CHAPTER 1

INTRODUCTION

1.1 Background

Both environmental education and conservation are two important components of environmental protection which are closely associated with one and another. Environmental protection efforts cannot really be successful with the lack of education and conservation efforts.

Environmental problems and resulting issues can become social concerns if remain unresolved, but we can create awareness among the public and educate them on possible solutions to the issues to ease such social concern. The public is made knowledgeable on the environmental problems by providing them with information on the problems, impacts, and best approaches to the mitigation of such problems. Thus environmental education plays a pivotal role in providing knowledge and change in attitude of the public towards environmental issues.

Environmental education programmes consist of various activities. Some of the methods used to educate the public on environment are the use of leaflets, brochures, posters, slides, videos, talks, newsletters and magazines, games, field trips, educational visits and camps.

In our school curriculum, environmental education is integrated into subjects other than Science such as English, Malay, Geography, Local Studies and Arts. Some of the school's co-curricular clubs activities organized pertaining to environment are in the

form of debates, role play, drawings, simulation, environmental games and recycling activities. Usually, some schools' activities are organized in conjunction with special environmental dates such as World Environment Day, Earth Day, and Clean Up Day.

Environmental camps are organized in jungles, beaches, islands and highlands to provide an opportunity for the public to learn and feel the natural environment. These camps are targeted at specific groups of the population, mainly the primary to secondary level school children. Environmental camps not only educate about the ecological functions and values of the rainforest, marine, mangrove, peat swamp ecosystems, as its name connotes but it is also about inculcating knowledge, awareness, change of attitude and actions on how the environmental ecosystems should be treated. Environmental Education encourages each individual to make the necessary effort, so that the collective effort of all the individuals in the society can contribute towards the maintenance of the well being and pristine state of the environment.

Khir Johari (1996) in a conference stated that awareness on environmental issues in Malaysia has increased but there is a lot more that needs to be done. Even when there is awareness, we have to encourage people to take action. In order for the public to understand the causes, effects and solutions of environmental issues, they should be explained on the environmental problems in a simple and easily understood manner so that they not only understand the problems but can decide for themselves what is at stake and what actions should be taken.

1.2 Definition of Wetlands

The particular wetlands camp where this study was conducted was organized nearby mangroves, lakes, peat swamp forest and rivers as wetlands ecosystems comprise of these entities. Wetlands are areas where water is the primary factor controlling the environment and the associated plant and animal life found there. Each wetlands habitat presents its own uniqueness, values, and functions.

Literally, wetlands mean wet areas (Jaya Mary, 2003i). In physical geography, a wetland is an environment 'at the interface between truly terrestrial ecosystems and aquatic systems making them inherently different from each other yet highly dependent on both (Mitsch & Gosselink, 1986). In essence, wetlands are ecotones; a transition zone between terrestrial and aquatic communities.

They occur where the water table is at or near the surface of the land, or where the land is covered by shallow water. The Convention on Wetlands of International Importance especially as Waterfowl habitat, often known as the Ramsar Convention (Wetlands International Malaysia, undated-i) defines wetlands as: '*Areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static, flowing, fresh, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed six metres*'. The wetlands ecosystem ranges from as far as the tundra to the tropics, covering an estimated 570 million hectares, roughly 6% of Earth's surface (Wetlands International Malaysia, undated ii).

There are three types of wetlands according to the Ramsar Convention, which are *marine and coastal wetlands* such as seagrass beds, mudflats, mangroves, estuaries,

swamps, nipah swamps, freshwater marshes, swamp forests, estuaries, salt flats; *inland wetlands* such as permanent or seasonal rivers, streams, freshwater or brackish lakes, marshes, pools, peat swamp forest; and *human made wetlands* such as aquaculture ponds, irrigation channels, rice fields, reservoirs, dams, mining pools, waste water treatment areas, canals (Chan et al, 2001; Davies & Claridge; 1993).

1.3 Importance of Wetlands

The relationship between wetlands and humans is very close as they provide a variety of uses and has many purposes. Humans depend on wetlands for wildlife and fisheries resource, economic revenue, transportation, recreation, and agriculture. The resources gained indicate the wide-ranging benefits/needs that humans rely on wetlands. All communities around the world have close linkage with wetlands, through their daily activities generated by the diversity of wetlands production. The productions acquired from wetlands are immense for they represent various resources and ecosystems. They generate products, services and attribute which are important to human and the environment.

Wetlands such as rivers and lakes are the source for most of the country's freshwater resources. There is a general perception that we have a copious amount of water in the world, since 71% of the Earth's surface is covered with water. However, 97% of the world's water is found in the oceans and is salty and unsuitable for human, animal and plant use. Only 3% represent fresh water. Further, much of that is inaccessible, either locked up in polar ice or deep under ground. In reality, only 0.003%

of the entire world's water is actually available for humans (Jaya Mary, 2003ii). Conserving these freshwater habitats ensures their vital hydrological and social benefits for the population. It is therefore important to realize that our fresh water resource is finite, precious and irreplaceable.

Ramsar (2001) reports that wetlands support more than 40% of the world's species and 12% of all animals' species. On the marine front, the corals reefs are among the most biologically diverse ecosystems. The biodiversity in wetlands is also valuable as a reservoir of genes that has considerable economic potential in the pharmaceutical industry and in commercial crop plants such as rice. Rice is a common wetlands plant and the staple diet for over half of the world's population. Products that can be harvested from wetlands are usually forest, wildlife and fishery resources consisting of timber, medicinal plants, fishes, amphibians, crustaceans, mollusks and other wetland dependent species and crocodiles for leathers. Fish form the primary source of protein for nearly 1 billion people and constitute a significant part of the diet. Two thirds of all fish consumed are dependent on coastal wetlands at some stage in their life cycle. For example, mangrove play a role in being a nursery and breeding ground for a lot of commercial fishes, small fishes and crabs to seek refuge. It has been estimated that well managed reefs can produce 15 tonnes of fish and other seafood per square kilometer per year. Annual protein production in swamps and marshes has been estimated at an average of 9 tonnes per square kilometers and estuaries are thought to be twice as productive.

Some wetlands along migratory routes are crucial for the survival of populations of waterbirds. Migratory routes or a flyway is the total area used by a group of migratory

birds species (Malaysian Nature Society, 2008). Millions of birds leave their origin country in the northern hemisphere from the month of July until August to escape the bitter cold of the northern winter to look for food, roosting (Siti Arifah, 2003) and breeding (Ministry of Science, Technology and the Environment, 2002) places at wetlands habitats. Kuala Gula, Tanjung Tuan and Klang Islands, are some of the wetlands habitats where migratory birds feed, roost and breed.

Inland wetlands such as lakes act as buffers to store excessive rainfall and release runoff gradually. By storing the water in the soil or retaining it on the surface as water in the lakes, marshes, and with the wetlands vegetation, flow of flood water is reduced.

Wetland vegetation helps to absorb the energy of waves and currents. Coastal forests and trees can act as bioshields against coastal hazards, including tsunamis, cyclones, wind and coastal erosion. Hurricanes, cyclones, storm surges and other coastal weather disturbances can cause immense damage through flooding and direct destruction of property and lives. Salt marshes, mangroves and other forested wetlands act as the frontline defence against incoming storms. They help minimize the impact of storms by reducing wind action, wave action and currents, while the roots of the plants help to hold the sediment in place. Mangroves are capable of breaking up storms waves that exceed 4 metres in height. The value of intact mangrove swamps in Malaysia for storm protection and flood control alone has been estimated at US$ 300,000 per kilometer – the cost of replacing them with rock walls (Ramsar, 2001).

Wetlands act as sinks of nutrients and toxicants as they are absorbed by wetland vegetation. The nutrients retained in wetlands support the growth of other wetland

organisms. Nutrients are often associated with sediments. These nutrients, mainly nitrogen and phosphorus from agricultural sources, human wastes and industrial discharges, may accumulate in the sub soil, be transformed by chemical and biological processes or be taken up by wetland vegetation which can then be harvested and effectively removed from the system. Vegetation of wetlands also acts like sieves that retain sediments in water (Ramsar, 2001).

There are huge amounts of organic matter in the substrate in the peat swamp that do not decompose easily because the decomposing agents such as bacteria and fungi do not function well in the acidic and oxygen deprived conditions of the peat swamp. Some of the organic matter do eventually break down into hydrocarbon compounds and turn into coal, gas and oil over million of years. These are important sources of energy for Man. (Ministry of Science, Technology and the Environment, 2003).

Wetlands have long been popular for recreation activities such as swimming, yachting, birdwatching, sport fishing and many more. Wildlife watching and ecotourism in wetland areas are developing and becoming important sources of revenue for many countries. Many wetlands are prime locations for tourism; some of the finest are protected as National parks, World Heritage Site, Ramsar Sites or Biosphere Reserves. Wetlands also offer educational values via recreation. Numerous education centres and programmes involve general public and school children with a variety of activities which can span the border between education and recreation.

Many historical and cultural heritages are located near wetlands such as rivers and lakes. Wetlands have also significant religious and archaeological significance. Out of

603 Ramsar sites examined, over 30% were recorded as having archaeological, historical, cultural, religiously, mythological significance at either the local or national level in addition to their many other values (Ramsar, 2001).

It is of great importance that wetlands as the most productive environment are conserved on a wise use basis. Tasek Bera was designated as Malaysia's first Wetland of International Importance (Ramsar Site) in November 1994, covering an area of 31, 120 ha. It is the largest natural fresh water lake in Malaysia comprising a few habitats; rivers, streams, open water, swamp, peat and fresh water swamp. It is of great importance not only from the biodiversity point of view but also in terms of scientific, recreational, educational and economic aspects (Mohd Azhar, 2008). Other important wetlands area in Malaysia is the Kuala Gula Bird Sanctuary in Perak a roosting home of the rarest waterbirds in the country, the Milky Storks; Tanjung Piai significant as the Southern most point of mainland Asia; Pulau Kukup, the sanctuary for the globally threatened Lesser Adjutant Stork and Sungai Pulai, the largest remaining intact riverine mangrove area in Peninsular Malaysia (Jaya Mary, 2003i). The South East Pahang Peat Swamp Forest (SEPPSF) in the state of Pahang is the largest peat swamp in mainland Asia (FRIM – UNDP/ GEF,2004).

By joining as Contracting Parties to the Ramsar Convention, which Malaysia became a signatory in the 1994, each country has agreed to commit for the conservation and wise use of wetlands by designating at least one wetland of international importance. To date, Malaysia has six Ramsar Sites; Tasek Bera (Pahang), Pulau Kukup, Tanjung Piai, and Sungai Pulai, in Johor, (2003) the Kuching Wetlands in Sarawak (2005) and the

Lower Kinabatangan - Segama Wetlands in Sabah which was designated recently in 2008 as Malaysia's largest, extending over 78,803 hectares of coastal mangrove and peat swamps. This area in Sabah is even larger than the total area of the other five designated Ramsar sites in Malaysia (Anonymous, 2008a).

1.4 Wetlands Issues

Despite wetlands habitats generating mega functions and goods, all over the world wetlands are continuously facing threats to make way for other rising economic development projects. The main wetlands that receive attention are mangroves peatlands and freshwater related wetlands.

The UN millennium wetlands assessment indicates wetlands as one of the most threatened ecosystems. Worldwide, around 50% of wetlands are estimated to have disappeared since 1900; during the first half of the previous century it occurred mostly in the northern temperate zones but since the 1950s, tropical and sub-tropical wetlands are becoming the latest victims.

Wetlands are removed for agriculture, settlements and urbanization, pollution, hunting, over-exploitation of groundwater resources or building dams. Pollution from agricultural and industrial sources increase levels of nutrients, pesticides or heavy metals and seriously impairs ecological processes.

