THE EFFECTIVENESS OF ENVIRONMENTAL INTERPRETATION IN ECOTOURISM DESTINATION: THE CASE OF KINABALU PARK

WAN NUR SYAZANA BT WAN MOHAMAD ARIFFIN

FACULTY OF BUILT ENVIRONMENT
UNIVERSITY OF MALAYA
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WAN NUR SYAZANA BT WAN MOHAMAD ARIFFIN

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THE EFFECTIVENESS OF ENVIRONMENTAL INTERPRETATION IN ECOTOURISM DESTINATION: THE CASE OF KINABALU PARK

ABSTRACT

Ecotourism primarily takes place in protected areas. Although protected, ecotourism still poses a threat to the sensitive environment if not practiced carefully. Hence, visitors' education is important in protected areas in order to mitigate the negative impacts on the environment. Interpretation plays an important role in visitors' education and it aims to increase their level of awareness and understanding that could potentially lead to positive behavior change. This study puts a primary emphasis on quantitative method while the qualitative method is used to support the quantitative outcome. This study takes into account the impacts of interpretation on visitors' knowledge, attitude, and behavioral intention in Kinabalu Park, Sabah, Malaysia. 200 sets pre-visit surveys were collected to analyze the visitors' level of knowledge, attitude, and behavioral intention before they were exposed to interpretation. Another 190 sets of post-visit surveys were also collected to analyze the same indicators among visitors that had been exposed to interpretation in the park. Furthermore, both the samples in the pre- and post-visit surveys are independent of one another. The results indicate that visitors in Kinabalu Park had higher level of knowledge and more positive attitude after they were exposed to interpretation as observed in the post-visit samples but only to a certain extent. Despite the higher level of knowledge and attitude among the post-visit samples, the visitors' intention to adopt environmentally responsible behaviors did not differ significantly between the pre- and the post-visit samples. Further observation found that interpretation in Kinabalu Park did not fully adopt the qualities of interpretation as highlighted in the EROT (enjoyable, relevant, organized, and thematic) framework resulting in the lack of difference between the pre- and post-visit samples in terms of their knowledge, attitude, and behavioral intention. Interpretation in Kinabalu Park is

thematic and organized but it lacks enjoyable, relevant, and provoking materials to sustain the visitors' attention. Thus there is a potential for interpretation in Kinabalu Park to be further improved based on the theme adopted in its interpretation. Both knowledge and attitude are important determinants in predicting a person's intention to engage in environmentally responsible behaviors. Therefore, interpretation in Kinabalu Park has to first focus in making the visitors more knowledgeable and shifting their attitude towards the environment.

Keywords: interpretation; knowledge; attitude; behavioral intention; protected areas

KEBERKESANAN INTERPRETASI ALAM SEKITAR DI DESTINASI EKOPELANCONGAN: KES TAMAN KINABALU

ABSTRAK

Kawasan perlindungan menjadi tumpuan utama aktiviti ekopelancongan dan ini boleh mengancam alam sekitar walaupun mempunyai status terlindung sekiranya tidak dipraktikkan dengan betul. Oleh itu, pendidikan pelancong adalah penting bagi mengurangkan kesan negatif pelancongan terhadap kawasan alam semulajadi. Interpretasi memainkan peranan penting dalam pendidikan pelancong bagi meningkatkan kesedaran dan pemahaman pelancong yang boleh membawa kepada perubahan tingkah laku yang positif. Kajian ini menggunakan kedua-dua kaedah kuantitatif dan kualitatif tetapi tumpuan diberikan kepada kaedah kuantitatif dan kaedah kualitatif digunakan untuk menyokong data kuantitatif. Tujuan kajian ini adalah untuk mengkaji pengaruh interpretasi terhadap pengetahuan, sikap, dan niat tingkah laku pelancong di Taman Kinabalu, Sabah, Malaysia. 200 borang soal selidik telah dikumpul untuk menganalisa tahap pengetahuan, sikap, dan niat tingkah laku pelancong sebelum mereka didedahkan dengan interpretasi. Manakala 190 borang soal selidik juga telah dikumpul untuk menganalisa penunjuk yang sama selepas pelancong didedahkan dengan interpretasi di dalam taman. Sampel kajian untuk borang soal selidik sebelum dan selepas adalah terdiri daripada dua kumpulan pelancong yang berbeza. Hasil kajian mendapati bahawa pengetahuan dan sikap positif pelancong adalah lebih tinggi di dalam kalangan mereka yang didedahkan dengan media interpretasi di Taman Kinabalu tetapi tidak secara menyeluruh. Hasil kajian juga menunjukkan tiada perbezaan yang signifikan dari segi niat tingkah laku pelancong di antara sampel soal selidik sebelum dan selepas. Berdasarkan pemerhatian, interpretasi di Taman Kinabalu tidak memenuhi secara menyeluruh kualiti interpretasi yang ditekankan di dalam rangka kerja EROT (*enjoyable, relevant, organized, and thematic*). Ini membawa kepada kurangnya

perbezaan dari segi pengetahuan, sikap, dan niat tingkah laku antara pelancong yang baru tiba di taman (*pre-visit*) dengan pelancong yang sudah didedahkan dengan interpretasi di Taman Kinabalu (*post-visit*). Interpretasi di Taman Kinabalu mempunyai tema khusus dan tersusun tetapi ia masih kekurangan dari segi bahan interpretasi yang mampu mengekalkan perhatian pelancong terutamanya bahan yang menyeronokkon, relevan, dan berunsur provokasi. Interpretasi di Taman Kinabalu berpotensi untuk ditambah baik berdasarkan tema yang sedia ada. Pengetahuan dan sikap memainkan peranan penting dalam menentukan niat seseorang untuk mengubahsuai tingkah laku supaya lebih bertanggungjawab terhadap alam sekitar. Oleh itu, interpretasi di Taman Kinabalu perlu lebih fokus ke arah menambah pengetahuan dan mengubah sikap pelancong terhadap alam semulajadi.

Kata kunci: interpretasi; pengetahuan; sikap; niat tingkah laku; kawasan terlindung

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LIST OF SYMBOLS AND ABBREVIATIONS

CNPPA	:	Commission on National Parks and Protected Areas
EROT	:	Enjoyable, relevant, organized, thematic
FRIM	:	Forest Research Institute Malaysia
HQ	:	Headquarter
IUCN	:	International Union for Conservation of Nature
KBRV	:	Kingfisher Bay Resort and Village
LEX	:	Linblad Expeditions
SPSS	:	Statistical Package for Social Science
SSL	:	Sutera Sanctuary Lodge
TORE	:	Thematic, organized, relevant, enjoyable
UiTM	:	Universiti Teknologi MARA
UMS	:	Universiti Malaysia Sabah
UNEP	:	United Nations Environment Programme
UNESCO	:	United Nations Educational, Scientific and Cultural Organization
UNWTO	:	United Nations World Tourism Organization
WCMC	:	World Conservation Monitoring Centre
WCPA	:	World Commission on Protected Areas
WEIP	:	Wetland Environmental Interpretation Program
WHC	:	World Heritage Centre
WHS	:	World Heritage Site

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CHAPTER 1: INTRODUCTION

1.1 Background of Study

Tourism has no doubt become the world's largest industry (Scheyvens, 2002) and is a major contributor to the world's economic sector including Malaysia. It is a major player in generating the nation's income. According to the United Nations' World Tourism Organization (WTO), Malaysia received a total of 25,721,000 international visitors in year 2015 (UNWTO, 2016). For most developing countries, one of the major resources for tourism is the natural environment particularly those practiced in protected areas (Nepal, 2000). Protected areas worldwide were initially set up for commercial purpose such as to preserve the scenic beauty and provide recreational experiences especially those designated with the status of national parks (Becken & Job, 2014). Protected areas were also established as an outcome of the environmental movements in the 1800s (Weaver, 2008). However, the demands of protected areas have increased in over the years and the role of protected areas shifted from recreational purposes to protection of species and habitats (Becken & Job, 2014).

Tourism is also practiced in protected areas as a mean of attracting financial aid, particularly for environmental protection (Mihalic, 2002). The environment depends on the financial revenue generated from the activities of tourism for its conservation efforts. Likewise, tourism within protected areas also depends on its uniqueness and relatively undisturbed natural environment to attract visitors and financial aids. Even though protected, national parks are still subjected to severe environmental and social impacts due to overuse from visitors (Tubb, 2003). Ecotourism is the type of tourism that is practiced in most protected areas in order to compensate for the loss of opportunity to use the natural resources and the generation of revenue from tourism justifies the preservation of the place in its natural state (Weaver, 2008).

Protected areas are said to be the most ideal setting for ecotourism because it can ensure that the unique features of the protected areas can be maintained in a long period of time (Ceballos-Lascurain, 1996). Ecotourism is supposed to accommodate the environmental and cultural conservation within the protected areas through the financial revenues generated from tourism activities. Both the government and tour operators often used the word ecotourism to promote a more sustainable and responsible type of travelling. It has now become a major tourism product instead of just a conservation tool. In most cases, ecotourism is often seen as a marketing tool (Linson & Getz, 1996).

Malaysia has positioned itself as one of the most visited destinations among international visitors. In 2016, Malaysia is ranked at 11th place as the most visited destinations by international visitors at 26.8 million (UNWTO, 2016). Although Malaysia is known as one of the best tourism destinations among other countries, the practice of ecotourism in the country is not as impressive compared to other leading ecotourism destinations such as Australia, Canada, Nepal, New Zealand, and more (Isa, Hasbullah, & Mohd Nasir, 2015). Despite the relatively young nature of ecotourism practice in Malaysia, there are several sites labeled as ecotourism destinations that are internationally recognized namely Danum Valley and Sipadan Island while sites like Kinabalu Park and Gunung Mulu National Park are designated with the UNESCO World Heritage Site status. The ministry launched the National Ecotourism Plan in 1996 with Hector Ceballos-Lascurain as one of the advisors and the plan was further revised in 2013. A new National Ecotourism Plan 2016-2025 was published based on the revision of the 1996 National Ecotourism Plan. Although ecotourism in Malaysia is mostly led by private sector, the government has done its fair share in the process of developing ecotourism into a major tourism practice in Malaysia (Daud, 2002). The Malaysian government had actively conducted campaigns in the efforts to raise the public's awareness on the importance of conservation and has provided funds for basic

infrastructures/facilities aside from planning and coordinating in order to make it accessible and available for visitors (Daud, 2002).

Most of the protected areas in Malaysia are promoted as ecotourism and nature-based tourism destinations such as Kinabalu Park, Taman Negara Pahang, Gua Niah National Park, Langkawi Island Geopark, Gunung Mulu National Park, and more. However, based on the 2013 Review of the National Ecotourism Plan, Malaysians are more interested in recreational pursuits rather than focusing on the idea of sustainability thus resulting in the degradation of a number of nature-based tourism sites in the country due to poor management and regulations. One of the major threats to the practice of ecotourism in Malaysia is the lack of understanding on the concept of ecotourism among the community at large thus contributing to the low level of involvement from stakeholders. With tourism being practiced within protected areas, they are vulnerable to a number of threats despite the protected area status (Tubb, 2003). Overuse from visitors and poor management plan can result in the degradation of its natural resources, reduction in the local people's economic sources because of environmental damages, and deterioration of the local people's traditional values (Ceballos-Lascurain, 1996).

Ecotourism aims to address the issue of emerging environmental and social impacts of tourism in protected areas. One of the core principles of ecotourism is education and it aims to educate the public on the importance of protecting natural heritage and the environmental consequences of their actions (Weaver, 2008). Education is also one of the most used visitor management strategies among park management worldwide along with other strategies namely regulatory, physical, and quotas and fees in the efforts to mitigate the negative impacts of tourism in protected areas (Orams & Hill, 1998; Papageorgiou, 2001; Weaver, 2008). In an ecotourism setting, there are arrays of approach to educating the visitors about the environment they are visiting and to govern

the way they behave in a sensitive environment. Interpretation is one of the approaches in visitors' education and through a wide range of interpretive methods, it can help regulate and reduce the impacts of tourism within sensitive areas (Powell & Ham, 2008; Buckley, 2009).

Interpretation is used as a tool to communicate the meanings and underlying information about certain area to the visitors (Ham, 1992; Moscardo, 1996; Tilden, 2007). There is a close link between interpretation and visitors' behavior where it aims to foster deeper understanding and appreciation of the natural environment that will eventually lead to more responsible behavior from the visitors (Jacobson, 2009; Stewart, Hayward, Devlin, & Kirby, 1998; Bramwell & Lane, 1993). In national parks, interpretation should be able to convey the conservation messages in a language that can be easily understood by visitors and increases their awareness on the consequences of their actions. Knowledge gained from interpretive activities will consequently lead to the respect for an area (Bramwell & Lane, 1993) and should prompt behavior change (Moscardo, 1996; Orams, 1996; Ham, 2007; Tilden; 2007). Effective interpretation can bring about the realization among the visitors on how their behaviors can affect the environment in ways they never know but eliciting such changes is proven to be a difficult task (Jacobson, 2009). Achieving the goals of interpretation depends on how respond to the interpretation and accept the information presented to them.

Ham (1992) developed a model of thematic interpretation known as the EROT framework containing four qualities needed in interpretation in order to attract and sustain visitors attention namely enjoyable, relevant, organized, and thematic. The EROT framework was later revised into TORE model of interpretive communication that emphasized on the need for interpretation to be thematic first before possessing the other three qualities of interpretation (Ham, 2013). The qualities in the EROT

framework are similar to the principles of interpretation highlighted by other scholars (Moscardo, 1998; Tilden, 2007). Moreover, the EROT framework has been proven to be one of the most effective tools in designing interpretation programs (Amin, Chan, & Mohd Shukri, 2014; Lim, Manohar, Azlizam, & Zakaria, 2016)

Furthermore, there is insufficient number of personnel and financial aids in many parks worldwide (Butler & Boyd, 2000, as cited in Goh & Rosilawati, 2014) and the shortage affected the park management ability to fully monitor the visitors' feedback on the existing interpretation methods adopted. Many scholars had highlighted the importance of effective environmental interpretation in managing visitors and tourism impacts but there have been little research done to prove the benefits and effectiveness of interpretation programs (Orams, 1996). While the study on the influence of interpretation on the visitors' knowledge, attitude, and behavior had been carried out extensively (Orams & Hill, 1998; Duncan & Martin, 2002; Tubb, 2003; Madin & Fenton, 2004; Powel & Ham, 2008; Sander, 2012; Jacobs & Harms, 2014; Robert, Mearns, & Edwards, 2014), it is an area less explored in the context of Malaysian national parks.

1.2 Research Significance

There had been many studies conducted involving the influence of interpretation on the knowledge, attitude, and behavioral intention of the visitors, but majority of those studies had taken place in mostly developed countries such as Australia and United Kingdom (Hill, Woodland, & Gough, 2007; Kim, Airey, & Szivas, 2010; Hughes, Packer, & Ballantyne, 2011). Little is known about the influence of interpretation in Malaysian National Parks though there had been a few studies related to interpretation carried out in Malaysia (Ismail, 2008; Roslina, Manohar *et al*., 2013; Amin *et al*., 2014; Lim *et al*., 2016; Bidder *et al*., 2016).

Kinabalu Park is one of Malaysia's first World Heritage Sites in the natural category and the park has long since become of the most-visited destinations in the country. As a World Heritage Site, Kinabalu Park has a certain standard to live up to and should be a leading example for other national parks in Malaysia. Hence, it is important to establish the effectiveness of the interpretation adopted in Kinabalu Park in influencing the visitors' knowledge, attitude, and behavioral intention. Establishing the effectiveness is important especially when it is a national park designated with the World Heritage Site status.

Furthermore, determining the differences between the pre- and post-visit samples in terms of their knowledge, attitude, and behavioral intention would help highlight the strength and weakness of the current interpretation methods adopted by the park management in Kinabalu Park. Apart from that, this research work also presents an insight on the current adopted interpretation in Kinabalu Park especially in terms of the qualities of interpretation as highlighted in the EROT framework (enjoyable, relevant, organized, thematic). The observation carried out in this study on the interpretation in Kinabalu Park would be able to highlight whether or not interpretation in the park adopts all the qualities in the design of effective interpretation. Once the content and design of interpretation in the park is identified based on the EROT qualities, recommendations can be given and improvements can be made to the interpretive programs in Kinabalu Park.

1.3 Area of Study: Kinabalu Park

Kinabalu Park was established in 1964 and the park covers an area of 75,370 ha located on the Crocker Range in the state of Sabah (Liew, 1996). The park is about two-hour drive (92km) from the capital city of Sabah, Kota Kinabalu and stands at an elevation of 1,520m above sea level (Figure 1.1). One of the most prominent features of

Kinabalu Park is Mount Kinabalu, which stands at 4,095.2m in height with its rocky summit protruding through the vast forest of Borneo. Mount Kinabalu is the tallest mountain in South East Asia between the Himalayas and New Guinea (UNESCO WHC, 2016). According the IUCN protected area category system, Kinabalu Park is a type II protected area, a national park that caters for both environmental conservation and recreation (UNESCO WHC, 2016).

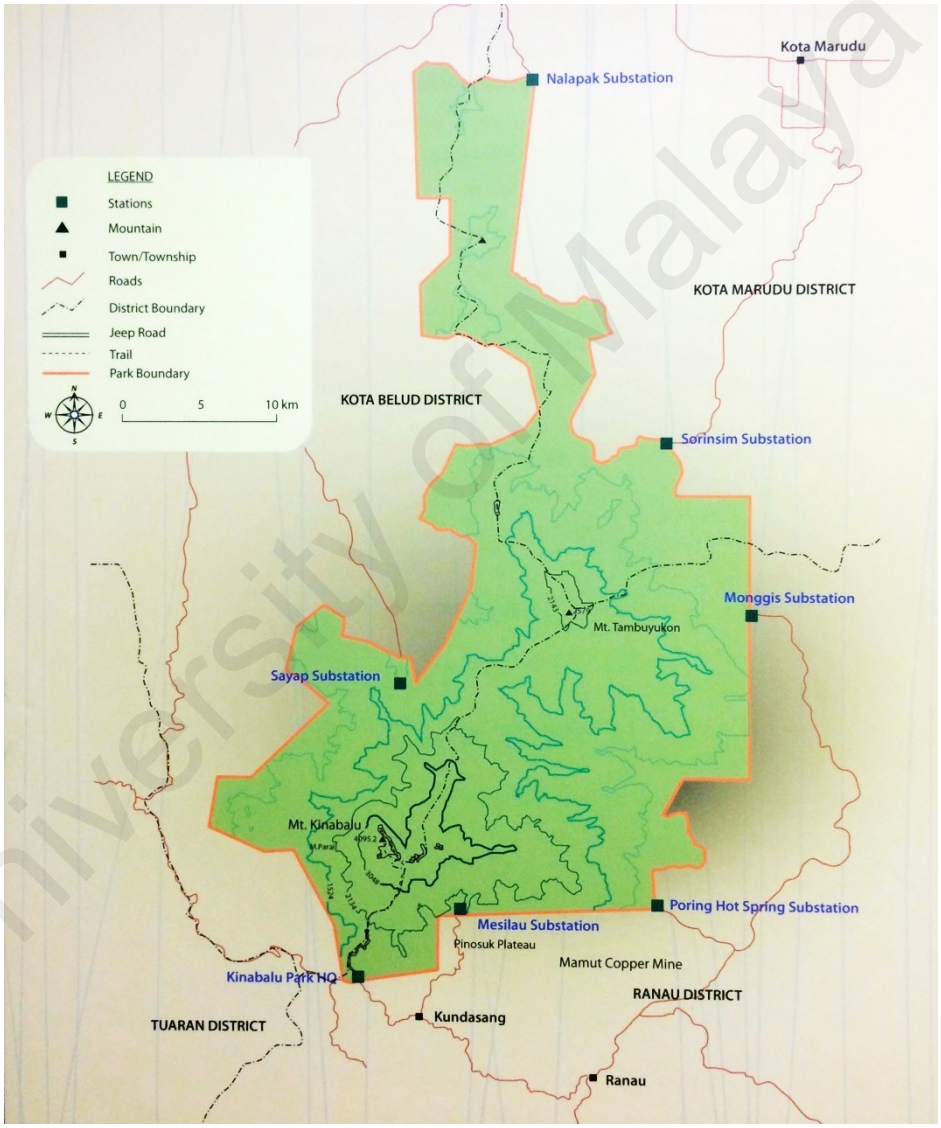

Figure 1.1: Map of Kinabalu Park's boundary

Source: Sabah Parks (2013)

Kinabalu Park is one of the first parks in Malaysia to be designated with the status of World Heritage Site by UNESCO in December 2000 due to its outstanding and unique values (UNESCO WHC, 2016). Kinabalu Park was awarded with the status of World Heritage Site in the natural category as it met two of the natural selection criteria which are criterion (ix) and (x). Criterion (ix) characterized Kinabalu Park as a place that is able to be an outstanding example representing significant on-going ecological and biological processes in the evolution and the development of terrestrial, fresh water, costal and marine ecosystems and communities of plants and animals. Criterion (x) concerns the fact that Kinabalu Park contains the most important and significant natural habitats for *in-situ* conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science and conservation (UNESCO WHC, 2016). Apart from that, Kinabalu Park is also declared as ASEAN Heritage Park under an initial agreement in 1984 (Review of National Ecotourism Plan, 2013).

There are three main stations in Kinabalu Park that cater to recreational activities namely Park HQ, Mesilau Nature Resort and Poring Hot Spring. Kinabalu Park also comprises of another four substations that initially serve as outposts for monitoring purpose but are becoming popular among the visitors. The four substations are Sayap, Nalapak, Serinsim and Monggis substations. Park HQ and Poring Hot Spring are the study area for this research due to its popularity among visitors. Kinabalu Park receives approximately 600,000 to 700,000 visitors annually (Figure 1.2). Both Park HQ and Poring Hot Spring record the highest number of visitors' arrival compared to other substations as both stations receive approximately 400,000 to 600,000 visitors every year. Mesilau Nature Resort is also a popular station of Kinabalu Park but was excluded from the study due to inaccessibility after the June 5th 2015 earthquake that affected the area extensively. The park management of Kinabalu Park adopts a variety of

interpretive approaches including guided walk, introductory signs, brochures, information sheets, information panels, preserved samples, video show, diorama, and illustrations.

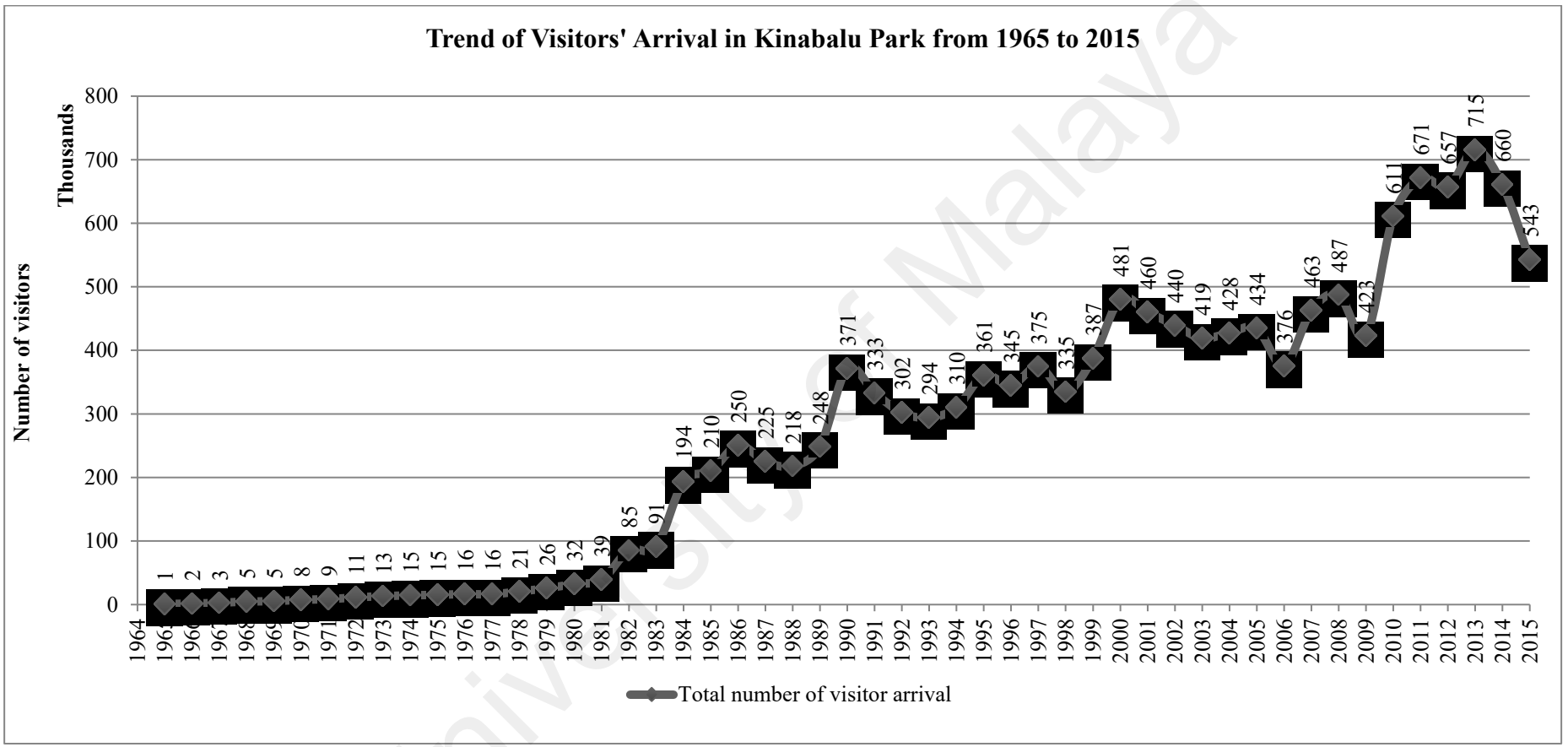

Figure 1.2: Visitors' arrival in Kinabalu Park from 1965 to 2015

Source: Sabah Parks (2016)

Geologically, Mount Kinabalu is considered young and is still growing at the rate of 5mm annually (Choi, 1996). Although young, Kinabalu Park is the Center of Plant Biodiversity for Southeast Asia (UNESCO WHC, 2016). Due to the diversity of flora and fauna in Kinabalu Park, it is also one of the world's 13 biodiversity hotspots and is also deemed as one of the primary centers of plant diversity in the world (Goh, 2008).

1.4 Problem Statement

There had been a few studies on interpretation in Malaysia's natural environment (Ismail, 2008; Roslina, Manohar, Ismail Adnan, Azlizam, & Mohd Aswad, 2013; Amin *et al*., 2014; Lim *et al*., 2016). Amin *et al*. (2014) and Lim *et al*. (2016) tested the impacts of interpretation that adopted the EROT framework (enjoyable, relevant, organized, and thematic) at Bako National Park and Pahang National Park respectively. However, Amin *et al*. (2014) study was focused on thematic interpretive guided tours impact on visitors while Lim *et al*. (2016) target population was secondary school students. There had been abundance of scientific studies carried out in Kinabalu Park due to the park's unique standing as one of the world's most biodiverse locations. Tourism study is common in Kinabalu Park but research related to the topic of interpretation is very limited. Prior studies in Kinabalu Park pertaining to interpretation were carried out by Bidder, Kibat, & Fatt (2016) that focused on cultural interpretation while Jacobson (2009) tested the impacts of guides, brochures, and signs on the visitors' knowledge within Kinabalu Park's Mountain Garden (now known as Botanical Garden). Furthermore, past research carried out in Kinabalu Park emphasized on the need to improve the educational elements in Kinabalu Park as the visitors had expected a more informative and educational experience while visiting the park (Goh, 2008). Although Kinabalu Park has long introduced educational elements as part of its recreational programs, the overall influence of interpretation in Kinabalu Park on the visitors' knowledge, attitude, and behavioral intention is still unaccounted for.

1.5 Research Objectives

The purpose of this research is to evaluate the effectiveness of interpretive programs in Kinabalu Park in influencing visitors' knowledge, attitude and behavioral intention. The research objectives are:

1. To identify the types of interpretive programs used by the park management in Kinabalu Park.
2. To evaluate the effectiveness of the interpretive programs used in Kinabalu Park in influencing visitors' knowledge, attitude and behavioral intention.
3. To suggest recommendations to the park management in relation to the improvements that can be made to the interpretive programs.

1.6 Research Questions

Three research questions have been identified in this study. The research questions are:

1. What are the existing types of interpretive programs adopted by Kinabalu Park?

   Secondary data related to the interpretive programs carried out in Kinabalu Park was collected from the park management, Sabah Parks. The researcher also took part in the interpretive programs at both Park HQ and Poring substations in order to observe on the types of interpretation methods incorporated into the programs. Afterwards, a review of the documents related to the interpretation programs in Kinabalu Park was conducted.

2. Does interpretation contribute to the visitors' knowledge, change their attitude and influence their intention to engage in environmentally responsible behaviors?

Pre- and post-visit surveys were used to evaluate the visitors' knowledge, attitude, and behavioral intention. The pre-visit surveys were handed out to visitors who were not yet exposed to interpretation in the park while the post-visit surveys targeted visitors that had taken part in the interpretive activities. The pre- and post-visit respondents were independent of one another and the results of both surveys were compared to evaluate the differences in the visitors' level of knowledge, attitude, and behavioral intention.

3. What are the improvements that can be made to the interpretive programs in Kinabalu Park?

   Based on the result of the survey and observation carried out in Kinabalu Park, the extent of the influence of interpretation on visitors' knowledge, attitude, and behavioral intention was established. Further recommendations were suggested to better improve the interpretive programs in Kinabalu Park in achieving the goals of interpretation to influence the visitors' knowledge and attitude towards the environment and simultaneously prompt them to behave more responsibly.

1.7 Organization of Dissertation

This dissertation is divided into six chapters: Introduction, literature review, methodology, analysis findings, discussion, and conclusion. This chapter generally includes an introduction to the nature of this research study. It discusses the general problems related to the research study as well as the objectives of the research.

Chapter 2 examines the literature review in-depth pertaining to the topic of ecotourism and interpretation. The literature review first touches on the introduction to the concept of ecotourism and its relevance in protected areas. The chapter then further discusses the visitor management strategies adopted by park managements worldwide in

order to cope with the negative impacts of practicing tourism in sensitive environment. This chapter then elaborates on one particular visitor management tool which is interpretation in regulating visitors' impact in protected areas by discussing how interpretation influences visitors' knowledge, attitude and behavior.

The methodology to this research is discussed in Chapter 3. Chapter 3 begins with a conceptual framework of the research and further discussed the research design of the study, which emphasized primarily on quantitative method while qualitative method serves as a support. The chapter then further highlights the steps in the primary and secondary data collection including both the questionnaire survey and observation. Further to that is a description of the analysis carried out for both the quantitative and qualitative data collected. A description of the research constraint is also included in this chapter. Chapter 4 outlines the results on analysis of the data collected. Descriptions of the interpretive programs in Kinabalu Park are included in this chapter. This chapter also presents the findings of the quantitative data analyzed using the Statistical Package for Social Science (SPSS). The results yielded from the SPSS software are interpreted and discussed in this chapter.

Chapter 5 discusses the results gained from this study on the influence of interpretation and repeat visitation on the visitors' knowledge, attitude, and behavioral intention. The findings in this study are also compared with the observation of the interpretation content in Kinabalu Park's interpretive programs to explain the nature of the results especially in terms of the qualities in the design of effective interpretation. Chapter 6 is the last and concluding chapter. Chapter 6 summarizes the overall findings in this study and a set of recommendation that can be made in Kinabalu Park's interpretive programs based on the findings.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter provides an overview of the literatures carried out by previous scholars in the field of interpretation. Firstly, this chapter explains the definition of ecotourism and protected areas including the criteria and application of ecotourism within protected areas. The chapter then discusses the various visitor management strategies undertaken by protected area management including the focus of this research, education. Following that, the chapter then explains the core variable in the study, interpretation including its definition, benefits, qualities and principles, and types. Once the concept of interpretation is explained, this chapter then evaluates the different studies carried out by different scholars on the effectiveness of interpretation in terms of knowledge, attitudes, and behaviors. Lastly, this chapter concludes with a brief summary of the literature review.

2.2 Ecotourism

2.2.1 Definition of Ecotourism

There are various definitions of the term ecotourism forwarded by scholars and organizations ever since it was first introduced in the 1980s. However, the practice and concept of ecotourism has been used long before the term ecotourism was first introduced. For example in Canada, the national forestry service has used educational ecotour in their practices since the year 1973 even before the term ecotourism exists. Earlier in the 1980s, Hector Ceballos-Lascurain, a Mexican ecologist first used the term *"ecoturismo"* which is Spanish. Another one of the earliest usage of ecotourism concept was in a paper written by Budowski (1976) in which he described the conflicted relationship between tourism and the natural environment and the potential of a mutual relationship between the two sectors (Weaver, 2008).

Ever since the inception of the word ecotourism and its concept, there has been influx of definitions. A content analysis study of ecotourism definitions conducted by Fennell (2001) identified at least 85 definitions of ecotourism put forward by different researchers and organizations. According to Fennell, one of the possible reasons why there are so many definitions of ecotourism out there is most likely due to the fact that none of the existing definitions described the concept rightfully. Another reason is because of the different geographical locations that require different definitions and principles of ecotourism (Fennell, 2001).

According to the International Union for Conservation of Nature (IUCN), ecological tourism or ecotourism is defined as:

'an environmentally responsible travel and visitation to relatively undisturbed natural areas, in order to enjoy and appreciate nature (and any accompanying cultural features – both past and present) that promotes conservation, has low visitor impact and provides for beneficially active socio-economic involvement of local populations.' (Ceballos-Lascurain, 1996)

The definition provided by Ceballos-Lascurain was one of the earliest and widely accepted definitions of ecotourism. Plenty of the definitions to follow were built up upon Ceballos-Lascurain's initial definition of ecotourism (Table 2.1). Certain proposed definitions of ecotourism are very comprehensive in explaining the core criteria that differentiate ecotourism from other types of tourism but certain other definitions are quite basic and open to the readers' interpretation. The reason for the varying definitions of ecotourism is because in-depth definitions could result in too many constraints for service providers to live up to the goals of ecotourism. However, loose definitions of ecotourism are also subjected to misrepresentation of the concept (Fennell, 2015). Despite the abundance of definitions, most of them incorporated the same themes.

Among the common themes in the definitions include nature-based; environmental education; conservation-oriented; involvement of local people; distribution of benefits; sustainability; and ethics and responsibility (Boo, 1991; Pedersen, 1991; Valentine, 1992; Buckley, 1994; Blamey, 2001; Weaver, 2001; Fennell, 2015; TIES, 2015).

Table 2.1: Definitions of ecotourism

Source	Definition
Boo (as cited in Weaver, 2008)	Ecotourism is a nature tourism that contributes to conservation, through generating funds for protected areas, creating employment opportunities for local communities, and offering environmental education.
Valentine (as cited in Weaver, 2008)	Nature-based tourism that is ecologically sustainable and is based on relatively undisturbed natural areas, is non-damaging and non-degrading, contributes directly to the continued protection and management of protected areas, and is subject to an adequate and appropriate management regime.
Buckley (1994)	A framework of ecotourism based on four main dimensions: a) Ecotourism being nature-based b) Conservation supporting c) Sustainably managed d) Environmentally educating
Goodwin (as cited in Weaver, 2008)	Ecotourism is low impact nature tourism which contributes to the maintenance of species and habitats either directly through a contribution to conservation and/or indirectly by providing revenue to the local community sufficient for local people to value, and therefore protect, their wildlife heritage area as a source of income.
Blamey (2001)	Ecotourism is: a) Nature-based b) Educational c) Sustainable
Weaver (2001)	Ecotourism is a form of tourism that fosters learning experiences and appreciation of the natural environment, or some component thereof, within its associated cultural context. It is managed in accordance with industry best practice to attain environmentally and socioculturally sustainable outcomes as well as financial viability.
Fennell (2015)	Travel with a primary interest in the natural history of a destination. It is a form of nature-based tourism that places about nature first-hand emphasis on learning, sustainability (conservation and local participation/benefits), and ethical planning, development, and management.
The International Ecotourism Society (2015)	Ecotourism is responsible travel to natural areas that conserves the environment, sustains the wellbeing of local people, and involves interpretation and education.

In the context of Malaysia, the National Ecotourism Plan 1996 originally adopted the ecotourism definition proposed by the IUCN. A report on the review of the National Ecotourism Plan 1996 was released in 2013 and a new definition reflecting the practice of ecotourism in Malaysia was adopted based on the inputs from different stakeholders (Review of National Ecotourism Plan, 2013). In 2017, the Ministry of Tourism and Culture adopted a new definition of ecotourism as highlighted in the National Ecotourism Plan 2016-2025. The new ecotourism definition is as follow:

'Tourism experiences evolved through collaboration between government, the private sector and local communities, that include the following elements: respect for nature, contribution to conservation, benefit to local communities, components of education and awareness, and sustainability – ecologically, economically, socio-culturally, and ethically.' (National Ecotourism Plan 2016-2025, 2016)

2.2.2 Criteria of Ecotourism

The definition of ecotourism remains disputed due to the different focus within each definition of ecotourism (Buckley, 2012; Fennell, 2015). The absence of an operational definition and consensus on the conceptual understanding of ecotourism had also led to ecotourism industry being evolved into many different forms (Chandel & Mishra, 2016). According to Blamey (as cited in Weaver, 2008), there are three common criteria of ecotourism that appeared in almost all of the definitions namely that it is nature-based, sustainable and has an educational element.

