of chemical products for cleaning	• using environmentally friendly cleaning products instead of toxic chemical cleaners
	• using stairs rather than elevator
	• procuring refurbished items when possible
	• having every-other light off where possible
Green library office The library refills toner cartridges rather than buying new ones.	• re-filling toner cartridges rather than buying new
Facilities management The library has installed energy efficient lighting	• installing energy-efficient lighting
	• using motion sensors
Green library office The library shuts down computers when the library is closed	• shutting down computers when the library is closed to the public

Green library office The library uses liquid crystal display (LCD) monitors	• using LCD monitors
Facilities management The library uses natural lighting and ventilation	• using natural lighting and ventilation
	• choosing and using Energy Star compliant computer components
	• consolidating servers in large institutions
	• using virtualization so that multiple patrons can share a single machine's computing power
Green library office The library repairs older computers	• managing equipment replacement cycles mindfully and having older computers repaired
	• finding reputable recyclers of e-waste
Green library office The library recycles printer cartridges and chooses green inks	• recycling toner cartridges and choosing "green" inks

Appendix I: Interview schedule

Library	Participants	Date interviewed	Place interviewed	Length of time to complete interview
Ottery	LIC 1	28/03/2019	Ottery Library	18 minutes and 8 seconds
Ottery	Librarian 1	27/05/2019	Ottery Library	14 minutes and 15 seconds
Meadowridge	Librarian 3	04/06/2019 and 15/06/2019	Wynberg Library	11 minutes and 54 seconds 12 minutes and 26 seconds
Retreat	Librarian 2	13/06/2019	Retreat Library	10 minutes and 55 seconds
Retreat	LIC 2	13/06/2019	Retreat Library	12 minutes and 46 seconds
Meadowridge	Librarian 4	03/07/2019	Meadowridge Library	17 minutes and 32 seconds
Meadowridge	LIC 3	03/07/2019	Meadowridge Library	11 minutes and 50 seconds
Claremont	LIC 4	01/08/2019	Claremont Library	21 minutes and 47 seconds
Claremont	Librarian 5	01/08/2019	Claremont Library	16 minute and 21 seconds
Claremont	Librarian 6	01/08/2019	Claremont Library	Estimated 16 minutes(No recording done)

Appendix J: UWC Ethical Clearance



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08 May 2018

Ms K Albertyn
Library and Information Studies
Faculty of Arts

Ethics Reference Number: HS18/1/15

Project Title: Public libraries going green: environmental sustainability and green information

Approval Period: 08 May 2018 – 08 May 2019

I hereby certify that the Humanities and Social Science Research Ethics Committee of the University of the Western Cape approved the methodology and ethics of the above mentioned research project.

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

Please remember to submit a progress report in good time for annual renewal.

The Committee must be informed of any serious adverse event and/or termination of the study.

Ms Patricia Josias
Research Ethics Committee Officer
University of the Western Cape

PROVISIONAL REC NUMBER - 130416-049

FROM HOPE TO ACTION THROUGH KNOWLEDGE

Appendix K: Research Approval Request

OPP 99

CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

Date: 10 October 2018
TO: DIRECTOR: ORGANISATIONAL POLICY AND PLANNING
REF: OPP-RR0032

Research Approval Request

In terms of the City of Cape Town System of Delegations (23 July 2018) - Part 29, No 1 Subsection 4 and 5 "Research:

(4) To consider any request for the commissioning of an organisational wide research report in the City and to approve or refuse such a request.

(5) To grant authority to external parties that wish to conduct research within the City of Cape Town and/or publish the results thereof.

(6) To offer consultation with the relevant Executive Director grant permission to employees of the City of Cape Town to conduct research, surveys etc. related to their studies, within the relevant directorate

The Director: Organisational Policy & Planning is hereby requested to consider, in terms of sub-section 6, the request received from

Name	: Kim Albertyn
Designation	: Faculty of Arts, Department of Library & Information Science, and CCT official
Research Title	: "Public libraries going green: environmental sustainability and green information literacy".

Taking into account the recommendations below (see Annexure for detailed review):

Recommendations

That the CCT Director: Organisational Policy & Planning grants permission to Ms Kim Albertyn, in her capacity as Master's student in the Faculty of Arts, Department of Library & Information Science of the University of the Western Cape and a CCT official in the Library and Information Services Department, to conduct research in the City of Cape Town subject to the following conditions:

- The researcher engages with the Librarians in Charge at the four select libraries for guidance and advice on which public librarians to interview, as well as how to manage the interviews with library users;
- The willingness and/or availability of individual LIS staff members to participate in the research, in a voluntary capacity;
- Acknowledgement that the views of CCT respondents are to be treated as personal views, and not as CCT official policy;
- Acknowledgement that the views of researcher is to be treated as personal view, and not as official CCT policy;
- Use of the City's logo or brand is not permitted;
- Submission of the completed research report to the Director: Organisational Policy and Planning; Manager Research in Organisational Policy & Planning, as well as the Director: IS, within 3 months of completion of the report.
- Permission of the Director: Organisational Policy and Planning is obtained to publish the study.

Approved ☑ Comment: 10/10/18

Not Approved ☐ Comment:

Hugh Cole: Director of the Organisational Policy and Planning Department — Date: 12/10/2018

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www.capetown.gov.za

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