The major threat to shorebirds and migratory birds is habitat destruction. Habitat destruction is caused by the reclamation of wetlands for agricultural, industrial and urban development, destruction of mangroves for aquaculture ponds. Pollution and pesticides are also identified as threats (Siti Arifah, 2003). Important coastal wetlands in Peninsular

Malaysia such as Klang Islands plays a key role in supporting the shorebird population for food. Tanjung Tuan is an important stop over site for migratory raptors after crossing the Straits of Malacca as it is the only remaining patch of coastal forest on the west coast of Peninsular Malaysia**.** It provides food and shelter for the raptors as well as a resting spot. Without Tanjung Tuan, many raptors may never make it back, due to exhaustion and lack of food (Malaysian Nature Society, 2008).

The peat swamp forest is Malaysia's largest wetland type in terms of coverage of area. More than 60% (over 20 million hectares) of the world's tropical peat land are found in Southeast Asian countries. Today, an estimated 1.54 million ha remain in Malaysia. Peat swamp forests are important for the production of timber, hydrology functions, flood mitigation, and serves as carbon sinks (FRIM-UNDP/GEF, 2004). Clearing or burning of peat swamp may release a huge amount of carbon dioxide into the atmosphere which can increase temperature and contribute to global warming (Ministry of Science, Technology and the Environment, 2003).

Wetlands such as rivers are often murky and polluted. Unplanned environmental development on or around wetlands habitats may cause environmental disasters such as flash floods, soil erosion and shortage of water resources for human consumption. Pollution and degradation of wetlands (rivers and coastal areas) causes adverse impacts to economic revenue if fishery products plunge. Coastal reclamation, cleaning up and water treatment plants are unnecessary costly affairs for the government. The ecological functions, values and attributes of wetlands can continue to function only if protection measures steps are for taken promptly. Two main tributaries of Sungai Sarawak in the

heart of Kuching City are deemed biologically dead. The water in Sungai Padungan and Sungai Maong cannot be used even for irrigation purposes as they are highly polluted (Sulok, 2008). Sungai Juru and Sungai Pinang in the state of Penang are among the 15 worst polluted rivers in the country. It would take RM300 million to rehabilitate Sungai Juru and and RM450 million for Sungai Pinang (Anonymous, 6 November 2008).

These are only a few of many reasons why wetlands are deteriorating hence for emphasis on education, conservation and rehabilitation on wetlands. Pan in his opinion says that "It is imperative that the present and future generations of Malaysia should be appropriately be exposed to environmental education (EE) and possessed a fair public awareness in conservation of nature and natural resources" (Pan,1997).

1.5 The Study

The environmental education camps where the study was conducted were organized by the Malaysian Nature Society (MNS) in 2007, at zonal level. These camps were carried out in the Northern, Southern and Eastern Zone of Peninsular Malaysia on different dates and venues. All camps were conducted for a period of 3 days and 2 nights. The participants were students ranging from primary to secondary national schools. The students from the Northern Zone were from the states of Perlis, Kedah, Pulau Pinang and Perak. The students from the Southern zone were from the states of Melaka, Johor and Negeri Sembilan. Students from the Eastern Zones are from the states of Pahang, Kelantan and Terengganu.

The Eastern Zone camp was conducted on 27- 29 April 2007, followed by Southern Zone camp on 8 -10 June 2007 and Northern Zone camp on 15- 17 June 2007. There were a total of 206 participants and a total of 76 schools participated in the zonal camps from the states of Peninsular Malaysia except Selangor and Wilayah Persekutuan Kuala Lumpur.

The activities were carried out by facilitators who were staffs of MNS. Most of the Environmental Education modules used in the activities during the camp were prepared by the MNS. The teaching methods used by the facilitators in the programme were short lectures, visual presentations, trail walks, group discussions, environmental games and experimental studies.

The younger generations must be more aware of their responsibilities to make wise choices for the environment with the hope that they 'do not make the same mistakes that the members of the older generation have committed out of necessity, ignorance, greed or apathy (Khir, 1996). Environmental education on wetlands motivates and empowers individuals especially the younger generations to take part actively to help lessen the damage on wetlands.

The study aims to investigate any significant differences and relationship in knowledge and attitude of students on wetlands before and after they had attended the programme.

1.6 Significance of the Study

Though MNS had organized many environmental education camps, there has been no academic study conducted so far on its programme especially on students' knowledge and attitude level on environmental issues from camping experiences. Moreover, studies pertaining to effectiveness of environmental education on wetlands are seldom conducted if any in Malaysia hence the need to carry out the study.

In the past, the success of Environmental Education programme was measured according to the total number of schools and total number of participating students. These statistics do not measure the success of the Environmental Education goals of increasing students' knowledge, experience, attitude, perceptions and behaviors. (Yusof, 1999)

The three days and two night's zonal camps (Eastern, Southern and Northern) ran a series of different types of environmental education activities to instill knowledge and eventually a change in the participants' attitude. A camp may be conducted well and interestingly by the organizers but what measures are there to determine if students have successfully acquired the knowledge and that they would be caring towards the environment?

Hence, it was necessary to find out if environmental education through camping experiences conducted does influence the attitude and knowledge of students. Though MNS has been strongly engaged in its objective to create environmental awareness, a formal evaluation will provide preliminary information on the success of their programme, to identify if the activities carried out cater with the purpose of educating on

the environment and to assist the organization in planning and developing environmental education programmes and modules in future.

Yusof (1999) stated that, *'studies conducted previously mentioned that knowledge is associated with more positive attitude…a specific intervention is able to provide positive environmental knowledge and attitude…intervention programmes such as environmental education… By determining and comparing the changes in knowledge and attitude before, during and after the intervention programme, the environmental programme can provide more effective environmental education'.*

Referring to the statement above, it is important that a formal study on the participating students be made available to measure the success of environmental education programme through camping experiences regarding wetlands.

1.7 Research Questions

a) What is the level of environmental knowledge of participants on wetlands before and after taking part in the camp?

b) What is the level of environmental attitude of participants on wetlands before and after taking part in the camp?

c) What are the students' expectations towards the camp before taking part in the activities and their perception towards the camp after taking part in the camp?

1.8 Objectives of Study

In order to answer the above research questions, the present study was carried out with the following objectives:

1. To determine whether environmental education camp has an effect on the level of knowledge and understanding of participants on wetlands.
2. To determine whether environmental education camp has an effect on the attitude level of participants regarding wetlands issues.
3. To determine participants' expectations and perception on the camp's programme.

In order to achieve the above objectives, students were given sets of questionnaire to test their knowledge, attitude and expectations towards the camp before they participated in the camp activities. The same sets of questionnaire were again given to the same participants on the final day of the camp to re-examine their level of knowledge, attitude and their perception on the environmental education camp. Based on their answers, results were obtained. It was hypothesized that students would acquire higher knowledge, positive attitude towards wetlands and positive opinion on the organization after the camp. Besides, secondary school students were expected to show higher level of knowledge than primary and lower secondary school students. Both primary and secondary school students were expected to be involved in some kind of environmental education activities.

CHAPTER 2

LITERATURE REVIEW

2.1 Conservation and Environmental Education on Wetlands

Conservation and environmental education programme on wetlands in the country are continuously developed through productive partnership between Government and Non-Governmental Organizations and corporate sectors. The mangrove forest of Peninsular Malaysia has been successfully managed by the various State Forestry Departments under the Ministry of Natural Resources and Environment for the production of charcoal, pole and firewood based on sustained yield principles such as in the Matang Mangrove Forest, Perak. Mature trees are clear-felled in batches of several hectares in area. In order to manage the forest resources, forestry departments classify forests into functional classes such as production, water catchments, flood control and educational forests (Anonymous i). The Forestry Department of Sarawak through its Education and Interpretation Unit concentrates specifically on formal environmental education to promote individual and collective responsibility for the sustainable use of natural resources. The target audiences are those in the formal education system (teachers and pupils); rural communities, especially those in and around Totally Protected Areas and special interest groups (Anonymous ii).

The Department of Irrigation and Drainage (DID), Ministry of Natural Resources and Environment had been entrusted to carry out comprehensive flood mitigation programme, river reserve maintenance and management. Effort by DID in education and

public awareness towards rivers include programme such as River Ranger, Love Our River Campaign, River Cleaning, River Beautification, Pollution Rehabilitation, River Adoption and Education Programs involving individuals, local communities, corporate bodies and the public sector (Anonymous iii).

Wetlands International**,** Malaysia has developed several programmes to sustain and restore wetlands with national and state government agencies and organizations to build capacity, to facilitate wetland conservation activities and to ensure their wise use. This organization had embarked on mangrove replanting and rehabilitation programme. This project promotes public awareness on the importance of mangrove ecosystems through direct community participation. For example, mangrove rehabilitation effort at Kuala Gula, Perak and Sedili Kecil , Johor wetlands is encourage the involvement of local communities to rehabilitate and monitor the mangrove by strengthening the capacity of the communities to rehabilitate and monitor the mangroves and to implement techniques for sustainable use so that local people's lives and their livelihoods are not adversely affected when faced with natural disasters such as tsunami and typhoons. Wetlands International also successfully conducted environmental education and eco tourism management in Tasek Bera for the local indigenous community. The primary aim was to educate the local community on the importance of conserving this natural wetlands site, whilst providing useful guidelines for conservation effort and wise use of natural resources in sustainable ways. (Anonymous iv)

Malaysian Nature Society (MNS) organizes environmental education based activities through its centres and parks such as the Nature Education Centre in the Forest Research Institute of Malaysia (FRIM), the Rimba Ilmu (The Forest of Knowledge) located in the University of Malaya, Kuala Lumpur, and Environmental Education Centre (EEC) in Kerteh, Terengganu, the Kuala Selangor Nature Park (KSNP), Selangor and MNS Boh Centre in Cameron Highlands. Of these the KSNP and EEC Kerteh are located in the vicinity of mangrove wetlands. The KSNP and EEC Kerteh are important environmental educational resource on wetlands which aims to instill greater appreciation and understanding of the unique mangrove habitat and the need for conservation. These centres receives a large number of group visitors and camp participants, ranging from school children, young adults, government agencies, corporate sectors and other organized groups. MNS, through its Environmental Education Unit (Gary, 1997) had carried out interesting indoor and outdoor activities to promote environmental education by conducting nature trips, talks and slide shows, exhibitions, scientific expeditions, promoting nature clubs (Kelab Pencinta Alam or Nature Lovers Club), field courses and environmental publications.

The World Wide Fund for Nature - Malaysia's (WWFM) programme "Forest for Water, Water for Life" embarked on the conservation of highland forests and wetlands. Both the highlands and wetlands have important roles – highland forest functions as water catchment areas whereas wetlands provide hydrological function in water supply, purification and flood control WWFM (formerly known as World Wildlife Fund) established a community interest group to support mangrove replanting efforts. A nursery

in Kuala Setiu Bahru has been set up and the community has started replanting mangrove seedlings in experimental plots within the lagoon (Anonymous v).

Global Environment Centre's – GEC awareness and capacity building programme incorporate activities relating to environmental education, information exchange and awareness raising on global environmental issues. GEC initiated the Friends of Mangrove programme to get the local community of Kuala Gula, Perak involved in the conservation, preservation of mangroves. It introduced a river auditing and flood awareness programme in the flood areas of Pagoh, Johor to enhance local people's understanding and knowledge on river ecology and hydrology, train them to monitor their river and build their capacity to enable them to contribute to the decision making process in the future. Other local community participation projects include rehabilitation of Kelana Jaya Lakes in Selangor, the Nenggiri River rehabilitation programme in Kelantan, Water 4 Life project, Forest and Wetlands restoration and management projects. (Anonymous vi)

DiGi Telecommunications has initiated a corporate social responsibility programme namely Amazing Malaysians. Since 2005, DiGi awards Amazing Malaysians who are doing great heritage work and engaging them in projects with youth or children living mainly in rural areas. It has identified five broad areas of heritage to focus on, namely natural**,** cultural**,** art**,** built and social heritage. In each project, an Amazing Malaysian works with some 50-100 children/youth for up to three months. The projects are designed both to be educational for the participants, with element of sustainability as well as to contribute in its preservation. Each project is also adopted by a different

department in DiGi, involving some 20 to 30 volunteers. The staffs participate to ensure the smooth implementation of these projects. These projects are carried out in Kuala Gula, Perak, at Tasik Telawak, Langkawi and Tasik Chini, Pahang wetlands. (Anonymous 2008b).