Firstly, ecotourism is a nature-based tourism practice in which the word 'eco' itself refers to ecology and ecosystem. Majority of the definitions of ecotourism had defined ecotourism as nature-based and nature-oriented travel (Weaver, 2008; Fennell, 2015; Chandel & Mishra, 2016). Thus the word ecotourism refers to a tourism practice that is primarily based on the natural environment. The fact that ecotourism is nature-based

explains why it primarily takes place in protected and relatively undisturbed natural areas. Ecotourism market is often overlapping with the nature-based tourism market because of the similarity between the two practices (Diamantis, 1999). One similarity is the settings of both practices in which both occur not only in protected areas but also in other forms of natural attractions such as biosphere reserves, marine parks, safaris, zoos, and others. The Australian Ecotourism strategy stated that ecotourism is a small subset of nature-based tourism (Diamantis, 1999). With the latter being primarily about enjoyment of nature while the former is more focused on nature conservation and educational elements (Blamey, 1997).

The second most important criterion in ecotourism is sustainability. The problems of conventional mass tourism are the damages it had to the environment and host destinations. Ecotourism rose as a response to the increasing concerns over the threatening nature of mass tourism on the physical and cultural environment (Kutay, 1990, as cited in Wearing & Neil, 1999; Weaver, 2008). The concept of sustainability in ecotourism refers to the ability to accommodate the needs of the visitors and at the same time sustain the sensitive environment (Weaver, 2008). In the criteria of sustainability, ecotourism aims to minimize the disruptive impacts of tourism on the environment physically, socially, behaviorally, and psychologically while at the same time also promotes the wellbeing of the local communities (Boo, 1991; Wearing & Neil, 1999; Weaver, 2008; Fennell, 2015; TIES, 2015; Aswita, 2018). Similarly, the content analysis of ecotourism definitions by Chandel & Mishra (2016) had also identified supporting conservation and socio-economic development of local area as the most frequently appeared themes in the various definitions of ecotourism. Both themes emphasized on conserving the natural environment and the empowerment of the local people in the area. The practice of ecotourism should help generate direct financial benefits to conservation of the area and the financial benefits should also extend to the

local communities as well as private industry (TIES, 2015). Ecotourism is sustainable as it takes into account not just the wellbeing and needs of visitors but also the environment, its people, its culture and its needs (Wearing & Neil, 1999).

The third and last criterion of ecotourism is its educational element. The content analysis of ecotourism definition by Fennell (2015) and Chandel & Mishra (2016) both highlights that education is one of the most vital parts of the visitors' ecotourism experience that occurred in majority of the definitions. Ecotourists are said to be different from tourists because they travel with the intention to learn at least the most basic things about nature and the environments they are visiting through activities/programs developed by ecotourism operators or the park management (Eagles, McCool, & Haynes, 2002; Fennell, 2015). The dependent nature of ecotourism on the environment along with ecotourists' needs to understand and interact with nature makes it important for management and operators alike to provide an appropriate form of environmental and cultural interpretation (Wearing & Neil, 1999). Education also helps garner the support of the public in which without it the place cannot function properly (Wearing & Neil, 1999).

Recreational activities take place within ecotourism settings and they can still cause damages to the environmental and cultural resources of the place despite the restricted nature of the activities (Wearing & Neil, 1999; Tubb, 2003). In this case, education plays an important role in regulating the visitors and reducing their impacts on the environment. Education through interpretation is a form of visitor management that can lead to an increase in visitors' knowledge, awareness, sense of appreciation, respect for nature and in the end direct them to behave more responsibly towards the environment (Ross & Wall, 1999; Orams, 1997; Powell & Ham, 2008). According to The International Ecotourism Society (2015) in its revised principles of ecotourism,

education at ecotourism sites should deliver the visitors with interpretive experiences that can help raise their awareness towards the host countries' political, environmental, social, and cultural climates.

Since ecotourism is mainly practiced in natural environments that are susceptible to degradation from visitation, education is important in order to balance the practice of tourism and conservation. In order to achieve sustainability in the practice of ecotourism, interpretation plays a vital role (Moscardo, 1998). Within the environment, interpretation serves as a conservation management tool by educating the visitors not just on the features of the place they are visiting but also by communicating the importance of protecting the environment (Wearing & Neil, 1999; Weaver, 2008). According to Moscardo (1998), there are four ways in which interpretation can help minimizes the negative impacts of tourism to the environment. Firstly, interpretation can influence the visitors on alternative sites they can visit and by doing so it can relieve the pressure of sites that are heavily used by visitors. Secondly, interpretation also provides the visitors with a substitute experience especially for those that cannot visit the actual sites. Thirdly, well-delivered interpretation in a sensitive environment can increase the visitors' awareness on the impacts of their behaviors towards the environment and at the same time inform them how to behave more appropriately within such environment. Lastly, effective interpretation will develop a sense of concern among the visitors. However, influencing the visitors' attitude towards the environment and prompting behavior change among them are not easy tasks (Jacobson, 2009).

Interpretation has to adhere to a set of principles in order for it to have a positive impact on the visitors' knowledge, attitude, and behaviors (Ham, 1992; Moscardo, 1998; Tilden, 2007; Ham, 2013). Besides alleviating the impacts of tourism on the environment, education in ecotourism also provides the local communities with

opportunities to learn and stimulate their appreciation towards their own cultures and traditions that could have otherwise been forgotten (Kutay, 1990, as cited in Wearing & Neil, 1999). Effectively delivered interpretation could also garner support from the local communities as they become more aware of the value of their local and natural attractions.

Each protected areas are different and unique from one another thus the criteria in ecotourism have to be defined differently according to the characteristics of the area in question (Dologlou & Katsoni, 2016). According to Dologlou & Katsoni (2016), the definitions and criteria of ecotourism will continue to change and redefine with time considering the on-going changes that might affect the area in question. Ecotourism is also closely linked with ethics especially the ecotourism business owners as they are recognized as businesses with strong environmental ethics (Buckley, 2005; Bowles & Ruhanen, 2018). The experience offered by ecotourism business owners can act as a catalyst for change through their environmental ethics and values. Successful ecotourism practices by operators can support and promote the role of ecotourism in sustainable tourism development (Holden, 2013). However, the reputation of ecotourism may also be damaged if the experiences delivered by ecotourism operators do not live up to the environmental ethics and values that underpinned the ecotourism practice (Bowles & Ruhanen, 2018)

2.2.3 Protected Areas

According to the International Union for Conservation of Nature (IUCN), a protected area is:

'…an area dedicated primarily to the protection and enjoyment of natural or cultural heritage, to maintenance of biodiversity, and/or to maintenance of ecological life-support services.' (Ceballos-Lascurain, 1996, p. 29)

The definition of protected areas came after the Commission on National Parks and Protected Areas (CNPPA) now known as the World Commission on Protected Areas (WCPA) held the 1992 World Parks Congress in Caracas, Venezuela which also resulted in the formation of the IUCN protected areas categories system used nowadays (Dudley, 2008). The definition of protected areas however was later revised and the first draft was produced during a meeting on the categories system in Almeria, Spain in May 2007. The proposed definition was reviewed by the members of the IUCN-WCPA and the new definition for protected area is:

'...a clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.' (Dudley, 2008)

In 2014, there is a total of 209, 429 sites covering a total area of 32, 868, 673 km² designated with the status of protected area under the United Nations List of Protected Areas (Deguignet, Juffe-Bignoli, Harrison, MacSharry, Burgess, & Kingston, 2014). Based on the statistics, approximately 14% of the world's terrestrial areas and 3.41% of the world's marine areas have been protected to date (Deguignet *et al*., 2014). The numbers of protected areas have increased tremendously over the past 50 years (Table 2.2). Back in 1962, there were 9,214 sites protected covering 2,400,000 km² of areas. In 2014, a significant increase was observed in the number and coverage of protected areas in which an additional 30,000,000 km² of areas have been protected under the UN list (Deguignet *et al*., 2014). As of December 2017, the total combined protected areas had increased up to 236,200 sites covering an area of 45,000,000 km^2 in which 25,000,000 km^2 are marine protected areas while another 20,000,000 km^2 are terrestrial protected areas ("Increased Growth of Protected Areas in 2017", 2017).

Table 2.2: Growth of protected areas since 1962 (Deguignet *et al*., 2014; "Increased Growth of Protected Areas in 2017", 2017)

Year	Number of sites	Total area protected (km²)
1962	9,214	2,400,000
1972	16,394	4,100,000
1982	27,794	8,800,000
1992	48,388	12,300,000
2003	102,102	18,800,000
2014	209,429	32,868,673
2017	236,200	45,000,000

The IUCN has devised a standard and widely accepted protected areas classification system known as the IUCN Protected Areas Categories System in 1994. There are six categories of protected areas listed under the IUCN classification system and each protected area is categorized based on their management objectives (Table 2.3). The lower the category number of the protected area, the less human intervention and modification are made to the place. Category I has the lowest amount of environmental modification and human impact compared to other categories. The last category, Category VI is mainly used for the purpose of extraction of natural resources such as logging (Eagles *et al*., 2002; Weaver, 2008).

Table 2.3: IUCN Protected Areas Categories system and description (IUCN, 2008)

Category	Designation	Description
Ia	Strict nature reserve	Area strictly protected to protect biodiversity and also possibly geological/geomorphological features, where human visitation, use and impacts are strictly controlled and limited to ensure protection of the conservation values. Such protected areas can serve as indispensable references areas for scientific research and monitoring.
Ib	Wilderness area	Protected areas are usually large unmodified or slightly modified areas, retaining their natural character and influence, without permanent or significant human habitation, which are protected and managed so as to preserve their natural condition.

Table 2.3, continued

Category	Designation	Description
II	National park	Protected areas are large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristics of the area, which also provide a foundation for environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities.
III	Natural monument of feature	Protected areas are set aside to protect a specific natural monument, which can be a landform, sea mount, submarine cavern, geological feature such as a cave or even a living feature such as an ancient grove. They are generally quite small protected areas and often have high visitor values
IV	Habitat/species management area	Protected areas aim to protect particular species or habitats and management reflects this priority. Many category IV protected areas will need regular, active interventions to address the requirements of particular species or to maintain habitats, but this is not a requirement of the category.
V	Protected landscape/seascape	A protected area where the interaction of people and nature over time has produced an area of distinct character with significant ecological, biological, cultural and scenic value: and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values.
VI	Protected area with sustainable use of natural resources	Protected areas conserve ecosystems and habitats, together with associated cultural values and traditional natural resource management systems. They are generally large, with most of the area in a natural condition, where a proportion is under sustainable natural resource management and where low-level non-industrial use of natural resources compatible with nature conservation is seen as one of the main aims of the area.

Malaysia is home to a total of 739 protected areas scattered throughout the country in which 63,474km^2 are terrestrial protected areas while another 6,358km^2 are marine protected areas. Out of the 739 protected areas, 29 of them are designated with the status of national park including Kinabalu Park (UNEP-WCMC, 2017).

2.2.4 Application of Ecotourism in Protected Areas

Most developing countries depend on the natural environment as one of their sources for tourism (Nepal, 2000) and for most of the developing countries, ecotourism largely takes place in protected areas (Weaver, 2008; Cobbinah, 2015). There are a few reasons why protected areas appeal as a platform for ecotourism to take place. One of the main reasons is because of the dramatic growth in the numbers of protected areas worldwide over the past 50 years. Another reason is because of its natural environment and functions. Protected areas are dedicated towards the conservation of the natural environment to a certain degree depending on the designation of the protected areas. One of the main criteria of ecotourism is nature-based hence making protected areas a suitable setting for ecotourism-related activities (Weaver, 2008). Category II and V which are National Park and Protected Landscape/Seascape respectively are the most suitable physical setting for nature-based tourism including ecotourism because it allows interaction between people and nature unlike the other categories of protected areas under the IUCN protected areas classification system.

Another reason is because of its high public profile. Some of the most famous protected areas in the world have gained high public attention that they have become iconic tourist attractions in their countries and perhaps even in their regions (Weaver, 2008). Visitors have considered these destinations as must-see or must visit destinations in their list while traveling. Kinabalu Park is famous for being a home to the tallest mountain in the South East Asian region and it is one of the most famous climbing spots in South East Asia among visitors to Malaysia and Borneo. Furthermore, the World Heritage Site status granted to protected areas can ensure an increase in visitation. A time series study at six Australian national parks revealed that World Heritage Listing had an impact on tourism's visitation level to the parks (Buckley, 2004). The study

found that the designation of WHS to protected areas contributed to the increase in the visitation level especially among international visitors.

Furthermore, the practice of tourism within protected areas can be used as a mean to contribute to the livelihood and living condition of the community residing in the vicinity of the area. In the case of developing countries, although sustainability is still one of the main criteria in ecotourism, research had shown that ecotourism in protected areas within developing countries is linked closely with the reduction of poverty in the local communities (Cobbinah, 2015) and underdevelopment alongside the conservation of natural resources (Skanavis & Kounani, 2017). The practice of ecotourism in protected areas bring changes to the local communities' way of living as it diversify their job opportunities and contributed to their livelihoods thus resulting in the reduction of poverty and development of the local communities living nearby the protected areas in question (Cobbinah, 2015; Das & Chatterjee, 2015; Aswita, 2018).

2.3 Visitors' Education in Protected Areas

The dual roles of protected areas in conservation and tourism as well as the increasing number of visitors to protected areas pose a detrimental threat to the already sensitive environment especially is it is not carefully planned and regulated (Skanavis & Kounani, 2017). Ecotourism itself is not exempted from such threat even though it is touted as the most appropriate form of tourism in protected areas (Orams, 1995; Orams & Hill, 1998; Powell & Ham, 2008). In order to strike a balance between tourism and conservation and to prevent further deterioration to the environment, park managements have been using several impact management strategies. The management responses can be classified into four different categories namely regulatory, physical, quotas and fees and education (Orams & Hill, 1998; Papageorgiou, 2001; Weaver, 2008).

Regulatory response is the most common strategy and it incorporates the use of rules and regulations in regulating visitors' behavior within protected areas. Among the regulatory responses are zoning and carrying capacity in which the former designates certain areas into different level of land uses depending on the sensitivity of the areas while the latter regulates the number of visitors based on the amount of pressure the area can accommodate without damaging the environment (Wearing & Neil, 1999; Littlefair, 2003; Weaver, 2008). Physical response refers to site hardening (boardwalks/plankwalks, viewing platforms, and barriers) and the adoption of sustainable and eco-friendly design facilities at protected areas (Orams & Hill, 1998). The use of ecolodges has the ability to promote the concept of sustainability among the visitors as it is designed in a sustainable manner and carefully managed in order to minimize the environmental impacts (Lee & Moscardo, 2005; Weaver, 2008; Eagles, undated). Park managements also impose users fee as part of the visitor management strategy. The idea is that by increasing the fees to certain activities or programs, they become less appealing to the visitors and it will automatically reduce the number of participants until it is within the pre-determined carrying capacity (Weaver, 2008).

Environmental education has been receiving much attention lately as an effective tool for visitor impact management and it is one of the most important criteria of ecotourism practice (Bramwell & Lane, 1993; Orams & Hill, 1998; Hughes & Morrison-Saunders, 2002a; Hill & Gale, 2009; Skanavis & Kounani, 2017). Environmental education is perceived as an important aspect in ecotourism as it has the ability to affect visitors' environmental behavior through personal experience that promotes environmentally responsible behaviors (Skanavis & Kounani, 2017). Codes of conduct and interpretation are two of the tools used in environmental education approach in minimizing visitors' impact towards the environment. A simple behavior code is laid out for visitors in protected areas in the forms of information panels,

brochures, and others disseminating messages about appropriate behaviors while in a sensitive environment. Interpretation is one of the most commonly used environmental education approaches. It involves communicating information about the significance of a particular natural environment to the visitors by revealing the meanings and relationships behind them instead of merely delivering facts (Ham, 1992; Tilden, 2007; Walker & Moscardo, 2014).

2.4 Interpretation

Interpretation seeks to raise awareness among the visitors to a natural area on the importance of conserving the environment by influencing their knowledge, attitude and encouraging them to behave more responsibly (Hungerford & Volk, 1990; Orams, 1997; Orams & Hill, 1998, Hughes & Morrison-Saunders, 2005; Munro *et al*., 2008). This will eventually helps reduce the negative impacts to the environment (Kimmel, 1999; Madin & Fenton, 2004). Interpretation can also increase visitors' enjoyment and in turn lead to them being more open and susceptible to pro-environmental attitudes and behaviors (Ross & Wall, 1999; Ballantyne & Packer, 2011). Interpretation is preferred because it is less intrusive in regulating visitors' behavior compared to regulations, physical limitations and sanctions as the latter three can affect the visitors' experience negatively (Papageorgiou, 2001; Duncan & Martin, 2002). Through the use of interpretation, visitors are able to retain their freedom of choice through the opportunity provided to interpret the information themselves and anticipate the consequences of their actions.

Most protected areas rely on regulations and sanctions in order to regulate the environmental impacts of tourism, but regulations and physical responses alone are not enough to regulate visitors' behavior. Interpretation is preferred because it does not just educate the public about the importance of conservation but it can also justify the need

for the rules and regulations imposed in protected areas (Papageorgiou, 2001; Duncan & Martin, 2002; Eagles *et al*., 2002).

2.4.1 Definition of Interpretation

There had been multiple definitions of interpretation forwarded by different scholars and organizations. But the simplest and most basic meaning of the term interpretation is translating (Ham, 1992). Interpretation can easily mean translating one language into another or even giving meanings to a dream (Ham, 1992; Tilden, 2007; Ham, 2013). Translation however is the basic foundation in which the term interpretation itself is built upon. According to Ham (1992), environmental interpretation involves translating the technical language of a natural science or related field into terms and ideas that people who are not scientists can readily understand. It is done in a way that is entertaining and interesting to these people. Ham's definition of interpretation takes into account the visitors who might not be able to understand the information if it is provided in technical terms. Hence it stresses the importance of the interpretation being portrayed in the easiest form that people can relate to and enjoy.

The most famous and sought for definition of interpretation to this day is the definition provided by Freeman Tilden (2007) in his work Interpreting Our Heritage. Tilden defined interpretation as:

'an educational activity which aims to reveal meanings and relationships through the use of original objects, by first-hand experience, and by illustrative media, rather than simply to communicate factual information.' (Tilden, 2007, p. 33)

Tilden's definition of interpretation does not confide in only simply translating factual information into easier terms but it addresses the needs to communicate the meanings and ideas behind the facts. The factual information in this regard is presented

only to help visitors understand, relate and be more appreciative towards the area or issue. There had been multiple definitions of interpretation that came after Tilden first published his stance on interpretation in 1957 (Table 2.4)

Table 2.4: Definitions of interpretation

Author/Organizations	Definition
Queensland National Parks and Wildlife Service (Carter, 1984)	Interpretation is a special process of stimulating and encouraging an appreciation of the natural and cultural heritage of a region, as well as a means of communicating nature conservation ideals and practices.
Interpretation Australia Association (1999)	Interpretation is a means of communicating ideas and feelings which helps people enrich their understanding and appreciation of their world and their role within it.
Weiler & Davis (1993)	Interpretation is an educational, illustrative and entertaining activity which aims at providing the visitor with an insight into the interrelationships of the various resources and systems comprising the natural environment by first-hand experiences.
Don Aldridge (1973)	Interpretation is the art of explaining man's place in his environment, for the purpose of enhancing visitor awareness of the importance of this interaction and awakening the desire to contribute to the conservation of the environment.
Yorke Edwards (1976)	Interpretation has four characteristics which make it a special discipline: It is attractive communication, it offers concise information, it is presented in the presence of the object in question, and its objective is to reveal a meaning.
Society for Interpreting Britain's Heritage (from Moscardo, 1998)	Interpretation is the process of explaining to people the significance of the place or object they have come to see, so that they enjoy their visit more, understand their heritage and environment better, and develop a more caring attitude towards conservation.
National Association for Interpretation (NAI, 2014, as cited in Moscardo, 2014)	Interpretation is a mission-based communication process that forges emotional and intellectual connections between the interests of the audience and the meanings inherent in the resource.
Association for Heritage Interpretation (AHI, 2014, as cited in Moscardo, 2014)	Interpretation enriches our lives through engaging emotions, enhancing experiences and deepening understanding of places, people, events and objects from the past and present.

Based on the various definitions of interpretation provided by different scholars and organizations, interpretation is a communication process in which messages and information are relayed to visitors in order to enrich their understanding and stimulate a sense of appreciation and care towards an area. Interpretation comes in various forms such as signage, information panels, visitor centers, ranger presentations, video shows, audio tours and many more. In order for visitors to develop affection towards the area they are visiting, the interpretive nature of the place has to have the ability to provoke visitors into thinking and contemplating the conservation messages they received that will eventually affect they way visitors behave towards a more responsible pole (Bramwell & Lane, 1993; Orams, 1997; Stewart *et al*., 1998; Tubb, 2003). Interpretation has to be interesting enough to capture the attention of the visitors and at the same time not providing visitors with too much information. It is proven that too much information as well as repetitive messages and information might discourage them from wanting to know more and creates a negative impression of their experience (Wearing & Neil, 1999; Hughes & Morrison-Saunders, 2005).

2.4.2 Benefits of Interpretation

Poorly planned interpretation programs in protected areas can result in the loss of interests among visitors but interpretation can also contribute to visitor's positive experience and enjoyment. There are four identified potential benefits interpretation brings with it: promotional, recreational, visitor management/environmental, and economical (Wearing & Neil, 1999; Littlefair, 2003). These benefits of interpretation also reflect the outcomes or goals of interpretation such as enhancing visitors' experience, facilitating appreciation, and influencing behavior (Ham, 2013).

In terms of promotional benefits, interpretation has the ability to enhance the image and standard of the agency or authority responsible for managing the place. Positive

stance among the visitors regarding the management authority can influence how they received the underlying conservation messages relayed to them (Wearing & Neil, 1999; Littlefair, 2003). Besides promoting the park management, interpretation is also used as a tool to promote the park itself and the activities it offers. Through interpretation, a park's values, history, missions and visions can be promoted to the visitors along with the recreational and interpretive activities offered in a park, which will eventually enhance their understanding and enjoyment (Wearing & Neil, 1999; Jacobson, 2009; Littlefair, 2003). Aside from that, interpretation can foster active involvement and support from the local community as they are the ones with extensive knowledge of their surroundings and know what should and should not be interpreted (Bramwell & Lane, 1993; Wearing & Neil, 1999).

Interpretation also provides recreational benefits for visitors. Firstly, interpretation enhances visitors' experience, satisfaction and enjoyment. Similarly, Ham (2013) highlighted that at the minimum one of interpretation's outcomes should be towards enhancing the visitors' quality of experience. The presence of interpretation can positively enhance visitors' satisfaction by creating a more enjoyable ecotourism experience for them (Hughes & Morrison-Saunders, 2002a) and the lack of interpretation can lead to visitors' dissatisfaction and them craving for more information (Hughes & Morrison-Saunders, 2002a; Hill, Woodland, & Gough, 2007; Orams, 1997). Visitors to a setting are actively seeking for experiences and interpretation activities and programs that exist within the setting contribute largely to the visitors' overall experience (Walker & Moscardo, 2014).

Quality interpretation program can make the visitors visit to a setting more meaningful, interesting, and enjoyable (Moscardo, 2014). Satisfied visitors can help increase the number of visitors to the site and longer length of stays among them thus

generating revenues (Interpret Europe, 2018). Furthermore, satisfied visitors can also enhance the image of the destination through word of mouths (Interpret Europe, 2018). However, there had been very few evidence that interpretation contribute to the increased visitation, length of stays among the visitors as well as increased revenues to tourism sites despite interpretation's ability to provide visitors with satisfying experiences (Moscardo, 2014).

Interpretation can also ensure the visitors' safety at an area as interpretive signage and information provide advices for visitors on the safety precautions they should take (Littlefair, 2003). Furthermore, interpretation is capable of stimulating and fostering a sense of place among the visitors towards an area despite their short stay and unfamiliarity with it (Moscardo, 1998; Stewart *et al*., 1998). Effective interpretation is known to help fasten visitor's process of developing a sense of appreciation for a place (Stewart *et al*., 1998). A qualitative study in Mount Cook National Park, New Zealand revealed that interpretation resulted in the visitors' attachment and appreciation for the place after their visit despite the short length of stay and first time visiting the place among majority of them (Stewart *et al*., 1998).

One of the most direct benefits of interpretation is its use as a visitor management tool. The utilization of interpretation as a tool for visitor impact management is considered as the second most important function of interpretation after providing visitors with positive experience (Moscardo, 2014). Scholars had long been linking interpretation's ability to manipulate visitors' behavior by increasing their knowledge and influencing their attitudes that will eventually increase their awareness and provoke them to behave more responsibly (Hungerford & Volk, 1990; Bramwell & Lane, 1993; Powell & Ham, 2008; Hughes & Morrison-Saunders, 2005; Orams, 1995; Tilden, 2007). Within tourism sites, particularly those with fragile settings and sensitive

environment such as protected areas, certain visitors do not behave appropriately and in turn resulted in damages to the area and its resources (Ham, 2013). Interpretation is expected to be able to mitigate this and point visitors in the correct direction in terms of how they should behave within such fragile settings.

Tailoring visitors' behavior towards a more responsible pole in protected areas is one of the main targets of interpretation in order to reduce the negative impacts towards the environment (Ham, 2013). Instead of simply delivering information, interpretation should be able to reveal the meanings and relationships of the natural environment (Orams, 1997). It is by contributing to visitors' understanding that they can develop a sense of care towards the place prompting them to behave more responsibly and be more supportive of conservation efforts (Bramwell & Lane, 1993; Stewart *et al*., 1998; Tubb, 2003; Wearing & Neil, 1999). Aside from altering visitors' behavior, interpretation is also commonly used as a mean to redirect visitors from heavily visited areas to alternative destinations and routes by subtly informing them through interpretive messages (Bramwell & Lane, 1993; Moscardo, 1998; Littlefair, 2003; Moscardo, 2014).

Interpretation has been widely used as a tool to regulate the visitors' behavior on-site and mitigate the negative impacts to the host destination. As of recent, interpretation has started to shift towards not only modifying visitors' behavior on-site but also off-site (Hughes *et al*., 2011). Effective interpretation is expected to be able to influence visitors in adopting a more environmental friendly lifestyle after their visit (Ballantyne & Packer, 2011; Walker & Moscardo, 2014). In this sense, interpretation is trying to induce long-term changes in the visitors' environmentally responsible behavior. In the efforts to induce further conservation behavior off-site, additional post-visit supports

and interpretive materials are provided to the visitors through email and online updates to help reinforce the on-site messages (Hughes *et al*., 2011; Ballantyne & Packer, 2011).

Interpretation can also benefit the local community economically. Firstly, unpopular and underused destinations can be promoted through interpretation and visitors can visit the areas they might not have visited had they not learn it through interpretation (Bramwell & Lane, 1993). This can in turn revitalize the under-used area as well as reduce the pressure at heavily used destinations (Moscardo, 1998). Secondly, interpretation has the ability to influence visitors to stay longer at a place, which will directly and indirectly benefit the local economy through generation of tourist dollars (Bramwell & Lane, 1993; Littlefair, 2003). For example interpretation can be used to promote local products and businesses to visitors and this could encourage visitors to use more local service operators. Thirdly, interpretation if managed properly and effectively can reduce the management cost (Sharpe, 1982; Wearing & Neil, 1999; Littlefair, 2003). The management cost would be reduced if visitors themselves through interpretation behave more responsibly and support the conservation efforts. Aside from benefiting the local community economically, successful interpretation within a tourism destination can help enhance the local people's sense of pride and self-esteem towards their own culture and environment (Interpret Europe, 2018). However, there is also very limited evidence that interpretation help enhance the local people's pride and self-esteem at the tourism sites (Moscardo, 2014).

2.4.3 Theories in Effective Interpretation

Several theories and models had been developed in explaining the relationships between interpretation and changes in the visitors' knowledge, attitude, and behavioral intention, which eventually leads to a change in their behavior. The traditional perspective shows a linear link between knowledge, attitude, and behavior known as the

behavioral change system (Figure 2.1). The behavioral change system in environmental education theorized that the increase in knowledge would influence the visitors' attitude towards the environment and prompts them to engage in environmentally responsible behavior (Hungerford & Volk, 1990). However, a number of studies had proven that this traditional perspective on behavioral change was too simplistic and there are other variables associated with the changes in a person's behavior (Hungerford & Volk, 1990; Lee & Moscardo, 2005). There are other aspects that influence a person's behavior change such as their demographic characteristics, motivations, repeat visitations, and more apart from knowledge and attitude. The increase in knowledge and shift in attitude do not guarantee a change in the person's behavior.

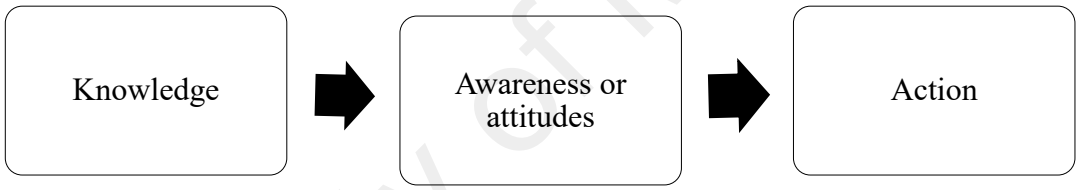

Figure 2.1: Behavioral change system

Source: Hungerford & Volk (1990)

Hines, Hungerford, & Tomera (1986/1987) further conducted a meta-analysis on environmental behavior change and found 15 different variables associated with responsible environmental behavior including knowledge and attitude (Figure 2.2).

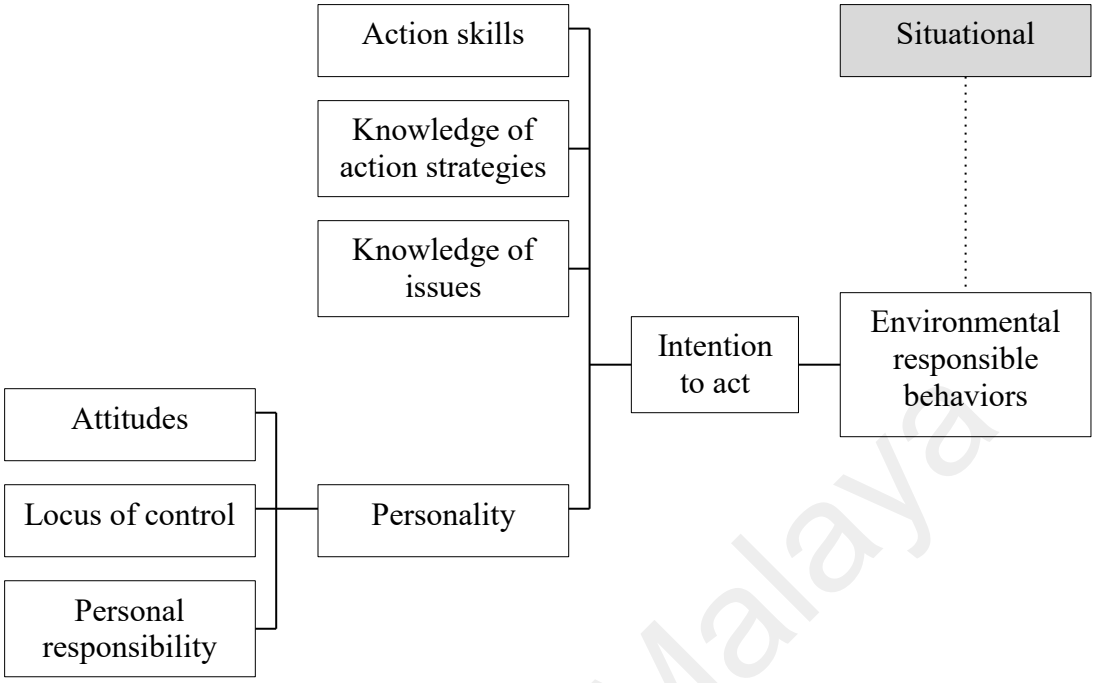

Figure 2.2: Hines' model of environmental responsible behavior

Source: Hungerford & Volk (1990)

Similar to the behavioral change system, Hines' model of environmental responsible behavior also views knowledge and attitude as part of the determining factors that influences the visitors to change the way they behave (Hines *et al*., 1986/1987; Hughes *et al*., 2011). However, knowledge in Hines' model is broken down into a more detailed elaboration in which the model highlights that in order to influence a person's intention to act, one must possess knowledge of the issue/problem along with the actions that can be taken to overcome the issue/problem. Furthermore, skill is also seen as an important determinant influencing a person's intention to act in environmentally responsible behaviors. Attitude in this model is grouped as part of personality factors that affect a person's desire to act. Apart from a person's attitude towards the environment, their internal locus of control (perceived ability to affect change) and personal responsibility (sense of duty towards the environment) are also part of a person's personality factors

that influence their intention to act. A person is less likely to take action if he/she perceives that their actions are too small to affect any change on the issue/problem (Jacobson, 2009).

Hines' model is similar to the Theory of Reasoned Action (TRA) and Theory of Planned Behavior (TPB) though there is a slight difference between the two in terms of their emphasis on the roles of knowledge and attitude in determining a person's action (Ajzen & Fishbein, 1980; Azjen, 1991). Azjen (1991) further developed TRA into TPB in which both theories refer to attitude as a combination of both knowledge and a person's evaluation of the intended behavior (Jacobson, 2009) while Hines' model separates knowledge from attitude (Hines *et al*., 1986/1987). Moreover, both TRA and TPB sees attitude as an immediate determinant to behavioral intention while Hines' model groups attitude as part of personality factors that affect a person's intention to act (Lee & Moscardo, 2005). There had been several studies related to interpretation's influence that adopted the use of Hines' model of environmental responsible behavior, TRA, and TPB (Lee & Moscardo, 2005; Powell & Ham, 2008; Lim *et al*., 2016). Despite the difference in terms of the placement of knowledge and attitude in predicting environmental behavior, it is agreed that both knowledge and attitude have influential roles on a person's intention to act upon environmentally responsible behaviors.

The theory in predicting behavioral change had evolved from the traditional behavior change system that emphasized a linear relationship between knowledge, attitude, and behavior to more complex models that take into account the different variables that must be addressed such as values, social norm, perceived control, behavioral intention, and actual behaviors (Moscardo, 2014).

2.4.4 Effective Interpretation

The success of interpretation in influencing the visitors depends on a number of variables. The design of interpretation plays a profound role in the visitors' receptiveness towards interpretation. Several scholars had come up with different principles and models in the design of effective interpretation. Tilden in his original work had described six important principles in interpretation (Tilden, 2007). Moscardo (1998) had also highlighted five different principles in the design of effective interpretation derived from previous published works and contemporary psychological theory. One of the most applied models in effective interpretation was developed by Ham (1992) and it was termed the interpretive approach to communication containing four important qualities namely enjoyable (E), relevant (R), organized (O), and thematic (T) also known as the EROT framework.

The EROT framework is derived from the perspective that visitors to an outdoor setting are non-captive audiences in which they are not required to pay attention unless they want to (Ham, 2013). Ham argued that as non-captive audiences, the visitors' actions are voluntary and if they find the interpretation uninteresting, too academic, and difficult to follow, they might lose interest in the information thus ignore it. Several of the principles proposed by Tilden (2007) and Moscardo (1998) were similar to the EROT framework proposed by Ham (1992). Table 2.5 highlights the principles of interpretation described by Tilden (2007) and principles in the design of effective interpretation by Moscardo (1998).

Table 2.5: Tilden's principles of interpretation and Moscardo's principles in designing effective interpretation

Author	Principles
Tilden (2007)	1. Any interpretation that does not somehow relate what is being displayed or described to something within the personality or experience of the visitor will be sterile. 2. Information, as such, is not interpretation. Interpretation is revelation based upon information. But they are entirely different things. However, all interpretation includes information. 3. Interpretation is an art, which combines many arts, whether the materials presented are scientific, historical, or architectural. Any art is in some degree teachable. 4. The chief aim of interpretation is not instruction but provocation. 5. Interpretation should aim to present a whole rather than a part and must address itself to the whole man rather than any phase. 6. Interpretation addressed to children (say, up to the age of twelve) should not be a dilution of the presentation to adults but should follow a fundamentally different approach. To be at its best it will require a separate program.
Moscardo (1998)	1. Designing differences into interpretive experiences. 2. Providing personal connections for visitors. 3. Practicing participation. 4. Creating clear content. 5. Allowing for alternative audiences.

According to Ham (1992), interpretation has to possess the quality of being enjoyable and pleasurable for the audience. Similarly, Moscardo (1998) also highlighted the need to provide visitors with a variety of interpretive experiences in order to attract their attention. The best interpretive programs are those that are interactive (Ham, 1992) and actively involves the visitors in the communication process as it is a known fact that people can recall 90% of what they do instead of just listening or reading (Wearing & Neil, 1999). Interactive interpretation especially those that stimulate the visitors' multisensory elements have the potential to hold their attention compared to static interpretation (Figure 2.3). Multiple studies had proven the importance of making interpretation interactive in order to retain the visitors' interest (Tubb, 2003; Lim *et al*., 2016). Tubb (2003) observed that visitors paid less attention to exhibits that did not contain any interactive materials at the Dartmoor National Park.