HSBC extents its commitment towards the conservation of the environment, doing its part to protect and preserve the natural heritage for future generations. HSBC with the Malaysian Nature Society launched its "Green Partnership Programme" and helped to upgrad the Environmental Education Centre (EEC) at Kuala Selangor Nature Park (KSNP), Selangor. Some of the activities in this programme include planting of mangrove saplings involving staff volunteers as part of the ecosystem enrichment programme. (Anonymous vii)

PETRONAS recognizes the importance of conserving biological diversity and embraces in its project planning and operation stages in order to ensure the protection of people, animals and plants. PETRONAS is a partner in the development of the 200-hectare Putrajaya Wetlands, the largest man-made wetlands in the tropics today. Constructed in 1999, the Putrajaya Wetlands play a significant role in improving urban water quality, especially in treating storm water, urban run-offs and agricultural effluents that enter the water systems. It has become a sanctuary for migratory and local birds, recreational haven, and for environmental research and education purposes. The Sarawak Reef Ball Project was initiated in 1998 to address the issue of declining turtle populations around the Talang-Satang National Park and the traditional fishing grounds at Lawas, Bintulu and Kampung Buntal, Kuching. PETRONAS has sponsored 100 of the reef balls

around the islands of Satang Besar and Tukong Ara, and at Telaga Air. In Terengganu, WWF-Malaysia works closely with partners BP PETRONAS Acetyls Pve Ltd (BPPA), BP Malaysia and the State Fisheries Department for turtle conservation. The Ma'Daerah Turtle Sanctuary Centre was built as a centre for nature education to generate public awareness. It also provides facilities for an important hatchery on the beach at Ma'Daerah. BPPA and BP have not only given crucial financial support to this effort, but have also been involved hands-on as partners in the planning and implementation of activities at the centre. (Anonymous. viii)

2.2 Case Studies Pertaining to Environmental Education through Camping/ Field Trip Experiences.

Studies and research are continuously conducted all over the world to test if positive results occur on the respondents attending environmental education programme.

Lee (1997) assessed students' attitudes toward biology field trips. There were 86 students in the laboratory-only (control) group and 77 students in the field trip (experimental) group from the introductory biology class, Survey of Organismal Biology. In addition, 59 students from two upper-division courses, Animal Behavior and Ecology, completed the questionnaire.

The results showed that students in the field trip groups had higher achievement as measured by quiz scores than those in the laboratory groups. Biology major students did not have more positive attitudes toward field trips than other science major and non-science major students. There was no correlation between students' attitude and the

number of past field trip experiences. Laboratory-only students showed more positive attitude toward field trips than field trip students. Students having negative attitude toward field trips benefited from field trips as much as those with positive attitude, as determined by their quiz scores. The study was limited to examining the impact of two field trips on students' learning of specific biology topics. College biology courses, such as ecology, biome biology, ornithology, etc., could be enhanced by the inclusion of field trips. The students may have the opportunity to broaden their ecosystem view and to learn from the natural world in which they live.

Yusof (1999) conducted a study on the effects of the Malaysian Department of Wildlife and National Park's (DWNP) environmental education program on the environmental knowledge and attitude of the secondary school students between May 11, 1998 and August 11, 1998 at the Environmental Education Centre, Bukit Rengit, Pahang. This study was designed to reflect three objectives: (1) to determine the effect of participation in the DWNP's environmental education program on environmental knowledge and attitude of 13-17 year old Malaysian students, (2) to identify demographic factors that contribute to the change of environmental knowledge and attitudes, and (3) to establish base line data for future evaluation of the effectiveness of DWNP's environmental education program. The sample comprised of 806 randomly selected students from 10 different schools, with 402 randomly assigned to the experimental grouped and 404 to the control group. Pre-test and post-tests were administered at the schools. The experimental group was exposed to the Environmental Education Program (EEP) at the Environmental Education Center (EEC) at Bukit Rengit, Lanchang, Pahang.

At the EEC, the experimental group was again divided, with half receiving the pre-test and post-test, while the other half were given only the post-test. Overall, secondary school students in the experimental group showed a significantly greater change in environmental knowledge than did students in the control group. Significant differences were also found on the Attitude sub-scale, with the control group exhibiting negative change in attitude, and slightly change occurring in the attitude of the experimental group. There were no significant differences of the change in environmental knowledge and attitude across age and place of residence than did gender of the EEP participants. The trend of changes in environmental knowledge and attitude between school and EEC were shown negatively. Changes in both environmental knowledge and attitude began to increase but change in knowledge exceeded the change in attitude when measured between the pre-test and post-test at the EEC. However, there was a slight increase in attitude toward environmental matters as compared to the change in environmental knowledge after the participants had been measured between the EEC and the school.

Moey (1999) studied students' perception on the effectiveness of environmental education camp at Bukit Rengit, Lanchang, Pahang. The students enrolled in the environmental education camp exhibited differences in the environmental aspects that were significant before they had undergone the programme (pre-test) and after they had (post-test). There was a significant difference in the activities and programme perception before and after the camp, but the outcome was not up to the participant's expectations. The students had in overall placed higher expectations in the activities and programme than what they had perceived experienced during the 3 days camp. The

programme was successful in changing the participants view regarding the environmental aspects but the programme was not up to the students expectations.

A study by Bexell (2006) was conducted to determine whether participation in a wildlife conservation education camp was effective in positively changing 8-12 year old students': (a) knowledge of animals, (b) care about animals, (c) propensity for environmental and wildlife stewardship, and (d) compassionate behavior toward animals. During the summer of 2005, two five-day camps were conducted at two zoological institutions in Chengdu, China. The camp curriculum was influenced by theory and research on the following: conservation psychology, social learning theory, empathy and moral development theory, socio-biological theory, constructivist theory, and conservation science. Camp activities were sensitive to Chinese culture and included Chinese conservation issues. Activities were designed to help children form bonds with animals and care enough about them to positively change their behavior toward animals and the environment.

This mixed methods study triangulated quantitative and qualitative data from six sources to answer the following questions: (1) Did camp increase student knowledge of animals? (2) Did camp increase student caring about animals? (3) Did camp increase students' propensity for environmental and wildlife stewardship? (4) Did camp affect students' compassionate behavior toward animals? A conservation steward survey revealed significant increases on pre-post, self-report of knowledge, care, and propensity. Pre-post, rubric-scored responses to human-animal interaction vignettes indicated a significant increase in knowledge, and stable scores on care and propensity. Qualitative

data from student journals, vignettes, and end-of-camp questionnaires demonstrated knowledge, caring, and propensity, and revealed the emergent theme empathy. Instructors tallied campers' behavior toward animals using a student behavior ethogram. Occurrence of positive behaviors was inconsistent, but negative behaviors decreased, indicating campers were more conscious of behaviors to avoid.

Stepath and Carl (2006) explored high school students' reef experiences with respect to specific learning outcomes. Queensland's students were surveyed and interviewed after training in the classroom and at Great Barrier Reef sites. Both quantitative and qualitative methods were employed. This presupposes that learning where a gain in knowledge (awareness) leads to a change in attitude, and thereby improves personal actions toward marine environments. This research analyses whether the links between the variables are linear and effects of reef experience. The student participants were divided into groups receiving different educational interventions. Some students received both interventions, while others received only one treatment and a contrast group received neither. Pre-test and post-test survey questionnaires and interviews collected responses, and results were compared. Results show reef experiential education to have a positive effect on students' environmental knowledge (awareness), attitudes towards reef environments and stated intention to act. The reef experience alone caused the greatest change in environmental attitudes and ecological intention to act.

Simon (2003) explored the effects of wilderness experience programs (WEP) on feelings of purism, privacy, and tolerated encounters. The study is linked to the 1964 Wilderness Act which was legislated to protect and maintain a portion of the nation's

remaining wild areas as they were during pre-settlement times. In part, the intent was to provide the opportunity for primitive forms of recreation in surroundings where wilderness can be experienced on its own terms. However, overuse and related resource degradation have resulted in the loss of the primeval character of many wilderness areas, decreasing the opportunity for solitude. Solitude is specifically mentioned in the Wilderness Act as a critical component of wilderness.

Pre-test and post-test were administered to 42 college students who participated in a short term WEP (about 5 days) and 64 participants in a long-term WEP (10-plus days). Pre-test data did not show a relationship between participant concern for solitude and the number of encounters participants would tolerate and still consider their trip a wilderness experience. However, post-test data indicated that following a field experience, participant concern for solitude was significantly related to unwillingness to tolerate encounters with others in the wilderness. These results suggest that WEPs emphasizing wilderness education may effectively influence course participants to become a more educated wild land user constituency and to support use limits and other resource protection measures.

Prokop et al. (2007) conducted a one-day field trip for both improving students' knowledge in ecology and for examining short-term effects. Based on the results of the research conducted, there was significant and positive increase in students' attitudes toward biology, natural environment outside and future career in biology. Moreover, students displayed a better understanding of ecology concepts like ecosystems and food webs. However, no similar pattern was observed for the control group who experienced

only traditional biology settings. Thus, the study is unique showing significant short-term effects of a field trip on students' attitude and knowledge toward biology.

Denholme (2004) examined both the learning environment created in a classroom-based programme and the learning environment created in a field-based programme. This study combined quantitative and qualitative methodologies in an attempt to identify the critical components of each type of learning environment as perceived by the students. Trends identified from a Learning Environment questionnaire were used to guide conversations with students during small group interviews. Students demonstrated insightful understanding of the differences between the two types of learning environments and the effect those environments had on their learning.

The findings from this study indicate that, although widespread implementation of programmes with environmental focused field-based excursions would be problematic, the basic structure and pedagogy of these field-based programmes could be implemented in a widespread manner. Such changes as proposed by the findings of this study could encourage an improved sense of connection to the environment and to each other that is argued for in the academic literature in the field of Environmental Education. Finally this study has successfully implemented the use of a research methodology that accommodates the inter-disciplinary and grass roots nature of environment education programmes. The continued use of Learning Environment Research within the field of Environmental Education may prove to be a very effective methodology for this field.

Futer (2005) investigated the apparent effectiveness of environmental education essential elements in school field trip programming. First, the elements essential to

environmental education field trips were identified from the literature. Second, these elements were incorporated into a questionnaire that was administered as a pre/post test to elementary school students visiting an extensive indoor environmental education facility located in Montreal. Finally, 24 environmental education programmes at eight institutions in Montreal were observed to investigate the extent and methodology of implementation of the essential elements. With regard to the chief institution, it was concluded that (1) the educational programming appeared to significantly increase environmental knowledge, and (2) the environmental attitude were most strongly correlated with students' background. Programme observation at the eight institutions demonstrated that a wide array of environmental topics was presented, but there was insufficient instruction of environmental issues and action strategies.

John (1997) believes that camps can help build the awareness that will be so important to the world's continued survival. Many studies on environmental education clearly point to the need for that education to be experiential, not just memorization. Camps are better positioned than any other organization to provide that developmental experience to children. He believes that camp is recognized as a place for child development experience as camping experiences offers opportunities for improving the society. The camp experience is acknowledged as a significant component in child development.

Jim (2007) stated that one category of research deals with "significant life experiences," which implies that certain encounters with people or places can shape the course of an individual's development. Sessions at camp, relations with camp counselors,

and wilderness trips, are often referred. Not surprisingly, non formal education has also been widely studied. School camping/outdoor education programs, nature centers, zoos, museums, and scouting experiences have all been part of environmental education research. Students' ability to define terms, and understand concepts and changes in attitude have all been documented, as have anecdotes of life-changing experiences. There is no doubt that camps have a major role to play in shaping the attitudes of young people toward a better relationship with nature. Many camp professionals and other environmental leaders can point to their experiences earlier in life that led to their choice in careers.

Recent research has shown that camping can help enhance a young person's self-esteem. Research shows that a set of socially desirable outcomes results from enhancement of one's self constructs. Paul (1999) agrees with the findings of a research "What Does Camp Do for Kids?" A Meta Analysis of the Influence of the Organized Camping Experience on the Self-constructs of Youth". The overall effect size for this meta-analysis is based on measurements taken from 2,279 campers. The camps included in the study were day and resident camps that had single gender or co-ed environments. The campers ranged in age from six to twenty-two years old and came from many different cultural groups, representing all of the socio-economic brackets. Campers with mental, physical, and emotional impairments as well as campers without impairments were included. The length of the camp sessions ranged from one to eight weeks in length. The camp programme were based on a broad variety of activities from structured learning environments to general camps with no expressed programme focus to camps that

incorporated enhancement of the self into some aspect of their program and philosophy. Commenting on the above finding in his article, he stated that these outcomes include easier adjustment to new environments, a greater sense of personal satisfaction, and personal habits that lead to a healthy lifestyle. If a camp experience enhances self-constructs, then camp is an environment that parents and communities should include in strategies that are designed to meet youth development needs. The enhancement of self is greater for younger campers, indicating a benefit to starting camp at an early age, as young as age six. The positive results across all ages suggest that camps with a self enhancement focus provide for the positive self-esteem development needs of all youth.

Many factors are addressed that result in a camp providing positive outcomes for growth and development. Marsh (1999) reviewed a number of studies conducted in the past 30 years and found they were generally based on small samples in specific camps rather than in a variety of camps. Marsh conducted a meta-analysis of 22 studies addressing self-constructs (self-esteem, self-confidence, and other aspects of self). The results showed that camp had a positive influence on self in relatively short periods of time across all age groups, but particularly among younger campers. The other significant conclusion was that camps that focused on enhancing self-constructs were more likely to effect them. Therefore, the intentional and deliberate programming done in camps related to building self-constructs more often resulted in improvements. If, for example, one focus of the camp experience was to help campers become more environmentally aware, this outcome was not likely to happen unless the camp purposely developed a program that encouraged discussions about the environment and the embodiment of

environmentally sound practices. In other words, camp staffs need to program for the goals that they wish to accomplish.

Study by Eborn (1999) examined the effects of participation in an environmental education experience on the level of creative thought for fifth-grade children. Subjects were 80 fifth-grade students from two different elementary schools in Jackson and Wilson, Wyoming. Six different classrooms were involved in the testing. One classroom, which did not attend the science school between tests, served as a control group. The results showed that, after attending the three-day Teton Science School program, fifth-graders had statistically significantly increased fluency and total creativity scores on the Torrance Test of Creative Thinking-Figural Portion. Eborn stated that the experience did have a significant effect on the children's total creativity scores.

Culen (1994) assessed the effects of an extended case study that focused on wetlands issues with seventh and eight grade students. The extended case study was an instructional methodology that incorporated the issue investigation / evaluation and action training module. A modified pre-test and post-test non equivalent control group design was utilized with fifteen intact classes from Illinois and Missouri. Post-test data was collected on the variables of overt environmental behaviour, knowledge of ecological foundations, individual locus of control, group locus of control, knowledge of citizenship action skills and perceived skills in the use of citizenship action skills. Analysis of covariance was used to compare treatment groups and control group means. Statistically significant differences were found with the variable overt environmental behaviour. The two experimental treatments were found to be more effective than the control, and

the full treatment was found to be more effective than the partial treatment in increasing overt environmental behaviour. The goal of conservation education is positive behavior change toward animals and the environment.

Conaway (2006) studied the effects of the *Mississippi River Program* on the environmental knowledge and awareness of middle school adolescents. The *Mississippi River Program* was an interdisciplinary environmental education curriculum implemented in La Crosse, Wisconsin. The programme integrated theory and practice of experiential, environmental, adventure, and place-based education, and was designed, implemented and assessed by the researcher. Effects of the *Mississippi River Program* on the environmental knowledge and awareness of middle school adolescents were unknown at the onset of this study. This was a quasi-experimental design involving non-random sampling of a charter Montessori Middle School as the experimental group (n=17), and a sample of public middle school students as the comparison group (n=18). A mixed-methods approach entailed quantitative assessment of mean pretest and posttest scores on the *Environmental Knowledge and Beliefs Questionnaire,* and a qualitative analysis of reflective papers written by the Montessori group. The research instrument was drawn directly from the state standards for environmental education for middle school adolescents, published by the Wisconsin Department of Instruction (1998). Results of ANOVA indicated a significant improvement in mean scores from pre-test to post-test for the experimental group, with no significant difference in scores for the comparison group (p=.0002). Student reflective papers written about experiences during this event were qualitatively assessed using an emergent open coding method, which revealed five

environmental learning themes. Qualitative findings reinforced the quantitative results, indicating that the programme participants improved significantly in knowledge of environmental content areas; and awareness of a personal relationship with, and responsibility to, the environment.

Dimopoulos (2003) constructed a 32-item survey instrument to measure the knowledge and aspects of attitudes (issue understanding and concern, locus of control, and verbal commitment) regarding sea turtle conservation on Zakynthos, Greece. It was completed by 332 5th and 6th grade students from 21 classes in 3 geographical field trips settings. The results indicate low knowledge scores, but high score levels for attitudes. Knowledge, understanding and/or concern, and locus of control significantly correlated with grade level. Overall, a significant positive correlation between knowledge and attitudes was demonstrated. The findings of the study helped to design environmental education programs to promote sea turtle conservation. The Bay of Laganas on the Greek island of Zakynthos, an important rookery for the *Caretta caretta* sea turtle, is the largest single nesting colony in the Mediterranean Zakynthos' fast growing tourist industry and unplanned development, have threatened the nesting beaches. Before the study was conducted, researchers need to investigate local people's knowledge of basic sea turtle biology and protection measures and local people's attitudes regarding sea turtle conservation on Zakynthos. Knowledge and attitudes must be enhanced to induce positive behaviors toward the management of sea turtles and their habitats. School children are often considered a good starting point for this purpose.

The results of the study indicated that the alpha coefficient for the attitude section was higher than the knowledge section. The fifth graders were slightly more consistent in their total scale item responses than the sixth graders. Both genders, however, were almost equally consistent in their total instrument item response. Knowledge mean scores were rather low compared with the mean scores for understanding and concern, locus of control, and verbal commitment, which were relatively high. There was no significant correlation between gender, father's occupation, and geographic setting of the school. However, grade was positively correlated with knowledge, issue understanding and concern, and locus of control. A significant positive correlation was established between (a) knowledge and issue understanding and concern, and (b) knowledge and locus of control. Knowledge and verbal commitment exhibited no significant correlation. A significant positive correlation was demonstrated between (a) issue understanding/concern and locus of control, (b) issue understanding/concern and verbal commitment, and (c) locus of control and verbal commitment.

Many researchers have investigated the immediate effect of short-duration field experiences, but few have studied the long-term effect of such programs. An inquiry into the long-term effects on students of an environmental education field trip was important for evaluating the sustainability and usefulness of such programs.

Farmer et al. (2000) examined by using phenomenological analysis, the long-term effects of an environmental education school field trip on fourth grade elementary students who visited Great Smoky Mountains National Park. The authors' findings

suggest that one year after the experience, many students remembered what they had seen and heard and had developed a perceived pro environmental attitude.

Informal, in-depth interviews were conducted a year after the trip, to explore the students' long-term memory recollections of the field trip experience. The researcher solicited student participation for the study, after receiving approval. A qualitative analysis was performed on the data from the in-depth interviews of 15 self-selected students out of the 30 who had participated in the programme. Initial contact with the students included an explanation for contacting them; scheduled the interviews a week later, to give the students time to prepare for the interview by attempting to recall the program. The authors discuss the phenomenological analysis, cite interviews with students, and draw conclusions on the effect of the field trip. The open-ended and unstructured interviews began with the following statement: "Could you please tell me what you remember about the field trip that you took to the Smoky Mountain National Park last year?" Subsequent statements or questions from the researchers represented attempts to obtain clarification or elaboration of a student's experience. Interviews were participant-centered in the sense that the students controlled the direction of the interview, including the subject matter and the range of topics discussed. The interviewer gave minimal encouragement to students' responses, asking follow-up questions only for summaries of content and clarification. The interviewer had no preplanned agenda of questions to be covered in the interview and consistently adhered to that strategy for each of the 15 students. The interviewer discontinued the interviews when students brought up no new materials and themes. The length of the interviews varied from 20 to 40 min. The

authors' findings suggest that one year after the experience, many students remembered what they had seen and heard and had developed a perceived pro environmental attitude.

Nevertheless, Sengstock & Hwalek (1999) stated that there are numerous challenges existing in studying outcomes or benefits. It is difficult to measure if a camping or recreation programme causes a change in behavior. It is even more difficult to measure the changes occurring in a relatively short period of time, such as for a five-day camp experience. Many factors may mitigate what happens to a young person. For example, it is more difficult to measure changes in youth because the rapid developmental changes in the first 15 years are unprecedented compared to other age groups. In addition, programme often include a wide variety of individuals with varied racial, ethnic, or cultural backgrounds. Little is known about how outcomes are related to identity characteristics.

From the case studies, research and observations conducted reveals that environmental education programme despite infusing knowledge, influences participants' ways of thinking which leads to the change in attitude and behavior towards the environment. Questionnaire and interviews were carried out to proof that environmental education programme contributes to positive mindsets. Results showed a significant positive effect of the programme on students' awareness of the local environment and on their knowledge of environmental concepts. These findings imply that teaching children about the positive aspects of their local environment would build their sense of caring ness and connection to the place where they live.

Studies carried out in other countries had investigated effects of camping experiences on knowledge and attitude level with regards to specific environmental cases, for example, on wildlife conservation by Bexell (2006), study by Stepath and Carl's (2006) on coral reefs and study on sea turtle conservation by Dimopoulos (2003). Studies from other countries also included diverse samples ranging from elementary school students to college and university students. Studies by Paul (1999) and Marsh (1999) stated camps can help enhance a young person's self esteem and provide positive outcomes for growth and development. It is regarded as a place of significant component for a child's development experience (John, 1997). Very few have studied the long term effect of such of field trip experiences but Farmer (2000) had investigated the long term effects of an environmental education camp programme which was conducted a year after the trip. Only a few empirical studies have examined the effects of environmental education programme through camping experiences in our country for example, studies by Yusof (1999) and Moey (1999).

Therefore this study endeavors to investigate the effects of environmental education programme through camping experience on the knowledge and attitude of students regarding wetlands issues.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This survey study was designed to investigate the effects of environmental education camp experience on the knowledge and attitude of students regarding wetlands. The survey was conducted on students who attended the environmental education camp on wetlands from the Northern, Southern and Eastern Zones of Peninsular Malaysia. The students from the Northern Zone were from the states of Perlis, Kedah, Pulau Pinang and Perak. The students from the Southern zone were from the states of Melaka, Johor and Negeri Sembilan. Students from the Eastern Zones are from the states of Pahang, Kelantan and Terengganu. The study investigated on the demographic profile, knowledge and attitude of students on wetlands before they participated in the camp and after they had participated in all the activities during the camp. The study aimed to investigate whether there is a gain in knowledge and positive attitude regarding wetlands by students before and after they attended the camp. The study also investigated students' expectations and perception towards the environmental education camp before and after they attended the camp. The survey study was conducted on the experimental group who were involved in the pre-test and post-test (students who attended the camp).

3.2 Pilot Test

3.2.1 The Samples

Both male and female students were sampled from two secondary schools, one from an urban and the other from a rural school in the district of Kuantan, Pahang. The questionnaire was pilot tested on 40 Primary 5 and 6 students from the urban school and 40 Primary 5 and 6 students from the rural school. The respondents from the primary school were students of mixed ability classes, representing from high to low achievers students. The respondents from the secondary schools were selected from the rural and the urban area. 40 questionnaires were given out to students from the lower secondary students (Forms 1 and 2) and 40 to upper secondary school students (Form 4 and Lower 6) in the urban and rural schools. The respondents from the secondary schools were also students of mixed ability classes comprising from high to low achievers. The questionnaires were pilot tested during the month of March 2007. The questionnaires were pilot tested on respondents from different areas and levels of primary and secondary school students. This pilot test represented different areas and level of primary and secondary school students because the students who will be attending the environmental education camp on wetlands were from different areas and levels of primary and secondary school students. The pilot test was conducted to ensure the questions were clear and understandable and to ensure students of different levels were able to answer the questions in the true sample questionnaire.