Figure 2.3: Interactive interpretive panels and Mount Vernon Forest Trail, Virginia, USA

Source: "Mount Vernon Forest Trail" (2018)

Secondly, interpretation is relevant (Ham, 1992; Ham, 2013). In order to be relevant, the information relayed to the visitors through interpretation must be meaningful and personal (Ham, 1992). Similarly, in Tilden's principles of interpretation, it was described that interpretation would be of no use if it does not relate to the visitors' personality or experience (Tilden, 2007; Jacobson, 2009). Moscardo (1998) also highlighted in her principles in the design of effective interpretation that interpretation needs to have a personal connection with the visitors for them to be able to relate to the information (Figure 2.4). Information by itself is not interpretation. Meanings and the truth behind the information has to be revealed to the visitors by using techniques such as examples, analogies and comparisons for it to be meaningful to them. The use of such methods can enhance the visitors' understanding of the interpretation provided because it is able to bridge the unfamiliar information they received with something they already know and are familiar with. At the same time, interpretation has to also

touch the visitors' lives such as themselves, families, values, convictions, beliefs, and more. Tilden (2007) believed that the visitors' chief interest will always be about something that concerns them and by creating a connection between interpretation and the visitors' circle of lives will it be personal to them. Interpretation should make the visitors feel involved in order to complement the information and knowledge they had gained (Dumbraveanu, Craciun, & Tudoricu, 2016). The likelihood for the conservation messages to get across to visitors is high when the interpretation relates to their personal life experience and is something that they care about.

Figure 2.4: Relevant interpretive panels at Gunung Mulu National Park, Sarawak that is personal to the visitors

Source: Author (2013)

Thirdly, Ham emphasized the quality of being organized in interpretation (Ham, 1992; Ham, 2013). In other words, interpretation has to be delivered in an organized, clear, and accessible manner (Fallon & Kriwoken, 2003) because disorganized

interpretation can result in the disinterest among the visitors, as it is hard for them to follow (Ham, 1992; Jacobson, 2009). Moscardo (1998) also highlighted in the principles of designing effective interpretation that interpretation has to provide visitors with a clear content and according to Tilden's principles of interpretation, interpretation should be presented as a whole rather than differentiating them into different parts (2007). For instance, information can be divided into different subcategories with respective headings and subheadings in order to make it clear to the visitors. Without organizational framework, the information presented will be isolated from one another and are just mere facts. In this sense, interpretation has to reveal the connection between the information presented to avoid from being isolated.

Apart from being organized, interpretation has to have a theme (Ham, 1992; Ham, 2013). According to Ham (1992), a theme is different from a topic. A topic is a subject matter while a theme contains main points or messages related to the topic/subject matter (Ham, 1992). Interpretation is similar to a story in which it requires a beginning, the middle, the end and most importantly the message it intends to convey (Ham, 1992; Tilden, 2007). Simply stating the topic as it is for instance 'conservation' without using themes and stories to further support the topic will leave the information in disarray. For example, in the topic 'conservation', interpreters could highlight the importance in protecting and conserving the natural environment as one of the themes and further support this theme with facts, concepts, main points, and messages or moral thus turning it into a story (Ham, 1992; Tilden, 2007).

In this EROT framework, Ham reasoned that it was important for interpretation to capture and sustain the visitors' attention in order for it to be effective thus explained the need for interpretation to first be enjoyable to the visitors, relevant and organized considering all three qualities specialized in holding the visitors' attention (Ham, 1992).

Interpretation in this sense was mainly designed by making it enjoyable, relevant, and organized first in order to attract the visitors and hold their attention. However, focusing only on the quality of E, R, and O only cause interpretation to lean more towards entertainment rather than a tool for communication because of its use in attracting and holding attention (Ham, 2013; Amin *et al*., 2014). The quality of thematic (T) was added to the E, R, and O in order for interpretation to make a compelling point and after attracting the visitors' attention (Ham, 2013; Amin *et al*., 2014).

The EROT framework was later revised into TORE model of thematic communication where the same qualities are retained in the model but rearranged in a manner where the quality of thematic (T) is added at the front followed by organized (O), relevant (R), and enjoyable (E) (Ham, 2013). According to Larsen (2003) and Brochu and Merriman (2012) making interpretation enjoyable, relevant, and organized first before developing a compelling point or theme is simply entertainment and it is not considered interpretation (as cited in Ham, 2013). Thus in this revised TORE model, interpretation needs to have a theme first and once a theme is developed, the focus can be shifted towards presenting the theme along with its concept, points, and messages in an organized, relevant, and enjoyable manner. In other words, for interpretation to be a persuasive tool in influencing visitors' behavior, it needs a strong theme that is presented in an organized, relevant, and enjoyable manner (Lim *et al*., 2016).

Previously, Lim *et al*. (2016) had carried out a study in Pahang National Park on the effectiveness of interpretation on secondary school students' intention to be involved in Malayan Tapir education program as an organizer at school. The study had designed and differentiated between non-interpretive (information-based program) and interpretive programs in which the interpretive program was developed based on Ham's EROT framework and Theory of Planned Behavior. This study observed that the non-

interpretive program that focused mainly on delivering knowledge using only poster exhibition had less impact on the students' intention to be involved in the Tapir education program. On the other hand, the students that were exposed to interpretive programs that incorporated the EROT elements had stronger desire to participate in future programs as well as intention to become involved in the Malayan tapir education program as organizers. In Bako National Park, Sarawak, a study on the impact of thematic interpretive guided tours on visitors' experience was conducted (Amin *et al*., 2014) in which thematic interpretation was adopted in the guides' training and used as a base for park guiding services in Sarawak. The findings in the study suggested that the thematic interpretive guided tours contributed to the visitors' positive experience and provoked the visitors to process new thoughts (Amin *et al*., 2014). Both studies emphasized the importance of incorporating the EROT qualities of thematic communication in interpretation to facilitate visitors' learning process.

Apart from the four qualities required in interpretation, one of the principles of interpretation highlighted by Tilden (2007) is provocation. Interpretation aims to provoke the audiences instead of merely serving as instructions (Tilden, 2007). Rather than simply instructing visitors on what not to do, interpretation should instead invoke their emotions on particular issues or subjects (Orams, 1997). Emotion plays an important role in predicting pro-environmental behaviors (Russell & Ashkanasy, 2011). At some point, audiences are looking for and want to feel the connection between them and the place they are visiting both intellectually and emotionally (Bedigan, 2016). It is said that by stirring visitors' emotions with sensitive issues and provoking them into thinking about the natural environment is more effective and will more likely to stimulate environmentally responsible behavior (Orams, 1997; Tubb, 2003). First hand experience is important in provoking the visitors and influencing them to participate more actively (Dumbraveanu *et al*., 2016). Interpretation that emphasizes on the

interaction between man and the environment has the potential to provide the visitors with a unique experience thus eliciting and emotional response from them through the interactions.

Studies have proven that provoking visitors' emotions does influence their intentions to engage in environmentally responsible behaviors (Russell & Ashkanasy, 2011; Jacobs & Harms, 2014; Lim *et al*., 2016). Emotional displays and messages have the ability to stimulate an emotional response from the visitors (Figure 2.5). Jacobs & Harms (2014) study at the Tenerife Island found that interpretation that focused on provoking the visitors' emotional response had a larger impact on their whale conservation intention compared to interpretation that is based on knowledge and responsibility (Jacobs & Harms, 2014). Similarly, Lim *et al*. (2016) study in Pahang National Park also found that students were more inclined to participate in the Malayan tapir campaign after they were shown displays of injured/dead Malayan tapirs compared to those who were not exposed to the displays.

Figure 2.5: Interpretive materials that employed emotional messages

Source: "Stop Wildlife Crime – WWF" (2018)

All four qualities in Ham's EROT and TORE models along with provocation as described in Tilden's principles of interpretation are taken into account in the evaluation

of interpretation's influence in Kinabalu Park on the visitors' knowledge, attitude, and behavioral intention. Figure 2.6 highlights the qualities for successful interpretation adopted into this study.

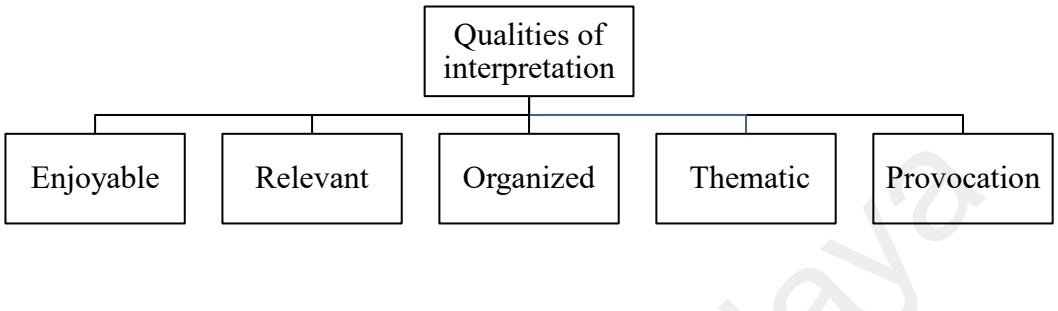

Figure 2.6: Qualities of interpretation

These qualities are important in developing successful interpretation in order to create 'mindful' visitors. The concept of mindfulness is closely related to interpretation in tourism as proposed by Moscardo's Mindfulness Model of Interpretation (Moscardo, 1996). One of the chief aims of interpretation is to create mindful visitors (Moscardo, 1996). Mindful visitors refer to those who are active and are keen on searching for further information beyond what is presented to them. Mindful visitors are more likely to enjoy their experience, form deeper appreciation towards the place, and become more aware of the consequences of their actions on the environment (Moscardo, 1996). Hence, interpretation has to be geared towards motivating and encouraging the visitors to actively search for information. There are two factors that have to be taken into account in order to produce mindful visitors namely the setting factor and visitor factor. The setting factor refers to the interpretation itself such as brochures, maps, guidebooks, walks, signs, exhibits, and guided tours while visitor factor refers to the visitors' motivation, companions, and familiarity with the place (Moscardo, 1996). Moscardo (1996) agreed that visitors are more likely to become mindful if they are presented with a variety of interpretation especially those that are interactive and participatory in

nature, relevant to their personality and experience, organized, and has the ability to surprise them. Hence, incorporating the five qualities of interpretation namely enjoyable, relevant, organized, thematic, and provocation is essential in creating mindful visitors that can lead to behavior change as well as reduction of negative impacts on the environment.

2.4.5 Types of Interpretation

Interpretation is divided into two types, non-personal and personal interpretation (Figure 2.7). Non-personal interpretation is also known as self-guided interpretation and it includes interpretive techniques such as signs, brochures, maps, information panels, visitor centers, audio-visual presentations and more. Non-personal interpretation is basically a one-way communication between visitors and the interpretive materials and visitors are required to extract the meanings behind it themselves (Munro *et al*., 2008). Having to interpret the messages by themselves might yield different meanings between different visitors as the manner of how they interpret them also depends on external factors such as person's demographic background (Moscardo, Wood, & Pearce, 1997, as cited in Littlefair, 2003).

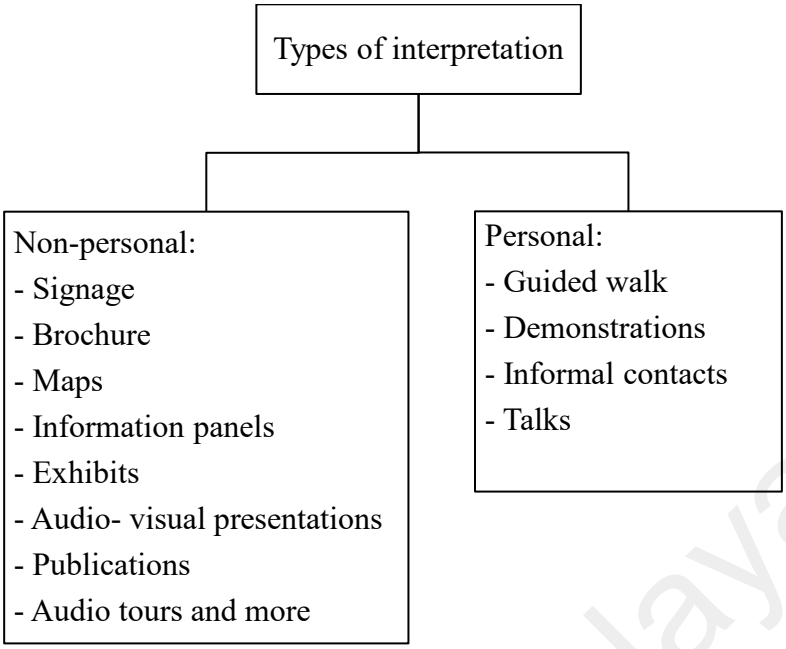

Figure 2.7: Types of interpretation

However, using non-personal interpretation to communicate information and conservation messages to visitors is one of the most cost-effective ways of communicating as some park management could not afford to hire and train interpreters for personal interpretation (Hughes, 2004; Jacobson, 2009). Interactive materials under non-personal interpretation are proven to be more interesting to visitors compared to text-based interpretation (Ham, 1992; Tubb, 2003; Hughes, 2004; Novey & Hall, 2006). A study conducted by Tubb (2003) in Dartmoor National Park discovered that the most popular exhibits at the High Moorland Visitor Center are the exhibits that contained interactive materials as visitors spent more time viewing these exhibits compared to text-based exhibits.

On the other hand, personal interpretation involves a two-way interaction between the visitors and interpreters at the area of interest. It is a face-to-face communication involving the interpreter explaining about the place to the visitors and visitors can engage in a more personal conversation regarding the place. Examples of personal

interpretation are guided walks, talks/presentations, demonstrations and more. Because of the interactive nature of personal interpretation, it allows a more dynamic and flexible communication for both interpreters and visitors (Wearing & Neil, 1999; Hughes, 2004; Munro *et al*., 2008). The flow of interaction between visitors and interpreters can change depending on the situation and visitors are free to engage in deeper conversations with the interpreters about the place.

Personal interpretation is said to have more impacts on visitors' experience and behavior compared to non-personal interpretation (Hughes & Morrison-Saunders, 2005; Jacobson, 2009). Personal interpretation is a more active way of communicating messages to visitors while non-personal interpretation is a passive type of interpretation, which requires visitors to extract meanings on their own. The one-way interaction nature of non-personal interpretation is considered less likely to influence visitors' behavior compared to personal interpretation that is more engaging (Hughes, 2004; Munro *et al*., 2008). However, personal interpretation is costlier than non-personal interpretive programs since it requires hiring interpreters, trainings and wages. Furthermore, personal interpretation is effective only if it is conducted in small groups while non-personal interpretation is able to cater to a wider range of audience (Hughes, 2004). The selection of interpretive techniques usually depend on the management's budget and most importantly the type of information that has to be delivered. A combination of both personal and non-personal interpretation is more effective as both are able to cater to various types of visitors.

2.4.6 Sociodemographic Characteristics

Visitors' sociodemographic characteristics such as age, gender, education, motivations, previous visit, length of stay, and place of origin also influenced their level of acceptance towards interpretation and have implications on the interpretive designs

(Ballantyne, Packer, & Beckman, 1998; Young, 1999). The differences in the visitors' sociodemographic characteristics suggest that each group has different needs and expectations. Several studies had shown that the differences in the visitors' motivations influenced the type of activities they participated in as well as their receptiveness towards interpretation (Ballantyne *et al*., 1998; Hughes & Morrison-Saunders, 2005). For example, Ballantyne *et al*. (1998) highlighted that the active visitors to the Fraser Island, Australia engaged in mobile activities and they are most likely more receptive towards interpretation compared to non-active visitors who engaged mostly in sedentary activities. Interpretation should be tailored to address these various types of visitors in order for it to be effective.

Furthermore, studies had also proven that first time visitors are more responsive and accepting towards interpretation compared to repeat visitors (Ballantyne *et al*., 1998; Hughes & Morrison-Saunders, 2002b). Ballantyne *et al*. (1998) found that first time visitors were more susceptible towards interpretation because of their nature as active visitors who mainly seek exploration and they were more inclined towards experiencing and learning new things. On the other hand, repeat visitors were less receptive towards interpretation because they engaged in mostly passive pursuits such as relaxing and enjoying their break from the city life (Ballantyne *et al*., 1998). Moreover, as repeat visitors, they were already desensitized to the environment and they return primarily to show their friends/relatives around (Hughes & Morrison-Saunders, 2002a). These findings clearly suggest that both the first time and repeat visitors have different motivations and needs. It highlights the importance of identifying the different types of visitors to an area especially in terms of their motivations, needs, prior knowledge, attitude, and beliefs in order to deliver effective interpretation (Orams, 1995; Ballantyne *et al*., 1998).

Prior visitation to an area also contributed to the higher level of knowledge among the visitors compared to those visiting for the first time (Young, 1999; Hughes & Morrison-Saunders, 2002a; Madin & Fenton, 2004). Young (1999) proven that visitors with prior experience to the Daintree and Cape Tribulation area, Queensland, Australia possessed a more advanced spatial knowledge compared to those without prior experience. This was observed among repeat visitors who were able to recall more details of the place especially the landmarks and paths in their sketched map of the area compared to first time visitors. Furthermore, a study at the Lulworth Coastal Area, UK showed that visitors with prior experience to the visitor center demonstrated a more positive attitude towards conservation issues compared to those that had not visit the center (Kim, Airey, & Szivas, 2010).

2.5 Evaluation on the Effectiveness of Interpretation

Interpretation is often touted as a preferred and effective tool in regulating the negative impacts of tourism on the environment (Bramwell & Lane, 1993; Munro *et a.l*, 1998; Tubb, 2003). There is a vital need to measure the effectiveness of the interpretive approaches adopted in order to determine whether conservation goals are achieved or not (Littlefair, 2003). It is through the evaluation of interpretation's effectiveness that park managements are able to decide whether or not certain interpretive programs should be continued, cancelled or improved (Madin & Fenton, 2004). This provides justification for the park management for choosing certain interpretive programs over another and may help prevent spending their budget on programs that do not yield any positive results.

The flaws and problems that normally occur in interpretation programs cannot be identified without proper evaluation of interpretation and changes cannot be made. Sometimes, conservation messages aimed at the targeted audience are easily

misinterpreted or misunderstood leading to confusion instead of understanding especially those that employed non-personal interpretive techniques (Moscardo *et al*., 1997, as cited in Littlefair, 2003). The confusion might lead to the visitors not engaging in preferred environmentally responsible behavior and visitors might end up unintentionally harming the natural resources instead. It is widely accepted by protected area managers that effective interpretation can result in the increase of visitors' knowledge, influence their environmental attitude, and modify their intention to behave more responsibly. Yet this notion remains largely untested and the relationship between interpretation and visitors' knowledge, attitude, and behavioral intention are less explored (Knapp, Volk & Hungerford, 1997; Powell & Ham, 2008; Weiler & Ham, 2010). Hence, it is important to evaluate the effectiveness of interpretation and the influence is has on visitors' knowledge, attitude, and behavioral intention in mitigating the negative environmental impacts.

The use of knowledge, attitude and behavioral intention as success indicators varied between studies. Some studies evaluated the effectiveness of interpretation in terms of knowledge (Papageorgiou, 2001; Hughes & Morrison-Saunders, 2002; Madin & Fenton, 2004; Novey & Hall, 2006), knowledge and attitude (Hughes & Morrison-Saunders, 2005; Hill *et al*., 2007), attitude (Stewart *et al*., 1998; Lee & Moscardo, 2005; Lim *et al*., 2016), behavior (Orams & Hill, 1998; Duncan & Martin, 2002; Lee & Moscardo, 2005; Lim *et al*., 2016; Marschall, Granquist, & Burns, 2017), and other studies evaluated all three indicators (Orams, 1997; Tubb, 2003; Powell & Ham, 2008; Ismail, 2008; Weiler & Smith, 2009; Sander, 2012;Roslina *et al*., 2013; Roberts, Mearns, & Edwards, 2014). The various studies conducted yielded mixed results across all three indicators.

Based on the literature available, studies evaluating the effectiveness of interpretation on knowledge gain, attitude change and behavioral intention had been carried out using either quantitative or qualitative methods and there also had been studies that used both methods. Questionnaire survey is the most used instrument in most of the studies related to the evaluation of interpretation specifically pre- and post-visit questionnaire survey (Tubb, 2003; Madin & Fenton, 2004; Hughes & Morrison-Saunders, 2005; Lee & Moscardo, 2005; Powell & Ham, 2008; Ballantyne, Packer, & Falk, 2011b; Roslina *et al*., 2013). According to Lee & Balchin (1995), it is more preferable to use both pre- and post-visit surveys instead of just conducting a simple 'exit' survey because using only 'exit' survey is considered a weak and less reliable method. Furthermore, using both pre- and post-visit surveys help assess the changes in visitors' knowledge, attitude, and behavioral intention by comparing the results from both surveys (Thom, 1980, as cited in Tubb, 2003). The extent of effectiveness of interpretation adopted can be measured through the comparison of pre- and post-visit surveys. Despite this, there had been a few studies that employed only post-visit or 'exit' survey as their method in evaluating the effectiveness of interpretation (Duncan & Martin, 2002; Weiler & Smith, 2009; He & Chen, 2011; Bidder *et al*., 2016).

Control and experiment groups are also commonly used in the study of interpretation's evaluation and such techniques had been used in the studies by Orams (1997), Orams & Hill (1998), Duncan & Martin (2002) and Marschall *et al.* (2017). Using control and experiment groups requires the visitors to be divided into two different groups in which one group is exposed to interpretation (treatment group) and the other group is not exposed to any form of interpretation (control group). Some researchers even incorporated the use of both control/experiment groups and pre-/post-visit survey in their studies (Hughes & Morrison-Saunders, 2002a; Novey & Hall, 2006; Hill *et al*., 2007).

This experimental design is used to measure the impact of different types of interpretation or interpretation contents on the visitors' knowledge, attitude, and behavior (Novey & Hall, 2006; Jacobs & Harms, 2014; Lim *et al*., 2016) and it has also been used to determine the influence of interpretation on different groups of visitors based on their motivations or experience (Hughes & Morrison Saunders, 2005; Kim *et al*., 2010). However, assigning visitors to control and treatment groups can be considered impractical as most of the visitors expect themselves to be able to participate in interpretive programs without being told which one to participate in (Jacobson, 2009). In certain occasion, control of treatment groups could be of great use. For example, Hughes & Morrison-Saunders (2002a) used control and treatment groups to test the impact of newly designed interpretive materials on the visitors before actual installation was made (Hughes & Morrison Saunders, 2002a).

There had been very few studies related to interpretation's evaluation that were conducted qualitatively. Most of the qualitative method was either combined with the quantitative method or served as a support for the research. Observation is one of the most used qualitative instruments in the evaluation of interpretation in which it is used by itself (Orams & Hill, 1998; Littlefair, 2003, Marschall *et al*., 2017) or employed along with other methods namely pre-/post-visit surveys and interviews (Tubb, 2003; Novey & Hall, 2006; Roberts *et al*., 2014). While pre-/post-visit surveys are used to determine the effectiveness of an interpretive program, observation helps to further explain the findings of the survey and provides substantial support to the analysis. In Tubb (2003) and Novey & Hall (2006) studies, both incorporated observation as part of their studies by observing the visitors' movement within an interpretive center especially towards the exhibit displayed.

Interview is rarely used as an instrument in determining the effectiveness of interpretation. However, a few studies had used interview as part of its research instrument. Certain studies had used structured or semi-structured interviews in sole qualitative study (Stewart *et al*., 1998) while some other studies embedded interview in their studies as part of a mixed method strategy (Orams & Hill, 1997; Fallon & Kriwoken, 2003). Table 2.6 highlights the different methods used by some of the studies related to the evaluation of interpretation.

Table 2.6: Methods used in the evaluation of interpretation

Author/Year	Location	Method	
		Quantitative	Qualitative
Orams & Hill (1998)	Tangalooma, Queensland, Australia	–	Observation with control and experiment groups
Papageorgiou (2001)	Vikos-Aoos National Park, Greece	Post-visit survey	–
Duncan & Martin (2002)	Lab experiment	Post-visit survey	–
Hughes & Morrison-Saunders (2002)	Walpole-Nornalup National Park, Australia	Pre- and post-visit surveys with control and experiment groups	–
Tubb (2003)	Dartmoor National Park, United Kingdom	Pre- and post-visit surveys	Participant observation
Madin & Fenton (2004)	Great Barrier Reef Marine Park, Australia	Pre- and post-visit surveys	–
Lee & Moscardo (2005)	Kingfisher Bay Resort & Village, Queensland, Australia	Pre- and post-visit surveys	–
Hughes & Morrison-Saunders (2005)	Shoalwater Marine Park, Perth, Australia	Pre- and post-visit surveys	–
Novey & Hall (2006)	New Mexico, USA	Pre- and post-visit surveys with control and experiment groups	Participant observation
Hill, Woodland & Gough (2007)	Crocodylus Rainforest Village, Queensland, Australia	Pre- and post-visit surveys with control and experiment groups	–
Powell & Ham (2008)	Galapagos National Park, Ecuador	Pre- and post-visit survey	–

Table 2.6, continued

Author/Year	Location	Method	
		Quantitative	Qualitative
Kim, Airey & Szivas (2010)	Lulworth Coastal Area, England, United Kingdom	Post-visit survey	Analysis of publications, informal exploratory interviews
Hughes, Packer & Ballantyne (2011)	Mon Repos Conservation Park, Queensland, Australia	–	–
Ballantyne, Packer & Sutherland (2011)	Queensland, Australia	Pre- and post-visit survey with follow-up survey	–
He & Chen (2012)	Visitor education centers in China	Post-visit survey	–
Sander (2012)	Rara Avis Ecolodge, Costa Rica	Pre- and post-visit surveys	–
Roslina, Manohar, Ismail Adnan, Azlizam, & Mohd Aswad (2013)	Forest Research Institute malaysia (FRIM), Malaysia	Questionnaire survey with control and experiment groups	–
Jacobs & Harms (2014)	Tenerife Island	Pre- and post-visit surveys with control and experiment groups	–
Roberts, Mearns, & Edwards (2014)	Kruger National Park, South Africa	Pre- and post-visit surveys	Participant observation
Lim, Manohar, Azlizam, & Zakaria (2016)	Pahang National Park	Pre- and post-visit surveys with control and experiment groups	Focus group discussion
Marschall, Granquist, & Burns (2017)	Illugastadir, Iceland	–	Participant observation

2.5.1 Knowledge

One of the fundamental goals of interpretation is to educate the visitors and foster their understanding of the environment and the importance of conserving them. Hence, the primary aim of interpretation is to achieve learning (Lee & Balchin, 1995). The main assumption is that by making visitors more knowledgeable, they will become

more aware of the impacts that they themselves pose to the environment and this will lead to them behaving more appropriately towards the fragile environment (Hungerford & Volk, 1990, Ham & Weiler, 2006) and perhaps even practice sustainable way of living back home (Higham & Carr, 2002; Walker & Moscardo, 2014). Knowledge is a key component in influencing visitors' attitude and awareness towards the environment that could result in behavior modification towards a more responsible pole (Walter, 2013; Cheng, Jin, & Wong, 2014).

Based on previous studies, the acquisition of facts or actual knowledge gain is the most used method in determining visitors' ability to recall the information they received during the visit (Lee & Balchin, 1995; Tubb, 2003; Novey & Hall, 2006, Hill, Woodland, & Gough, 2007; Sander, 2012). In order to determine the extent of the visitors' ability to recall information and facts, quiz-like questions reflecting the information portrayed were used in the surveys and visitors' knowledge is measured through the number of correct response. Another most used method in testing knowledge is by measuring the level of perceived or self-report knowledge among the visitors. This is done by asking the visitors to rate the extent of the knowledge they had gained from the interpretive experience based on their own perception (Hill *et al*., 2007; Powell & Ham, 2008; Mearns & Edwards, 2014). Although rarely used, some studies incorporated the measurement of conceptual understanding in their surveys (Lee & Balchin, 1995; Tubb, 2003; Novey & Hall, 2008). This method also requires the visitors to recall information but instead of focusing on facts, it focuses more on the underlying concept or message the interpretation is trying to relay. Studies mostly used open-ended questions in order to evaluate the visitors' overall understanding of the intended message.

The evaluation of interpretation's effectiveness on visitors' level of knowledge had produced mixed results. Most of the studies resulted in a positive or partially positive increase of visitors' knowledge upon being exposed to interpretation (Tubb, 2003; Madin & Fenton, 2004; Hughes & Morrison-Saunders, 2005; Hill *et al.*, 2007; Powell & Ham, 2008; Roslina *et al*., 2013). For example, a research at the High Moorland Visitor Center in Dartmoor National Park, UK by Tubb (2003) used both acquisition of facts and measurement of conceptual understanding. The study found that the interpretive center contributed to the increase in knowledge and awareness from pre-visit to post-visit respondents. Furthermore, Madin & Fenton (2004) study at the Great Barrier Reef Marine Park, Australia only utilized visitors' self-report knowledge and it yielded a partially positive increase in visitors' knowledge related to reef following exposure to the interpretive programs. However, other knowledge aspects namely human impacts, reef health, and reef tourism showed no difference between the pre- and post-visit surveys.

Another example of a study that showed knowledge increase among visitors was conducted at the Penguin Islands, Western Australia (Hughes & Morrison-Saunders, 2005). This study adopted the use of short-term factual recall of information among the visitors through a quiz. However, the impact of interpretation was evaluated based on their motivation for visiting namely exploration, recreation, and hybrid (exploration and recreation). Interpretation at the visitor center contributed to the increase in knowledge across all groups despite the difference in their motivation. Hill *et al*., (2007) research at Daintree Forest in Crocodylus Rainforest Village, Queensland, Australia revealed that knowledge gain was evident among visitors who received biodiversity information sheet compared to those without the information sheet. Both the perceived and actual knowledge of the visitors with biodiversity information sheet increased after their visit.

Powell & Ham (2008) research in Galapagos National Park evaluated the interpretive programs adopted by Linblad Expeditions (LEX) on a seven-day cruise in the archipelago. The study found that visitors' self-reported knowledge and actual knowledge both increased from pre-voyage to post-voyage. In Malaysia, a similar interpretation evaluation study was conducted at the Forest Research Institute Malaysia (FRIM) on the effectiveness of the Wetlands Environmental Interpretation Program (WEIP) on school children's knowledge on depreciative behaviors towards trees (Roslina *et al*., 2013). The results showed school children that were exposed to the WEIP intervention program had higher level of knowledge and beliefs about the negative impacts of scratching on trees compared to those who were not exposed to the program.

However, there were also studies that yielded negative results where interpretation had very little to no influence on visitors' level of knowledge (Papageorgiou, 2001; Hughes & Morrison-Saunders, 2002a; Sander, 2012; Roberts *et al*., 2014). For example, Papageorgiou (2001) study at the Vikos-Aoos National Park, Greece assessed the difference between a local and non-local group in terms of their knowledge. The study revealed that the level of knowledge regarding park issues and regulations was low in both groups based on the knowledge questions given in the exit survey. Another study by Hughes & Morrison Saunders (2002a) at the Walpole-Nornalup National Park, Australia also indicated no changes in the visitors' knowledge after being exposed to interpretation. This study used a quiz-type format in the survey in order to assess the actual knowledge gained by the visitors before and after interpretive signs were installed.

An assessment of the visitors' knowledge at the Rara Avis Ecolodge in Costa Rica by Sander (2012) revealed that the experience at the ecolodge did not affect their level

of knowledge. The study also took into account the fact that Rara Avis Ecolodge attracted visitors that already had some knowledge of the environment. Furthermore, an evaluation between guided and non-guided interpretation's impact on visitors' knowledge conducted at the Kruger National Park, South Africa (Roberts *et al*., 2014) found no differences in the level of knowledge gained between visitors that took part in guided interpretation and those that took part in non-guided interpretation.

2.5.2 Attitude

The success in increasing visitors' knowledge and understanding of the places will provoke the visitors into thinking (Orams, 1997) and it will thus influence their attitude towards the environment as well as foster a sense of respect for the area (Bramwell & Lane, 1993; Tubb, 2003; Ham & Weiler, 2006). Park managements should incorporate activities and interpretive programs that contain educational messages that can influence visitors' attitude, reinforce the importance of protected areas (Tubb, 2003) and develop an appreciation for an area (Stewart *et al*., 1998). A study by Stewart *et al*. (1998) found that interpretation in Mount Cook National Park contributed to the visitors' deep appreciation and attachment towards the place despite the short length of stay in the park. Interpretation in the natural environment should be geared towards the idea that a park is a special place and that it requires special behaviors (Sharpe, 1982) in which visitors must tailor their actions in a way that suits the place they are visiting.

Similar to knowledge, most studies evaluating the impact of interpretation on visitors' attitude incorporated the use of a series of statements pertaining to attitude in the form of Likert scale. However, the use of attitudinal statements differed between the studies. For example, studies by Lee & Balchin (1995), Orams (1997), Hill *et al*., (2007), Kim *et al*. (2010), Coghlan & Kim (2012), and Roslina *et al*. (2013) used attitude statements related to site-specific issues while other studies used attitude

statements related to general environmental issues (Ballantyne *et al*., 2011b; Hughes, Packer, & Ballantyne, 2011; Sander, 2012). There was also a study carried out by Powell & Ham (2008) in Galapagos National Park that adopted statements that reflected the visitors' attitude towards the park's management practices. Several other studies used multiple attitudinal measures that included statements related to site-specific issues, general environmental issues, and management practices (Tubb, 2003; Lee & Moscardo, 2005; Weiler & Smith, 2009; Lim *et al*., 2016).

Similar to knowledge, previous studies on environmental attitudes had also produced mixed results. While some studies demonstrated changes in the visitors' environmental attitudes (Tubb, 2003; Hughes & Morrison-Saunders, 2005; Powell & Ham, 2008; Weiler & Smith, 2009; Kim *et al*., 2010), others found no difference in the visitors' attitude after they were exposed to interpretation (Lee & Moscardo, 2005; Hill *et al*., 2007; Sander, 2012; Roslina *et al*., 2013; Roberts *et al.*, 2014).

For example, Tubb (2003) study at the Dartmoor National Park found that the interpretive center did influence the visitors' attitude after their visit but the increase was only in relation to certain issues of the park and there was no change in attitude for the important environmental issues. However, the study also found that the visitors' attitude towards the park management was negatively affected after their visit. The study noted that less interactive materials in the interpretation resulted in the lack of interest among the visitors as they progressed through the visitor center thus affecting their attitude (Tubb, 2003). Similarly, Hughes & Morrison-Saunders (2005) study at the Penguin Islands indicated that the visitors had a shift in attitudes after their visit to the interpretive center known as Penguin Experience along with an increase in knowledge. This study also suggested that visitors' environmental attitudes are not only influenced by on-site interpretation but by the activities the visitors take part in as well.

Furthermore, visitors' attitude towards the resource management of Galapagos National Park increased after their LEX cruise expedition in the Galapagos National Park as observed in the post-visit survey (Powell & Ham, 2008). The same study also demonstrated an increase in the visitors' knowledge. Another study that provided evidence of positive outcome in terms of attitude is carried out by Weiler & Smith (2009) in Werribee Open Range Zoo, Melbourne, Australia. The study proved that the more interpretive activities the visitors participated in, the more positive the impacts were on the visitors' attitude. Kim *et al*. (2010) study at the Lulworth coastal area in Dorset, Southwest of England found that the site-based interpretation at the visitor center did influence the visitors' attitudes towards local environmental issues. Although visitors' attitude towards site-related issues was positively influenced, interpretation at the visitor center had less effect on their general environmental attitude. The study also found that repeat visitors demonstrated higher level of positive attitude compared to first time visitors.

Unlike previous research studies mentioned, Lee & Moscardo (2005) found that their study at the Kingfisher Bay Resort and Village (KBRV), Queensland, Australia did not yield a positive outcome in terms of visitors' awareness and attitude after their stay. Additionally, it was found that the pre-visit respondents already had high level of environmental awareness and concern. This was similar to the study by Sander (2012) at the Rara Avis ecolodge in Costa Rica. The experience at the ecolodge also did not change the visitors' attitude towards the environment as both the pre- and post-visit respondents already indicated high levels of positive environmental attitude. Both KBRV in Australia and Rara Avis ecolodge in Costa Rica attracted visitors that were already to some extent aware of the environmental issues and concerns therefore contributing to the high level of positive attitude towards the environment even prior to their stay (Lee & Moscardo, 2005; Sander, 2012).

Another study that showed no increase in visitors' environmental attitude was the research conducted at the Daintree Forest in Crocodylus Rainforest Village, Queensland, Australia (Hill *et al*., 2007). Despite the increase in knowledge, no difference was observed in terms of the visitors' attitude towards rainforest conservation between those that received interpretive material in the form of biodiversity information sheet during their walk and those that did not. Similar to the studies by Lee & Moscardo (2005) and Sander (2012), the study area attracted visitors that already had strong environmental attitude prior to the experience. Roslina *et al*. (2013) study at FRIM also revealed that the wetland interpretation program (WEIP) before a jungle trekking activity was not successful in influencing school children's attitude towards depreciative behaviors especially scratching of trees despite the increase in knowledge after the program. Both the school children that were exposed to WEIP and those that were not exhibited similar level of concern towards the trees. Roberts *et al*., (2014) study at the Kruger National Park showed that though visitors who received guided interpretation exhibited higher level of positive attitudes. However, the difference was not significant with those that took part in non-guided interpretation.