3.2.2 Instruments

The survey questionnaire had four separate instruments (see appendix A). They were:

a) Section A: General Information of the students
b) Section B: Knowledge Test on Wetlands
c) Section C: Attitude Towards Wetland Issues
d) Section D: Expectations from the Environmental Education camp (pre-test group)
e) Section D: Perception on the Environment Education Camp (post-test group)

a) Section A: General Information of the Students

Section A of the survey questionnaire consisted of general information about the students. The survey questionnaire asked on their state, name of school, level of study (primary and secondary), age, gender, race, place of stay (urban and rural), experience in environmental leisure activities (hiking, camping, canoeing, jungle tracking, cleaning river and etcetera), why they were not involved in environmental activities, who encouraged them to attend the camp, academic achievement in Science subject and academic performance in the class and national level examinations. Question number 10 (see Appendix A: Section A, number 10) was not applicable for the sample in the pilot test as it asked who encouraged the respondents to participate in the camp. Thus, the respondents do not have to answer the question during the pilot test.

b) Section B: Knowledge Test on Wetlands

Section B of the survey questionnaire tested students on their knowledge on wetlands. The test contained items related to wetlands such as on the definition of wetlands, functions and values of wetlands, basic characteristics of wetlands, impacts to wetlands on habitats and flora and fauna species, water quality, significant date and places of wetlands. This section tested on the knowledge on wetlands through 24 objective questions, formulated with three answer options. This section was pilot tested again formulated with four answer options. The questions were designed based on the indoor talks and outdoor activities on wetlands, which will be carried out later by the organizers during the camp. The researcher had discussed with the organizer (Malaysian Nature Society MNS) the type of activities and contents of the talks to be carried out during the camp. Based on this, the researcher designed the questions to test the knowledge on wetlands.

c) Section C: Attitude towards Wetlands Issue

This section consisted of 20 attitude statements regarding students' attitude towards wetlands issues. Students were required to indicate their responses by choosing one of the five responses: "Strongly agree", "Agree", No Comment", "Disagree" or "Strongly Disagree". The section consisted of statements to test students' attitude, concern and commitment in the conservation of wetlands.

3.2.3 Administration of Test

Each student was given a time of an hour to answer the questions in the pilot test questionnaire. The pilot test was carried on during the school hours with permission and cooperation of the school principal and teachers. The class teachers gave out the pilot test questionnaires. The students were able to answer the questions within the time given.

After the completion of the pilot test, the researcher received the following comments from the students. The secondary school students were able to understand the questions and were able to answer the questions because they had acquired environmental knowledge from the Science, Biology and Geography subjects though not precisely on the subject of wetlands. They were able to relate effects of development to the environment and the consequences.

The primary school students had commented to their teachers that the questions were challenging to them. The primary school students were unsure of the correct answers and found the questions were challenging because they had less exposure to environmental knowledge. Despite that the questions were challenging for the primary school students, the primary school students were able to give correct answers based on the clues in the option answers. Initially there were 3-option answers (a, b and c) in the questionnaire. Therefore, the pilot test questions showed that students were able to relate to the answers by looking for the clues and because there were only three option answers given, the probability of correct answer chosen by guessing was greater. Thus, the score for correct answer selection for the primary school students for Section B were high despite the comments given. Therefore, the pilot test questions for Section B were edited

giving an option of four choices (a,b,c and d). The edited Section B questionnaire was pilot tested again to same group of primary and secondary school students. Section A, C and D remained the same questions. The second pilot test showed the score for correct answer selection for the primary and secondary school students were lesser than the first pilot test.

The language used in the questionnaire was Bahasa Malaysia (Malay Language), which will be the medium of language to be used during the camp. The terms and sentences were edited too so that students do not look for clues but to be able to rationalize their answers. The edited questionnaires were used in the true sampling test.

3.2.4 Validity and Translation of the Questionnaire

Though the Science subject in the national school is now taught in the English language, the medium of language used during the talks and activities for the camp will be in the Bahasa Malaysia language. The Head of Science Unit teacher checked the questions to ensure that correct science terms were used. She has been teaching Science both in the Malay and now in the English language in the government school for over 10 years. A Malay Language teacher was consulted so that the sentence constructions were correct and understood by the students. He had been teaching Bahasa Malaysia for 12 years. The questionnaire was then sent for comments to the Environmental Education Officer of Malaysian Nature Society (MNS) who will be facilitating the activities during the camp. She had more than 5 years of experience conducting environmental education

programmes. The questions were later checked and commented by an academician from the University of Malaya who is an expert in Environmental Education field.

3.2.5 Data Analysis

The pilot test was conducted to determine the applicability of the questions for the true sample questionnaire later. There was no data analysis involved for the pilot test sampling.

3.3. Camp's Programme

The camp began with registration of attendance, ice breaking sessions, instructions on the dos and don'ts during the camp, briefing on the overall activities followed by presentations and environmental games on the first day. The following day were mostly on outdoor activities such as trail interpretation on biological diversity of plant and animals, water quality monitoring consisting of chemical, physical and biological studies, presentations on biological diversity and result findings from the water quality monitoring.. The final day of the camp was introduction to birding, birdwatching, presentation by students on birds identified. Students were grouped randomly. About two to three teachers were assigned to each group. Each group was facilitated by MNS staffs with qualified environmental academic background. Though the zonal level camps were carried out on in different venues, the modules of activities in all zones remain similar. Students from all the three zonal camps have undergone the same modules of activities.

3.3.1 Camp activities

i. Trail interpretation

Each group of less than 20 students, was taken into the trail by a facilitator and followed by teachers. Before the students went into the trail, they were briefed on the rules and given an introduction to the trail interpretation activity. There was a hiatus from one and another group as they walked into the trail. This is to ensure that groups do not collide with one another. Students remained in the same small groups. This is to ensure active participation and communication between students and facilitators.

As groups of participants were tracking in the trail, they were briefed on plants and animals at different stops along the trail. Participants touched, felt, and observed the different type of plants consisting of shrubs, epiphytes, climbers and gigantic trees, leaves, seedlings and roots of the trees. Students were asked to use their senses to listen to the sounds of the animals such as birds and monkeys in the jungle. Students were required to write down the information given as they will be presenting the information in the next session. Participants were permitted only to pick up fallen leaves as samples for their presentations because the rules required them to '*take nothing but photographs, leave nothing but footprints'*. All groups were given interpretation by facilitators at the same main stops so that participants did not lack information with other groups.

i. Water quality monitoring

The water quality testing was conducted at water based sites such as rivers, streams and lakes. Each group was given a water testing kit. Based on the instructions given by the facilitators, groups were required to conduct test on the biological, chemical and physical characteristics of water. Guided by a facilitator for each group, participants tested for basic water quality parameters such as pH, biological oxygen demand (BOD), Dissolved Oxygen (DO), turbidity, nitrate, phosphate, and temperature. Participants carried out the activity step by step from diagrammed instructions and with the help of facilitators. Their findings were then presented in the next session in which they will identify practices and issues which have led to changes in the water quality parameters.

ii. Birdwatching

Before students went for the birdwatching, there was an indoor session on birdwatching. There was a presentation on birdwatching. Students had a practice on how to use the binoculars and identifying birds using field guide books. Each group was led into different sites by facilitators. Binoculars were distributed to each group and shared by group members. Field guide books on identifying birds were provided for the groups. While watching birds through binoculars, they were requested to observe the parts of the body, make a sketch in a note book and identify the bird species by using the field guide books. Participants need to present their findings by naming and drawing the birds they have sighted.

iii. Presentations

There were presentations on environmental themes from the MNS staffs, invited speakers as well as participants of the camp. The presentations would be either before an outdoor activity or as a follow up activity in which participants need to present their findings after they had undergone activities such as trail interpretation, water quality monitoring test and birdwatching. When groups have presented their findings, a facilitator will wrap up the sessions by commenting the issues and facts presented. Environmental themed presentations were on forest ecology, wetlands, birds, and peat swamp forest and climate change using audio visual and multimedia facilities.

3.3.2. Role of Facilitators

The facilitators were officers of Environmental Education Department of the Malaysian Nature Society (MNS) and assisted by the teachers. There were about 6 MNS environmental education officers who had more than two years of working experience in carrying out environmental education programme nationwide.

3.3.3. Equipments

Audio visual equipments were used such as laptops and LCD for presentations. As for the water quality test, the low cost monitoring kit provides a simple, non hazardous method of testing river water for basic water quality parameters such as dissolved oxygen (DO), biological oxygen demand (BOD), nitrate, pH, phosphate, temperature and turbidity, with step by step diagrammed instructions for each test.

Binoculars, filed guide books were provided for students on sharing basis as well as stationeries.

3.3.4. Programme Schedule

Below was the activities carried out in the Eastern Zone Camp. (Pekan, Pahang)

Day	Activities
Friday (First day)	Registration *Pre-test carried out* Ice breaking Talk on peat swamp forest Talk on wetlands Night walk
Saturday (Second day)	Jungle walk to the peat swamp forest Presentation by groups (based on activity sheet) Water quality monitoring Presentation by group (based on activity sheet) Talk on birds Demonstration on using the binoculars
Sunday (Final day)	Birdwatching Presentation by groups on birds sighted *Post test* Closing ceremony

Below was the activities carries out in the Northern Zone. (Teluk Bahang, Penang)

Day	Activities
Friday (First day)	Registration *Pre-test carried out* Ice breaking Talk on forest ecology Talk on climate change Night walk
Saturday (Second day)	Jungle walk Presentation by groups (based on activity sheet) Water quality monitoring Presentation by group (based on activity sheet) Talk on wetlands
Sunday (Final day)	Talk on birds Birdwatching Presentation by groups on birds sighted *Post test* Closing ceremony

Below was the activities carries out in the Southern Zone.(Kuala Selangor Nature Park, Selangor)

Day	Activities
Friday (First day)	Registration *Pre-test carried out* Ice breaking Talk on wetlands Talk on mangrove Jungle walk into the mangrove forest Presentation by groups (based on activity sheet)
Saturday (Second day)	Jungle walk into mangroves Presentation by groups (based on activity sheet) Water quality monitoring Presentation by group (based on activity sheet) Night walk

Sunday (Final day)	Talk on birds Birdwatching Presentation by groups on birds sighted *Post test* Closing ceremony

During the pre-test, students were asked to answer all the sections in the questionnaire. They were not informed that they will be tested again after the pre-test sessions. The post-test questionnaire was given to the students on the final day. The researcher expected that the students would be able to rationalize the answer on their own based on the activities they underwent in the camp. Hence, the researcher did not influence or direct the students for the right answer selection. However the three days and two nights camping experiences were carried out in a short period of time, hence the probability of students answering correctly was greater.

3.4 Proper Survey

3.4.1 The Samples

The samples for the true test consisted of students from primary and secondary schools throughout Malaysia. The organizer for the environmental education camps was the Malaysian Nature Society (MNS). The two days and three nights' environmental education camps were conducted at zonal levels namely Northern, Southern and Eastern Zones of Peninsular Malaysia on separate dates and locations. The students from the North East Zones were from the states of Perlis, Kedah, Pulau Pinang and Perak. The students from the Southern zone were from the states of Melaka, Johor and Negeri Sembilan. Students from the Eastern Zones are from the states of Pahang, Kelantan and

Terengganu. The Malaysian Nature Society (MNS) with the approval of the Ministry of Education Malaysia encourages the setting up of Nature Lovers Club (Kelab Pencinta Alam). The members have privileges of joining environmental based programmes organized by MNS. One such programme was the environmental education camp. MNS had sent out the letters through the State Education Department of respective states informing about the environmental education camp. From the State Education Department, the letters were sent out to the schools. The schools were required to send students as participants with a teacher accompanying them. Each school was allowed to bring three participants comprising of male and female students. The environmental education camp for the Eastern Zone was held in Casuarina Resort, Pekan, Pahang (27 – 29 April 2007); Southern Zone in Kuala Selangor Nature Park (8 – 10 June 2007) and Northern Zone in Teluk Bahang Forest Reserve, Penang Island (15 – 17 June 2007). The Southern and Northern Zones consisted of participants from secondary school students except the Eastern Zone, which consisted of mix participants from primary and secondary school students.