2.5.3 Behavioral Intention

Modifying a person's behavior to suit the need of the environment is an extremely difficult task (Jacobson, 2009). Simply having the knowledge and awareness on the environmental issues does not guarantee a person will alter his/her behavior accordingly. Interpretation can only seek to influence the visitors to voluntarily modify their behavior but it cannot force them to do so. The knowledge and awareness of the environmental issue among the visitors will help the visitors to see the connection between their actions and the impacts they have on the environment itself (Phillips, 1989). Once visitors are aware of this relationship, it will motivate them to behave more responsibly in sensitive environment and influence them to engage in more eco-friendly

practices in the future (Lee & Moscardo, 2005; Walker & Moscardo, 2014). According to the Theory of Reasoned Action by Ajzen & Fishbein (as cited in Jacobson, 2009), the visitors' intention to behave accordingly is seen as an immediate determinant of actual behavior change among the visitors.

Similar to attitude, visitors' behavior is measured using a series of behavioral statements that requires visitors to rank them according to their beliefs in the form of Likert scale. Certain studies focused on measuring the visitors' immediate behavioral intention as a result of interpretation (Duncan & Martin, 2002; Tubb, 2003; Weiler & Smith, 2009; Kim *et al*., 2010; Sander, 2012; Roslina *et al*., 2013; Robert *et al*., 2014; Jacobs & Harms, 2014; Lim *et al*., 2016). Some other studies went beyond measuring visitors' behavioral intention by also measuring actual behavior change among them either immediately or in the long run (Orams, 1997; Orams & Hill, 1998; Lee & Moscardo, 2005; Powell & Ham, 2008; Hughes *et al*., 2011; Hughes, 2013; Marschall *et al*., 2017). In terms of the behavioral statement, different studies adopted different behavioral statements namely those related to the visitors personal, general, and social behaviors. Personal behavior statement includes recycling, use of eco-friendly products, use of public transportation, and others while social behavior statements were mostly related to donation, participation in environmental organizations, electing environmental-friendly officials, letters to government, and more.

There had been studies with results that demonstrated the effectiveness of interpretation in modifying visitors' behavioral intention and actual behavior (Orams & Hill, 1998; Powell & Ham, 2008; Ismail, 2008; Kim *et al*., 2010; Jacobs & Harms, 2014; Lim *et al*., 2016; Marschall *et al*., 2017). Orams & Hill (1998) study at Tangalooma in Moreton Island, Queensland, Australia evaluated visitors' actual behavior change after the implementation of a wild dolphin education program. The

study observed that the number of inappropriate behaviors specifically touching and patting the dolphins during the feeding sessions reduced significantly among visitors that underwent the program compared to those that did not. A study by Ismail (2008) at the Penang National Park, Malaysia showed a partially positive increase in the behavioral intention of the visitors that were exposed to interpretive signage. However, there were no changes at all in the behavioral intentions of those that were not exposed to the interpretive signage. The study also observed that knowledge gain and attitude change were evident among visitors exposed to the interpretive signage compared to those that were not.

A study on the whale conservation intention among visitors at the Tenerife Island differentiated the outcome of different interpretation contents namely no interpretation, knowledge content, responsibility content, and emotion content (Jacobs & Harms, 2014). The results suggested the visitors' whale conservation intention increased in all three groups that received interpretation (knowledge, responsibility and emotion contents) but no increase was observed in the group that received no interpretation. It was also proven that interpretation focused on the visitors' emotion (emotion content) had a larger impact on the their intention to conserve whale compared to interpretation contents that were based on knowledge and responsibility. Rural secondary school students in Pahang National Park, Malaysia were assessed in terms of their intention to be involved as an organizer of Malayan Tapir education program (Lim *et al*., 2016). The results indicated students that participated in interpretive program (indoor and outdoor) had higher level of intention in being involved as organizers of Malayan Tapir education program compared to students that participated in the non-interpretive program (poster exhibition) and those that did not received any interpretation.

Recently, a study on actual behavior change was carried out at a seal watching site in Iceland which yielded positive results in terms of interpretation's ability in influencing behaviors that were considered appropriate during seal watching (Marschall *et al*., 2017). The difference between this study and prior studies in interpretation was that it differentiated the impacts of interpretation between signs that contained instructions without explanation (ontological) and signs that contained instructions with explanation (teleological). The study revealed that interpretation did influence the visitors' behavior positively among those in the treatment group that were exposed either ontological or teleological signs compared to those in the control group (no interpretation). However, further observation revealed that teleological signs were more effective in eliciting responsible seal watching behaviors among the visitors compared to ontological signs (Marschall *et al*., 2017). The study also found that families tend to cause more disturbance at site compared to other groups of visitors.

Although certain studies observed positive changes in the visitors' behavior, there were also studies in which interpretation did not influence the visitors' behavioral intention or actual behavior (Tubb, 2003; Lee & Moscardo, 2005; Sander, 2012; Roslina *et al*., 2013; Roberts *et al*., 2014). For example, Tubb (2003) found that interpretation at the High Moorland Visitor Center in Dartmoor National Park was not successful in influencing the visitors' intention to engage in environmentally responsible behaviors despite the increase in knowledge and attitude. Similarly, Lee & Moscardo (2005) also reported no increase in the visitors' intention to hire environmentally responsible tour operators and accommodation after their stay at the Kingfisher Bay Resort and Village (KBRV). The study also found that both the pre- and post-visit respondents believed their behaviors had very little impact on the environment.

Furthermore, Sander (2012) study at the Rara Avis ecolodge, Costa Rica demonstrated that the stay at the ecolodge did not influence the visitors' behavioral intentions from the pre- to the post-visit survey. It was also revealed that majority of the visitors to the ecolodge were already environmental-oriented. It was highlighted in the research that Rara Avis is an ecolodge thus it attracted visitors that were keen on experiencing the wilderness and interacting with the environment. It was also pointed that the visitors had to have possess some knowledge related to the environment and its importance (Sander, 2012). However, very few of them were willing to write letters about environmental issues to their representatives and participate in environmental organizations.

The study in FRIM on the wetlands interpretation program by Roslina *et al*., (2013) also yielded similar result in which no difference was found in terms of the school children's behavioral intention towards scratching of trees between the school children that took part in the WEIP intervention program and those who did not. The evaluation of guided versus non-guided interpretation at the Kruger National Park by Roberts *et al*., (2014) found that visitors who took part in guided interpretive activity did demonstrate slightly higher intention to engage in environmentally responsible behaviors compared to those who took part in non-guided interpretive activity but the difference was not significant. Based on observation, the study also revealed that visitors failed to adhere to the guide's safety instructions on several occasions during the vehicle tour.

2.6 Summary

Ecotourism is a form of alternative tourism that arose in the mid-1980s as a response to the growing concern on the environmental, economical and sociocultural impacts of mass tourism (Weaver, 2008). Ecotourism embodies three of the main criteria that

distinguishes it from other types of tourism namely that it is nature-based, sustainable, and has an educational element. As a subset of nature-based tourism, most ecotourism practices take place in the natural environment and protected areas are the dominant setting for ecotourism specifically national park as it allows interaction between people and nature. With the practice of ecotourism, protected areas now play a dual role involving both conservation and tourism. Ecotourism, if not practiced according to its criteria will result in similar impacts as mass tourism in which it poses a threat to the ecotourism destinations. Hence, visitors' education is important in order to prevent the negative impacts of tourism from occurring in host destinations.

As one of the main criteria of ecotourism, education is often used as a tool in visitor management strategies. Visitors' education in protected areas is commonly implemented through the use of interpretation. Interpretation is a form of tool that communicates information about the site and relevant messages to the visitors during their visit. In protected areas, interpretation aims to educate the public on the importance of conservation and at the same time influence their knowledge, attitude, and behavior towards a more responsible pole. This will in turn help reduce the negative impacts to the environment. However, not all interpretation is successful in eliciting change in visitors' knowledge, attitude, and especially behavior. Modifying visitors' behavior to best suit the needs of the environment is proven to be a complex task. Different scholars had carried out different studies related to the evaluation of interpretation's effectiveness. These studies also differed in terms of the indicators used in measuring the extent of interpretation's influence. Some studies evaluated interpretation using only visitors' knowledge as the indicator (Papageorgiou, 2001; Hughes & Morrison-Saunders, 2002; Madin & Fenton, 2004; Novey & Hall, 2006), attitude (Stewart *et al.*, 1998), and behavior (Orams & Hill, 1998; Duncan & Martin, 2002; Lim *et al*., 2016). Instead of using only one indicator, there had also been studies

that used two indicators either knowledge and attitude (Lee & Balchin, 1995; Hill *et al*., 2007) or attitude and behavior (Lee & Moscardo, 2005; Kim *et al*., 2010; Lim *et al*., 2016).

However, most of the studies on interpretation usually incorporated all three, knowledge, attitude, and behavior as the indicators in their studies (Orams, 1997; Tubb, 2003; Powell & Ham, 2008; Weiler & Smith, 2009; Ballantyne *et al*., 2011b; Hughes *et al*., 2011; Sander, 2012; Roslina *et al.*, 2013; Roberts *et al*., 2014). The literature review also showed that the study on interpretation's effectiveness had used different techniques to measure the differences in the visitors' knowledge, attitude, and behavior and had also produced mixed results across all three indicators. Table 2.7 summarizes the indicators used and the outcomes of different studies on interpretation on the indicators measured.

Table 2.7: Summary of indicators and findings in interpretation studies

Location	Author/Year	Findings		
		Knowledge	Attitude	Behavior
Tangalooma, Queensland, Australia	Orams & Hill (1998)	–	–	Positive increase
Vikos-Aoos National Park, Greece	Papageorgiou (2001)	No difference	–	–
Lab experiment	Duncan & Martin (2002)	–	–	Positive increase
Walpole-Nornalup National Park, Australia	Hughes & Morrison-Saunders (2002)	No difference	–	–
Dartmoor National Park, United Kingdom	Tubb (2003)	Positive increase	Partially positive increase in relation to certain issues	No difference
Great Barrier Reef Marine Park, Australia	Madin & Fenton (2004)	Partially positive increase in relation to certain issues	–	–
Kingfisher Bay Resort & Village, Queensland, Australia	Lee & Moscardo (2005)	–	No difference	No difference
Shoalwater Marine Park, Perth, Australia	Hughes & Morrison-Saunders (2005)	Positive increase	Positive increase	–
New Mexico, USA	Novey & Hall (2006)	No difference	–	–
Galapagos National Park, Ecuador	Powell & Ham (2008)	Positive increase	Positive increase	Positive increase

Table 2.7, continued

Location	Author/Year	Findings		
		Knowledge	Attitude	Behavior
Penang National Park, Malaysia	Ismail (2008)	Partially positive increase in relation to certain issues	Positive increase	Partially positive increase in relation to certain issues
Lulworth Coastal Area, England, United Kingdom	Kim, Airey & Szivas (2010)	–	Partially positive increase in relation to certain issues	Partially positive increase in relation to certain issues
Mon Repos Conservation Park, Queensland, Australia	Hughes, Packer & Ballantyne (2011)	Partially positive increase in perceived knowledge	Positive increase	Positive increase
Rara Avis Ecolodge, Costa Rica	Sander (2012)	No difference	No difference	No difference
Forest Research Institute malaysia (FRIM), Malaysia	Roslina, Manohar, Ismail Adnan, Azlizam, & Mohd Aswad (2013)	Positive increase	No difference	No difference
Tenerife Island	Jacobs & Harms (2014)	–	–	Positive increase
Kruger National Park, South Africa	Roberts, Mearns, & Edwards (2014)	No difference	No difference	No difference
Pahang National Park	Lim, Manohar, Azlizam, & Zakaria (2016)	–	Positive increase	Positive increase
Illugastadir, Iceland	Marschall, Granquist, & Burns (2017)	–	–	Positive increase

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter explains the methodology used in this study beginning with a conceptual framework. This chapter then further discusses the research design adopted including both quantitative and qualitative methods, population and sample, and the research instrument used. Next, it highlights the details of the data collection process and data analysis carried out for the quantitative and qualitative data collected.

3.2 Conceptual Framework

Figure 3.1 is the conceptual framework of the study highlighting the relationship between interpretation and visitors' knowledge, attitudes, behavioral intentions, and mitigation of negative impacts to the environment.

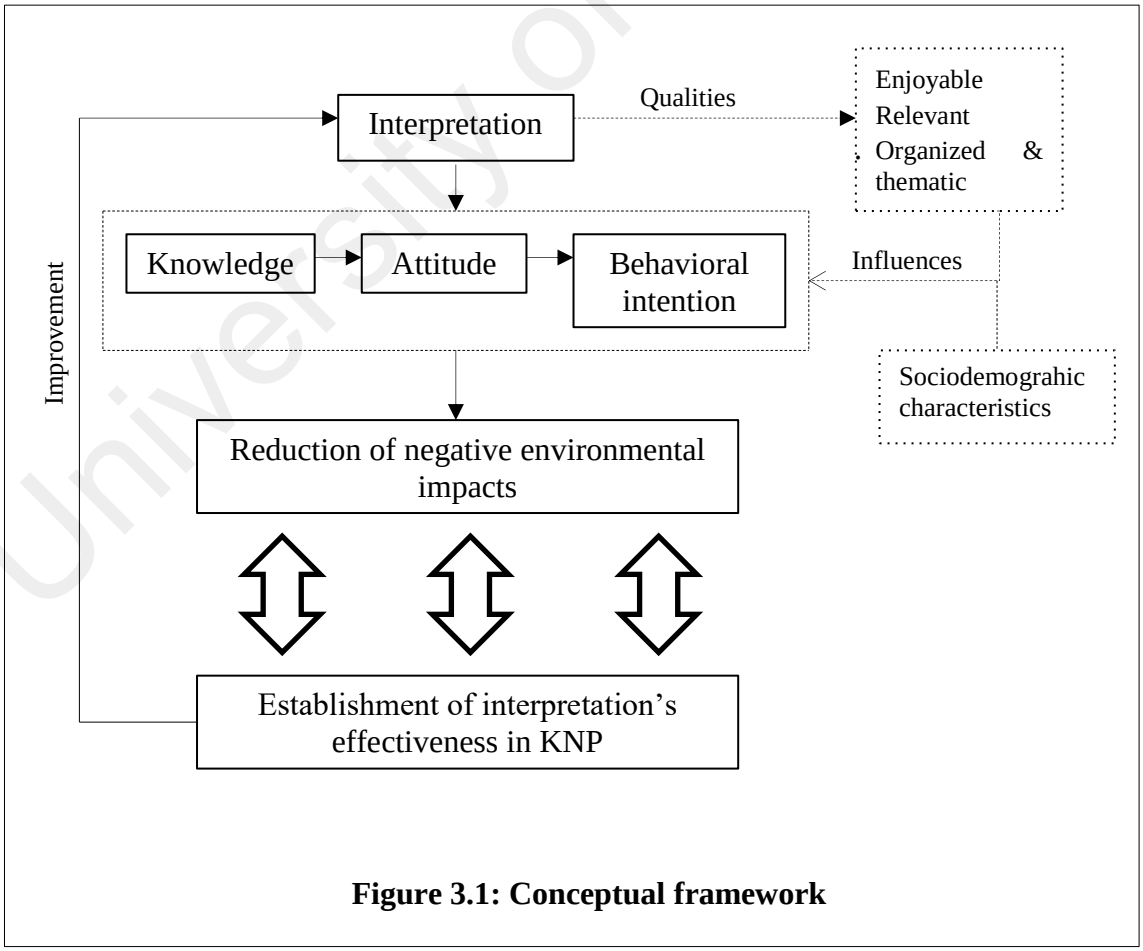

Figure 3.1: Conceptual framework

The main assumption is that increasing visitors' level of knowledge about the importance of environmental conservation will influence their attitudes positively towards the issue itself and in turn motivate them to tune their behaviors to be more environmentally responsible (Hungerford & Volk, 1990; Ham & Weiler, 2006). Visitors' knowledge and attitudes are important determinants of a person's intention to engage in environmentally responsible behaviors (Hughes, 2013; Jacobs & Harms, 2014). The visitors' behavioral intention though measured immediately after they were exposed to interpretation has the potential to translate into actual behavior change (Tubb, 2003; Lee & Moscardo, 2005; Ismail, 2008; Ballantyne & Packer, 2011; Jacobs & Harms, 2014; Lim, 2014). However changing visitors' attitude and influencing them to behave more responsibly proved to be very challenging tasks as such interpretive programs if not delivered correctly can lead to misinterpretation and confusion among the visitors.

There are other factors that contribute to the visitors' acceptance towards the interpretation presented to them especially the content of the interpretation. Interpretation has a set of qualities that are deemed important in order to affect influence on the hearer or reader. As discussed in Chapter 2, a framework on interpretive approach to communication was developed by Ham (1992) and contained four important qualities namely enjoyable, relevant, organized, and thematic coined the EROT framework. The four qualities from EROT framework shared similarities with Moscardo's principles in the design of effective interpretation and Tilden's principles of interpretation (Moscardo, 1998; Tilden, 2007). Thus the EROT framework along with provocation emphasized by Tilden in his principles of interpretation are taken into account in this study in order to evaluate the influence of these qualities within Kinabalu Park's interpretation on the visitors' knowledge, attitude, and behavioral intention.

Studies by Powell & Ham (2008) at the Galapagos National Park and Lim *et al*. (2016) at the Pahang National Park had both highlighted that interpretation that is enjoyable, relevant, organized, and thematic influenced the visitors and school children's knowledge, attitude, and behavioral intention respectively after they were exposed to interpretation. Another influencing factor on the visitors' receptiveness towards interpretation is their sociodemographic characteristics such as age, gender, education, length of stay, previous visit, motivations, and more (Orams, 1995; Ballantyne *et al*., 1998; Young, 1999; Hughes & Morrison-Saunders, 2002b; Hughes & Morrison Saunders, 2005). For instance, Hughes & Morrison-Saunders (2002b) and Madin & Fenton (2004) studies at the Walpole- Nornalup National Park and Great Barrier Reef Marine Park respectively provided evidence that visitors with prior experience tend to demonstrate higher level of knowledge compared to those who are visiting for the first time. However, this study only focused on the influence of interpretation on the visitors' knowledge, attitude, and behavioral intention. It does not take into account the other influencing factors that could have also influence the outcome of interpretation.

The primary aim of interpretation as a visitor management tool is to educate the visitors and prompt behavior change among them (Orams, 1996; Moscardo, 1998). The success of interpretation in modifying the visitors' behavioral intentions could lead to visitors' adopting environmentally responsible behaviors not just on-site but also off-site when they leave the park. Hence, by influencing the visitors' behavior towards a more responsible pole, the negative impacts to the environment can be indirectly reduced. However, the effectiveness of the interpretation adopted has to first be established in order to determine the extent of the interpretation in mitigating the negative impacts of tourism on the environment. Once the extent of the effectiveness of interpretation is determined, appropriate improvement should be made in order to

provide visitors with the type of interpretation that will not just educate and instill awareness among them but also tailor their behavior to minimize the impacts on the environment.

3.3 Research Design

Different scholars had previously adopted different research designs to their studies. This study involved both quantitative and qualitative methods in terms of its research design but a primary emphasis is placed on the quantitative method. According to Creswell (2009), the selection of research design is carried out by choosing the appropriate philosophical worldview assumptions (post-positivism, constructivism, advocacy/participatory, or pragmatism), strategies of inquiry (qualitative, quantitative, or mixed methods strategies) and specific research methods (data collection, analysis, and interpretation). Figure 3.2 shows the flowchart of research design in this study.

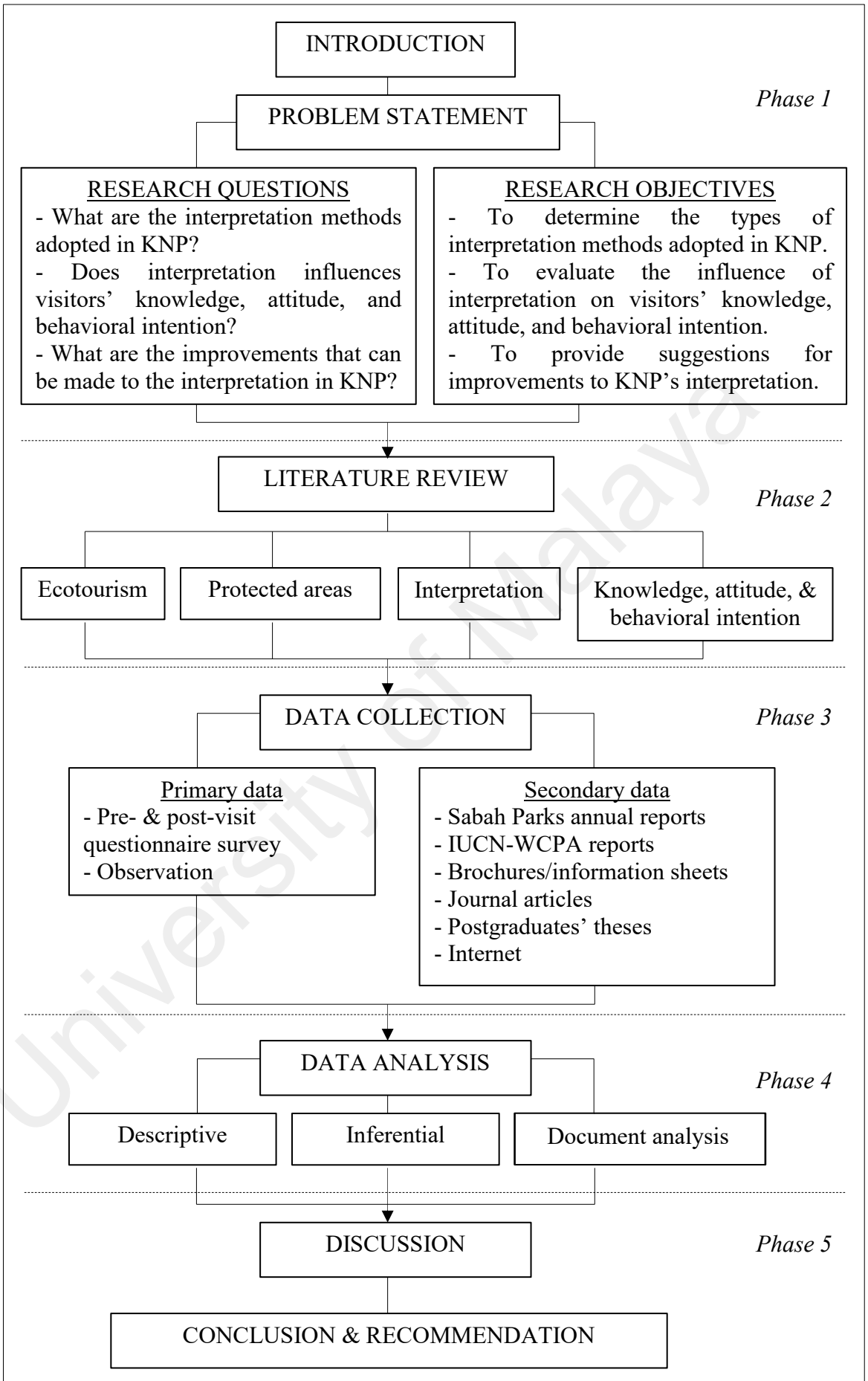

Figure 3.2: Flowchart of research design

3.3.1 Quantitative and Qualitative Methods

The philosophical worldview proposed in this study is pragmatism that has led the researcher to adopt an approach that included both quantitative and qualitative strategies. In pragmatist sense, the researcher is able to choose the type of methods applicable to their research and by using both quantitative and qualitative, different methods can be adopted to explain the research problem instead of adopting only one method (Creswell, 2009). However, a primary emphasis is placed on the quantitative method in this study while the qualitative method is adopted in order to further support the quantitative outcome. This study begins with a theory that interpretation contributes to the visitors' knowledge, change their attitude and influence their intention to behave more responsibly. These changes will potentially lead to the reduction of negative impacts in Kinabalu Park. The results obtained from the sample are used to generalize and make claims about the population bearing in mind of the visitors' demographic characteristics. This study aims to test the impact of an intervention and in this case the interpretive programs in Kinabalu Park on visitors' knowledge, attitude, and behavioral intention. The quantitative data collected in this study will either support or refute the proposed theory while the qualitative data helps to support the quantitative findings of the study.

3.3.2 Data Collection

Primary Data Collection

The data collected in this study is divided into two types of data that were primary and secondary data. The process of data collection in Kinabalu Park was carried out in steps accordingly. The primary data was collected using both quantitative and qualitative methods. Quantitative data collection was carried out with the use of pre- and post-visit questionnaire survey aimed at the visitors in Kinabalu Park while

qualitative data collection was carried out through observation of the interpretive programs in Kinabalu Park. The collection of primary data in Kinabalu Park involved more detailed stages before carrying out the actual fieldworks. Before the primary data collection took place, the population and sample were first identified in which the sample was later selected for interpretation evaluation from the population of the study. Once the population and sample were determined, the proper research instruments to carry out the evaluation were chosen and then the fieldworks were conducted in Kinabalu Park.

3.3.2.1 Quantitative Method

(a) ***Population and Sample***

The target population in this study is visitors in Kinabalu Park. The target population was divided into two categories; visitors who had just arrived at the park (pre-visit) and visitors who had taken part in the interpretive programs in Kinabalu Park (post-visit). Ever since the park was opened to public in 1964, visitors' arrival in Kinabalu Park has increased gradually over the years and as of 2014, Kinabalu Park received 660,368 visitors across all three main substations. The sample size of this study was determined through the table outlined by Krejcie and Morgan (1970). Through the table developed and based on the current population size of Kinabalu Park's visitors, the sample size required for this research was 384. Otherwise, the sample size can also be determined using the formula by Krejcie and Morgan (1970):

$$s = X^2NP(1 - \mathrm{P}) \div d^2(N - 1) + X^2P(1 - P).$$

According to Krejcie and Morgan (1970), s = required sample size, X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841), N = the population size, P = the population proportion (assumed to be .50 since this would

provide the maximum sample size), and d = the degree of accuracy expressed as a proportion (.05).

The samples were selected using stratified convenient sampling method as this method provides all the visitors in Kinabalu Park an equal chance to be selected and the results can be generalized to the entire population (Creswell, 2009, p. 148). Prior to selecting the sample, stratification of the population was carried out according to the park's statistic on visitors' arrival. The samples were stratified according to local and international visitors. In 2014, out of all the 660,368 visitors in Kinabalu Park, 532,763 were local visitors and 127,605 were international visitors. Hence, more local visitors were selected as the sample for this research study than international visitors. By doing so, the sample size selected would represent the actual proportions of visitors in Kinabalu Park (Figure 3.3).

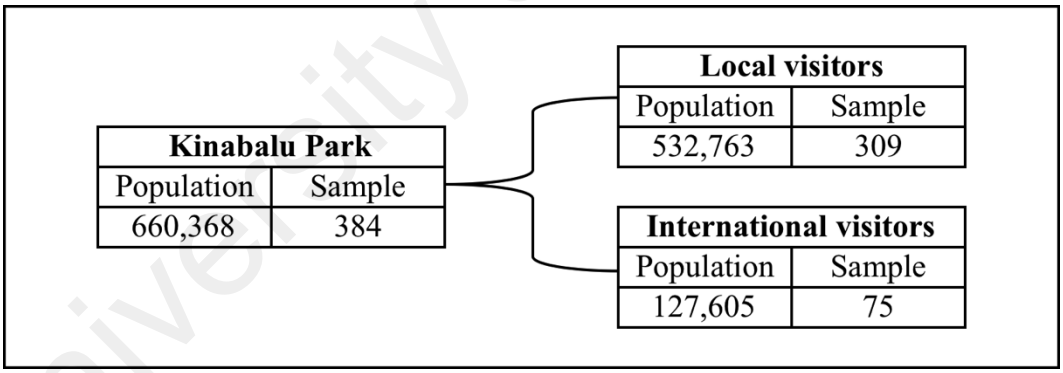

Figure 3.3: Sample size from population of visitors

(b) ***Research Instrument***

A visitors' questionnaire survey was designed for this study and it aimed to evaluate the differences in the visitors' level of knowledge, attitude and behavioral intention before and after they were exposed to interpretation in Kinabalu Park. The survey was designed to assess the effectiveness of interpretation in Kinabalu Park in influencing the

visitors' knowledge, attitude, and behavioral intention in the efforts to reduce the negative impacts to the environment. In order to determine the differences, the questionnaire survey was designed into pre-visit and post-visit surveys. The visitors' level of knowledge, attitude, and behavioral intention were evaluated through the distribution of pre-visit survey before they engage in any particular activity upon their arrival in Kinabalu Park. Post-visit surveys on the other hand were handed out to different group of visitors that had taken part in the park's interpretive activities in order to assess the outcome of the intervention (interpretation) on the same indicators.

According to Lee & Balchin (1995), conducting only post-visit survey is considered less reliable and weak because visitors' prior knowledge, attitude, and behavior are not assessed. On the other hand, using both pre- and post-visit surveys allow comparisons to be made between the visitors' pre- and post-visit experience. A number of studies on the evaluation of interpretation had incorporated the use of pre- and post-visit surveys as their instrument in data collection (Tubb, 2003; Madin & Fenton, 2004; Hughes & Morrison-Saunders, 2005; Lee & Moscardo, 2005; Hill *et al*., 2007; Powell & Ham, 2008; Roslina *et al*., 2013). Furthermore, steps were taken to ensure that respondents who had answered the pre-visit survey did not take part in the post-visit survey. The reason why two independent groups of visitors in Kinabalu Park were tested for both pre- and post-visit surveys was to avoid biased response considering pre-visit respondents were already aware of the questions and were more likely to shift their focus towards the particular variables (Lee & Balchin, 1995; Tubb, 2003; Hughes & Morrison-Saunders, 2005; Lee & Moscardo, 2005). In this study, the differences in the visitors' knowledge, attitude, and behavioral intention were analyzed by comparing two independent samples for both the pre- and post-visit surveys.

Control and experiment groups were not used in this study because the interpretive activities in Kinabalu Park have long been introduced in the park thus assigning visitors to control and experiment groups was impractical because most visitors expect to have the opportunities to take part in the program and not be told what they can and cannot participate in (Jacobson, 2009). Both the pre- and post visit surveys were self-administered. Visitors in Kinabalu Park were given the questionnaire and completed the surveys by themselves. Self-administered questionnaire was convenient especially in reducing the time spent in collecting the data. Multiple surveys were handed out to different respondents at the same time and collected once finished.

(c) ***Questionnaire Design***

Both the pre- and post-visit surveys were consisted of five sections containing similar questions. Multiple-choice questions approach was adopted in this survey design because of its advantages. The use of multiple-choice questions helped visitors to be more at ease while answering them, took a shorter amount of time to be completed and the results are also easily quantified and compared during the analysis stage as opposed to open-ended questions (Neuman, 2000; Hughes, 2004). The questionnaire design focused on close-ended questions because open-ended questions are sometimes left unanswered and can be time consuming (Beaumont, 1999; Littlefair, 2003). Table 3.1 highlights the five sections of the question survey that are (A) respondent's background, (B) visitation profile, (C) knowledge, (D) attitude towards Kinabalu Park, and (E) visitor's behavior (Appendix A).

Table 3.1: Sections in the pre- and post-visit surveys

Section	Content
A	Visitor's demographic background including age, gender, nationality, education, and annual income.
B	Visitation profile includes questions related to number of visit, substations visited, preparation, length of stay, motivation, and source of information.
C	12 series of statements were highlighted in this section in order to test the visitors' level of knowledge before and after their visit. Multiple-choice answers were given: "true", "false", and "not sure".
D	13 series of statements were designed to reflect the visitors' attitude towards Kinabalu Park. Likert scale measurement was used ranging from "strongly disagree" to "strongly agree" to analyse the differences before and after thir visit. One multiple-choice question was inserted after the series of statements in order to determine the visitors' overall view of Kinabalu Park.
E	Eight different statements related to behavioral intention were given using a Likert scale measurement ranging from "strongly disagree" to "strongly agree" in order to determine the differences in the responses before and after their visit.

As mentioned in Chapter 2, there are three different ways in which knowledge gain among visitors can be measured namely the acquisition of facts or actual knowledge, perceived knowledge, and measurement of conceptual understanding. In this study, knowledge gain among visitors was measured by testing the visitors' actual knowledge and their ability to recall factual information from interpretation they received in Kinabalu Park. This was done using a series of knowledge statements laid out in a quiz-type format. The knowledge statements used in the survey were derived from the information found in the interpretation within Kinabalu Park. In other words, each of the knowledge statements in the survey reflected the content of interpretation found throughout Kinabalu Park.

The attitude statements in the survey were also designed to reflect the information found within the interpretation in Kinabalu Park. Interpretation in Kinabalu Park mostly focused on delivering visitors with information related to the endemic features of the park and the importance of conserving them. Hence, the attitude statements in this study

mainly constituted of attitude pertaining to the general environmental issues. Some of the statements were also designed to reflect the visitors' attitude towards the park management, Sabah Parks. Considering none of the interpretation in Kinabalu Park was related to site-specific issues, this study did not include any attitude statements related to such issues.

In terms of behavior analysis, this study measured the impact of interpretation in terms of the visitors' behavioral intention and it did not measure actual changes in the visitors' behaviors. Similar to attitude, different behavioral statements were used to reflect the visitors' intention to engage in specific behaviors related to the environment. The study adopted statements related to personal, general, and social behaviors but there were no site-specific statements considering interpretation in Kinabalu Park was more focused on the general environmental issues. Among the statements used were related to the behavior of recycling, use of eco-friendly products and operators, donation, participation in environmental organization, and informing families and friends.

The pre- and post-visit questionnaire surveys were first tested and handed out to a few respondents in Universiti of Malaya including friends and families that had visited Kinabalu Park before in order to test the validity of the questions whether or not they managed to measure what they intend to measure. After the pre-test was conducted, the questionnaires were later amended and prepped for the principle survey application in Kinabalu Park. Prior to the pilot survey, a section was included in the post-visit survey that inquired about the visitors' willingness to pay and satisfaction towards several aspects in Kinabalu Park but the section was removed after the pilot survey, as it was deemed not suitable to the research scope.

Six enumerators from Universiti Teknologi MARA (UiTM) Sabah and Universiti Malaysia Sabah (UMS) were hired to help with the data collection process. Prior to the

actual data collection, the researcher had explained the contents of the survey to the enumerators and showed them firsthand on how the survey were distributed and collected. Due to the time constraints and distant location of the study area, the questionnaire survey distribution had to be conducted in three different stages as shown in Table 3.2. Two enumerators were used during each of the data collection stages. A total of 443 sets of questionnaire survey were distributed and collected from the visitors in Kinabalu Park. Out of the 443 sets, 53 sets were damaged because it was not completely filled by the respondents. Hence, only 390 sets were rendered usable for further analysis. 200 of these sets were pre-visit questionnaire survey and another 190 sets were post-visit survey.

Table 3.2: Stages of fieldwork and number of surveys collected

Stage	Date	No. of surveys collected
1	22 - 25 November 2015	164
2	26 - 29 November 2015	110
3	7 - 10 January 2016	116
	Total	**390**

(d) ***Pre-visit Survey***

The pre-visit surveys were distributed during the first stage of the fieldwork and were subsequently collected during the second stage of fieldwork due to the insufficient number of surveys for the pre-visit samples. The distribution of the pre-visit surveys were done mostly at the entrance of both Park HQ and Poring Hot Spring substations considering the area would be where majority of the visitors that had not yet taken part in any of the interpretive activities could be spotted. The enumerators however first asked the visitors whether they had taken part in any of the park's interpretive activities or not to ensure they were suitable as pre-visit samples.

(e) ***Post-visit Survey***

The distribution of the post-visit surveys took place during the second stage of the fieldwork after the completion of the pre-visit surveys. The distribution of the post-visit surveys was also done at the entrance of both substations but the enumerators were also placed at different locations within both substations. At Park HQ, enumerators were also placed at a restaurant located just outside the entrance of the park and at the Liwagu Visitor Centre. At Poring substation, the surveys were administered at the hot tub areas and restaurants outside the park. The same step was also taken to ensure that the visitors who responded to the post-visit survey had already taken part in the park's interpretive activities and did not take part in the pre-visit survey.

3.3.2.2 Qualitative Method

Observation was used in this study in which the researcher participated in the various interpretive programs at both Park HQ and Poring substations and observed the types of interpretation and interpretive materials adopted by the park management. During the data collection stages, the researcher visited the Botanical Garden, Kinabalu Natural History Gallery, Liwagu Visitor Center, and the nature trails at Park HQ substation. The researcher also visited the Poring Visitor Center, Butterfly Farm, Orchid Conservation Center, Tropical Garden, Ethnobotanical Garden, Rafflesia Garden, Bamboo Garden, video show, and Canopy Walkway at the Poring substation. The purpose of participating in these interpretive programs was to observe the content and condition of the interpretive programs in Kinabalu Park especially in terms of the qualities of interpretation based on the EROT framework and Tilden's principles of interpretation namely enjoyable, relevant, organized and thematic, and provocation.

The researcher had been involved in tourism-related projects carried out in Kinabalu Park as a research assistant in University of Malaya thus had the opportunity to visit the

park multiple times for data collection purpose. Based on these previous visits, the researcher observed that interpretation in Kinabalu Park had focused on a theme and was organized in a manner that revolved around the theme. Hence, for the purpose of this research, the qualities of organized and thematic are lumped together and observed together during the fieldwork for this study. A checklist was designed for the observation of interpretation in Kinabalu Park (Table 3.3). An example of how the checklist was used during and after the fieldwork is attached in the appendix (Appendix B).

Table 3.3: Observation checklist for interpretation in Kinabalu Park

Quality of interpretation	Interpretive centres	ex-situ gardens	Nature trails	Brochures/ leaflets
Enjoyable 1. Does interpretation in Kinabalu Park utilize interactive materials? 2. Was there an audio tour? 3. Can the visitors manipulate the exhibits? 4. Was music utilize as a background sound? 5. Does it contain actual objects (plants & animals)? 6. Was there any game for the visitors to play with?				
Relevant 1. Does the interpretation use examples, metaphors, analogies, or comparisons? 2. Was there too many technical terms used? 3. Does the interpretation put the visitors in the situation such as asking them of their opinions or putting them in a situation? 4. Does the interpretation touch the visitors' circle of lives such as themselves, families, values, beliefs, and wellbeing?				
Organized & thematic 1. Does interpretation has a topic? 2. If yes, was there any themes used in the interpretation related to the topic? 3. Was the information presented organized in a way that supports the topic and theme? 4. Was interpretation in the park organized in a clear manner that is easy for the visitors to follow?				

Table 3.3, continued

Quality of interpretation	Interpretive centres	ex-situ gardens	Nature trails	Brochures/ leaflets
Provocation 1. Does interpretation in Kinabalu Park contain any emotional messages directed at the visitors? 2. Does it utilize emotional displays that depict the dangers faced by the park such as images of illegally-logged area or pictures of dead/injured animals due to illegal poaching within the park?				

Secondary Data Collection

The secondary data was collected mainly from the park management, Sabah Parks. Sabah Parks' Annual Reports were obtained from the Research and Education Division at Sabah Parks office in Kota Kinabalu. Visitors' statistics comprising of the number of visitors' arrival across all three substations and climbers were obtained from the Public Relations Division of Sabah Parks also in Kota Kinabalu. A few list and brochures as well as the visitors' statistics for participation in different interpretive programs in Kinabalu Park were collected from the Interpretative Unit of Sabah Parks located at Kinabalu Park HQ. Related brochures about the park and content of interpretive programs produced by Sabah Parks were collected at each of the interpretive activities' sites at Park HQ and Poring Hot Spring. Articles from available journals such as Journal of Ecotourism, Journal of Sustainable Tourism, Journal of Environmental Education, Journal of Interpretation Research, and more were also retrieved for the purpose of reference and comparison to this study.

3.3.3 Data Analysis

For the quantitative data, both the pre- and post-visit surveys collected from the fieldwork were analyzed using the Statistical Package for Social Science (SPSS) software version 23. Both descriptive and inferential statistics were used in analyzing

the data. The descriptive statistics analysis was used to determine the features of the samples selected from the population. Table 3.4 highlights the type of descriptive and inferential statistic tests used to analyze the variables in the survey.

Table 3.4: SPSS tests conducted in the analysis

Variables	SPSS test
Respondent's background	Frequency and percentage distribution, Chi-square
Visitation profile	
Knowledge	Percentage distribution and Chi-square
Attitude	Percentage distribution and Mann-Whitney U
Behavioral intention	

The Pearson chi-square test of independence was used to analyze the relationship between two categorical variables that are in nominal measurement (Holcomb, 2006 & Talib, 2015). Mann-Whitney U test was used to test the differences between two independent variables and a dependent variable, which is an ordinal data (Chua, 2013,). Mann-Whitney U, a two-independent samples test, in this case was used to analyze the differences between visitors' level of attitude and behavioral intention before (pre-visit) and after (post-visit) participating in the interpretive programs in Kinabalu Park. Visitors' knowledge difference between the pre- and post-visit samples on the other hand was analyzed using chi-square test.

In order to analyze the qualitative data from the observation on interpretation in Kinabalu Park, documents review was used. There had been multiple studies that incorporated the use of document analysis as part of their data analysis (Rossman & Wilson, 1985; Sogunro, 1997, as cited in Bowen, 2009). Documents related to the interpretive programs adopted in Kinabalu Park were reviewed in order to identify how interpretation is presented to the visitors particularly whether or not they adhered to the principles of interpretation. These documents include brochures, information sheets, and

interpretive panels as well as exhibits. According to Bowen (2009), there are multiple purposes to using documents as part of the research materials and in this study, the documents related to interpretation in Kinabalu Park were used as supplements to the quantitative data collected through questionnaire survey. Similar analysis of documents was used to analyze the secondary data collected in this study.

3.4 Research Constraints

There were a few constraints faced during the duration of the research in Kinabalu Park. One of the major challenges encountered was the earthquake that struck Sabah on June 5th, 2015. The data collection process was supposed to take place in the early month of June 2015 thus the sampling size was determined based on the statistic for visitors' arrival in the year of 2014. However, due to the earthquake the process had to be postponed to a later date. The earthquake resulted in extensive damages to the park that it had to be closed for search and rescue mission. One of the substations, Mesilau was originally included as part of the primary research area but was taken out because it was severely damaged during the quake. Apart from that, the number of visitors' arrival in Kinabalu Park dwindled after the earthquake and the data collection only took place in November 2015 after the number of visitors had started to rise again.

Among other challenges faced was the location of the study area. The fieldworks to Kinabalu Park had to be planned precisely and thoroughly due to the distant location of the park in Sabah and the high cost of transportation. Due to the large sample size needed to be collected for the analysis, enumerators had to be hired to help out with the distribution of the survey. There were a few problems encountered while looking for suitable candidates from local universities in Sabah as enumerators especially in terms of communication. However, six students from UiTM and UMS, Sabah were chosen as enumerators during the fieldworks.

Apart from physical challenges, this study also faced other limitations especially in terms of its method. Firstly, the representativeness of the sample is one of the limitations occurred in this study due to the absence of control and experiment groups. Although stratified convenience sampling technique was used in selecting the samples, there were significant differences between the pre- and post-visit samples in terms of visitors' demographic characteristics. This present study does not take into account the influence of the visitors' demographic characteristics and visitation profile on the visitors' knowledge, attitude, and behavioral intention. This study analyzed only the first layer in which it looked at the overall effectiveness of the interpretation programs adopted in Kinabalu Park on the visitors. It also did not take into account the impact of each interpretive activity and did not differentiate between the different types of interpretation methods adopted. Hence, the changes to the visitors' knowledge, attitude, and behavioral intention in this study could be attributed to the influence of interpretation in Kinabalu Park only due to the differences between both samples. Moreover, this study only covers the non-personal interpretation in Kinabalu Park and it did not include the personal interpretation in the park namely by park guides and tourist guides.

Another limitation to this study is that it only measured the visitors' immediate intention to engage in environmentally responsible behaviors. This study does not measure actual behavior changes among the visitors after they were exposed to interpretation. Although the visitors' behavioral intention is an immediate determinant to possible behavior change, the intentions do not necessary translate into actual behavior change. Future research could perhaps adopt the use of observation or follow-up survey in order to determine the extent of behavior change occurred among the visitors especially in terms of long-term behavior change. Furthermore, the use of attitude scale specifically Likert-scale in measuring the visitors' attitude and intention to

engage in environmentally responsible behaviors resulted in the findings being influence by social desirability, which is a type of response bias. The respondents in both the pre- and post-visit samples most likely had provided a more socially acceptable answer instead of their actual beliefs. Table 3.5 highlights the timeline of chapter writing in this study.

Table 3.5: Timeline of research work

Year	2014									2015												2016												2017			
Months/Details	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**	**4**
Chapter 1: Introduction																																					
Chapter 2: Literature review																																					
Chapter 3: Methodology																																					
Instrument design																																					
Pilot survey																																					
Actual survey																																					
Chapter 4: Analysis findings																																					
Data entry																																					
Data analysis																																					
Chapter 5: Discussion																																					
Chapter 6: Conclusion																																					
Amendments																																					
First draft																																					
Second draft																																					

Submission of first draft

Submission of second draft

Submission of third draft

3.5 Summary

Overall, this chapter had discussed the steps and research methodology taken in conducting this research. The first step taken in figuring out the direction of this study was determining the relationship between the nature of this study and the different philosophical worldviews. The adopted philosophical worldview in this research is pragmatism highlighting on the importance of environmental interpretation in influencing the outcome of visitors' knowledge, attitude, and behavioral intention. This research study primarily emphasis on quantitative method while the qualitative method was used as a support. Questionnaire survey was selected as the research instrument in which it was divided into pre- and post-visit surveys targeting at the visitors in Kinabalu Park upon their arrival (pre-visit) and the visitors that had been exposed to interpretation (post-visit). The pre- and post-visit data collected were analyzed using the SPSS software where chi-square and Mann-Whitney U tests are carried out in order to determine the differences in terms of visitors' knowledge, attitude, and behavioral intention before and after taking part in interpretive programs in Kinabalu Park. The qualitative and secondary data were analyzed using document analysis. The difference in visitors' knowledge, attitude, and behavioral intention between the pre- and post-visit samples established the effectiveness of the interpretive programs adopted in Kinabalu Park.

CHAPTER 4: ANALYSIS FINDINGS

4.1 Introduction

This chapter presents the results on the analysis of the data collected from Kinabalu Park. This chapter first describes the descriptive findings of the interpretive programs available in both Park HQ and Poring substations of Kinabalu Park. The second part of this chapter describes the findings of the quantitative analysis that are divided based on the sections in the survey; respondent's background, visitation profile, knowledge, attitude, behavioral intention, and post-visit opinions. The analysis focuses on the impact of interpretive programs in Kinabalu Park on visitors' knowledge, attitude, and behavioral intention by comparing the pre- and post-visit samples. This chapter also discusses further analysis carried on the post-visit samples in order to analyze the impact of repeat visitation on the visitors' knowledge, attitude, and behavioral intention.

4.2 Analysis Findings

4.2.1 Interpretive Programs in Kinabalu Park

Kinabalu Park provides different types of interpretive programs aiming at informing the public on the various features of the park. The interpretive programs in the park are provided and managed by Sabah Parks. Both Park HQ and Poring substations provide different types of interpretive programs in which some of the activities employed the use of both personal and non-personal interpretation. Certain activities employed only one type of interpretation, either personal or non-personal interpretation. However, there are also activities that did not incorporate any interpretive materials into its programs such as at the Canopy Walkway and Ethnobotanical Garden. Table 4.1 highlights the types of interpretation employed in the activities at both substations including personal and non-personal interpretation.

Table 4.1: Types of interpretation used in Park HQ and Poring substations

Substation	Interpretive programs	Types of interpretation	
		Personal	Non-personal
Park HQ	Mountain climbing	Guided walk	–
	Botanical Garden	Guided walk	Introductory sign, brochures, information panels
	Nature trails	Guided walk (Silau-silau trail)	–
	Sabah Parks Exhibition Hall	–	Information panels, preserved samples
	Video show	–	video show
	Kinabalu Natural History Gallery	–	Information panels, preserved leave and animal samples, diorama, rock samples, interactive materials
Poring Hot Spring	Poring Visitor Center	–	Information panels, diorama
	Butterfly Farm	–	Information panels, preserved insect samples, animal enclosure
	Poring Walk Around	Guided walk	–
	Orchid Conservation Center	Guided walk	Introductory sign, information panels
	Tropical Garden	Guided walk	Introductory sign, information panels, animal enclosure
	Rafflesia Garden	–	Information panels
	Bamboo Garden	–	Information panels
	Canopy Walkway	–	–
	Ethnobotanical Garden	–	–

In general, interpretation in Kinabalu Park at both Park HQ and Poring Hot Spring targets the general public especially with majority of the programs being self-guided. Interpretation at the visitor centres combined the information about Kinabalu Park within a place and caters for visitors on day trips, mass tourists as well as incidental tourists. The interpretation in Kinabalu Park did not target any specific group such as children, ecotourists, or any other tourist segments. However, guided walks and the *ex-situ* gardens offered the visitors with a more in-depth explanation of the flora and fauna within Kinabalu Park in which provides the visitors with an educational experience

especially for ecotourists. Furthermore, Sabah Parks also conducted special interpretive programs on targeted audiences namely school students and outside institutions upon request (Sabah Parks, 2011). Table 4.2 highlights the chronology on the development of interpretive programs and activities in Kinabalu Park since it was opened to public in 1965.

Table 4.2: Chronology on the development of interpretive programs in Kinabalu Park.

Year	Interpretive programs
1965	Mountain climbing
1981	Botanical Garden, Park HQ
1983	Sabah Parks Exhibition Hall
1987	Video show, Park HQ
1987	Orchid Conservation Centre, Poring Substation
1988	Tropical Garden, Poring Substation
1989	Butterfly Farm, Poring Substation
1990	Canopy Walkway, Poring Substation
2001	Kinabalu Natural History Gallery, Park HQ
2004	Bamboo Garden
2004	Poring Visitor Centre
2006	Ethnobotanical Garden, Poring Substation
2006	Rafflesia Garden, Poring Substation
2017	Poring Walk Around, Poring Substation

4.2.1.1 Park HQ

There are several activities in Kinabalu Park's Park HQ substation that incorporated interpretive materials into the programs including both personal and non-personal interpretation. Among the interpretive programs practiced in Park HQ are mountain climbing, Botanical Garden, nature trails, Sabah Parks Exhibition Hall, video show, and Kinabalu Natural History Gallery. Table 4.3 highlights the statistics on visitors' participation in interpretive programs at Park HQ in 2014 and Table 4.4 shows the breakdown of the fees for the interpretation programs.

Table 4.3: Visitors' statistics on participation in interpretive programs at Park HQ in 2014 (Sabah Parks, 2015)

Activity	Malaysian	International	Total
Botanical Garden	188	970	1158
Guided Nature Walk (Silau-silau trail)	213	877	1090
Video show	247	666	913
Kinabalu Natural History Gallery	2507	887	3394

Table 4.4: Breakdown of fees for interpretive programs in Park HQ (Sabah Parks, 2015)

Activity	Malaysian	International
Botanical Garden tour	RM4 (adult) RM2 (child)	RM5 (adult RM2.50 (child)
Guided Nature walk (Silau-silau trail)	RM2 (adult) RM1 (child)	RM3 (adult) RM1.50 (child)
Video show	RM2 (adult)	
	RM1 (child)	
Kinabalu Natural History Gallery	RM2	RM3

The most famous interpretive activity in the entire Kinabalu Park, specifically the headquarters is the climbing activity. Mountain climbing is considered the most famous activity in Kinabalu Park, be it interpretive in nature or not. Climbing the mountain requires hiring a mountain guide mainly for safety reasons. Apart from being responsible for the climbers' safety, mountain guides are also responsible for providing interpretation during the climb to the climbers in order to enrich their climbing experience. All the mountain guides in Kinabalu Park are registered with Sabah Parks and are managed by an association known as Kinabalu Mountain Guide Association (PEMANGKINA). Sabah Parks at time would offer courses on emergency response and on plants and birds to better equip the mountain guides with knowledge. Moreover, majority of the mountain guides were local people that came from the villages in the vicinity of the park and were already well versed in the local knowledge. Several information sheets pertaining to the climbing fees, map of the route to the summit,

safety and security for climbers were all placed at the Visitor Center of Park HQ for the visitors' convenience. The information is available in Bahasa Malaysia, English, Korean, and Japanese. The information was disseminated in English because it is a common language used especially in the European continents while Korean and Japanese targeted specific Korean and Japanese visitors as English is not their native language.

The Park HQ also houses a Botanical Garden near the lodges and hostels operated by Sutera Sanctuary Lodge (SSL). The Botanical Garden (initially known as Mountain Garden) was opened in 1981 and it serves as an *ex-situ* conservation site for preserving rare and endangered plant species and the garden also exists in order to educate and create public awareness on the importance of conservation of these endangered species (Goh, 2008). The garden provided visitors with information related to the endemic plant species that are found in the vicinity of Kinabalu Park. The Botanical Garden is comprised of a nursery (not open to visitors) and a short thematic nature trail that was designed into a one-way loop trail. The Garden employs both personal and non-personal interpretation in its interpretive program. Personal interpretation is conducted in the form of a guided walk by the park's interpreter three different times daily at 9.00AM, 12.00PM, and 3.00PM. The tours are conducted in English and/or Bahasa Malaysia and takes about one hour each.

Non-personal interpretation is presented in the form of introductory signs, brochures, information panels, and labels (Figure 4.1). Two introductory signs are placed at the garden in which one is before the ticketing entrance and the other after the ticketing entrance. The introductory signs at the entrance provided visitors with a brief description on the establishment and purpose of the Botanical Garden. The signs also include a trail map and the arrangement of the endemic plants found within the garden

according to different color groups. The information panels in the garden contain brief description including the scientific and common names of the plant, features of the plant and their daily uses as well as benefits. Visitors are provided with a brochure containing information about the educational activities within Park HQ (Appendix C) and an information sheet specifically for visitors' guidance at the Botanical Garden (Appendix D). The information sheet is a trail map of the garden with numbered stops accompanied with illustrations of the plants that could be found at these stops. As an ex-situ garden, it provided visitors with the opportunity to observe actual plants in its natural environment.

Figure 4.1: (a) One of the introductory signs (left) and (b) one of the information panels (right) at the Botanical Garden

There are nine nature trails known as Kiau View trail, Pandanus trail, Bundu Tuhan View trail, Silau-silau trail, Bukit Burung trail, Bukit Tupai trail, Mempening trail, Bukit Ular trail, and Liwagu trail. Most of these trails are interconnected with one another with a two-way traffic and located in the vicinity of the park headquarters. The trails are a combination of short and long distance trekking paths and they require no guiding assistance. The nature trails employ both personal and non-personal interpretation though to a limited extent. Personal interpretation for the nature trails is presented in the form of a guided walk conducted daily at 11AM but only for the Silau-

silau trail. The non-personal interpretation is provided in the form an information sheet that contains a map of the trails and brief description of the trails including the length and time. Each trail is explained in the information sheet in terms of the derivation of their names, features of the trails including the distance and time required to trek them, and the points of interest. The information sheet is provided by both Sabah Parks and SSL (Appendix E and F). Apart from the guided walk and information sheet, there are no other interpretive materials employed at the nature trails. The entrances of the trails are clearly marked with gates but there are no information panels along the trails themselves.

The Kinabalu Natural History Gallery is located at the conservation building along with the park's administration office. The gallery aims at relaying information about the history of Kinabalu Park and both its natural and cultural values to the visitors. The gallery is divided into six sections according to the different features in the park (Figure 4.2). Majority of the information displayed in the exhibits were knowledge-based information relayed in a factual manner. Table 4.5 highlights the different sections within the gallery and their description.

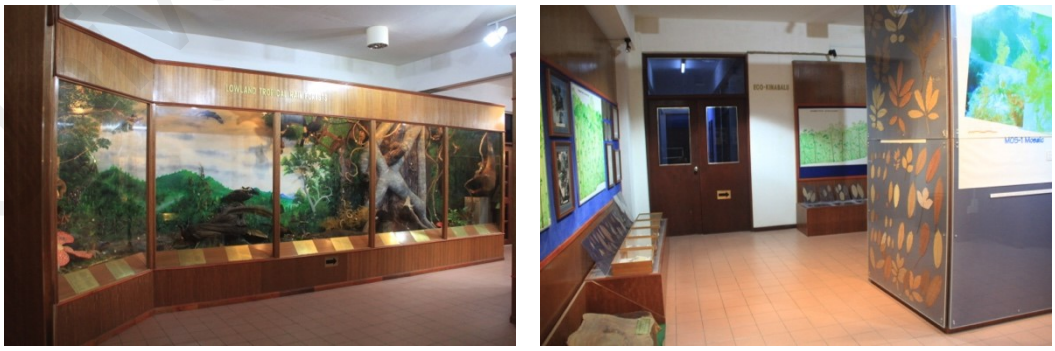

Figure 4.2: Different sections in Kinabalu Natural History Gallery including sections on (a) lowland tropical rainforest (left), (b) eco-kinabalu (right)

Table 4.5: Description of the sections in Kinabalu Natural History Gallery

Section	Description
First section	Hightlighted information about the park management, Sabah Parks along with its vision and mission.
Second section	Dedicated to the geology of Mount Kinabalu with a diorama of the mountain located in the middle of the section and various different rock samples displayed on the surrounding shelves.
Third section	Contains information panels about the different types of forests that exist in Kinabalu Park from the lowest to the highest altitude along with leave samples displayed at the center of the section.
Fourth section	Dedicated to the flora and fauna of Kinabalu Park ranging from Rafflesia to moonrats. Mummified samples of animals that are endemic to the park were displayed in a glass display.
Fifith section	Dedicated to the ecology of insects in Kinabalu Park in which most of the information displayed are in the form of research posters displaying the research findings conducted by the German Research Team.
Sixth section	Portrayed information on the plant and human resources found in Kinabalu Park particularly those of extreme important for the local community for their continuous survival.

Kinabalu Natural History Gallery adopts a few interactive materials in its interpretive center. A diorama is used to highlight the geological landscape of Mount Kinabalu and different rock samples are also displayed representing the rocks that are found in Kinabalu Park (Figure 4.3). Furthermore preserved leave and animal specimens are also displayed in glass cases inside the interpretive center. The preserved animal specimens show the type of animals that are endemic to Kinabalu Park and each specimen is marked with numbers indicating the name of the species. Hands-on exhibits in which the visitors are able to manipulate are also displayed in the center including several microscopes with specimens underneath. Apart from that, handicrafts made from local plant resources in Kinabalu Park by the local people are also shown.

Figure 4.3: (a) Rock samples (left) and (b) a diorama of Mount Kinabalu (right) displayed at the Kinabalu Natural History Gallery

Nearby the Botanical Garden is the Liwagu Visitor Center that houses the Sabah Parks Exhibition Hall and a video show at the basement of the center. Similar to Kinabalu Natural History Gallery, the exhibition hall is divided into sections and a few interactive materials are used but only to a limited extent. The exhibition hall displays rock samples similar to the ones at the gallery and preserved insects (Figure 4.4). Apart from the interactive materials, the hall displays similar type of information to the ones at the natural history gallery. Most of the information panels at the hall focus on Sabah Parks' involvement in research projects and description of other parks under Sabah Parks' management. There is however information related to the features of Kinabalu Park although not as comprehensive as the ones portrayed at the natural history gallery. However, the hall had been closed to the public since the June 2015 earthquake.

Figure 4.4: (a) Preserved animal samples (left) and (b) local handicrafts (right)

The video show on the other hand is located in the basement of the visitor center and a video titled “The Beacon of Diversity” is displayed for interested visitors and the VCD is also available for purchase. The video is shown daily at the Liwagu visitor center at 2PM from Tuesday to Thursday and an additional timing at 7.30PM from Friday to Monday including public holidays. Package tour is also offered combining all three interpretive programs namely the Botanical Garden, Silau-silau trail guided walk, and video show.

4.2.1.2 Poring Hot Springs

Similar as in Park HQ, Poring substation also incorporates both personal and non-personal interpretation into its interpretive programs. Among the activities offered in Poring substation include Poring Visitor Center, Poring Walk Around, Butterfly Farm, Orchid Conservation Center, Canopy Walkway, Lowland Tropical Garden, Ethnobotanical Garden, and Rafflesia Garden (Appendix G). Table 4.6 highlights the statistics on visitors’ participation in the interpretive programs for the year 2013 and Table 4.7 shows the breakdown of the fees for the interpretation programs.

Table 4.6: Visitors' statistics on participation in interpretive programs in Poring Hot Springs in 2013 (Sabah Parks, 2015)

Activity	Malaysian	International	Total
Butterfly Farm	5667	4612	10279
Orchid Conservation Center	104	849	953
Canopy Walkway	78784	42808	121592
Tropical Garden	46	138	184

Table 4.7: Breakdown of fees for interpretive programs in Poring Hot Springs (Sabah Parks, 2015)

Activity	Malaysian	International
Butterfly Farm	RM3 (adult) RM1.50 (child)	RM4 (adult) RM2 (child)
Orchid Conservation Center	RM5	RM10
Canopy Walkway	RM3 (adult) RM1.50 (child)	RM5 (adult) RM3 (child)
Tropical Garden	RM2	RM3
Ethnobotanical Garden	Free	
Bamboo Garden	Free	
Rafflesia Garden (open when rafflesias are blooming)	RM10	

Poring Visitor Center is located at the entrance of the substation and opened daily at 9AM to 4.30PM from Monday to Friday and 9AM to 4PM on Saturday, Sunday and public holidays. Similar to the Kinabalu Natural History Gallery and Sabah Parks Exhibition Hall at Park HQ, Poring Visitor Center is also divided into sections albeit there are no interactive materials used at the Poring Visitor Center except for a diorama portraying the layout of Poring Hot Springs (Figure 4.5). Although there are no interactive materials at the Poring Visitor Center, the center uses illustrations instead. Illustrations including photographs, maps, and paintings are used at all three interpretive centers in Kinabalu Park. Brief texts and captions accompanied the illustrations and serves as clarification for visitors' understanding in Poring Visitor Center. Similar to Kinabalu Natural History Gallery at the Park HQ, Poring Visitor Centre is focused on delivering visitors with factual information as observed in the exhibits which contained mostly factual information.

Figure 4.5: A diorama of Poring Hot Spring's facilities at Poring Visitor Center

A video is shown inside the visitor center daily at 10AM, 12PM and 2PM for free. The video is an introduction to Poring Hot Springs that highlighted the various activities and facilities available in Poring substation for visitors' use. Sabah Parks recently introduced a free guided tour for visitors titled "Poring Walk Around". The one hour guided tour is conducted daily at 11AM by a Sabah Parks' staff and it starts from Poring Visitor Center.

The Butterfly Farm was established in 1989 for the purpose of conservation and research, education as well as to promote ecotourism related to butterfly. The Farm currently has an Exhibition Gallery, a large butterfly enclosure, a breeding room and nursery larvae's food plants. Similar to the Botanical Garden at Park HQ, the Butterfly Farm focused completely on highlighting the different butterfly species that are endemic in Kinabalu Park. The Butterfly Farm incorporates only non-personal interpretation into its program as displayed in the farm's Exhibition Gallery and butterfly enclosure (Figure 4.6).

Figure 4.6: (a) One of the information panels (top left), (b) preserved butterflies (top right) at the exhibition gallery, and (c) one of the information panels at the butterfly enclosure (bottom) in the Butterfly Farm

The information panels in the exhibition gallery are presented in a systematic manner in which each panel contains different sub-topics on butterflies namely on butterfly and moth, their life cycles, eggs, caterpillars, pupa, and different species of butterflies. The gallery also displayed various preserved samples of the different butterflies' species as well as other insects in glass cases. While the exhibition gallery provides visitors with the opportunity to learn about the butterflies and insects, the butterfly enclosure situated next to the exhibition room enables visitors to observe and interact with the living butterflies. Apart from that, the enclosure also displays information in the form of panels regarding butterflies' behavior (eating, drinking, mating, birth, etc.) and the stages of their life cycle. Similar to the gallery, the information panels in the enclosure are also divided according to sub-themes. The nursery and breeding room on the other hand are not open for visitation.

The Orchid Conservation Center, opened in 1988 is one of the examples of an *ex-situ* conservation site for various orchid species in Sabah. Kinabalu Park is considered as the center of Sabah's endemic orchid species and it is home to approximately 1,200 species of orchids, which are found throughout Kinabalu Park. The primary aim of this center is to conserve most of Sabah's endemic orchid species as most of them are categorized as endangered species. The center covers an area of 6 acre and has 858 different species of orchids representing the species endemic to Kinabalu Park.

The center itself is a nature trail that adopts both personal and non-personal interpretation. An interpretive guided walk is conducted for visitors daily at 11.30AM, 2.30PM and 3PM led by a Sabah Parks' staff. Non-personal interpretation at the center is presented in the form of two introductory signs, information panels, and labels (Figure 4.7). One of the introductory sign contains a map of the trail at the conservation center that indicates the location of the office and nursery while the other introductory sign displays information about the pricing, opening hours, and precautions. Unlike the Botanical Garden at Park HQ substation, the introductory sign did not highlight any description about the conservation center. The trail itself is designed into a one-way cursive loop trail in which the visitors start and end at the same place. The orchids are marked with information panels highlighting descriptions about particular species and distinct features.

Figure 4.7: (a) Introductory signs (left) and (b) one of the information panels (right) at the Orchid Conservation Center

The Canopy Walkway is one of the most participated attractions in Poring substation and it has three suspended platforms in which two of the platforms are for visitors' use and another platform is for research purpose. One platform is 175m long and 41m high from the ground and another is 108m long platform and stands at 30m above the ground. The platform for research purposes is located 1km from the entrance farther than the other two walkways and it spans at approximately 125m. The Canopy Walkway attracts the highest number of participants compared to other activities in the substation.

The walkway is opened from 8.00AM to 4.00PM daily and is accessible upon request for visitation outside of the opening hours while being accompanied by the park staff. The only form of interpretation available at the walkway is at the entrance in the form of an introductory sign that contains only precautions, opening hours, as well as information on the fees (Figure 4.8). There is no information regarding the walkway itself at both the entrance and platforms. However, a brief description about the Canopy Walkway is displayed at the Poring Visitor Center in the form of information panels.

Figure 4.8: An introductory sign at the Canopy Walkway

Another example of *ex-situ* garden in Kinabalu Park is the Lowland Tropical Garden with a size of approximately 6ha. The garden houses a bird aviary and a trail network that allows visitors to explore unguided. The garden is also home to species of animals that are normally found in the lowland tropical rainforest such as deer, squirrel, and other animals. The Tropical Garden uses both personal and non-personal interpretation to relay information to the visitors including guided walk, information panels, signage, and introductory signs (Figure 4.9). Similar to the Orchid Conservation Center, Tropical Garden is made up of a loop trail with several points of interest along the trail namely a bird aviary, animal enclosures, and feeding platforms. These points of interest are marked on a trail map displayed on the introductory sign located at the entrance of the garden. Similarly, the introductory signs also contain only trail maps, information about the opening hours and fees, and precautions. Within the garden, the plants and animal enclosures at the Tropical Garden are provided with brief description on the panels. The panels describe the features, whereabouts, and uses of the plants and the animals. The Tropical Garden allows the visitors the chance to observe and interact with the tropical animals endemic to Kinabalu Park in their natural habitat.

Figure 4.9: (a) Introductory signs (left) and (b) one of the information panels (right) at Tropical Garden

The Ethnobotanical Garden is home to local forest products that are useful in terms of their medicinal purpose and for daily use. The visitors are not charged for their entrance into the Ethnobotanical Garden and Bamboo Garden that is located next to the Poring Visitor Center (Figure 4.10). Bamboo is abundant in Poring and the locals mainly used it to build their bamboo houses. Several species of bamboo tree can be spotted in the garden and are labeled according to their species. Rafflesia Garden on the other hand is extended from the Ethnobotanical Garden and is opened to visitors only when Rafflesia is blooming for a short period of time considering the short life span of Rafflesia flowers.

Figure 4.10: Entrance into Bamboo Garden

These three *ex-situ* gardens portrayed less interpretive materials compared to the other *ex-situ* gardens in Poring substation. There are no introductory signs at all three gardens. The Rafflesia Garden has information panels about rafflesia and its life cycle. However, there are no information panels installed at the Bamboo and Ethnobotanical Gardens except for labels of plant names. Descriptions about the Ethnobotanical and Bamboo Gardens are only found at the Poring Visitor Center.

4.2.2 Pre- and Post-Visit Surveys

4.2.2.1 Respondent's Background

Out of all the 390 questionnaire surveys collected, 200 of them were pre-visit surveys and another 190 were post-visit surveys. Overall, majority of the visitors in Kinabalu Park were between the ages of 16 - 35 years old in which 36.2% were between 16 – 25 years old (*n*=141) and another 37.7% were between 26 – 35 years old (*n*=147). 10% of the visitors were aged between 36 – 45 years old (*n*=39) and 10.5% were between 46 – 65 years old (*n*=41). Only 4.9% were aged between 56 – 65 years old (*n*=19) while only 0.8% of the visitors were over 66 years old (*n*=3). In terms of gender,

47.2% were male visitors (*n*=184) and another 52.8% were female visitors (*n*=206). Malaysians made up the majority of the respondents in this study as 72.8% were recorded (*n*=284). The rest were international visitors in which most of them were Europeans (11.3%, *n*=44). 5.4% of the visitors were Asian but not from ASEAN countries (n=21), 4.1% were Australians & Oceania (*n*=16), and 3.6% were ASEAN (*n*=14). Other nationalities recorded very few numbers of visitors. Table 4.8 shows the breakdown of the pre- and post-visit samples in terms of their age, gender, and nationality.

Table 4.8: Visitors' age, gender, and nationality

Demographic background	Pre-visit (*n*=200)		Post-visit (*n*=190)	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Age*				
16 - 25 years old	58	29.0	83	43.7
26 - 35 years old	91	45.5	56	29.5
36 - 45 years old	18	9.0	21	11.1
46 - 55 years old	19	9.5	22	11.6
56 - 65 years old	11	5.5	8	4.2
66 years old and above	3	1.5		
Gender				
Male	90	45.0	94	49.5
Female	110	55.0	96	50.5
Nationality*				
Malaysian	117	58.5	167	87.9
ASEAN	6	3.0	8	4.2
Asian, but not ASEAN	17	8.5	4	2.1
African			1	0.5
Australian & Oceania	13	6.5	3	1.6
European	40	20.0	4	2.1
North American	7	3.5	1	0.5
South American			2	1.1

* indicates significant differences between pre- and post-visit samples at $p<0.05$

Chi-square test conducted revealed that there were significant differences between the pre- and post-visit samples in terms of their age and nationality ($p<0.05$) but not their gender. In terms of age, most of the pre-visit samples were between the ages of 26 - 35 (45.5%) compared to post-visit samples that only had 29.5% of the visitors within

the same age range. On the other hand, post-visit samples were constituted of 43.7% of visitors aged between 16 – 25 years old compared to 29.0% of pre-visit samples. The rest of the age ranges were similar between both pre- and post-visit samples except post-visit samples did not have visitors above the age of 66 years old. In terms of nationality, Malaysian visitors made up the majority of both pre- and post-visit samples but post-visit samples had more Malaysian respondents (87.9%) compared to pre-visit samples that had 58.5% Malaysian respondents. However, the number of European respondents among post-visit samples was lower (2.1%) while pre-visit samples were comprised of 20% European respondents. Among the pre-visit samples, none of them were African and South American. Although low, post-visit samples had 0.5% African and 1.1% South American respondents.

Overall, majority of the visitors had either diploma education (31.5%, *n*=123) or bachelor's degree education (28.7%, *n*=112). 23.1% of them had secondary school education (*n*=90) and another 12.1% had master's degree education (*n*=47). Very few of the visitors had PhD education (1.3%, *n*=5) and foundation/A-level/STPM (3.3%, *n*=13). It was also observed that most of the visitors in Kinabalu Park were students (*n*=111), general workers (*n*=61), and professionals (*n*=68) in which 28.5%, 15.6%, and 17.4% of them respectively indicated so. 37% of the visitors were not applicable to the inquiry about their annual income (*n*=145) while majority of those who were applicable had an annual income between RM12,000 –RM35,999 (*n*=102) as 26.2% of them agreed so. 11% of the visitors had an income of RM120,000 and above annually while other income groups had less than 10% of the visitors. Table 4.9 highlights the frequency and percentage of both pre- and post-visit samples profile in terms of education, occupation, and annual income

Table 4.9: Visitors' educational background, occupation, and annual income

Demographic background	Pre-visit (*n*=200)		Post-visit (*n*=190)	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Education*				
Secondary school	34	17.0	56	29.5
Diploma	42	21.0	81	42.6
Bachelor's degree	77	38.5	35	18.4
Master's degree	34	17.0	13	6.8
PhD	4	2.0	1	0.5
Foundation/A-level/STPM	9	4.5	4	2.1
Occupation*				
Student	40	20.0	71	37.4
Unemployed	15	7.5	8	4.2
Retired	7	3.5	6	3.2
Home duty	3	1.5	13	6.8
Self-employed	16	8.0	12	6.3
General worker	24	12.0	37	19.5
Clerical/supervisory	17	8.5	11	5.8
Professional	49	24.5	19	10.0
Executive	18	9.0	8	4.2
Managerial	11	5.5	5	2.6
Annual income (RM)*				
NA	52	26.0	93	48.9
Below 6,000	14	7.0	3	1.6
6,000 - 12,000	16	8.0	14	7.4
12,000 - 35,999	47	23.5	55	28.9
36,000 - 59,999	13	6.5	13	6.8
60,000 - 95,999	14	7.0	2	1.1
96,000 - 119,999	8	4.0	3	1.6
120,000 and above	36	18	7	3.7

* indicates significant differences between pre- and post-visit samples at $p<0.05$

The chi-square test also revealed significant differences between pre- and post-visit samples in terms of their education, occupation, and annual income ($p<0.05$). In terms of educational background, pre-visit samples were comprised of more visitors with bachelor's degree (38.5%) and master's degree (17%) compared to post-visit samples that had only 18.4% visitors with bachelor's degree and 6.8% with master's degree. However, the number of visitors with secondary school education and diplomas were higher among post-visit samples, 29.5% and 42.6% respectively. On the other hand,

only 17% and 21% of the pre-visit samples had secondary school education and diploma respectively.