3.4.2 Instruments

The questionnaire used in the true survey was similar to the pilot test questionnaire. The true survey questionnaire consisted of four sections (see Appendix A). The pre-test questionnaire were given out to participants on the first day of their camp, before they took part in any activities and the post-test questionnaire on the last day of the camp, after

they had taken part in all the activities. The sets of questionnaire in pre-test and post- test consisted of four sections; Section A, B, C and D.

a) Section A: General Information of the Students

This section requested for the participants information such as their state, name of school, level of study (primary and secondary), age, gender, race, place of stay (urban and rural), experience in environmental leisure activities (hiking, camping, canoeing, jungle tracking, cleaning river and etcetera), why they were not involved in environmental activities, who encouraged them to attend the camp, academic achievement in Science subject and academic performance in the class and national level examinations.

b) Section B: Knowledge Test on Wetlands

This section consisted of questions to test participants' knowledge on wetlands. The test contained items related to wetlands such as on the definition of wetlands, functions and values of wetlands, basic characteristics of wetlands, impacts to wetlands on habitats and flora and fauna species, water quality, significant date and places of wetlands. This section tested on the knowledge on wetlands through 24 objective questions, restructured with four multiple-choice answer options.

c) Section C: Attitude Towards Wetland Issues

This section consisted of 20 attitude statements regarding students' attitude towards wetlands issues. All 20 questions were selected for the true sampling survey. Students were required to indicate their responses by choosing one of the five responses: "Strongly agree", "Agree", No Comment", "Disagree" or "Strongly Disagree". The section consisted of statements to test students' attitude, concern and commitment in the conservation of wetlands.

d) Section D: Expectations from the Environmental Education Camp

Perception of the Environmental Education Camp

This section tested on the participants' expectations of the environmental education camp. The questionnaires were distributed on the first day of the camp before the participants joined in any activities. Participants were also tested on their perception (actual opinion) towards the environmental education camp. They filled up the questionnaire on the last day of the camp after having participated in the activities stating their perception on the overall camp. This section consisted of 19 questions statements.

3.4.3 Respondents of the Study

The respondents of the study were divided into two Treatment groups

i. Treatment Group 1: Pre-test Group

This comprised participants of the environmental education camp who had not yet taken part in the environmental education activities of the camp.

ii. Treatment Group 2: Post-test Group

This comprised of the same participants who had experienced indoor and outdoor environmental education activities of the camp. They took part in the environmental education activities on wetlands where they were taken into the trails to study the plant life, experienced ecological trips to the peat swamp and mangroves areas to study the inter-relationship of living and non – living organisms, conducting water quality and birding trips. Apart from field study experience, participants were given talks on wetlands and forest ecology.

3.4.4. Administration of Test

The test was conducted during the camps. Two sets of questionnaire were given to the participants. The first set of questionnaire was given on the first day of the camp before (pre-test) the students took part in any environmental education activities. The second set of questionnaires was given on the last day of the camp after (post-test) the students experienced all the activities in the camp. A 45 minute time slot was given for the students to complete the questionnaire.

3.4.5. Marking Scheme

The marking scheme carried points for Section B, C, and D. Section B consisted of objective structured questions with 4 answer options. For every correct answer 1 point was given. There were altogether 24 questions. The maximum score for Section B was 24

if all the questions were answered correctly whereas the minimum score was 0 if all the questions were answered wrongly. For this section, the higher the score a student obtained, the higher the level of knowledge on wetlands.

For Sections C and D which tested on the students' attitude on wetlands and students expectation / attitude on the environmental education camps, the points were:

Points	Answer Selection
4	Strongly Agree
3	Agree
2	Disagree
1	Strongly Disagree
0	No Comment

If more answers were selected on 'Strongly Agree', the higher the points were obtained. The points for negative statements were attributed in reverse from the points in the table above. There were 5 negative statements for Section C (questions 1, 7, 12, 15 and 17) one negative statement for section D (question 16). For these questions the points given were:-

Points	Answer Selection
4	Strongly Disagree
3	Disagree
2	Agree
1	Strongly Agree
0	No Comment

The minimum score for this section (C and D) was 0 if a student selects 'No comment' answer, whereas the maximum score for Section C (20 questions) were 80 points and Section D (19 questions) were 76 if all the selected answers were 'Strongly Agree' for positive statement and 'Strongly Disagree' for negative statements.

3.4.6. Data Processing and Data Analysis

The data for the proper survey were processed using the computer programme of Statistical Package for Social Science (SPSS) and Statistica version 8.

To test the effects of sex, location and level of education (factors) on the following variables: knowledge, attitude and expectation, an analysis of variance (ANOVA) was carried out on the pre-camp data of these variables. These three variables were found to satisfy the required assumptions of the test, i.e. being normally distributed based on the normal plot of within-cell residual test, and having homogeneity of variance based on Cochran C test ($p > 0.05$), as performed by Statistica. If the ANOVA test showed significant significance ($p \leq 0.05$), post-hoc comparison among the means were carried out using Tukey HSD test.

The non-parametric Wilcoxon paired-sample test was applied to test for significant difference between pre-camp and post-camp results on knowledge regarding wetlands, attitude, expectations and perception towards the camp's programme. This was because the post-camp results were highly skewed and showed significant deviation from normality and homogeneity of variance. The null hypothesis of no difference was rejected if $p \leq 0.05$.

The 2x2 Chi-Square contingency table (with Yates correction) was applied to test for independence between two variables measured on frequencies of occurrence. For example, the level of knowledge was tested to see if it was independent or dependent on sex, location (rural and town) or level of education. The null hypothesis of independence between the two variable is rejected if $p \leq 0.05$.

To calculate and test the significance of the correlation between the following variables: knowledge and attitude, the Spearman Rank Order Correlation coefficient was used. A correlation with a p-value of more than 0.05 is considered not significant.

3.5 Limitations of the Study

Camp participants differed in demographic profile, academic background, types of activities and schedule, interests and had opinions of their own on facilitator skills. Participants would not have favoured outdoor activities, wetlands habitats or the weather! Hence, participants would have experienced different perception about the camp and their different characteristics had influenced their attitudes.

Furthermore, the 3 days and 2 nights camping experiences was a short period of time and would not be able to bring about drastic changes in knowledge and attitude. The number of students in the camp was determined by the organizers. Therefore, the researcher had no control over the number of students. The study was based on the topic wetlands and cannot be generalized for other environmental topics.

3.6 Definition of Terms

Pre-test group

The pre test group consisted of students who attended the camp. They were tested before participating in any environmental education activities on wetlands.

Post- test group

The post test group consisted of students who participated in the environmental education programme. They were tested after participating in all the activities.

Expectations

Expectation is the hope of participants of the camp towards the environmental education programme before attending the camp.

Perceptions

Perception is the view of participants of the camp towards the environmental education programme after attending the camp.

Knowledge

Knowledge is the information and understanding students acquired on wetlands by participating in the environmental education programme.

Attitude

Attitude is the thoughts and opinion students have towards wetlands issues.

Pre-camp knowledge

Pre-camp knowledge is the information and understanding on wetlands that students have before attending the camp.

Post-camp knowledge

Post-camp knowledge is the information and understanding on wetlands that students acquired after attending the camp.

Pre-camp attitude

Pre-camp attitude is the thoughts and opinion students have towards wetlands issues before attending the camp.

Post-camp attitude

Post-camp attitude is the thought and opinion students have towards wetlands issues after attending the camp.

CHAPTER 4

RESULTS AND DISCUSSION

4.1. Demographic Profile of Sampled Students

Table 4.1 shows sampled students by number of response to the survey.

Table 4.1. Frequency Distribution of Sampled Students by Number of Response.

GROUP	No.
Pre test and post test	206
Total	412

The result showed a total of 412 questionnaires were given to students to answer. 206 questionnaires were given to the pre-test group before participating in the camp and again in the post-test after participating in the camp.

Table 4.2 shows sampled students by zone. The East zone included the states of Pahang, Terengganu and Kelantan states. The South zone included the states of Johor, Melaka, and Negeri Sembilan. The North zone included the states of Perlis, Kedah, Pulau Pinang and Perak.

Table 4.2 Frequency Distribution of Sampled Students by Zone.

ZONE	No.	Percentage
East	88	42.72
South	42	20.39
North	76	36.89
Total	206	100.00

The highest number of students sampled was from the East zone (88, 42.72%) followed by North (76, 36.89%) and South zones (42, 20.39%).

Table 4.3 shows sampled students by states. There were a total of ten states from Peninsular Malaysia which participated in the survey.

Table 4.3 Frequency Distribution of Sampled Students by States.

STATE	No.	Percentage
Pahang	24	11.65
Terengganu	30	14.56
Kelantan	34	16.50
Johor	3	1.46
Melaka	31	15.05
Negeri Sembilan	8	3.88
Perlis	20	9.71
Kedah	35	17.00
Perak	18	8.74
Pulau Pinang	3	1.45
Total	206	100.00

The highest number of samples was from the state of Kedah (35, 17.00%) followed by Kelantan (34, 16.50%), Melaka (31, 15.05%) and Terengganu (30, 14.56%). The frequency of students sampled from the states of Johor and Pulau Pinang showed distinct variation. For example, the number of students from the states of Johor and Pulau Pinang were only 3 (1.46%) students. This variation occurred because the number of students depended on the number of students responding to the invitation to attend this camp. Participation to the camp was opened to the Nature Lovers Clubs (KPA). The Malaysian Nature Society (MNS) extended the invitation to the camp through the State Education Department. But it was the school who confirmed the participation to the camp. As the

number of KPA clubs was lesser in these states, it affected the number of students participating in the camp.

Table 4.4 shows sampled students by primary and secondary schools.

Table 4.4 Frequency Distribution of Sampled Students by Schools (Primary and Secondary)

SCHOOL	No.	Percentage
Primary	29	14.08
Secondary	177	85.92
Total	206	100.00

The result showed the number of students from the secondary school (177, 85.92%) outnumbered students from the primary school (29, 14.08%). The reason for the distinct variation in the result shown is because only the East zone camp had samples from the primary school. The samples from the North and South consisted of secondary school students.

Table 4.5 shows that the students who attended the camp represented different streams; science and arts.

Table 4.5 Frequency Distribution of Sampled Students by Stream.

STREAM	No.	Percentage
Science	65	31.55
Art	45	21.84
Not related	96	46.61
Total	206	100.00

Steaming in the Malaysian school system begins at the upper secondary school level (Forms 4, 5 and 6). This means students from the primary level who attended the camp

(ages 10 to 12) to lower secondary level (Forms 1 to 3) had no streaming, hence they have answered 'not related'. The number of science stream students sampled was 65 (31.55%) and arts stream students were 45 (21.84%).

Table 4.6 shows sampled students by age.

Table 4.6 Frequency Distribution of Sampled Students by Age.

AGE OF STUDENT	No.	Percentage
10	4	1.94
11	8	3.90
12	17	8.25
13	4	1.94
14	33	16.00
15	17	8.25
16	60	29.12
17	55	26.70
19	8	3.90
Total	206	100.00

The age of sampled students in the study ranged from 10 years to 19 years. Ages 10 to 12 were students from primary schools. The rest were from secondary schools. A total of 17 (8.25%) students were 12 years old. The highest number of students (60, 29.12%) were 16 years old, followed by 17 years old (55, 26.70%) and 14 years old (33, 16%).

Table 4.7 shows sampled students by gender.

Table 4.7 Frequency Distribution of Sampled Students by Gender.

GENDER	No.	Percentage
Male	100	48.54
Female	106	51.46
Total	206	100.00

The survey comprised of 106 (51.46% female and 100 (48.54%) male students.

Table 4.8 shows sampled students by race.

Table 4.8 Frequency Distribution of Sampled Students by Race.