The number of visitors who worked as professional was higher among the pre-visit samples (24.5%) compared to post-visit samples (10%). It was observed that the post-visit samples were made up of mostly students (37.4%) while pre-visit samples had only 20% visitors who were students. The number of visitors who were general workers among post-visit samples (19.5%) slightly outweighed the pre-visit samples (12%). 28.9% of the post-visit samples had an annual income between RM12,000 – RM35,999 while 23.5% pre-visit samples also received the same income annually. The number of pre-visit samples that had an income above RM120,000 annually was greater (18%) compared to only 3.7% of the post-visit samples with the same annual income. Considering the significant differences between the pre- and post-visit samples, there was a possibility that the visitors' knowledge, attitude, and behavioral intention were also influenced by their age, nationality, educational background, occupation, and annual income instead of only interpretation in Kinabalu Park.

4.2.2.2 Visitation Profile

Table 4.10 highlights the visitation profile of the respondents in this study in terms of the types of visitors, substations, preparation, length of stay, source of information, and motivation.

Table 4.10: Respondents' visitation profile

Visitation profile	Pre-visit (%)	Post-visit (%)	Total (%)
Types of visitors			
First time	77.0	41.6	59.7
Repeat	23.0	58.4	40.3
Substations			
Park HQ	87.0	78.9	83.1
Poring Hot Spring	54.0	89.5	71.3
Nalapak	12.5	2.6	7.7
Serinsim	8.5	2.1	5.4
Monggis	6.5	0.5	3.6
Sayap	7.0	3.2	5.1
Preparation			
Extremely prepared	8.5	14.7	11.5
Well-prepared	60.5	65.8	63.1
Less prepared	31.0	19.5	25.4
Length of stay			
Day trip	37.5	46.3	41.8
Overnight	23.0	21.6	22.3
2 nights	26.5	18.9	22.8
3 nights	5.5	9.5	7.4
4 nights	5.0	3.2	4.1
More nights	2.5	0.5	1.5
Source of information			
Internet	62.5	60.0	61.3
Brochures	14.0	20.0	16.9
Newspapers	3.5	11.1	7.2
Friends	54.5	57.9	56.2
Family/relatives	35.5	53.7	44.4
TV programs	5.0	11.1	7.9
School	2.5	1.1	1.8
Travel guide/book	4.0	0.4	2.3
Motivation			
Recreational	59.0	76.3	67.4
Local people's culture	22.5	28.4	25.4
Knowledge/information	28.5	36.3	32.3
Landscape/scenery	60.5	66.8	63.6
Therapeutic reasons	8.5	8.9	8.7
Spiritual reasons	3.0	5.8	4.4
World Heritage Site	23.5	20.5	22.1
National Park	30.5	25.8	28.2

In terms of the visitation profile, 59.7% (n=233) of them were in Kinabalu Park for the first time and the rest, 40.3% (n=157) were repeat visitors. The chi-square analysis revealed a significant relationship between both the pre- and post-visit samples in terms

of their visitation (p=0.000). The number of first time visitors was significantly higher among pre-visit samples (77%) compared to only 41.6% first time visitors among post-visit samples. The number of repeat visitors was also significantly higher among post-visit samples (58.4%) than pre-visit samples (23.0%). The question pertaining the substations visited was slightly different in the pre- and post-visit survey. The pre-visit survey asked the visitors which substations they intend to visit because they have just arrived at the park and the post-visit survey inquired on which substations they have visited. The analysis showed that majority of the visitors in Kinabalu Park visited or wanted to visit Park HQ and Poring Hot Spring as 83.1% (*n*=324) and 71.3% (*n*=278) agreed so respectively. Very few of the visitors visited or wanted to visit the other four substations of Kinabalu Park.

In terms of preparation before visiting Kinabalu Park, only 11.5% of the visitors were extremely prepared while majority of them were well-prepared (63.1%). 25.4% others were less prepared. Visitors' length of stay in Kinabalu Park varied but majority of them, 41.8% (*n*=163) came on day trips. The number of visitors that spent an overnight and two nights in Kinabalu Park was almost the same where 22.3% stayed overnight (*n*=87) and another 22.8% stayed for two nights (*n*=89). The rest of the visitors, 13% stayed for more than three nights in Kinabalu Park (*n*=51). There difference between the pre- and post-visit samples in terms of their length of stay was however not significant (p=0.085).

More than half of the visitors gained their information about Kinabalu Park from the Internet (61.3%, *n*=239), friends (56.2%, *n*=219), and family/relatives (44.4%, *n*=173). 16.9% of the visitors also agreed that one of their sources of information about the park was from the brochures (*n*=66). Almost similar number of visitors got their information from TV programs and newspapers where 7.9% (*n*=31) and 7.2% (*n*=28) of them agreed

so respectively. There were significant differences between pre- and post-visit samples in the sources of information especially newspapers, family/relatives, TV programs, and travel guide/book. In terms of newspapers (p=0.004), the analysis revealed that more post-visit samples got their information from the newspapers (11.1%) compared to only 3.5% of the pre-visit samples. The number of visitors that got their information from family/relatives (p=0.000) was also higher among post-visit samples (53.7%) compared to pre-visit samples (35.5%). TV programs (p=0.027) were also a major source of information for more post-visit samples (11.1%) compared to only 5% of the pre-visit samples that used it. Although very few of the visitors used travel guide/book (p=0.022) as their source of information on Kinabalu Park, more pre-visit samples (4%) used it than 0.5% of the post-visit samples.

Recreational and landscape/scenery were two of the highest motivations for visiting Kinabalu Park among the visitors as 67.4% were motivated by recreational purpose (*n*=263) while another 63.6% were motivated by the landscape/scenery (*n*=248). 32.3% of the visitors were also motivated by the knowledge/information they could gain from visiting the park (*n*=126). Over 20% of the visitors agreed that local people's culture (*n*=99), the status of World Heritage Site (*n*=86), and National Park (*n*=110) were among their motivations for visiting. Less than 10% visited Kinabalu Park for therapeutic (*n*=34) and spiritual reasons (*n*=17). The chi-square test showed a significant relationship between pre- and post visit samples in terms of motivation but only for the recreational purpose (p=0.000). It was found that the number of post-visit samples that were motivated to visit Kinabalu Park for recreational purpose was significantly higher compared to pre-visit samples. 76.3% of the post-visit samples came for recreational purpose while only 59% of the pre-visit samples came for the same motivation.

4.2.2.3 Impact of Environmental Interpretation

(a) ***Knowledge***

Table 4.11 shows the percentage of correct response between pre- and post-visit samples and the chi-square results. The analysis revealed that the number of correct responses to the knowledge questions was higher among the post-visit samples compared to the pre-visit samples. However, the higher level of correct responses among post-visit samples was only in relation to six out of all 12 knowledge statements (highlighted in grey).

Table 4.11: Percentage of correct responses among pre- and post-visit samples in terms of the knowledge statements and chi-square results

No.	Item	Percent (%)		Significance (p-value)
		Pre-visit (*n*=200)	Post-visit (*n*=190)	
1	Kinabalu Park is a World Heritage Site in the natural category declared by the UNESCO World Heritage Committee.	83.5	77.9	0.362
2	Mount Kinabalu is the highest mountain between the Himalayas and New Guinea.	44.5	35.8	0.162
3	Kinabalu Park is a hotspot for plant biodiversities containing over 5,000 to 6,000 vascular plants.	61.0	59.8	0.819
4	There are five stations in Kinabalu Park.	15.5	17.9	0.043*
5	Climbing Mount Kinabalu requires two days and one night.	60.3	63.2	0.207
6	Low's Peak is the highest peak on top of Mount Kinabalu.	45.7	58.3	0.001*
7	Mount Kinabalu is considered sacred by the local Dusun-Kadazan people.	65.0	77.4	0.007*
8	Mount Kinabalu is still growing at the rate of 5mm annually.	34.2	31.1	0.510
9	Kinabalu Park also acts as the Centre for Plant Biodiversity for Southeast Asia.	50.0	41.3	0.000*
10	Many of the animals inside Kinabalu Park are threatened and vulnerable to extinction.	52.5	54.2	0.831
11	Entrance fee to Kinabalu Park is also called Conservation fee.	59.5	53.7	0.407
12	Sabah Parks is responsible for the management and conservation of Kinabalu Park.	62.5	66.8	0.298

* indicates significant differences between pre- and post-visit samples at $p<0.05$

Further chi-square test showed that there were significant differences between the pre- and post visit samples in terms of four of the statements ($p<0.05$). The first statement that showed a significant difference was knowledge statement (4) *there are five stations in Kinabalu Park* ($X^2=6.285$, *df*=2, p=0.043). This was a wrong statement and there are actually seven stations in Kinabalu Park. Although very few from both samples managed to give the correct response, more post-visit samples responded correctly (17.9%) compared to pre-visit samples (15.5%). The second statement with a significant difference was knowledge statement (6) *Low's Peak is the highest peak on top of Mount Kinabalu* ($X^2=13.511$, *df*=2, p=0.001). 58.3% of the post-visit samples answered correctly while only 45.7% of pre-visit samples did. The number of visitors that were not sure was also significantly lower among post-visit samples (24.6%) compared to pre-visit samples (42.2%).

Knowledge statement (7) *Mount Kinabalu is considered sacred by the local Dusun-Kadazan people* was the third statement with statistically significant difference ($X^2=10.037$, *df*=2, p=0.007). 65% of the pre-visit samples responded correctly and the number of correct response was significantly higher among post-visit samples (77.4%). The number of visitors that were not sure of this statement was also lower among post-visit samples (16.8%) as opposed to 30.5% in the pre-visit sample. Post-visit samples showed a lower level of knowledge across seven of the knowledge statements as the number of correct responses slightly decreased. However, the decrease was significant only in relation to statement (9) *Kinabalu Park also acts as the Center for Plant Biodiversity for Southeast Asia* ($X^2=18.558$, *df*=2, p=0.000). It was found that the number of correct responses was higher among the pre-visit samples (50%) and lower among the post-visit samples (41.3%). Only 3.5% of the pre-visit samples answered incorrectly but the number of those that responded incorrectly was higher in the post-visit samples (16.4%).

Further analysis of the post-visit samples found that repeat visitors had higher level of knowledge as more of them responded correctly to all of the knowledge statements except for statement (5) *climbing Mount Kinabalu requires two days and one night* compared to first time visitors (Table 4.12). The chi-square test showed that there were significant differences in the number of correct responses between first time and repeat visitors in relation to seven of the statements ($p<0.05$).

Table 4.12: Percentage of correct responses among first time and repeat visitors in terms of the knowledge statements and chi-square results

No.	Item	Percent (%)		Sig. (p-value)
		First time visitor (*n*=79)	Repeat visitor (*n*=111)	
1	Kinabalu Park is a World Heritage Site in the natural category declared by the UNESCO World Heritage Committee.	75.9	79.3	0.356
2	Mount Kinabalu is the highest mountain between the Himalayas and New Guinea.	29.1	40.5	0.010*
3	Kinabalu Park is a hotspot for plant biodiversities containing over 5,000 to 6,000 vascular plants.	59.5	60.0	0.986
4	There are five stations in Kinabalu Park.	11.4	22.5	0.073
5	Climbing Mount Kinabalu requires two days and one night.	72.2	56.8	0.048*
6	Low's Peak is the highest peak on top of Mount Kinabalu.	40.3	70.9	0.000*
7	Mount Kinabalu is considered sacred by the local Dusun-Kadazan people.	68.4	83.8	0.040*
8	Mount Kinabalu is still growing at the rate of 5mm annually.	30.4	31.5	0.414
9	Kinabalu Park also acts as the Centre for Plant Biodiversity for Southeast Asia.	39.7	42.3	0.039*
10	Many of the animals inside Kinabalu Park are threatened and vulnerable to extinction.	53.2	55.0	0.955
11	Entrance fee to Kinabalu Park is also called Conservation fee.	41.8	62.2	0.021*
12	Sabah Parks is responsible for the management and conservation of Kinabalu Park.	51.9	77.5	0.001*

Note: * indicates significant differences between first time and repeat visitors at $p<0.05$

Firstly, a significant difference was observed in statement (2) *Mount Kinabalu is the highest mountain between the Himalayas and New Guinea* (X^2=9.236, *df*=2, p=0.010). Significantly higher number of repeat visitors responded correctly (40.5%) compared to only 29.1% first time visitors. Secondly, a significant difference was also found in statement (5) *climbing Mount Kinabalu requires two days and one night* (X^2=6.074, *df*=2, p=0.048). However, more first time visitors (72.2%) responded correctly to this statement compared to repeat visitors (56.8%). Thirdly, statement (6) *Low's peak is the highest peak on top of Mount Kinabalu* (X^2=21.229, *df*=2, p=0.000) was also statistically significant. 70.9% of the repeat visitors answered correctly while only 40.3% of the first time visitors did.

Fourthly, statement (7) *Mount Kinabalu is considered sacred by the local Dusun-Kadazan people* (X^2=6.459, *df*=2, p=0.040) also indicated a statistically significant difference. Slightly more than four-fifth of the repeat visitors (83.8%) responded correctly but among the first time visitors, roughly two-third of them provided the correct response (68.4%). Fifthly, the test also showed significant differences in terms of statement (9) *Kinabalu Park also acts as the Centre for Plant Biodiversity for Southeast Asia* (X^2=6.499, *df*=2, p=0.039). Almost half of the repeat visitors answered correctly (42.3%) but only 39.7% of the first time visitors did. Sixthly, statement (11) *entrance fee to Kinabalu Park is also called Conservation fee* also showed a significant difference (X^2=7.762, *df*=2, p=0.021) in which 62.2% of the repeat visitors provided the correct response but only 41.8% of the first time visitors did. Lastly, a significant difference was also observed in statement (12) *Sabah Parks is responsible for the management and conservation of Kinabalu Park* (X^2=14.569, *df*=2, p=0.001). More than two-third of those with prior experience in Kinabalu Park responded correctly (77.5%) but only slightly more than half of those that visited for the first time did (51.9%).

(b) ***Attitude***

Table 4.13 highlights both the pre- and post-visit samples responses towards 13 attitude statements in which 11 were positive statements and two were negative statements. The analysis revealed that more post-visit samples agreed and strongly agreed with the positive attitude statements and more post-visit samples also disagreed and strongly disagreed with the negative attitude statements. Both negative statements marked higher level of disagreement among the post-visit samples. However, the high number of visitors that agreed and strongly agreed with the positive statements was related to only certain attitude statements as highlighted in Table 4.13. Almost similar number of both pre- and post-visit samples remained neutral in their responses but the number of post-visit samples that remained neutral was slightly lower among the post-visit samples across seven of the attitude statements.

Table 4.13: Pre- and post-visit samples' responses towards attitude statements

No.	Item	Pre-visit (%) (*n*=200)					Post-visit (%) (n=190)				
		1	2	3	4	5	1	2	3	4	5
	Positive statements										
1	Kinabalu Park is a special place.	3.0	1.0	10.0	51.5	34.5	2.1	1.1	7.4	58.9	30.5
2	I feel it is important that floras and faunas are preserved.	2.5	0.5	6.5	34.5	56.0	1.6	1.1	4.7	60.5	32.1
3	I feel the need to behave more responsibly while in Kinabalu Park.	3.0	2.0	6.0	53.5	35.5	1.6	1.6	9.5	58.4	28.9
4	The park's authority plays an important role in protecting the park.	2.5	2.0	14.5	49.5	31.5	1.6	1.1	7.9	56.3	33.2
5	The park's authority plays an important role in managing the park.	2.5	2.0	16.5	47.5	31.5	1.6	1.1	11.1	52.6	33.7
6	Tourism plays an important role in the conservation efforts.	2.0	4.5	17.5	51.5	24.5	0.5	2.1	9.5	57.4	30.5
7	I respect the cultural features of Kinabalu Park.	2.5	0.5	5.0	48.0	44.0	0.0	3.2	5.8	51.1	40.0
8	The local culture is an important part if Kinabalu Park.	2.5	2.5	9.0	47.0	39.0	1.1	1.6	12.1	50.5	34.7
9	I respect the natural landscapes of Kinabalu Park.	2.5	0.5	5.0	43.5	48.5	1.1	1.6	5.8	54.7	36.8
10	I feel anxious when thinking about the threats to the environment.	5.0	8.0	18.0	43.5	25.5	0.5	3.2	15.3	55.3	25.8
11	Mount Kinabalu is an important element to Kinabalu Park.	3.0	2.0	4.0	40.5	50.5	1.6	0.5	5.3	49.5	43.2
	Negative statements										
12	Human's presence in Kinabalu Park can be harmful to the environment.	17.5	38.0	21.5	15.0	8.0	12.1	46.8	25.8	11.1	4.2
13	Floras and faunas should be protected for economic purposes.	33.5	37.0	16.5	8.0	5.0	35.3	48.9	13.7	2.1	0.0

Note: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, & 5=strongly agree

The Mann-Whitney U test revealed significant differences in the relationship between the pre- and post-visit samples across four out of all 13 attitude statements at $p<0.05$ (Table 4.14). The z-value at $p<0.05$ in this study is ±1.96. If the z-value in the test is located outside of the range between +1.96 and -1.96, then there is a significant difference between the pre- and post-visit samples in terms of the attitude statement.

Table 4.14: Results of Mann-Whitney u test between pre- and post-visit samples towards attitude statements

No.	Item	Mann-Whitney U test	
		z-value	Significance (p-value)
Positive statements			
1	Kinabalu Park is a special place.	-0.220	0.826
2	I feel it is important that floras and faunas are preserved.	-3.933	0.000*
3	I feel the need to behave more responsibly while in Kinabalu Park.	-1.264	0.206
4	The park's authority plays an important role in protecting the park.	-1.344	0.179
5	The park's authority plays an important role in managing the park.	-1.268	0.205
6	Tourism plays an important role in the conservation efforts.	-2.596	0.009*
7	I respect the cultural features of Kinabalu Park.	-0.784	0.433
8	The local culture is an important part if Kinabalu Park.	-0.699	0.485
9	I respect the natural landscapes of Kinabalu Park.	-2.069	0.039*
10	I feel anxious when thinking about the threats to the environment.	-1.956	0.050
11	Mount Kinabalu is an important element to Kinabalu Park.	-1.086	0.278
Negative statements			
12	Human's presence in Kinabalu Park can be harmful to the environment.	-0.494	0.621
13	Floras and faunas should be protected for economic purposes.	-2.169	0.030*

Note: *indicates significant differences in which the z-value is located outside of the ±1.96 range

Firstly, there was a significant difference between pre- and post-visit samples in their responses towards statement (2) *I feel it is important that floras and faunas are preserved* (z=-3.933, p=0.000). The number of visitors that agreed and strongly agreed with this statement was slightly higher among post-visit samples (92.6%) compared to 90.5% pre-visit samples. However, further observation revealed the number of pre-visit samples that strongly agreed with this statement was significantly higher as 56% of them indicated so compared to only 32.1% post-visit samples. It was found that almost two-third of the post-visit samples (60.5%) rated the statement as "agree" compared to 34.5% of the pre-visit samples.

Secondly, a significant difference was also observed in statement (6) *tourism plays an important role in the conservation efforts* (z=-2.596, p=0.009). More post-visit samples (87.9%) held positive attitude towards this statement compared to 76% pre-visit respondents that felt the same. It was also found that more post-visit samples held stronger positive attitude as 30.5% of them rated the statement as "strongly agree" compared to 24.5% pre-visit samples. The number of visitors that agreed was also higher among post-visit samples (57.4%) compared to 51.5% pre-visit samples. 17.5% of the pre-visit samples remained neutral and the number was lower among post-visit samples (9.5%).

Thirdly, statement (9) *I respect the natural landscapes of Kinabalu Park* was also statistically significant (z=-2.069, p=0.039). However, unlike the other significant attitude statements, respondents in the pre-visit samples had higher level of agreement (92% agreed and strongly agreed) while the number was slightly lower among post-visit samples (91.5% agreed and strongly agreed). Although the difference was small, it was found that more pre-visit samples held stronger positive attitude towards the statement as 48.5% strongly agreed compared to post-visit samples (36.8%). Majority of the post-

visit samples rated the statement as “agree” (54.7%) while slightly lower number of pre-visit samples did (43.5%).

The negative statement (13) *floras and faunas should be protected for economic purpose* also portrayed a significant difference (z=-2.169, p=0.030). More post-visit samples disagreed with the statement (84.2%) than pre-visit samples (70.5%). Among the pre-visit samples, only 8% and 5% of them agreed and strongly agreed with this statement and the number was lower among post-visit samples as only 2.1% agreed and none strongly agreed. Less post-visit samples (13.7%) was neutral towards the statement compared to pre-visit samples (16.5%).

Table 4.15 shows the differences between the first time and repeat visitors in terms of their responses to the 13 attitude statements among the post-visit samples. It was found that more repeat visitors had positive attitude (agree and strongly agree) towards the attitude statements compared to the first time visitors in regard to all 11 positive attitude statements. In terms of the negative attitude statements, it was found that the negative attitude (disagree and strongly disagree) was slightly higher among the first time visitors compared to repeat visitors. Both the first time and repeat visitors showed high level of positive attitude in response to the attitude statements. However, the Mann-Whitney U test conducted indicated no significant differences between the first time and repeat visitors in their responses towards the attitude statements.

Table 4.15: First time and repeat visitors' responses towards attitude statements

No.	Item	First time visitor (%) (*n*=79)					Repeat visitor (%) (*n*=111)				
		1	2	3	4	5	1	2	3	4	5
	Positive statements										
1	Kinabalu Park is a special place.	2.5	1.3	10.1	59.5	26.6	1.8	0.9	5.4	58.6	33.3
2	I feel it is important that floras and faunas are preserved.	1.3	2.5	6.3	59.5	30.4	1.8	0.0	3.6	61.3	33.3
3	I feel the need to behave more responsibly while in Kinabalu Park.	1.3	2.5	13.9	51.9	30.4	1.8	0.9	6.3	63.1	27.9
4	The park's authority plays an important role in protecting the park.	1.3	1.3	8.9	53.2	35.4	1.8	0.9	7.2	58.6	31.5
5	The park's authority plays an important role in managing the park.	2.5	2.5	12.7	49.4	32.9	0.9	0.0	9.9	55.0	34.2
6	Tourism plays an important role in the conservation efforts.	0.0	5.1	12.7	53.2	29.1	0.9	0.0	7.2	60.4	31.5
7	I respect the cultural features of Kinabalu Park.	0.0	6.3	3.8	54.4	35.4	0.0	0.9	7.2	48.6	43.2
8	The local culture is an important part if Kinabalu Park.	2.5	1.3	17.7	44.3	34.2	0.0	1.8	8.1	55.0	35.1
9	I respect the natural landscapes of Kinabalu Park.	1.3	2.5	5.1	57.0	34.2	0.9	0.9	6.3	53.2	38.7
10	I feel anxious when thinking about the threats to the environment.	1.3	3.8	13.9	54.4	26.6	0.0	2.7	16.2	55.9	25.2
11	Mount Kinabalu is an important element to Kinabalu Park.	2.5	1.3	6.3	50.6	39.2	0.9	0.0	4.5	48.6	45.9
	Negative statements										
12	Human's presence in Kinabalu Park can be harmful to the environment.	15.2	46.8	24.1	10.1	3.8	9.9	46.8	27.0	11.7	4.5
13	Floras and faunas should be protected for economic purposes.	36.7	48.1	12.7	2.5	0.0	34.2	49.5	14.4	1.8	0.0

Note: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, & 5=strongly agree

Overall, majority of the visitors viewed Kinabalu Park as a place where people can observe nature and culture simultaneously as 72.2% of the visitors indicated so. The second highest view of Kinabalu Park among the visitors was that the park is a place for people to enjoy the scenery (65.7%). 26.8% of the visitors viewed Kinabalu Park as a place for environmental protection while another 24% viewed it as a place where endangered species live safely. Very few visitors viewed Kinabalu Park as a place where people live and work considering only 4.1% of them agreed so. Figure 4.11 shows the difference in the pre- and post-visit samples view of Kinabalu Park. However, no significant difference was observed between the two samples.

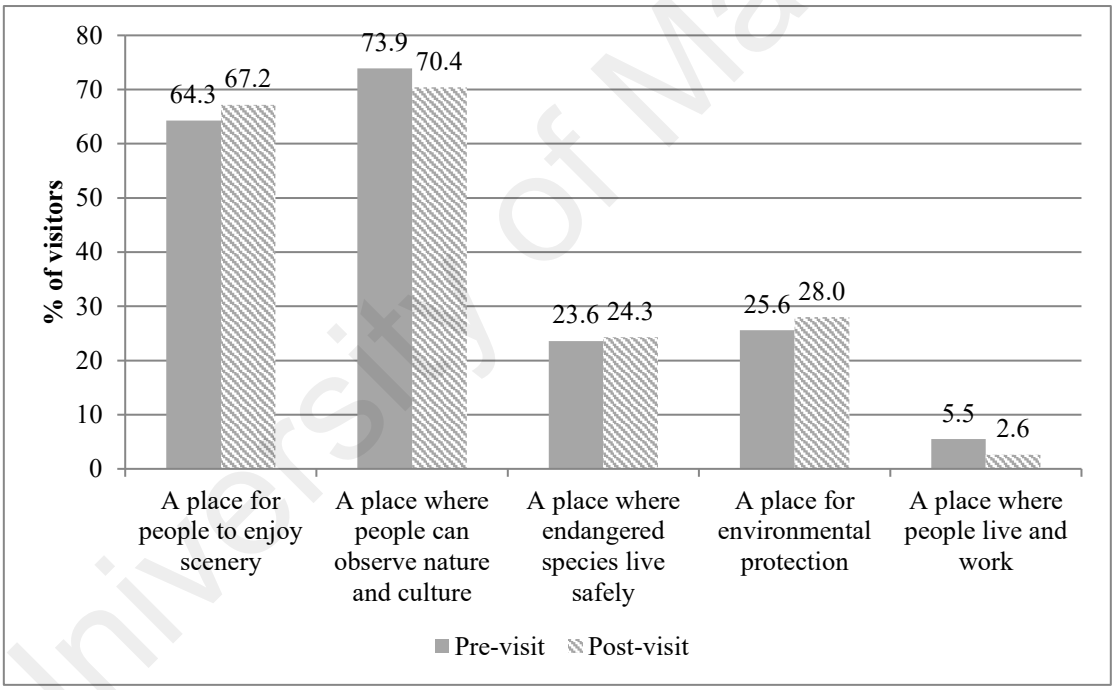

Figure 4.11: Pre- and post-visit samples' view of Kinabalu Park

(c) ***Behavioral Intention***

Overall, more than half of the visitors (both pre- and post-visit) agreed and strongly agreed with all eight behavioral statements. It was found that the number of visitors that agreed and strongly agreed with the behavioral statements was higher among the post-visit samples across six out of the eight statements as highlighted in the Table 4.16. The

analysis also demonstrated that statements (7) *reduce, reuse, and recycle* and (8) *inform friends and families about the importance of Kinabalu Park* had the highest number of visitors that agreed and strongly agreed in both the pre- and post-visit samples. 86.5% of the pre-visit samples and 79.5% of the post-visit samples agreed and strongly agreed with statement (7) *reduce, reuse, and recycle* while 80.5% and 86.3% of the pre-visit and post-visit samples respectively also agreed and strongly agreed with statement (8) *inform friends and families about the importance of Kinabalu Park*. Table 4.16 shows both the pre- and post-visit samples' responses towards eight of the behavioral statements.

Table 4.16: Pre- and post-visit samples' responses towards behavioral statements

No.	Item	Pre-visit (%) (*n*=200)					Post-visit (%) (*n*=190)				
		1	2	3	4	5	1	2	3	4	5
1	Donate money to environmental organizations concerned with the protection and improvement of the environment.	4.0	3.0	28.5	52.0	12.5	2.6	3.2	27.4	53.7	13.2
2	Participate in volunteer programs or activities involving the environment.	2.0	1.0	23.0	59.0	15.0	0.5	2.1	24.7	57.4	15.3
3	Participate in interpretive activities in Kinabalu Park.	2.0	1.0	29.0	57.0	11.0	0.5	1.6	27.4	55.8	14.7
4	Hire an eco-friendly tour operator.	4.0	4.0	23.5	57.0	11.5	1.1	2.1	26.8	53.7	16.3
5	Pay more for an eco-friendly trip.	4.0	7.5	34.0	43.0	11.5	1.1	7.4	30.0	47.4	14.2
6	Join organizations concerned with the environment.	3.0	3.0	25.5	55.5	13.0	0.0	2.1	27.4	51.6	18.9
7	Reduce, reuse, and recycle at home.	1.5	1.5	10.5	48.0	38.5	1.1	1.6	17.9	47.9	31.6
8	Inform friends and families about the importance of Kinabalu Park.	2.0	1.5	16.0	45.5	35.0	0.5	1.1	12.1	54.7	31.6

Note: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, & 5=strongly agree

Other behavioral statements namely statements (1) *donate money to environmental organizations concerned with the protection and improvement of the environment*, (2) *participate in volunteer programs or activities involving the environment*, (3) *participate in interpretive activities in Kinabalu Park*, (4) *hire eco-friendly tour operator*, and (6) *join organizations concerned with the environment* had approximately two-third of visitors agreed and strongly agreed. However, statement (5) *pay more for an eco-friendly trip* recorded the lowest level of agreement from the visitors as only 54.5% of the pre-visit samples and 61.6% post-visit samples agreed and strongly agreed. This statement also recorded the highest number of visitors that remained neutral in their opinions as 34% and 30% of the pre- and post-visit samples respectively indicated so.

The Mann-Whitney U test revealed no significant differences in the behavioral intentions between the pre- and post-visit samples. The z-values at $p<0.05$ in the test were also all located within the range of ±1.96 which indicates that there were no differences between the pre- and post-visit samples in terms of their behavioral intentions. Further analysis of the post-visit samples showed that the number of first time and repeat visitors that agreed to the behavioral statements in the post-visit survey was almost similar across all eight statements (Table 4.17).

Table 4.17: First time and repeat visitors' responses towards behavioral statements

No.	Item	First time visitor (%) (n=79)					Repeat visitor (%) (n=111)				
		1	2	3	4	5	1	2	3	4	5
1	Donate money to environmental organizations concerned with the protection and improvement of the environment.	5.1	3.8	17.7	58.2	15.2	0.9	2.7	34.2	50.5	11.7
2	Participate in volunteer programs or activities involving the environment.	1.3	3.8	19.0	57.0	19.0	0.0	0.9	28.8	57.7	12.6
3	Participate in interpretive activities in Kinabalu Park.	1.3	1.3	22.8	62.0	12.7	0.0	1.8	30.6	51.4	16.2
4	Hire an eco-friendly tour operator.	1.3	3.8	24.1	50.6	20.3	0.9	0.9	28.8	55.9	13.5
5	Pay more for an eco-friendly trip.	1.3	8.9	25.3	45.6	19	0.9	6.3	33.3	48.6	10.8
6	Join organizations concerned with the environment.	0.0	2.7	28.8	50.5	18.0	0.0	2.7	28.8	50.5	18
7	Reduce, reuse, and recycle at home.	1.3	1.3	19	44.3	34.2	0.9	1.8	17.1	50.5	29.7
8	Inform friends and families about the importance of Kinabalu Park.	1.3	1.3	11.4	55.7	30.4	0.0	0.9	12.6	54.1	32.4

Note: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, & 5=strongly agree

However, slightly more first time visitors agreed with five out of eight statements compared to repeat visitors. Among the statements that showed higher number of first time visitors agreeing were statements (1) *donate money to environmental organizations concerned with the protection and improvement of the environment*, (2) *participate in volunteer programs or activities*, (3) *participate in interpretive activities in Kinabalu Park*, (4) *hire an eco-friendly tour operator*, and (5) *pay more for an eco-friendly trip*. Another two statements indicated slightly more repeat visitors agreeing compared to first time visitors and they were statements (7) *reduce, reuse, and recycle*, (8) *inform friends and families about the importance of Kinabalu Park* while statement (6) *join*

organizations concerned with the environment yielded similar number of first time and repeat visitors agreeing to it. However, there were no significant differences between both types of visitors in their responses towards the behavioral statements. The z-values at $p<0.05$ were all also located within the ±1.96 range, further highlighting the insignificant differences between first time and repeat visitors.

4.3 Summary

This chapter highlighted the findings from the fieldworks carried out in Kinabalu Park including the detailed observation of the interpretive programs in both Park HQ and Poring Hot Spring and the results of the pre- and post-visit questionnaire survey analysis. The chapter included a description on the interpretation methods adopted in Kinabalu Park. In terms of knowledge, the research showed that post-visit samples had higher level of knowledge in relation to some of the knowledge statements compared to pre-visit samples. Out of the 12 knowledge statements, six of the statements showed higher number of correct responses among the post-visit samples while another six statements indicated a lower number of correct responses. However, only four statements indicated statistically significant differences between the pre- and post-visit samples. Three of the statements namely statements (4) *there are five stations in Kinabalu Park*, (6) *Low's Peak is the highest peak on top of Mount Kinabalu*, and (7) *Mount Kinabalu is considered sacred by the local Dusun-Kadazan people* had significantly higher number of post-visit samples that responded correctly compared to pre-visit samples. Another statement, which was statement (9) *Kinabalu Park also acts as the Center for Plant Biodiversity for Southeast Asia* recorded a significantly higher number of correct responses among the pre-visit samples compared to the post-visit samples. However, post-visit samples managed to demonstrate a significantly higher level of knowledge though only in relation to three of the knowledge statements.

Visitors' positive attitude towards Kinabalu Park was also higher among post-visit samples across all 13 attitude statements. The positive attitude among the post-visit samples was especially significant in four of the statements namely statements (2) *I feel it is important that floras and faunas are preserved,* (6) *tourism plays an important role in the conservation efforts,* (9) *I respect the natural landscapes of Kinabalu Park,* and (13) *floras and faunas should be protected for economic purpose.* However, despite the higher level of positive attitude in the post-visit samples, it was also observed that visitors' positive attitude was less strong in two of the statements namely statements (2) *I feel it is important that floras and faunas are preserved* and (9) *I respect the natural landscapes of Kinabalu Park* in the post-visit samples compared to pre-visit samples. The analysis also indicated that the number of visitors with neutral opinion of the attitude statements was also lower among post-visit samples compared to pre-visit samples.

In terms of behavioral intention, both pre- and post-visit samples portrayed high level of positive behavioral intention across all eight behavioral statements. The number of visitors that agreed and strongly agreed with engaging in environmental friendly behaviors was relatively the same among the pre-visit samples (before being exposed to interpretation) and post-visit samples (after being exposed to interpretation) in Kinabalu Park as the analysis revealed no significant differences between both samples in their intention to engage in environmentally responsible behaviors. Further analysis of the post-visit samples also revealed that repeat visitation to Kinabalu Park contributed to the higher level of knowledge among the visitors across all of the statements except for the fifth statement related to the *number of days required to climb the mountain*. The high level of knowledge was also found to be significant in seven out of all the statements. However, it was also observed that repeat visitation did not influence visitors' attitude

and behavioral intention as the response towards both attitude and behavioral statements was similar between first time and repeat visitors.

Despite the higher level of knowledge and attitude among the post-visit samples as opposed to the pre-visit samples, the visitors' age, nationality, educational background, occupation, and annual income might have had an influence on the visitors' responses towards the statements due to the significant differences between both samples in terms of their demographic characteristics.

CHAPTER 5: DISCUSSION

5.1 Introduction

This chapter discusses the findings from the analysis in terms of the impacts of interpretation in Kinabalu Park on the visitors' knowledge, attitude, and behavioral intention. The results on the visitors' knowledge, attitude, and behavioral intention are explained based on the observation of the interpretation presented in Kinabalu Park and how the interpretation provided relates to the qualities of interpretation namely enjoyable, relevant, thematic and organized, and provocation adopted from Ham's EROT framework and Tilden's principles of interpretation.

5.2 Impact of Interpretation

5.2.1 Knowledge

This study showed that knowledge gain was evident among the visitors after they were exposed to interpretation in Kinabalu Park as observed in the post-visit samples. However, the visitors' significantly higher level knowledge in the post-visit samples was mostly related to Kinabalu Park's general facts and values while majority of the insignificant changes was in relation to statements pertaining to the scientific aspect of Kinabalu Park. One of the main reasons the visitors' knowledge related to the park's general facts was higher in the post-visit samples was due to the various interpretive panels installed at strategic locations throughout the park. The main interpretive panels contained maps of the park highlighting the features of Kinabalu Park, route trail map to the summit, number of substations, and the different peaks of Mount Kinabalu. These interpretive panels were installed at both entrances of Park HQ and Poring substations as well as along the main roads inside both substations. Apart from interpretive panels, the information was also displayed in several different forms namely printed handouts at the visitor centres and interpretive panels at the interpretive centres (Kinabalu Natural History Gallery and Poring Visitor Centre). The availability of information related to

the park's general facts help to further intensify the visitors' memories contributing to their level of knowledge gain post-visit.

Furthermore, the location of the information also influenced the visitors' knowledge especially the order the information was displayed at the interpretive centres. The interpretation related to the park management, Sabah Parks and general features of Kinabalu Park were portrayed in the earlier sections of the interpretive centres. Visitors to these interpretive centres would first encounter the information panels related to Sabah Parks and the general facts at the beginning of their visit to the centre. Tubb (2003) study at the Dartmoor National Park in the UK provided evidence that visitors spent less time viewing the exhibits the more they progressed through the interpretive centres. Thus visitors in Kinabalu Park were most likely able to focus on the information in the earlier sections related to Sabah Parks and general features of the park but they began to lose focus as they progressed further into the interpretive centres.

Based on observation of interpretation in Kinabalu Park, information related to the park's values especially those related to the culture and lifestyle of the local people was limited compared to other aspects. Bidder *et al*. (2016) study in Kinabalu Park also revealed that cultural interpretation was very limited within the park. Despite the lack of information of the park's values, visitors in the post-visit samples demonstrated a significantly higher level of knowledge related to the sacredness of Mount Kinabalu. Although limited, there was a section dedicated to the cultural aspects of Kinabalu Park at the interpretive centres and the legend of Mount Kinabalu was also highlighted at the interpretive centres. Overall, the knowledge gain in this study is similar to previous studies (Tubb, 2003; Madin & Fenton, 2004; Hughes & Morrison-Saunders, 2005; Hill *et al.*, 2007; Mohd Hafizal Ismail, 2008; Powell & Ham, 2008; Roslina *et al*., 2013). Similarly, Tubb reported that after visiting the High Moorland Visitor Centre, visitors'

knowledge increased but only those related to farming issues. Tubb attributed this increase to the interactive nature of the exhibits pertaining to farming in the Dartmoor thus emphasizing on the importance of interactive materials in interpretation. However, Kinabalu Park relied heavily on text-based interpretation and it lacks interactive materials. This most likely contributed to the lower level of knowledge among the post-visit samples especially those related to scientific aspect.

Interactive material is one of the most important elements that make interpretation enjoyable and interesting for visitors in a national park. Ham (1992) highlighted the importance for interpretation to be enjoyable while Moscardo (1998) also emphasized that visitors have to be provided with a variety of interpretive experience during their visit. Although few, the interpretive centres in Kinabalu Park namely the Kinabalu Natural History Gallery and Sabah Parks Exhibition Hall did incorporate interactive materials as part of the exhibits. However, Poring Visitor Centre did not utilize any interactive materials except for a diorama of the substation and relied heavily on text-based interpretation and illustrations. The high level of knowledge related to general facts and values of Kinabalu Park among the post-visit samples after they were exposed to interpretation was most likely because such information are easier for the visitors to process using text-based interpretation but the same did not apply to scientific information.

Scientific information is more complicated and harder for the visitors to comprehend due to the technical terms. Most of the information related to the scientific aspect of Kinabalu Park used text-based interpretation in the form of information panels at the interpretive centres and *ex-situ* gardens. However, very few of these scientific exhibits especially at the interpretive centres incorporated the use of interactive materials in explaining the science of the park except for preserved samples and diorama. According

to Moscardo (1998), it is important to practice participation within interpretation because doing so provides the visitors with a degree of control over the information thus emphasizing on the importance of interactive materials. Hence, the lack of exhibits that were interactive and participatory in nature resulted in the disinterest among the visitors as they progressed through the centres resulting in the indifference in their knowledge related to the park's scientific aspect.

Another reason that contributed to the indifference in the visitors' knowledge related to scientific aspect despite being exposed to interpretation was the factual nature of interpretation in Kinabalu Park that contained mostly knowledge-based information. Simply communicating factual information without trying to be meaningful and connects with the visitors' personality and experience made the information irrelevant to them (Tilden, 2007). Tilden emphasized in his principles of interpretation that information is not interpretation instead it is revelation based upon information but all interpretation includes information (Tilden, 2007). Relevant is one of the most important qualities in the design of effective interpretation in which Ham (1992) highlighted that interpretation has to be meaningful and personal in order for the information to be relevant to them. The text-based interpretation throughout Kinabalu Park rarely incorporated metaphors, examples, comparisons, and analogies to aid the visitors' learning process especially when it comes to scientific information. The absence of these methods resulted in the visitors' inability to connect the information provided to them with something they are already familiar with or know about thus rendering the information meaningless to them.

Despite the less enjoyable and relevant nature of interpretation at the interpretive centres, the park's *ex-situ* gardens on the other hand utilized more enjoyable and relevant materials as part of its interpretation. Unlike the interpretive centers, the *ex-situ*

gardens in Kinabalu Park used actual objects in this case actual plants and animals thus making it more interactive and enjoyable for the visitors. Moreover, information panels at these *ex-situ* gardens also incorporated meaningful interpretation by giving examples on the uses of the plants making the information more relevant to the visitors. However, the use of examples was only to a limited extent and not all of the *ex-situ* gardens provided them.

Further analysis of the post-visit samples showed that visitors with prior experience in Kinabalu Park had higher level of knowledge compared to those without prior experience. Furthermore, the higher level of knowledge among repeat visitors was significant in relation to six out of 12 statements thus providing evidence that repeat visitors were better informed and knowledgeable compared to first time visitors. Similar to previous studies, this finding shows that repeat visitation to an area do influenced the visitors' knowledge related to that area (Young, 1999; Hughes & Morrison-Saunders, 2002b; Madin & Fenton, 2004). In Young (1999) study at the Daintree and Cape Tribulation area, Queensland, Australia, repeat visitors were able to sketch a more detailed spatial map of the area compared to first time visitors. Similarly, Madin & Fenton (2004) study at the Great Barrier Reef Marine Park found evidence that visitors with prior experience possessed higher level of knowledge compared to those that were there for the first time.

However, bearing in mind that there were significant differences between the pre- and post-visit samples in terms of their demographic characteristics, such differences might have influenced the visitors' ability to recall factual information thus affecting their responses to the quiz-like knowledge statements in both the pre- and post-visit surveys.

5.2.2 Attitude

Similar to knowledge, the analysis indicated that interpretation in Kinabalu Park did affect the visitors' attitude positively after their visit as observed in the post-visit samples. However, the positive attitude of the visitors in the post-visit samples was observed only in relation to general conservation issues mainly about the role of tourism in conservation and preservation of flora and fauna. Visitors' attitude towards the park management, cultures, human impacts, respect for the park, and environmentally responsible behaviors remained unaffected among the post-visit samples. Despite the higher level of positive attitude in the post-visit samples, the differences that occurred varied between statements. For instance, visitors' attitude towards the importance of preserving floras and faunas was more positive among visitors that had been exposed to interpretation yet it was less strong compared to the visitors in the pre-visit samples. On the other hand, visitors' positive attitude towards tourism's role in conservation was stronger among post-visit samples compared to pre-visit samples. Similarly, visitors' attitude towards protecting floras and faunas for economic purposes was significantly more negative among the post-visit samples than the pre-visit samples.

The findings suggest that interpretation in Kinabalu Park was partly successful in influencing visitors' attitudes especially in relation to the general conservation issues. However, further analysis indicated that interpretation had less influence on visitors' attitudes in terms of other aspects bearing in mind of the significant differences in the demographic characteristics of both pre- and post-visit samples. This was not surprising due to the fact that interpretation in Kinabalu Park mainly focused on the topic of preservation and conservation. This finding is consistent with the study carried out at Lulworth Coastal Area in the county of Dorset, England (Kim *et. al*., 2010). The interpretive programs at the coastal area was tailored specifically towards site-related issues namely cliff and fossil protection. It was found that the interpretive programs

carried out were successful in generating favorable attitudes among the visitors in regards to site-related issues at the coastal area but it did not affect the visitors' attitude towards general environmental protection. Compared to Kim *et al*. (2010) study, the interpretation in Kinabalu Park was more focused on general conservation issues instead of site-related issues thus resulted in the more positive nature of the visitors in the post-visit samples' attitude towards general issues of conservation.

The interpretation in Kinabalu Park focused on highlighting the endemic features of Kinabalu Park especially in terms of its floras and faunas. Interpretation in Kinabalu Park in this sense fulfilled two of the qualities needed in interpretation that are thematic (T) and organized (O) as highlighted in Ham's EROT framework and TORE model of thematic interpretation (Ham, 1992; Ham, 2013). The main theme of interpretation in Kinabalu Park was about protecting and preserving the endemic features of Kinabalu Park. All of the subsequent interpretive materials and activities in Kinabalu Park were developed to support this main theme of conservation and preservation where they were mostly aimed at communicating the general importance of the floras, faunas, and the park's environment. Furthermore, Kinabalu Park's interpretation focused on delivering visitors with facts to support the theme of preservation and conservation in an organized manner. Interpretation in Kinabalu Park followed a logical train of thought making it easier for the visitors to follow. If visitors find the interpretation difficult to follow, they will most likely lose interest in the first few minutes.

For instance, all of the interpretive centres in Kinabalu Park were divided into different sections with well-distinguished topics namely dedicated to the park's geology, ecology, floras and faunas, and plant and human resources. Each of these topics described the various features that are endemic to Kinabalu Park and how these features are important in ensuring the continuous survival of both the ecosystem and

local community. Apart from the interpretive centres, the *ex-situ* gardens in both Park HQ and Poring substations were also organized according to the different features of Kinabalu Park providing additional information that reinforced the idea of preservation and conservation. For example, the Botanical Garden focused on communicating the plant species that are found in the vicinity of the park while the Butterfly Farm was dedicated to the different butterfly species endemic to Kinabalu Park. Similarly, the Tropical Garden contained information about the tropical animals that lived in Kinabalu Park's area. Furthermore, all of these *ex-situ* gardens clearly indicated their main purposes, which were preservation and conservation of the endemic floras and faunas in Kinabalu Park.

The organization of interpretation in Kinabalu Park according to the different features of the park helped facilitate the visitors' understanding because the facts provided were geared towards the idea that it is important to preserve and conserve Kinabalu Park due to its unique and outstanding values. Moreover, Sabah Parks' primary objective is to protect and conserve the park's values for the benefit of the public and future generations (Sabah Parks, 2011) and these objectives were highlighted in the early sections of all the interpretive centres in Kinabalu Park. Focusing on a theme and organizing all the facts within an organizational framework made it easier for the visitors in Kinabalu Park to distinguish the message the park was trying to convey. Without themes and organization, interpretation can become mere isolated facts (Ham, 1992). Tilden's definition of interpretation highlighted that interpretation aims to reveal meanings and relationships (Tilden, 2007) thus having a theme and being organized contribute to the visitors' ability to connect the facts and information presented to them. Hence, the thematic and organized nature of interpretation in Kinabalu Park related to preservation and conservation contributed to the positive shift in the visitors' attitude towards general conservation issues as observed in the post-visit samples. The

indifference in attitude towards other aspects was most likely due to the lack of interpretation involving these aspects within Kinabalu Park.

Apart from the thematic and organized nature of interpretation in Kinabalu Park, the visitors' positive attitude towards general conservation issues in the post-visit samples was also attributed to the more relevant nature of interpretation at the *ex-situ* gardens. Instead of just portraying the species features on the information panels and labels at the *ex-situ* gardens, examples were used especially in explaining the daily and medicinal uses of the plants for the local communities (Figure 5.1). Through examples, visitors were made aware of importance of these plant species especially for the local communities thus reinforced idea of protecting and preserving these species.

Figure 5.1: Plant label in Botanical Garden, Kinabalu Park

However, Kinabalu Park only incorporated the use of examples at the *ex-situ* gardens and it did not use other techniques in order to help explain the unfamiliarity of information to the visitors especially at the interpretive centres such as geological process or vegetation zones with something that the visitors were familiar with. Simply communicating factual information to the visitors without connecting them to the visitors' existing knowledge is can be meaningless to them. Furthermore, interpretation has to also be personal for it to be relevant to the visitors (Ham, 1992; Tilden, 2007). The interpretive contents have to portray information that concerns the visitors

themselves such as those that touch their families, beliefs, values, and well-beings. According to Tilden (2007), the visitors' chief interest will always be about something that concerns them thus it is important to involve them as part of the interpretation itself in order to provoke their attitude towards the place or issue. Information that is connected to their lives is more important to them because it is more personal. Despite the abundance of information displayed throughout the park, interpretation in Kinabalu Park was unable to serve the visitors' interests, as the interpretation content did not connect with the visitors' inner circle of lives such as themselves, their beliefs, values, convictions, their loved ones, and more. The lack of interpretation that visitors can relate to on a more personal level resulted in the indifference in their attitude towards other aspects of the park. Visitors in Kinabalu Park most likely avoided reading the interpretation considering it had no relevance or connection to them.

Apart from that, another reason for the post-visit samples' positive attitude towards general conservation issues was the enjoyable nature of the interpretation at the *ex-situ* gardens in the form of actual objects. The *ex-situ* gardens provided the visitors with opportunity to observe and interact with actual plants and animals making the experience more enjoyable and this further reinforced their positive attitude towards preservation and conservation. However, the lack of interactive and enjoyable materials at the other parts of the park especially the interpretive centres resulted in the indifference of attitude towards other aspects of Kinabalu Park. This further highlights the importance of interactive materials in interpretation especially in capturing and sustaining the visitors' attention. For instance, a study of audio tour users and non-audio tour users was carried out at the Carlsbad Caverns National Park, USA (Novey & Hall, 2006). The study found that the audio tour users' attitude towards the Carlsbad Caverns audio tour was very positive and the tour was well liked among the visitors despite the indifference in their knowledge. Almost all of the visitors that took part in the audio tour

indicated that the tour was informative and very enjoyable. Interactive materials do not only serve as learning aids for the visitors during their visit but it also contributes to their overall experience and satisfaction.

Interestingly, the visitors' attitude towards the role of tourism in the conservation effort in Kinabalu Park was significantly more positive among the post-visit samples despite the fact the information was not interpreted in the interpretive programs within the park. One of the reasons that contributed to the visitors' awareness on the role of tourism in conservation was the entrance fee. Instead of using the term entrance fee like most parks in Malaysia, Kinabalu Park used the term conservation fee thus making the visitors more aware of the fact that the money they paid to enter the park will be used for the conservation of the park itself. Apart from that, the brochures given out at the Botanical Garden also stated the purpose of the fees paid by the visitors for participating in the interpretive activities in Kinabalu Park. It was mentioned in the brochure (Appendix C) that the "*money from the fees are important for better management of the park and to conduct more awareness programs to the public*". This statement reinforced the idea that their participation and the money they spent are used for the benefits of the park hence indicating a relationship between tourism and conservation itself.

Further analysis also found that visitors in the pre-visit samples in Kinabalu Park had already possessed high level of environmental attitudes despite the fact that they were not yet exposed to interpretation. Post-visit samples also exhibited high level of environmental attitudes. This finding is similar to previous studies that also yielded the same results (Orams, 1997; Lee & Moscardo, 2005; Hill *et al*., 2007; Kim *et al*., 2010; Ballantyne *et al*., 2011b; Sander, 2012). Eagles and Wight (as cited in Lee & Moscardo, 2005) suggested that ecotourism products generally attract visitors who are environmentally conscious. In this case, Kinabalu Park is listed as one of the official

ecotourism sites in Malaysia and is often marketed as an ecotourism destination by the government and tour operators thus attracting ecotourists and achieving a 'ceiling effect'. This finding demonstrated an example of 'preaching to the converted' and interpretation programs in Kinabalu Park in this case act as a mediator that reinforces the visitors' already positive environmental attitudes. Moreover, the high level of environmental attitude might have also been influenced by 'social desirability', which is a type of response bias among the visitors. Environmental and conservation issues have long been at the center of attention globally and the visitors' response towards the attitude statements could have been influenced by the exposure of on-going environmental issues (Orams, 1997). As a result of being exposed to such issues, the visitors might have responded in a way that others will view favorably by providing a more 'desirable' and socially acceptable response instead of reflecting their actual beliefs regarding the attitudes (Orams, 1997; Kim *et al*., 2010).

Further analysis of the post-visit samples in this study showed that despite the attitude towards all 13 attitude statements was more positive among the repeat visitors compared to first time visitors, the difference was not significant. Considering the fact that visitors in Kinabalu Park had high level of positive environmental attitudes even prior to their experience, both the first time and repeat visitors also portrayed the same high level of positive environmental attitudes. Similarly, 'social desirability' and 'ceiling effect' might have affected the visitors' attitudes towards the environment. The visitors' attitude towards the statements might have also been influenced by their demographic characteristics considering the differences in the pre- and post-visit samples.

5.2.3 Behavioral Intention

In terms of behavioral intention, this study found that the visitors' response towards the behavioral statements was more positive among the post-visit samples in relation to six out of eight statements. However, the intention to engage in environmentally responsible behaviors did not differ significantly between the pre- and post-visit samples. Hence, the interpretive programs in Kinabalu Park did not influence the visitors' intention to engage in environmentally responsible behaviors despite the higher level of knowledge and attitude among the post-visit samples after being exposed to interpretation. These results are similar to previous studies that also observed no changes in the visitors' behavioral intention (Orams, 1997; Tubb, 2003; Lee & Moscardo, 2005). Further observation suggests that the indifference in the visitors' behavioral intention was due to the lack of interpretation that utilizes provocation. Tilden emphasized in his principles of interpretation that interpretation is not instruction but provocation (Tilden, 2007).

According to Ansel F. Hall (as cited in Tilden, 2007), the interpretation content should be able to provide the visitors with an idea about the place and provoke their desire to search for additional information that support that idea by themselves. Effective interpretation should elicit an emotional response from the visitors so that they would be able to see the connection between their behavior and the consequences and in turn foster their intention to behave responsibly (Jacobs & Harms, 2014). The visitors' emotions can be easily stimulated if they are exposed to emotional displays in the form of images of natural disasters, poaching, and more that highlighted the human impacts on the environment because it had been proven that such display of events can move a person's emotions and opinions compared to mere text-based interpretation focusing on knowledge (Jacobson, 2009). Environmental psychologists believed that emotion is an important antecedent in pro-environmental behaviors (Russell & Ashkanasy, 2011).

Multiple studies had proven the effectiveness of interpretation focused on visitors' emotion (Russell & Ashkanasy, 2011; Jacobs & Harms, 2014; Lim *et al*., 2016).

For example, Lim *et al*. (2016) research at Pahang National Park, Malaysia found that pictures of dead/injured Malayan tapir evoked a sense of anger from the students and influenced their intention to conserve tapir compared to those exposed to factual information only. Similarly, Jacobs & Harms (2014) study at the Tenerife Islands manipulated the interpretation content by comparing the whale to human in terms of their family structure and how similar their actions were to human. By doing so, it resulted in a stronger emotional response and intention to conserve the whales from the visitors that were exposed to interpretation focused on emotion compared to knowledge-based and responsibility-based interpretation. The findings in both studies suggest that provocation and stimulation of the visitors' emotions are important in eliciting a positive behavioral intention towards environmentally responsible behavior.

However, interpretation in Kinabalu Park did not incorporate the use of emotional displays or messages that could have otherwise stimulate the visitors' emotion towards conserving and preserving the park such as the declining number of endangered species within the park, the illegal poaching and illegal logging that occurs within the park alongside their impacts. Instead, interpretation in the park was more focused on the knowledge content in which it simply aimed at conveying factual information to the visitors. Simply conveying factual information without highlighting a more personal connection between the visitors and the intended information might have occurred as irrelevant to them and could not stimulate an emotional response from them. Hence, the visitors were unable to see the connection between their actions and the impacts they have on the environment due to the limited explanations provided.

Furthermore, Hines *et al*. (1986/1987) Model of Environmental Responsible Behaviors suggested that apart from knowledge and personality factors (attitude), there are other factors influencing a person's intention to engage in certain behaviors namely situational factors such as demographic background. In this study, the visitors' age, nationality, educational background, occupation, and annual income could have also influenced the visitors' intention to engage in environmentally responsible behaviors considering the significant differences in both samples in terms of their demographic characteristics. Apart from that, visitors have to also possess the knowledge on how to take actions in overcoming the problem/issue and the skill sets to do so. Moscardo & Woods (as cited in Tubb, 2003) emphasized the importance of raising the visitors' awareness on the environmental problems caused by tourism and informing them of their roles in order to encourage them to behave more responsibly. Jacobson (2009) highlighted that a person is less likely to take action if he/she perceives that their actions are too small and will not affect the issue/problem. Hence, providing information on the proper action strategies or behaviors they could undertake might help enhance their perceived ability to affect change (locus of control) by convincing them that even the smallest acts could help save the environment. However, the interpretation in Kinabalu Park rarely highlight the appropriate actions that visitors can take in contributing to the conservation effort thus leading to the indifferences in their intention to engage in environmentally responsible behaviors despite possessing the knowledge of the issues and proper attitude.

The indifference in the visitors' intention to engage in environmentally responsible behaviors even after being exposed to interpretation in Kinabalu Park further stressed the importance of incorporating the EROT qualities of interpretation along with provoking the visitors' emotions in order for it to be effective. Lim *et al*. (2016) study at the Pahang National Park differentiated the impacts of non-interpretive (information-

based programs) and interpretive (incorporated EROT qualities) on secondary school students' intention to engage in Malayan tapir education program as organizers. However, Lim *et al*. (2016) was focused secondary school students only while this study in Kinabalu Park targeted the visitors instead. Despite the difference in population selected, Lim *et al*. (2016) had further draw attention to the importance of incorporating EROT qualities in the design of interpretation for visitors' education. Further analysis of the post-visit samples showed that repeat visitation to Kinabalu Park had no impact on the visitors' intention to engage in environmentally responsible behaviors as the response to the behavioral statements between the first time and repeat visitors was similar. Similar to attitude, 'social desirability' might have had an impact on the visitors' responses towards the behavioral statements.

5.3 Summary

This chapter had discussed the findings in this research on the influence of interpretation in Kinabalu Park on the visitors' knowledge, attitude, and behavioral intention. The study had revealed that the interpretation in Kinabalu Park affected the visitors in terms of their knowledge in relation to the general facts and values about the park but not the scientific aspect. It was also found that interpretation in Kinabalu Park also influenced the visitors' attitude but only those related to general conservation issues. Despite the higher level of knowledge and attitude among the visitors in the post-visit samples, their intention to engage in environmentally responsible behaviors did not differ between visitors that were not yet exposed to interpretation (pre-visit) and those that had been exposed to interpretation (post-visit). This chapter also discussed the importance of designing interpretation according to the qualities of interpretation adapted from Ham's EROT framework/TORE model of thematic communication and Tilden's principles of interpretation (Ham, 1992; Tilden, 2007; Ham, 2013) and the

roles they played in influencing the visitors' knowledge, attitude, and behavioral intention in Kinabalu Park.

The mixed results yielded in this study were due to the fact that interpretation in Kinabalu Park did not fully adopt the qualities in the design of effective interpretation. The higher level of knowledge and attitude among the post-visit samples was mainly because of the thematic and organized nature of interpretation in Kinabalu Park. However, it was also observed that Kinabalu Park lacks interactive exhibits, relevant materials, and provoking displays as well as messages that could stir the visitors' emotional responses. Thus Kinabalu Park falls short when it comes to making interpretation enjoyable, relevant, and provoking for the visitors. Despite these findings, the visitors' responses to the knowledge, attitude, and behavioral statements were also most likely to be influenced by their demographic characteristics especially their age, nationality, educational background, occupation, and annual income as significant differences were observed among both samples.

CHAPTER 6: CONCLUSION

6.1 Introduction

Chapter 6 is the last chapter in this dissertation and it concludes the overall findings in this study on the influence of interpretation on the visitors' level of knowledge, attitude, and behavioral intention in Kinabalu Park. Following the conclusion is a set of recommendation to the park management on areas of interpretation in the park that can be improved and added based on the findings of this research.

6.2 The Existing Effectiveness of Interpretation in Kinabalu Park

The primary aim of this study is to establish the influence of interpretation in Kinabalu Park on the visitors' knowledge, attitude, and behavioral intention. Overall, this main objective of the study is achieved and it was found that interpretation in Kinabalu Park was successful in influencing the visitors' knowledge related to general facts and values and attitude related to general conservation issues but not in terms of other aspects. Furthermore, the study also revealed that the high level of knowledge and attitude among the visitors in the post-visit samples did not lead to changes in their intention to engage in environmentally responsible behaviors. Further observation discovered that the qualities adopted from Ham's EROT framework/TORE model of thematic communication and Tilden's principles of interpretation namely enjoyable, relevant, thematic and organized, and provocation had played profound roles in eliciting the changes that occurred in the visitors' knowledge, attitude, and behavioral intention after being exposed to interpretation in Kinabalu Park. The findings suggested that the interpretation in Kinabalu Park was thematic and organized but lacks in terms of the other qualities. Table 6.1 highlights the summary on the influence of the principles of interpretation on the visitors' knowledge, attitude, and behavioral intention.

Table 6.1: Summary on the influence of interpretation's qualities on the visitors' knowledge, attitude, and behavioral intention in Kinabalu Park

Qualities in interpretation / Indicators	Knowledge	Attitude	Behavioral intention
Enjoyable	*Lack of interactive materials used in the exhibits in communicating scientific information especially at the interpretive centres	*Interpretation at the *ex-situ* gardens allowed the visitors to observe and interact with actual plants and animals thus boosting their attitude towards preservation and conservation	–
Relevant	*Interpretation relied heavily on text-based interpretation but it did not incorporate meaningful information that could bridge the visitors' unfamiliarity with the information especially those related to scientific aspect	*Interpretation was meaningful only at the *ex-situ* gardens in which it adopted the use of examples but not at the interpretive centres *The text-based interpretation did not connect with the visitors on a more personal level	*Interpretation in Kinabalu Park did not provide visitors with the proper actions/strategies/behaviors that can be taken for them to help contribute to protecting the environment.
Organized & thematic	*The ready availibility and location of the general information about Kinabalu Park throughout the park in the form of interpretive panels and brochures helped intensified the visitors' ability to recall the information	*The interpretive centres were divided into different sections describing the different features of Kinabalu Park *Each *ex-situ* gardens aimed at communicating the different endemic floras and faunas of Kinabalu Park	–
Provocation	–	–	*The absence of emotional displays and messages led to the lack of emotional response from the visitors and the indifference in their intentions

In terms of knowledge, further assessment showed that the availability of the information related to the general facts and values throughout the park in the form of information panels, brochures, and exhibits at the interpretive centres help intensified the visitors' ability to recall the particular information. The location of the exhibits in the interpretive centres also contributed to the visitors' knowledge considering information about the park's general facts were depicted in the earlier sections of the interpretive centres in Kinabalu Park. The indifference in the visitors' knowledge regarding scientific aspects was attributed to the lack of interactive and relevant materials. The lack of interactive materials games, 3D exhibits, easily manipulated exhibits, puzzles, and audio tour affected the visitors' ability to stay focus on the information provided especially when it comes to scientific knowledge. Although enjoyable is not the chief aim in visitors' education, it plays a vital role in capturing and holding the visitors' attention, as they were non-captive audiences who were likely to switch attention if they do not find it enjoyable to follow.

Furthermore, Kinabalu Park relied heavily on text-based interpretation that was very factual in nature and contained mostly knowledge content. Simply communicating information especially the scientific aspect without attempting to be meaningful to the visitors made interpretation irrelevant and harder for them to comprehend. For instance, the information related to the geological process or altitudinal zones of the mountain were explained mostly in technical terms and were mostly knowledge-based information. Visitors that read through the interpretation might find the information less appealing and not meaningful to them due to the technical terms and they were not able to associate the information with something they were familiar with. The interpretation did not use techniques such as examples, analogies, metaphors, and comparisons that could have otherwise bridge the visitors' unfamiliarity with the scientific explanation by making references to something the visitors are already aware of.

The positive nature in the visitors' attitude towards general conservation issues observed in the post-visit samples was attributed to the thematic and organized nature of interpretation in Kinabalu Park. Interpretation in Kinabalu Park was focused on the topic of preservation and conservation by highlighting the park's endemic features. The interpretation was further focused on the theme of protecting and preserving these endemic features of Kinabalu Park to support the topic of preservation and conservation. According to Ham (1992), majority of the problem with interpretation is that it has a topic but lacks in terms of theme that could have otherwise provide the interpretation with a sense of direction. In other words, the information can sometimes be all over the place instead of following a proper direction or flow that helps facilitate the visitors' ability to understand the information. In Kinabalu Park, visitors were able to distinguish the messages about preservation and conservation due to the interpretation being focused solely on delivering visitors with facts related to the park's unique features. Furthermore, the various interpretation programs offered in the park were organized in a way that supplemented the idea on the importance to preserve and conserve the park. For instance, the interpretive centres were divided into different thematic sections focusing on the different features of Kinabalu Park while each *ex-situ* garden was dedicated to different endemic plants and faunas found in the park. The fact that interpretation including the visitor centres, *ex-situ* gardens, and guided walk were developed around the theme of protecting and preserving the park's unique features made it easier for visitors to follow and eventually understand the underlying message.

Although Kinabalu Park lacks interactive materials in its interpretation, the existence of the *ex-situ* gardens provided visitors with the opportunity to interact with actual objects namely the endemic plants and animals. Hence, being able to interact and observed the actual plants and animals made the experience more enjoyable for the visitors and further helped shift their attitude towards preserving the park's floras and

faunas. However, interpretation in Kinabalu Park did not connect with the visitors personally thus rendering it irrelevant to them. This further resulted in the inability of the interpretation to influence the visitors' attitude towards issues other than general environmental conservation. Ham (1992) believed that visitors would pay attention to information that concerns them especially if it affects their values, convictions, life, and anything related to their personality and experience. Very few of the information in Kinabalu Park tried to include the visitors as part of the interpretation.

Despite the high level of knowledge and attitude among the visitors after being exposed to interpretation, their intention to engage in environmentally responsible behaviors remained unaffected. This was most likely due to the nature of interpretation in the park that was mostly aimed at delivering factual information. Hence, despite the fact that visitors were able to grasp the main message of preservation and conservation's importance, the absence of stimulating interpretation that can provoke an emotional response from the visitors led to the lack of understanding among them on the connections between their behavior and the environment. It has been established that emotions play a significant role in influencing visitors' intention to engage in environmentally responsible behavior and further behavior change (Russell & Ashkanasy, 2011). Moreover, visitors have to possess the knowledge on proper actions to be taken apart from knowledge of the issue and attitude in order to engage in environmentally responsible behaviors (Hines *et al*., 1986/1987). Despite having the knowledge on the importance of Kinabalu Park and experiencing a change in their attitude towards the environment, the absence of the knowledge on how to take action and how to contribute in protecting the environment also resulted in the indifference of their intentions.

As highlighted in the previous model in predicting environmentally responsible behaviors among visitors, other factors might have played a role in influencing their knowledge, attitude, and behavioral intention in Kinabalu Park considering there were significant differences between the pre- and post-visit samples in their demographic characteristics. However, this study only took into account the overall impact of interpretation on the visitors' knowledge, attitude, and behavioral intention. Repeat visitation was also found to have a significant influence in the visitors' knowledge. There were also a number of other factors that influences a person's decision to engage in certain behaviors apart from knowledge and attitudes. Based on the Theory of Planned Behavior (TPB), a person's attitude towards the behavior, subjective norm, and perceived behavioral control are also determinants of their intention to engage in specific environmental behaviors and their actual behavior change (Ajzen, 1991). Apart from that, 'social desirability' and 'ceiling effect' might have also affected the study.

The outcome of this research work further emphasized on the importance of the qualities of interpretation adopted in this study based on the EROT framework/TORE model of thematic communication and the principles of interpretation namely provocation. Several past studies in Malaysian national parks had also highlighted the importance of these qualities in the design of effective interpretation (Amin *et al*., 2014; Lim *et al*., 2016). The study conducted in Bako National Park tested the impact of interpretation among visitors that took part in guided tours in the park. The guided tour was designed according to Ham's TORE model of thematic communication (Amin *et al.*, 2014). On the other hand, the study carried out at Pahang National Park tested the impact of interpretation designed based on the EROT framework on secondary school students' intention to conserve Malayan tapir (Lim *et al*., 2016). Compared to the two prior studies, this study in Kinabalu Park tested the impacts of interpretation on visitors and was focused on interpretation as a whole in Kinabalu Park.

Based on Ham (2013) TORE model of communication, interpretation in Kinabalu Park managed to fulfill the most important aspect of the model which is organized and thematic. The park management was able to develop interpretive activities in Kinabalu Park that revolved around the theme of protecting and preserving the endemic features of the park. The park management's focus on delivering visitors with information related to the endemic features the park can be seen through the earlier interpretive facilities that were set up within Kinabalu Park. The *ex-situ* gardens were among the earliest interpretive facilities that were developed namely the Botanical Garden, Orchid Conservation Centre, Tropical Garden, and Butterfly Farm that were all opened in the 1980s. The focus of interpretation in Kinabalu Park was clear from the development of these *ex-situ* gardens and the park management was able to organize the method of delivering the information by defining the different purpose of each of these gardens.

6.3 Recommendation

The findings in this study provided evidence on the extent of the impact interpretation in Kinabalu Park had on the visitors understanding towards the environment. It can be used as a base to develop a more comprehensive and enjoyable interpretive programs that will influence not just the visitors' understanding towards the environment but also increase their experience in the park. Increased satisfaction among the visitors from their experience influences their level of acceptance towards pro-environmental attitudes and behaviors (Ross & Wall, 1999; Ballantyne & Packer, 2011). Although the primary aim of establishing the park is for conservation purpose, Sabah Parks also highlights the need to develop sustainable ecotourism within the parks under its management (Sabah Parks, 2011). Education and interpretation are the core part of ecotourism hence there is a need for the park management to improve the condition of the interpretive programs in Kinabalu Park. The positive impact of interpretation on the visitors' knowledge, attitude, and intention to engage in

environmentally responsible behaviors will help in the efforts of mitigating the negative impacts of tourism on the environment.

Based on the results yielded in this research, it can be concluded that interpretation has to adopt the qualities of interpretation into the designing of the interpretive programs in order to achieve the goal of interpretation, which is education. Ham revised the EROT framework into TORE model of thematic communication in which the theme comes first within interpretation. Once the theme is developed, the focus can be shifted to creating interpretation that supports the theme in an organized, enjoyable, and relevant manner. Based in the EROT framework, interpretation in Kinabalu Park has all the qualities emphasized by Ham. However, interpretation in the park only fulfilled the qualities of being thematic and organized while it did not fully incorporate enjoyable and relevant materials into the interpretation. Furthermore, Tilden (2007) also emphasized on the need for interpretation to be more than just an instruction but to also provoke the visitors' emotional responses yet interpretation in Kinabalu Park lacks emotional content.

Hence, this study provided evidence that the interpretation in Kinabalu Park has the potential to be developed even more based on TORE model of thematic communication considering interpretation in the park was already thematic and organized in a manner that supported the theme of conserving and preserving the park's unique features. Improvements have to be made to the park's interpretation especially by making it more enjoyable, relevant and provoking in order to influence not just the visitors' knowledge and attitude but also encourage them to adopt environmentally responsible behaviors.

6.3.1 Enjoyable (E)

Interpretation in Kinabalu Park was enjoyable but only to a certain extent. The *ex-situ* gardens displayed actual objects such as plants, animals, butterflies, and more hence

it provided visitors with the opportunity to immediately engage with their surrounding after being exposed to interpretation. On the other hand, interpretation at the visitor centers in the park especially Poring Visitor Centre relied heavily on text-based interpretation and illustration. Despite the use of illustrations, the text-based interpretation in Kinabalu Park focused mainly on delivering factual information and knowledge to the visitors without incorporating interactive materials or relevant information. As non-captive audiences, the visitors in Kinabalu Park were more likely to pay less attention to interpretive exhibits that reminded them of formal education (Ham, 1992).

Kinabalu Natural History Gallery on the other hand serves as an excellent example of an effective interpretive centre due to the interactive materials incorporated. For example, the centre displayed various rock samples pertaining to the park's geology, preserved animals displayed in glass casings representing actual animals that are endemic to the park, locally made handicrafts along with musical instruments, and hands-on exhibits that enabled the visitors to do something such as microscopes that allow the visitors to maneuver the object (Figure 6.1). Poring Visitor Center could adopt similar interactive materials along with the text-based interpretation because the centre only utilized a diorama and illustrations along with its text-based interpretation.

Figure 6.1: (a) Hands-on exhibits (left) and (b) preserved leave samples (right) at the Kinabalu Natural History Gallery

Furthermore, the Sabah Parks Exhibition Hall also had interactive materials such as rock samples, preserved leave and animal samples, and local handicrafts but the interpretive exhibits mostly in the form of information panels were quite old. The interpretive exhibits at the exhibition hall should be updated and reflects the current condition of the park. Apart from adopting similar form of interactive interpretation at Poring Visitor Centre, the park management could also introduce other new forms of interactive interpretation that are visually enjoyable, participatory, and could retain the visitors' interest. Visitors are more likely to be able to retain the information given if they can do something such as touching, smelling, turning, and manipulating the displays (Domroese & Sterling, 1999). For example, the interpretation at the visitor centres could pose questions to the visitors and stimulate them into thinking by using games, puzzles, and quizzes. The Balmaha Visitor Center at the Loch Lomond & Trossachs National Park, UK installed an interpretive section that had quizzes for the visitors and the answers are revealed by turning the interactive displays over (Figure 6.2).

Figure 6.2: Quizzes in the form of interactive displays at the Balmaha Visitor Center in Loch Lomond & Trossachs National Park, UK

Source: "Balmaha Visitor Center" (2017)

Enjoyable interpretation is important in order to attract visitors to further explore the information presented to them. While text-based interpretation even without interactive materials has the potential to attract adult visitors to read them, the same does not apply to children visitors. According to Tilden (2007), park management has to adopt an entirely different approach in interpretation when it comes to addressing the children visitors. In Kinabalu Park, a children's play area or an activity station could be set up inside the Kinabalu Natural History Gallery that provides the children visitors with the opportunity to engage in environmental learning in a fun and interesting way instead of reading through the materials inside the centre. For example, the Lassen Volcanic National Park, USA recently introduced two learning stations exclusively for children visitors for them to engage in hands-on activities related to the park's natural history ("New Children's Exhibits", 2016). Among the activities presented at the learning stations are drawing insects, examining skulls, challenging them into evaluating their choices related to energy usage (Figure 6.3).