RACE	No.	Percentage
Malays	164	79.61
Chinese	26	12.62
Indians	3	1.46
Others	13	6.31
Total	206	100.00

Most of the sampled students were Malays (164, 79.61%), followed by Chinese (26, 12.62%) and Indians (3, 1.46%). The participants from the East and North zone were almost all Malays, thus influencing the number of sampled students by race. The aborigines from the state of Pahang and Eurasian students stated their race as 'others'.

Table 4.9 shows sampled students by Member of Nature Lovers (KPA) club.

Table 4.9 Frequency Distribution of Sampled Students by Member of Nature Lovers Club (KPA)

Member of Nature Lovers Club (KPA)	No.	Percentage
Yes	110	53.40
No	96	46.60
Total	206	100

The survey comprised of 110 (53.40%) members of the nature lovers club and 96 (46.60%) were non members.

Table 4.10 shows sampled students by location (rural and town).

Table 4.10 Frequency Distribution of Sampled Students by Location.

Place of stay	No.	Percentage
Rural	130	63.11
Town	76	36.89
Total	206	100.00

The number of students from the rural area was 130 (63.11%) and town area was 76 (36.89%).

Table 4.11 shows sampled students by involvement in environmental education programme.

Table 4.11 Frequency Distribution of Sampled Students by Involvement in Environmental Education Programme.

Involvement in Environmental Education Programme	No.	Percentage
Yes	43	20.87
No	163	79.13
Total	206	100.00

The students were asked if they had taken part in any environmental education programme such as hiking, camping, canoeing, jungle tracking, and river or clean up programme. The result shows that a majority of the participants (163, 79.13%) of the camp had not been involved in environmental education activities prior to this camp.

Table 4.12 shows sampled students by their involvement in environmental education programme.

Table 4.12 Frequency Distribution of Sampled Students by Frequency of Involvement in Environmental Education Programme.

Frequency of Involvement	No.	Percentage
Very often	3	1.46
Often	14	6.79
Seldom	26	12.62
Not related (Not involved)	163	79.13
Total	206	100.00

Students who were involved in environmental education were asked to answer the frequency of their involvement in environmental based activities. The sample of students rated their involvement as very often (3, 1.46%) or often (14, 6.79%) but most answered seldom (26, 12.62%). The 'not related' were samples of students who were not involved in environmental based activities.

Table 4.13 shows sampled students by reason not involving in environmental education programme.

Table 4.13 Frequency Distribution of Sampled Students by Reason Not Involved in Environmental Education Programme

Reason not involved	No.	Percentage
No opportunity given	51	24.76
Unable to pay	2	0.97
Time unavailable	20	9.71
No interests	34	16.51
No programme organized	32	15.53
Not allowed by parents	24	11.65
Not related (involved in EEP)	43	20.87
Total	206	100.00

Students were asked to give reason as to why they were not involved in environmental education programme. A majority of the students (51, 24.76%) answered that they were not given the opportunity to be involved in the environmental education programme. Lack of programmes (32, 15.53%) organized could be a contributing factor and 34 (16.51%) students had no interests. Permissions disallowed by parents (24, 11.65%) did influence their participation in environmental education programmes. Financial factor was not rated as hindrance to participate in the environmental education programme, thus being the least (2, 0.97%) of all the reasons given. Forty three (20.97%) of the sampled students had involved in environmental education programme

Table 4.14 shows sampled students by "participation supported by".

Table 4.14 Frequency Distribution of Sampled Students by "Participation Supported By".

Participation in this programme	No.	Percentage
Own self	80	38.83
Family	10	4.86
Teacher	94	45.63
Friends	22	10.68
Total	206	100.00

In the questionnaire, students were asked to answer who were supportive towards their involvement in the environmental education programme. The result showed teachers (94, 45.63%) being the most supportive. Eighty (38.83%) of the samples answered that it was their own self which led them to join in environmental education programme. Family (10, 4.86%) and friends (22, 10.68%) were least supportive. The result indicated that if

invitations and opportunities were offered, students would be interested to take part in the environmental education programme.

Table 4.15 shows sampled students by academic achievement in their Science subject.

Table 4.15 Frequency Distribution of Sampled Students by Academic Achievement in Science Subject.

Academic achievement in science subject	No.	Percentage
Excellent (A)	45	21.84
Pass (B/C)	152	73.79
Failed (D/E)	9	4.37
Total	206	100.00

The result showed that students scored mostly B and C (152, 73.79%) which indicated a Pass in the Science subject. Students who scored “A” or excellent result in Science subject were 45 (21.84%). The score above indicated that majority of students had some basic knowledge in the Science subject.

Table 4.16 shows sampled students by academic achievement in their examination.

Table 4.16 Frequency Distribution of Sampled Students by Academic Achievement in Examination.

Academic Achievement in Examination	No.	Percentage
Excellent	58	28.16
Average	92	44.66
Pass	54	26.21
Failed	2	0.97
Total	206	100.00

The term examination was referred to as school based examination and the national examinations such as the UPSR, SPM and STPM. For the primary school students the highest level of examination was the school based examination. The lower secondary school students (Form 1 to 3) answered their academic achievement based on their UPSR examination result which they sat when they were in Year Six. The upper secondary school students (Form 4 to 5) answered their academic achievement based on their PMR examination result which they sat when they were in Form 3. Those in Lower and Upper Six answered their academic achievement based on their SPM examination result. Students who had obtained excellent academic results were 58 (28.16%), average 92 (44.66%) and pass 54 (26.21%).

Table 4.17 shows sampled students by Members of Nature Lovers Club and Gender.

Table 4.17 Frequency of Sampled Students as Groups by Members of Nature Lovers Club (KPA) and Gender.

Member of the Nature Lovers Club (KPA)	Group	Gender		
		Male	Female	Total
Yes	Pre test =Post test	47 (22.8%)	63 (30.6%)	110 (53.4%)
No	Pre test =Post test	53 (25.7%)	43 (20.9%)	96 (46.6%)
Total:		100 (48.5%)	106 (51.5%)	206 (100%)

**Numbers in parentheses indicate percentage*

The result from the table above showed 47 (22.8%) male and 63 (30.6%) female belonged to the Nature Lovers Club (KPA). However, the 2X2 contingency table test shows that membership to KPA was independent of sex (χ^2, Yates corrected = 2.72, p =0.10).

Table 4.18 shows sampled students as groups by involvement in environmental education programme and gender prior to attending the camp.

Table 4.18 Frequency of Sampled Students as Groups by Involvement in Environmental Education Programme (EEP) and Gender.

Involvement in EEP	GROUP	Gender		
		Male	Female	Total
Yes	Pre test = Post test	28 (13.6%)	15 (7.3%)	43 (20.9%)
No	Pre test = Post test	72 (34.9%)	91 (44.2%)	163 (79.1%)
Total		100 (48.5%)	106 (51.5%)	206 (100%)

** Numbers in parentheses indicate percentage*

The involvement of male (28, 13.6%) students in environmental education programme was higher compared to the female students' (15, 7.3%) involvement in environmental education programme. Samples who were not involved in environmental activities such as hiking, camping, canoeing, jungle tracking, and river or clean up programme showed more female students (91, 44.2%) were not involved in environmental activities compared to male students (72, 34.9%). The 2x2 contingency results show that students' involvement in environmental education programme was dependent on sex (χ^2, Yates

corrected = 5.17, p =0.023). In this case, there were relatively more female students (44.2%) who were not involved as compared to male students (34.9%).

Table 4.19 shows sampled students by frequency of involvement in environmental education activities prior to the camp.

Table 4.19. Frequency of Sampled Students as Groups by Frequency of Involvement in Environmental Education Programme Prior to Attending the Camp.

Frequency of Involvement in Any Environmental Educational Programme Before Camp	Group	Gender		
		Male	Female	Total
Very often	Pre test = Post test	3 (1.5%)	0 (0%)	3 (1.5%)
Often	Pre test = Post test	9 (4.4%)	5 (2.4%)	14 (6.8%)
Seldom	Pre test = Post test	16 (7.7%)	10 (4.9%)	26 (12.6%)
Not related (not involved)	Pre test = Post test	72 (34.9%)	91 (44.2%)	163 (79.1%)
Total		100 (48.5%)	106 (51.5%)	206 (100%)

** Numbers in parentheses indicate percentage*

There were only 3 (1.5%) males who were very often involved in environmental education activities such as hiking, camping, canoeing, jungle tracking, and river or clean up programme. Nine male (4.4%) and 5 (2.4%) female students answered that they often involved in these activities. The frequency of involvement by the samples were mostly on a seldom basis with 16 (7.7%) male and 10 (4.9%) female students. The results showed that the male students had higher frequency of involvement compared to the female students.

Table 4.20 shows sampled students as groups by location and members of the nature club (KPA).

Table 4.20. Frequency of Sampled Students as Groups by Location (rural and town) and Members of Nature Lovers Club (KPA).

Members	GROUP	Location		
		Rural	Town	Total
Members of KPA	Pre test = Post test	75 (36.4%)	35 (17%)	110 (53.4%)
Non Members of KPA	Pre test = Post test	55 (26.7%)	41 (19.9%)	96 (46.6%)
Total		130 (63.1%)	76 (36.9%)	206 (100%)

** Numbers in parentheses indicate percentage*

The result showed 75 (36.4%) rural area students and 35 (17%) town area students were members of the KPA club. 55 (26.7%) rural area students and 41 (19.9%) town area students were non KPA members. KPA members and non KPA members from the rural area (63.1%) was higher compared to the KPA members and non KPA members from the town area (36.9%) because participation from the rural area schools was higher compared to the town area schools. The Eastern and Northern zones schools were mostly from rural area. However, the percentage number of KPA members in rural and town area were not significantly different (χ^2, Yates corrected = 1.43, p = 0.23).

Table 4.21 above shows sampled students as groups by involvement in environmental education programme prior to attending the camp.

Table 4.21 Frequency of Sampled Students as Groups by Location (rural and town) and Involvement in Environmental Education Programme Prior to Attending Camp.

Involvement in any Environmental Education Programme	GROUP	Location		
		Rural	Town	Total
Yes	Pre test = Post test	31 (15.0%)	12 (5.8%)	43 (20.8%)
No	Pre test = Post test	99 (48.1%)	64 (31.1%)	163 (79.2%)
Total		130 (63.1%)	76 (36.9%)	206 (100%)

** Numbers in parentheses indicate percentage*

The result shows 31 (15.0%) rural area and 12 (5.8%) town area students had been involved in environmental education activities. The result overall shows that more students were not involved (163, 79.2%) in environmental education activities. They were 99 (48.1%) from rural area and 64 (31.1%) from the town area. However, the 2x2 contingency table test shows that students' involvement in environmental education programme prior to the camp was independent of location (ie. Rural or town) (χ^2, Yates corrected = 1.43, p = 0.23).

Table 4.22 above shows sampled students as groups by location and frequency of involvement in environmental education programme prior to attending camp.

Table 4.22 Frequency of Sampled Students as Groups by Location (rural and town) and Frequency of Involvement in Environmental Education Programme Prior to Attending Camp.

Frequency of Involvement in Environmental Education programme	GROUP	Location		Total
		Rural	Town	
Very often	Pre test = Post test	2 (0.9%)	1 (0.5%)	3 (1.4%)
Often	Pre test = Post test	10 (4.9%)	4 (1.9%)	14 (6.8%)
Seldom	Pre test = Post test	19 (9.2%)	7 (3.4%)	26 (12.6%)
Not involved	Pre test = Post test	99 (48.1%)	64 (31.1%)	163 (79.2%)
Total		130 (63.1%)	76 (36.9%)	206 (100%)

** Numbers in parentheses indicate percentage*

The result showed that only 2 (0.9%) students from rural area participated very often, 10 (4.9%) often and 19 (9.2%) seldom. One student (0.5%) from the town area participated very often, 4 (1.9%) often, 7 (3.4%) seldom. Overall, students from the town area had lower involvement in environmental education programme.