Figure 6.3: A section for children's activity at the Lassen Volcanic National Park Visitor Center, USA

Source: "New Children's Exhibits" (2016)

Another example of interactive interpretation that could be introduced to Kinabalu Park is by using easily manipulated displays that could trigger visitors' interest. For instance, an interactive exhibit called Peek-A-Boo tables was installed at the Brooklyn Botanic Garden Visitors Centre, New York, USA and the exhibits allow the visitors to make use of their multisensory elements while manipulating the displays ("Electrosonic Installs Interactive Exhibits", 2012). Visitors can lift the flaps to further learn about the plants and animal species in the garden. Upon lifting the flaps, they are presented with a short film on a small LCD screens about specific species. A button is also present allowing the visitors to hear the sound and smell the fragrances of the garden (Figure 6.4). This particular exhibit is technologically advanced and might be expensive to develop but it does not have to use such technology in order to be effective. Sabah Parks could pose the visitors with similar questions or quizzes and answers could be installed under the flaps instead of displaying LCD screens. Such methods would still allow visitors to manipulate the displays instead of just reading through the text-based interpretation.

Figure 6.4: Interactive exhibit at the Brooklyn Botanic Garden Visitors Center, New York, USA

Source: "Electrosonic Installs Interactive Exhibits" (2012)

Apart from using hands-on objects and 3D exhibits, interpretation inside the visitor centre could also be enhanced by incorporating the use of audio tours. Studies have shown that visitors paid less attention to text-based interpretation and spend very little time viewing them (Sandifer, 1997; Chiozzi & Andreotti, 2001; Novey & Hall, 2006). Implementing audio tours can be expensive but multiple studies had proven the ability in attracting visitors compared to text-based interpretation. For example, Novey & Hall (2006) differentiated the impacts of learning between audio users and non-audio users at Carlsbad Caverns National Park, New Mexico USA. Despite the fact that there was no difference in the level of knowledge between both groups, visitors that used the audio tours found it to be enjoyable and engaging. Furthermore, it was also observed that the visitors spent more time listening to the narration (Novey & Hall, 2006).

6.3.2 Relevant (R)

Apart from enjoyable, interpretation also has to be relevant to the visitors in a way that is meaningful and personal so that they can relate to the information provided. Scientific explanation tends to be overloaded with technical terms that visitors are not familiar with. Interpretation in Kinabalu Park should make such information relevant to the visitors by bridging the unfamiliar with something they visitors are familiar with. The park management in Kinabalu Park should use more examples, analogies, and comparisons in their interpretation especially in communicating scientific information to the visitors. This can be done by first providing the visitors with the intended information and further bridge that information with something the visitors already know.

Besides meaningful, interpretation in Kinabalu Park should also be personal in order for it to be relevant. The park management can use methods such as self-referencing and labeling in their interpretation. Such methods are deemed effective because it puts the

visitors in the context of the information provided. Tilden (2007) proposed that the visitors' chief interest is always about something that concerns them and Ham (1992) agreed that interpretation that touches the visitors' circle of lives such as themselves, families, friends, values, convictions, and more will always appeal and appear important to them. The interpretation in Kinabalu Park could be personal by giving the visitors opportunity to think about themselves with putting the word "you" in the interpretation or by labeling the visitors into groups that they can associate or dissociate with (Figure 6.5).

Figure 6.5: An interpretive panel at the Hopewell Rocks Interpretive Center, Canada

Source: "Hopewell Rocks Interpretive Center" (2017)

For instance, before explaining about the geological landscape of Mount Kinabalu, the interpretation could start with a simple enquiry asking the visitors with a question like "have you ever seen a mountain with so many peaks protruding like Mount Kinabalu is?' and then explain about the how nature turn the mountain into what it is.

Similar methods could be used in the interpretive materials throughout the park. For example, a study by Jacobs & Harms (2014) at Las Galletas, Tenerife Islands found that interpretation that are personal to the visitors influenced their intention to conserve whales compared to interpretation that focused only on delivering factual knowledge and highlighting human's impacts on the whales. The interpretation focused on emotion content highlighted the similarity between whales and humans in terms of the familial structure and bond. Some of the lines used during the whale watching tour were *"They are particularly intelligent mammals and, like us, they place a lot of value on their families…"* and *"when the older mothers stop having children, they act as midwives by helping their children to nurse their grandchildren"* (Jacobs & Harms, 2014). The comparison between whales and humans in terms of its familial bond made interpretation relevant to the visitors because the term family is personal to them and it was something that they cared about.

6.3.3 Provocation (P)

In order to provoke an emotional response from the visitors, the park management could also develop interpretive signage with strong messages on the value of the park. Although several messages were found throughout the park, the park management should incorporate stronger messages especially about what they can do to help protect the environment instead of just highlighting what they should not do while in Kinabalu Park. For example, bats in the Lick Creek Cave of the Beaverhead-Deerlodge National Forest, Montana, USA are facing the danger of being completely wiped out due to fungus infestation ("Beaverhead-Deerlodge National Forest Bat Panels", 2017). The US Forest Service developed a series of thematic interpretive panels aiming at informing the visitors to the cave of the perils faced by the bats and what they can do in order to reduce the spreading of the fungus (Figure 6.6).

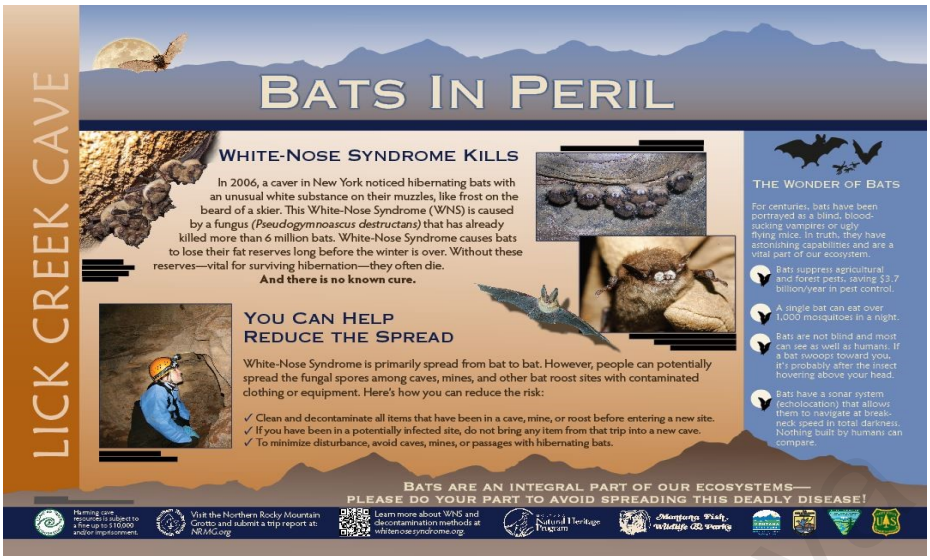

Figure 6.6: An interpretive panel in Beaverhead-Deerlodge National Forest, Montana, USA dedicated at communicating the dangers faced by bats

Source: "BDNF Bat Panels" (2017)

Although Kinabalu Park's interpretation was not focus on instruction, the knowledge-based interpretation portrayed in the various interpretive programs was unable to provoke an emotional response from the visitors. Instead of just conveying factual information, the park management should also focus on using interpretation approach that emphasizes their responsibility towards the environment and provoke emotional responses from them. Interpretation that highlights the connection between the visitors' action and their impacts on the environment and accentuates the positive emotion in them is more effective in influencing visitors' behavioral intention compared to interpretation that focuses solely on transferring knowledge to the visitors (Jacobs & Harms, 2014).

The park management could adopt the use of emotional displays and messages in order to evoke emotions such as anger, sadness, and fear. For example, the park could highlight the issues of illegal poaching of animals and logging within the boundary of Kinabalu Park and the consequences of those events. Pictures or videos related to the issues could be displayed within the interpretive centres or the *ex-situ* gardens. It has

been proven that the manipulation of emotional displays and messages (Russell & Ashkanasy, 2011; Lim *et al*., 2016) has the potential to elicit strong emotions from the visitors. Park management in Kinabalu Park could include as part of its interpretive exhibits the negative impacts of illegal logging by displaying pictures of illegally logged areas and the subsequent impacts such as loss of habitats and landslide. Strong messages could also be incorporated along with the displays. For instance, it would also be effective to provide statistics on the declining number of endangered species inside Kinabalu Park and the impacts it would have if these species become extinct. Revealing emotional displays and messages to the visitors would most likely influence their attitude towards the issues highlighted and prompts them to do something to help alleviate those problems.

6.3.4 Additional Recommendations

It is to be noted that the nine nature trails at the Park HQ and the Canopy Walkway in Poring substation should also be improved in terms of interpretation. As mentioned in Chapter 4, interpretation for the nature trails and Canopy Walkway were very limited. Interpretation at the nature trails could only be found in the form of an information sheet describing the trails map and brief introduction about each trails. A guided walk was also utilized but only for Silau-silau trail and there were no interpretive materials along all nine trails. On the other hand, the Canopy Walkway also did not have any interpretive materials except for an introductory sign at the entrance. In this case, the park management could install information panels along the trails or shelters and the Canopy Walkway highlighting the point of interests or perhaps a brochure or leaflet could be handed out to the visitors as a form of guidance especially at the nature trails.

Furthermore, introductory signs could be installed at each of the nine trails' entrances. An introductory sign is important as it has the ability to attract visitors to

further explore the trails (Morales, 1992, as cited in CCAD-SICA, 2005). The introductory sign should include information about the trail especially a brief description of the trail, the length, the estimated time required, and a map highlighting the points of interests along the trail. The interpretive programs in Kinabalu Park have the ability to positively influence the visitors' awareness and understanding of the environment and its importance but improvements must be made to the existing programs in order for it to be a successful visitor management tool in reducing the negative impacts to the environment.

Future interpretation studies in Kinabalu Park could differentiate the impact between different interpretation programs on the visitors' knowledge, attitude, and behavioral intention in order to investigate which of the interpretive programs in the park have more positive impact in the visitors. Furthermore, considering this study only covers the non-personal interpretation in Kinabalu Park, future studies could also include personal interpretation especially the influence of tour guides on the visitors as part of the analysis. Another limitation to this study is that it did not take into account the visitors' demographic profiles in analyzing interpretation's influence on the visitors' knowledge, attitude, and behavioral intention. Thus future possible research could assess how the visitors' demographic profiles play a role in influencing the visitors' receptiveness towards interpretation. Although the impact of repeat visitation was included in the analysis, the influence of repeat visitation was not part of the research objective and the study only took into account the influence of interpretation on the visitors' knowledge, attitude, and behavioral intention. However, further research could analyze the influence of repeat visitation to Kinabalu Park on the respective indicators.

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LIST OF PUBLICATIONS AND PAPERS PRESENTED

No.	Title	Conference/ Seminar/Journal	Date	Place
1	The effectiveness of environmental interpretation in ecotourism: The case of Kinabalu Park	Proposal defence	30th August 2014	Faculty of Built Environment, University Malaya
2	The effectiveness of environmental interpretation in influencing visitors' knowledge in Kinabalu Park	10th ASEAN Postgraduate Seminar	15th November 2016	Faculty of Built Environment, University Malaya

APPENDIX

APPENDIX A: Pre- and post-visit questionnaire surveys

Survey number:

Date:

Visitors' pre-visit questionnaire survey

Dear respondent,

I am a Master's Degree student from Faculty of Built Environment, Universiti Malaya Kuala Lumpur. I am currently conducting a study on the effectiveness interpretation programs adopted in Kinabalu Park in influencing tourists' knowledge, attitude and behaviour.

This survey consists of quiz-like questions and also questions regarding Kinabalu Park.

The information obtained from this survey will remain confidential and will be used solely for research purposes.

This survey will take approximately 15 minutes of your time.

Section A: Respondent's Background

1. Age
   - ☐ 16 – 25 years old
   - ☐ 26 – 35 years old
   - ☐ 36 – 45 years old
   - ☐ 46 – 55 years old
   - ☐ 56 – 65 years old
   - ☐ 66 years old and above

2. Gender
   - ☐ Male
   - ☐ Female

3. What is your nationality?
   - ☐ Malaysian
   - ☐ ASEAN
   - ☐ Asian, but not ASEAN
   - ☐ African
   - ☐ Others, _____
   - ☐ Australian & Oceania
   - ☐ European
   - ☐ North American
   - ☐ South American

4. Highest education
   - ☐ Secondary school
   - ☐ Diploma
   - ☐ Bachelor's degree
   - ☐ Master's degree
   - ☐ PhD.
   - ☐ Others, _____

5. Occupation
   - ☐ Student
   - ☐ Unemployed
   - ☐ Retired
   - ☐ Home duty
   - ☐ Self-employed
   - ☐ General worker
   - ☐ Clerical/supervisory
   - ☐ Professional
   - ☐ Executive
   - ☐ Managerial
   - ☐ Others, _____

6. What is your estimated annual income before tax? (Currency: _____)
   - ☐ NA
   - ☐ Below 6,000
   - ☐ 6,000 – 12,000
   - ☐ 12,000 – 35,999
   - ☐ 36,000 – 59,999
   - ☐ 60,000 – 95,999
   - ☐ 96,000 – 119,999
   - ☐ 120,000 and above

Section B: Visitation profile

7. Are you in Kinabalu Park for the first time?
   - ☐ Yes
   - ☐ No

8. Which station(s) do you plan to visit? **(You may choose more than one answer)**
   - ☐ Park HQ
   - ☐ Substation Poring Hot Spring
   - ☐ Substation Mesilau
   - ☐ Substation Nalapak
   - ☐ Substation Serinsim
   - ☐ Substation Monggis
   - ☐ Substation Sayap

9. Who are you visiting the park with? **(Please choose one answer only)**

☐ By myself
☐ Family/relatives
☐ Friends
☐ School/college trip
☐ Company trip
☐ Tour operator
☐ Free-independent
☐ Free & easy
☐ Business/work-related trip
☐ Others, _____

10. How long is your visit?

☐ Day trip
☐ Overnight
☐ 2 nights
☐ 3 nights
☐ 4 nights
☐ More, _____ nights

11. Types of accommodation **(You may choose more than one answer)**

☐ Not applicable

Inside Kinabalu Park

☐ Sutera Sanctuary Lodge (SSL)
☐ Laban Rata

Outside Kinabalu Park

☐ Hostel
☐ Lodge
☐ Homestay
☐ Resort
☐ Hotel
☐ Others, _____

12. Where did you get the information about Kinabalu Park? **(You may choose more than one answer)**

☐ Internet
☐ Brochures
☐ Newspapers
☐ Friends
☐ Family/relatives
☐ TV programs
☐ Others, _____

13. What are your motivations for visiting Kinabalu Park? **(Please choose three answers only)**

☐ Recreational
☐ Local people's culture
☐ Knowledge/information
☐ Landscape/Scenery
☐ Therapeutic reasons
☐ Spiritual reasons
☐ World Heritage Site
☐ National Park
☐ Others, _____

14. Prior to coming here, how well-prepared were you for this trip?

☐ Extremely prepared
☐ Well-prepared
☐ Less prepared

Section C: Knowledge

1. Please answer the question below:

No.	Statements	TRUE	FALSE	NOT SURE
1	Kinabalu Park is a World Heritage Site in the natural category declared by the UNESCO World Heritage Committee.			
2	Mount Kinabalu is the highest mountain between the Himalayas and New Guinea.			
3	Kinabalu Park is a hotspot for plant biodiversities containing over 5000 to 6000 vascular plants.			
4	There are five stations in Kinabalu Park.			
5	Climbing Mount Kinabalu requires two days and one night.			
6	Low's Peak is the highest peak on top of Mount Kinabalu.			
7	Mount Kinabalu is considered sacred by the local Dusun-Kadazan people.			
8	Mount Kinabalu is still growing at the rate of 5mm annually.			
9	Kinabalu Park also acts as the Centre for Plant Biodiversity for Southeast Asia.			
10	Many of the animals inside Kinabalu Park are threatened and vulnerable to extinction.			
11	Entrance fee to Kinabalu Park is also called Conservation fee.			
12	Sabah Parks is responsible for the management and conservation of Kinabalu Park.			

Section D: Attitude towards Kinabalu Park

1. Please rate your opinions based on the statements below:

No.	Statements	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	Kinabalu Park is a special place.					
2	I feel it is important that floras and faunas are preserved.					
3	Human's presence in Kinabalu Park can be harmful to the environment.					
4	I feel the need to behave more responsibly while in Kinabalu Park.					
5	The park's authority plays an important role in protecting the park.					
6	The park's authority plays an important role in managing the park.					
7	Tourims plays an important role in the conservation efforts.					
8	I respect the cultural features of Kinabalu Park.					
9	The local culture is an important part of Kinabalu Park.					
10	I respect the natural landscapes of Kinabalu Park.					
11	I feel anxious when thinking about the threats to the environment.					
12	Mount Kinabalu is an important element to Kinabalu Park.					
13	Floras and faunas should be protected for economic purposes.					

2. What is your view of Kinabalu Park? **(Please choose two out of five statements below)**
   - ☐ A place for people to enjoy the scenery
   - ☐ A place where people can observe nature and culture
   - ☐ A place where endangered species live safely
   - ☐ A place for environmental protection
   - ☐ A place where people live and work

Section E: Visitors' Behavior

1. Please rate your opinions based on the statements below:

No.	Statements	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	Donate money to environmental organizations concerned with the protection and improvement of the environment.					
2	Participate in volunteer programs or activities involving the environment.					
3	Participate in interpretive activities in Kinabalu Park.					
4	Hire an eco-friendly tour operator.					
5	Pay more for an eco-friendly trip.					
6	Join organizations concerned with the environment.					
7	Reduce, reuse, and recycle at home.					
8	Inform friends and families about the importance of Kinabalu Park.					

Thank you!

UNIVERSITY OF MALAYA

Survey number:

Date:

Visitors' post-visit questionnaire survey

Dear respondent,

I am a Master's Degree student from Faculty of Built Environment, Universiti Malaya Kuala Lumpur. I am currently conducting a study on the effectiveness interpretation programs adopted in Kinabalu Park in influencing tourists' knowledge, attitude and behaviour.

This survey consists of quiz-like questions and also questions regarding Kinabalu Park.

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   - ☐ 36 – 45 years old
   - ☐ 46 – 55 years old
   - ☐ 56 – 65 years old
   - ☐ 66 years old and above

2. Gender
   - ☐ Male
   - ☐ Female

3. What is your nationality?
   - ☐ Malaysian
   - ☐ ASEAN
   - ☐ Asian, but not ASEAN
   - ☐ African
   - ☐ Others, _____
   - ☐ Australian & Oceania
   - ☐ European
   - ☐ North American
   - ☐ South American

4. Highest education
   - ☐ Secondary school
   - ☐ Diploma
   - ☐ Bachelor's degree
   - ☐ Master's degree
   - ☐ PhD.
   - ☐ Others, _____

5. Occupation
   - ☐ Student
   - ☐ Unemployed
   - ☐ Retired
   - ☐ Home duty
   - ☐ Self-employed
   - ☐ General worker
   - ☐ Clerical/supervisory
   - ☐ Professional
   - ☐ Executive
   - ☐ Managerial
   - ☐ Others, _____

6. What is your estimated annual income before tax? (Currency: _____)
   - ☐ NA
   - ☐ Below 6,000
   - ☐ 6,000 – 12,000
   - ☐ 12,000 – 35,999
   - ☐ 36,000 – 59,999
   - ☐ 60,000 – 95,999
   - ☐ 96,000 – 119,999
   - ☐ 120,000 and above

Section B: Visitation profile

7. Are you in Kinabalu Park for the first time?
   - ☐ Yes
   - ☐ No

8. Which station(s) do you plan to visit? **(You may choose more than one answer)**
   - ☐ Park HQ
   - ☐ Substation Poring Hot Spring
   - ☐ Substation Mesilau
   - ☐ Substation Nalapak
   - ☐ Substation Serinsim
   - ☐ Substation Monggis
   - ☐ Substation Sayap

9. Who are you visiting the park with? **(Please choose one answer only)**

☐ By myself
☐ Family/relatives
☐ Friends
☐ School/college trip
☐ Company trip
☐ Tour operator
☐ Free-independent
☐ Free & easy
☐ Business/work-related trip
☐ Others, _____

10. How long is your visit?

☐ Day trip
☐ Overnight
☐ 2 nights
☐ 3 nights
☐ 4 nights
☐ More, _____ nights

11. Types of accommodation **(You may choose more than one answer)**

☐ Not applicable

Inside Kinabalu Park

☐ Sutera Sanctuary Lodge (SSL)
☐ Laban Rata

Outside Kinabalu Park

☐ Hostel
☐ Lodge
☐ Homestay
☐ Resort
☐ Hotel
☐ Others, _____

12. Where did you get the information about Kinabalu Park? **(You may choose more than one answer)**

☐ Internet
☐ Brochures
☐ Newspapers
☐ Friends
☐ Family/relatives
☐ TV programs
☐ Others, _____

13. What are your motivations for visiting Kinabalu Park? **(Please choose three answers only)**

☐ Recreational
☐ Local people's culture
☐ Knowledge/information
☐ Landscape/Scenery
☐ Therapeutic reasons
☐ Spiritual reasons
☐ World Heritage Site
☐ National Park
☐ Others, _____

14. Prior to coming here, how well-prepared were you for this trip?

☐ Extremely prepared
☐ Well-prepared
☐ Less prepared

Section C: Knowledge

1. Please answer the question below:

No.	Statements	TRUE	FALSE	NOT SURE
1	Kinabalu Park is a World Heritage Site in the natural category declared by the UNESCO World Heritage Committee.			
2	Mount Kinabalu is the highest mountain between the Himalayas and New Guinea.			
3	Kinabalu Park is a hotspot for plant biodiversities containing over 5000 to 6000 vascular plants.			
4	There are five stations in Kinabalu Park.			
5	Climbing Mount Kinabalu requires two days and one night.			
6	Low's Peak is the highest peak on top of Mount Kinabalu.			
7	Mount Kinabalu is considered sacred by the local Dusun-Kadazan people.			
8	Mount Kinabalu is still growing at the rate of 5mm annually.			
9	Kinabalu Park also acts as the Centre for Plant Biodiversity for Southeast Asia.			
10	Many of the animals inside Kinabalu Park are threatened and vulnerable to extinction.			
11	Entrance fee to Kinabalu Park is also called Conservation fee.			
12	Sabah Parks is responsible for the management and conservation of Kinabalu Park.			

Section D: Attitude towards Kinabalu Park

1. Please rate your opinions based on the statements below:

No.	Statements	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	Kinabalu Park is a special place.					
2	I feel it is important that floras and faunas are preserved.					
3	Human's presence in Kinabalu Park can be harmful to the environment.					
4	I feel the need to behave more responsibly while in Kinabalu Park.					
5	The park's authority plays an important role in protecting the park.					
6	The park's authority plays an important role in managing the park.					
7	Tourims plays an important role in the conservation efforts.					
8	I respect the cultural features of Kinabalu Park.					
9	The local culture is an important part of Kinabalu Park.					
10	I respect the natural landscapes of Kinabalu Park.					
11	I feel anxious when thinking about the threats to the environment.					
12	Mount Kinabalu is an important element to Kinabalu Park.					
13	Floras and faunas should be protected for economic purposes.					

2. What is your view of Kinabalu Park? **(Please choose two out of five statements below)**
   - ☐ A place for people to enjoy the scenery
   - ☐ A place where people can observe nature and culture
   - ☐ A place where endangered species live safely
   - ☐ A place for environmental protection
   - ☐ A place where people live and work

Section E: Visitors' Behaviour

1. Please rate your opinions based on the statements below:

No.	Statements	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	Donate money to environmental organizations concerned with the protection and improvement of the environment.					
2	Participate in volunteer programs or activities involving the environment.					
3	Participate in interpretive activities in Kinabalu Park.					
4	Hire an eco-friendly tour operator.					
5	Pay more for an eco-friendly trip.					
6	Join organizations concerned with the environment.					
7	Reduce, reuse, and recycle at home.					
8	Inform friends and families about the importance of Kinabalu Park.					

Thank you!

APPENDIX B: An example of how the observation checklist was used

Quality of interpretation	Interpretive centres	Ex-situ gardens	Nature trails	Brochures/ leaflets
Enjoyable				
1. Does interpretation in Kinabalu Park utilize interactive materials? microscope 3D samples →	Park HQ, yes but very limited. Poring – none	X	NA	NA.
2. Was there an audio tour?	NO. X	X	X	NA
3. Can the visitors manipulate the exhibits?	yes some at Park HQ – microscopes.	X	X	NA.
4. Was music utilize as a background sound?	X	X (outdoor)	X (outdoor)	NA.
5. Does it contain actual objects (plants & animals)?	NA – only preserved samples.	✓	✓	NA
6. Was there any game for the visitors to play with?	X	X	X	NA
Relevant				
1. Does the interpretation use examples, metaphors, analogies, or comparisons?	yes, but very limited. (illustrations).	yes (limited) @ Botanical Garden. (used examples).	there is no non-personal interpretive materials @ the trails.	yes (limited). – very few brochures & leaflets @ the park.
2. Was there too many technical terms used? esp @ KNHG, park HQ.	yes – esp. in explaining scientific infos.	no, it was balanced with the use of examples.		– most were related to fees / regulations & rules.
3. Does the interpretation put the visitors in the situation such as asking them of their opinions or putting them in a situation?	X	X		X
4. Does the interpretation touch the visitors' circle of lives such as themselves, families, values, beliefs, and wellbeing?	X	X		X
Organized & thematic				
1. Does interpretation has a topic? → preservation & conservation.	✓	✓	no non-personal interpretive materials along the trails.	NA.
2. If yes, was there any themes used in the interpretation related to the topic?	✓ protecting & preserving the endemic species in KNP.	✓		NA
3. Was the information presented organized in a way that supports the topic and theme?	✓	✓		NA
4. Was interpretation in the park organized in a clear manner that is easy for the visitors to follow?	✓	✓		NA.
Provocation				
1. Does interpretation in Kinabalu Park contain any emotional messages directed at the visitors?	X – only message	X	no non-personal interpretive materials along the trails.	X
2. Does it utilize emotional displays that depict the dangers faced by the park such as images of illegally-logged area or pictures of dead/injured animals due to illegal poaching within the park?	X do not littering in the park.	X		X

APPENDIX C: Brochure of interpretive programs at Park HQ

Look especially for these groups of plant:

Nepenthes or pitcher-plants are among the most interesting plants found in the garden. At least five species can be seen here.

At any time, you will see some orchids flowering. Don't be disappointed though to find most have tiny flowers. It's always a matter of luck to see those few with bigger and more attractive flowers.

The bright colour of *Rhododendrons* make them easy to notice. Their flowers are usually seen at eye-level but sometimes also high up on the trees.

The flowers of gingers can be very attractive. The flowers can be on the ground, along or at the end of the stems, or on separate stems near the plant depending on thte species. Note how ginger leaves are arranged in the picture.

Many aroids have heart-shape leaves. But if broken they can cause severe irritation to the skin, so be careful.

It is interesting to see the figs in many different size and colours. The figs can be on the ground, along the main trunk, or among the leaves of the fig tree. Figs are among the main source of food to animals in the forest.

While in the garden you may find many plants are labeled. The colour of a label determines the type of the plant, that is, **black** label for common plant, **green** label for orchid, **blue** label for useful plant and **red** label for plant that is endemic to this park.

There are also bigger labels that contain more information about a certain group of plant. Don't forget to check on the notice board at the entrance for the latest updates.

Public Programme

The Interpretative and Education Unit of Kinabalu Park offers several public programmes every day to further enrich your experience here:

Botanical garden tour at **9.00**am, **12.00**pm and **3.00**pm

Silau-silau Trail tour at **11.00**am (meeting point is near **Kinabalu Hall**)

Video show at the theater in the **Liwagu building** (i.e. Liwagu Restaurant, downstairs) at **2.00**pm (and **7.30**pm on Friday-Monday & public holiday)

Fees

Your contribution is very much appreciated. Money from the fees are important for better management of the park and to conduct more awareness programmes to the public.

Botanical garden entrance fee

Non-Malaysian	18yrs and above	RM5.00
	below 18yrs	RM2.50
Warganegara Malaysia	18thn ke atas	RM4.00
	bawah 18thn	RM2.00

Silau-silau Trail tour

Non-Malaysian	18yrs and above	RM3.00
	below 18yrs	RM1.50
Warganegara Malaysia	18thn ke atas	RM2.00
	bawah 18thn	RM1.00
Video show	18yrs and above	RM2.00
	below 18yrs	RM1.00

Alternatively, you may purchase a packaged ticket for all programmes at the following prices:

Non-Malaysian	18yrs and above	RM8.00
	below 18yrs	RM4.00
Warganegara Malaysia	18thn ke atas	RM6.00
	bawah 18thn	RM3.00

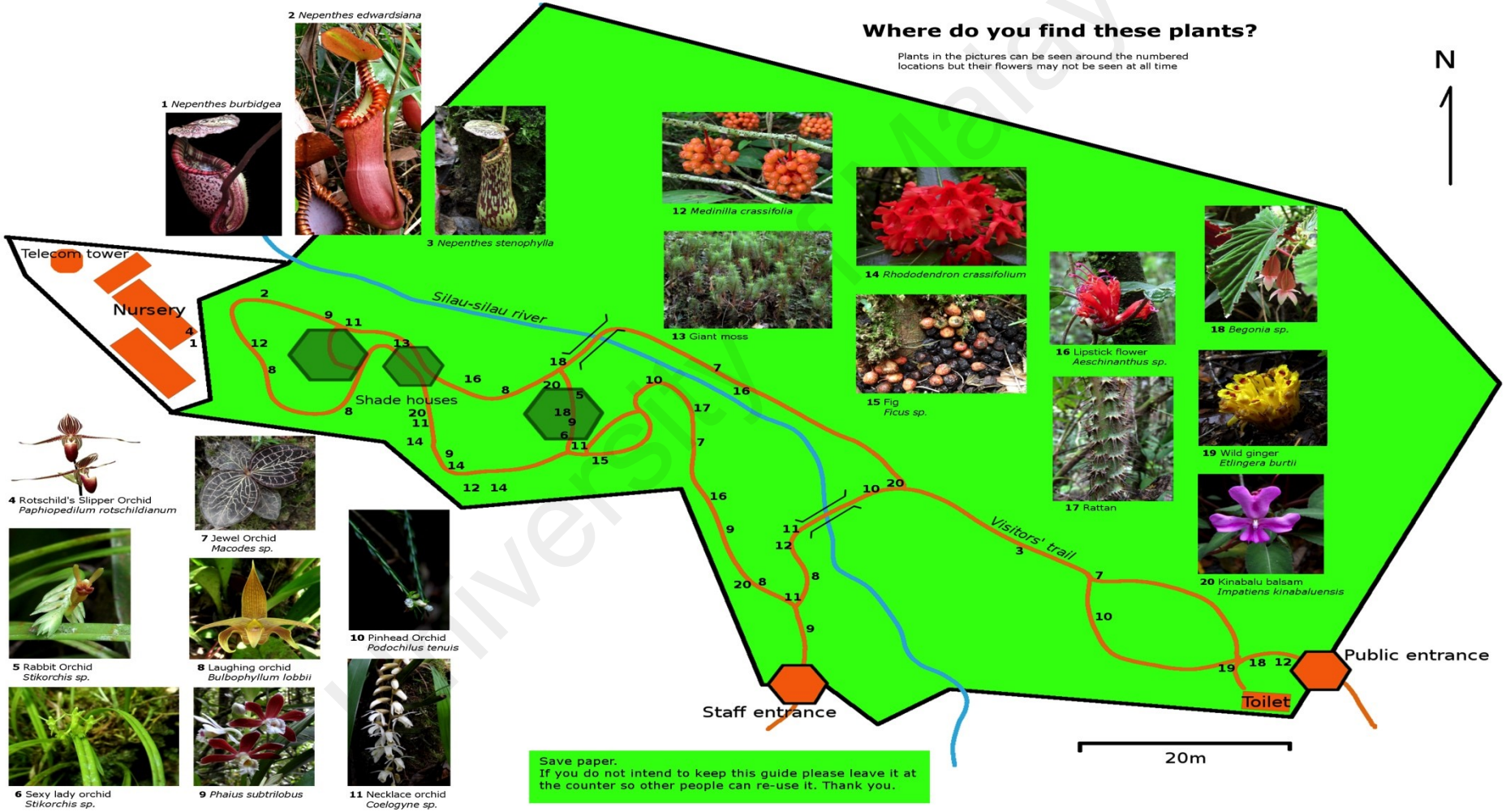
You may obtain the packaged ticket from the ticket-counter of the Silau-silau Trail tour at **10.45**am to 11.00am. The counter is located near **Kinabalu Hall**.

Established: 1981
Area: 1.4 hectare

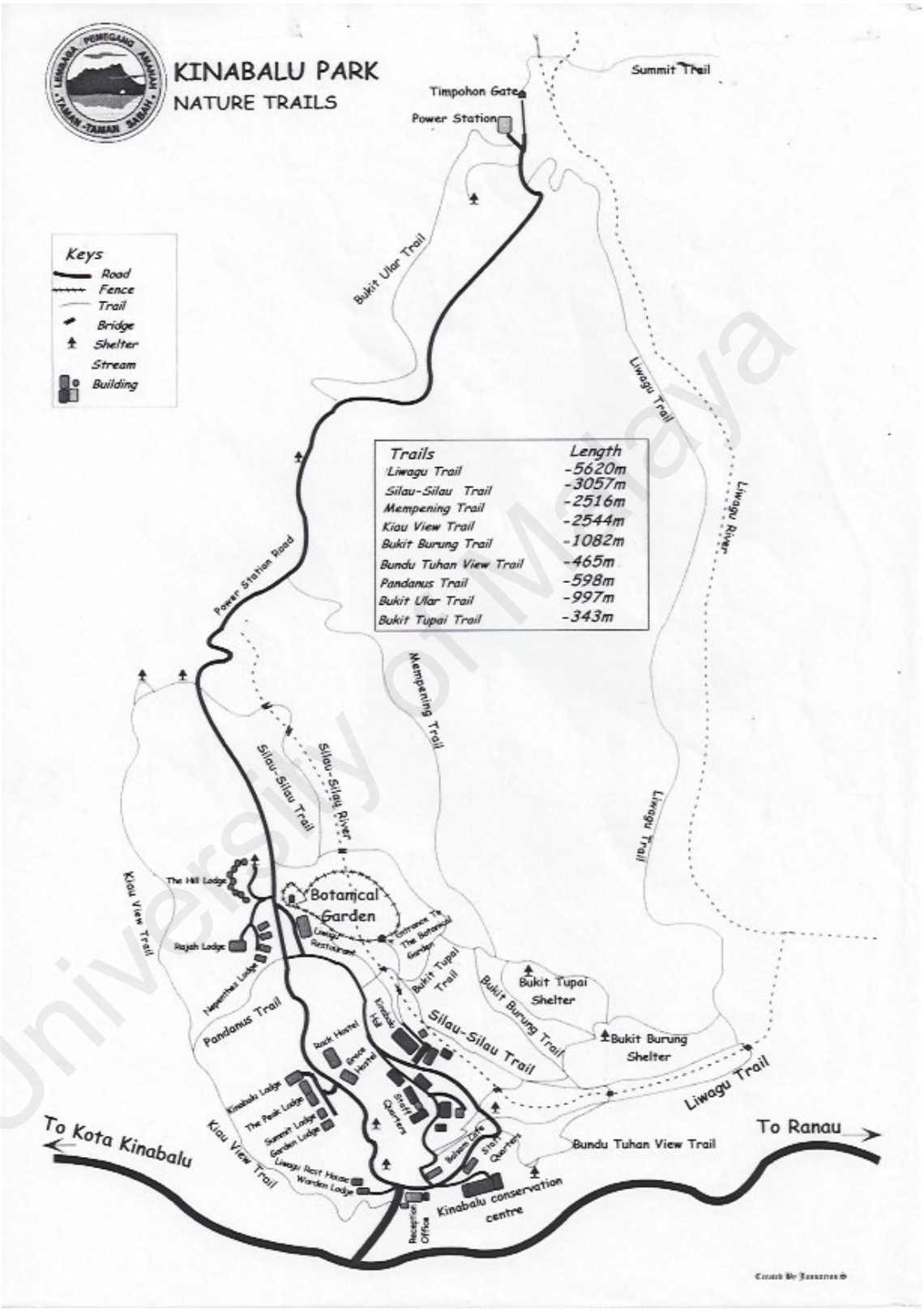
Welcome to the montane rainforest of Kinabalu. Know the amazing natural history of plants that grow in the forest, their ecological importance and uses to the local community of Sabah. Get to know the plants that are endemic to this park, many of which are planted or growing naturally in the garden. Understand the importance of this park to be protected for the benefit of mankind especially the future generations.

http://www.sabahparks.org

APPENDIX D: Botanical Garden's information sheet



APPENDIX E: Nature trail map



APPENDIX F: SSL's nature trail map

APPENDIX G: Poring Hot Springs map