4.2 Pre-camp Knowledge of Wetlands: Effects of Gender, School Location and Level of Education

ANOVA test was conducted to determine effects of gender, location of schools and level of education on students' environmental knowledge of wetlands before they attended the camp (Table 4.23). The level of education had highly significant effect ($p<0.0001$) on the level of knowledge of wetlands. Both upper secondary (Forms 4 to 6) and lower secondary school (Forms 1 to 3) students showed significantly higher mean scores (12.97 and 11.41) than the primary school students (8.98) (Table 4.24, Figure 1). Although the results show that gender and location ($p>0.05$) individually had no significant effect on the level of knowledge of wetlands, the results interestingly showed significant interaction effects between the two factors ($p < 0.05$). It is shown that location did modify the effects of gender, in this case, the town male (M, T, 9.39) had significantly lower mean score than the rest; rural male (M, R, 12.14), rural female (F, R, 11.19) and town female (F, T, 11.74) (Table 4.25, Figure 4.2). This showed that location of schools did modify the effects of gender on the level of knowledge of wetlands.

Table 4.23 ANOVA Summary Table of the Effects of Gender (Sex), Location of Schools, Level of Education on Students' Knowledge regarding Wetlands.

Effect	SS	Deg of freedom	MS	F	p-level
Sex	9.8	1	9.8	1.03	0.312
Loc	24.2	1	24.2	2.55	0.112
Level	220.8	2	110.4	11.6	.000**
Sex*Loc	54.9	1	54.9	5.77	.017*
Sex*Level	0.7	2	0.4	0.04	0.962
Loc*Level	7.2	2	3.6	0.38	0.686
Sex*Loc*Level	21.6	2	10.8	1.14	0.323

*Results with * indicate significant results at 5% significant level; ** at 1% significant level.*

Table 4.24 Mean Score on Knowledge of Wetlands by Students' Level of Education.

Level	Pre _Know Mean	Pre _Know Std.Err.	N
U	12.96611	0.298020	123
L	11.40504	0.421288	54
P	8.98016	0.891928	29

Figure 4.1 Mean Score on Knowledge of Wetlands by Students' Level of Education. (U = upper secondary, L = lower secondary, P = primary)

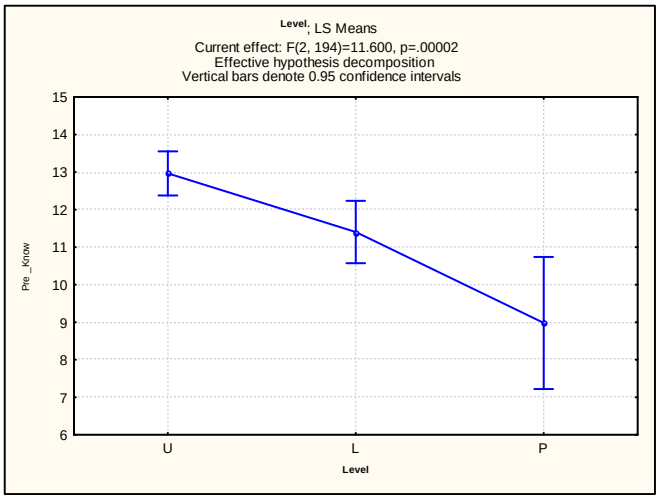
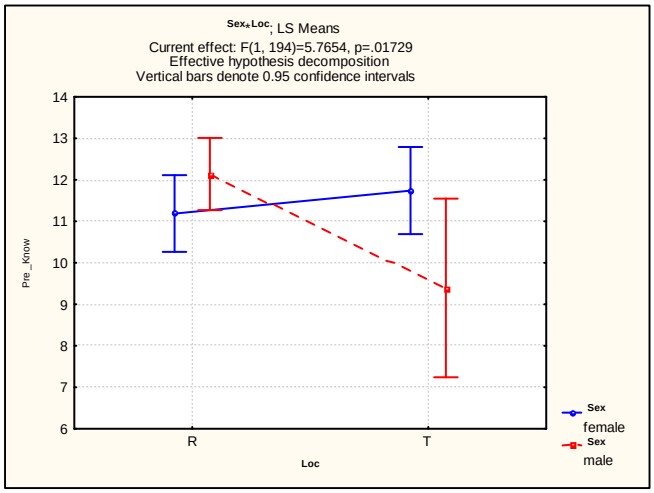


Table 4.25 Mean Score by Students' Gender and Location on Knowledge regarding Wetlands

Sex	Loc	Pre _Know Mean	Pre _Know Std.Err.	N
Female	R	11.18862	0.468495	63
Female	T	11.74206	0.532238	43
Male	R	12.14164	0.441205	67
Male	T	9.39608	1.091000	33

Figure 4.2 Mean Score by Students' Gender and Location
on Knowledge regarding Wetlands.
(R= rural, T= town)



Results from Table 4.26 shows that zone alone contributed significant effect ($p < 0.05$) on the knowledge of wetlands. However, gender alone and the interaction effects between zone and gender did not affect the level of knowledge on wetlands ($p > 0.05$).

Table 4.26 Effects of Zone and Gender of Students' Knowledge regarding Wetlands.

Effect	SS	Deg of freedom	MS	F	P
Zone	83.15	2	41.58	3.911	.022*
Sex	14.87	1	14.87	1.399	0.238
Zone*Sex	54.11	2	27.05	2.545	0.081

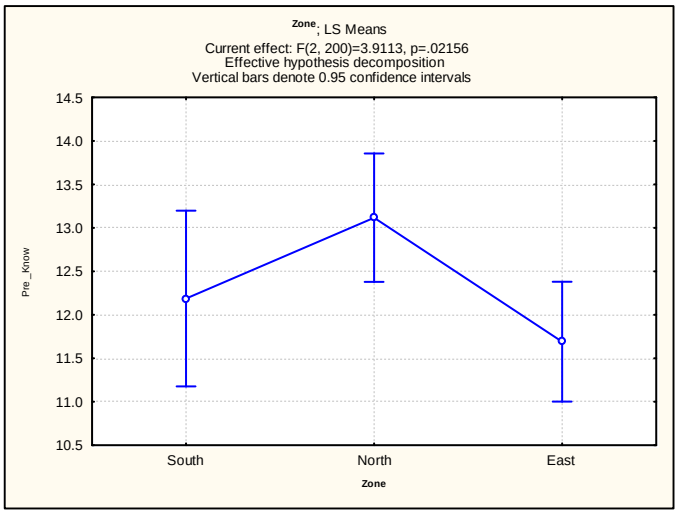
*Results with * indicate significant results at 5% significant level*

Table 4.27 and Figure 4.3 shows that students from the Northern zone had significantly the highest mean score of 13.11 (North) followed by Southern zone (South, 12.18) and Eastern zone (East,11.69) on knowledge of wetlands. The Eastern zone students from the states of Pahang, Kelantan and Terengganu had significantly the lowest mean score (11.69) than the rest due to lack of environmental access such as information centers and educational camps.

Table 4.27 Mean Score on Knowledge of Wetlands by Zone

Zone	Pre _Know Mean	Pre _Know Std.Err.	N
South	12.18706	0.512472	42
North	13.11667	0.374512	76
East	11.69126	0.349825	88

Figure 4.3 Mean Score on Knowledge of Wetlands by Zone.



4.3 Effects of Environmental Education Camp: Level of Knowledge on Wetlands

4.3.1 Results of Wilcoxon pair test, Box and Whisker plot analysis on knowledge level of students before and after education camp.

The Wilcoxon pair test from Table 4.28 on knowledge level of students before and after education camp shows there was highly significant difference ($p<0.01$) on the students' level of knowledge of wetlands between the pre-test and post-test.

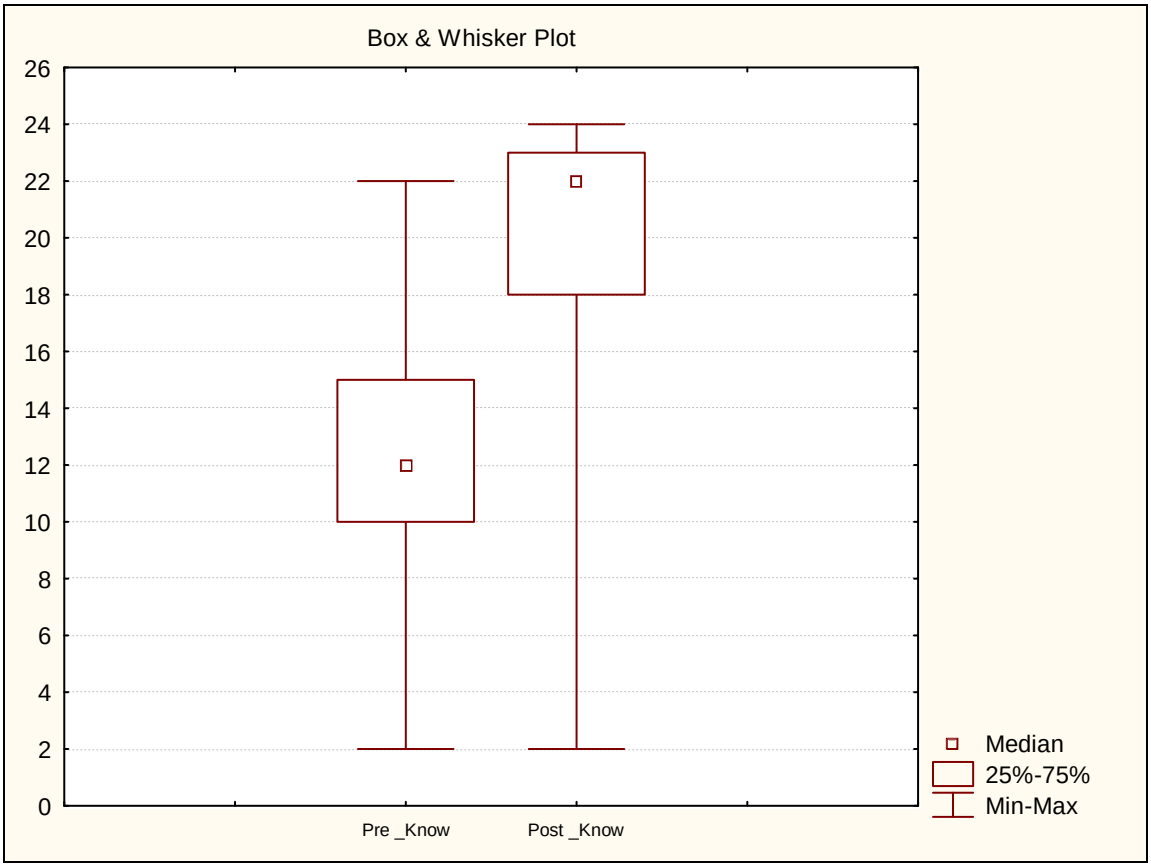
Table 4.28 Wilcoxon Matched Pairs Test on Students' Knowledge regarding Wetlands

Pair of Variables	Valid	T	Z	p-level
Pre _Knowledge & Post _Knowledge	206	243.0000	12.12893	< 0.01

Results indicate significant results at 1% significant level.

The Box and Whiskers plot from Figure 4.4 further shows the difference between the pre-test and post-test results on the level of knowledge on wetlands. The distribution of pre-test frequency distribution of correct answers shows a normal population, with the median (as well as mean and mode) at 12. In contrast, the distribution of post-test correct answers shows a highly skewed population with the median and mode at 22, illustrating the marked improvement after students had undergone the education camp.

Figure 4.4 Box and Whisker Plot Analysis on Students' Knowledge regarding Wetlands



4.3.2. Performance by Zone

Results in Table 4.29 shows the frequency of the correct answer selection scores (Question No.1 to 24) by students on knowledge of wetlands by group and zone. Generally, most of the students in the post-test group from the Eastern, Southern and Northern zones were able to answer the questions correctly after participating in the camp. The score of correct answer selection for the pre-test students were lower

compared to the post-test group. This indicated that after participating in the camp, the correct answer selection among the post-test students was greater.

The frequency of correct answers for question no. 6 showed that in the pre-test, the correct answer selection was very low. For example, the frequency of correct answers from the East zone was 15 (17.0%), South 7(16.7%) and North 16 (21.0%). In the post-test, the frequency of correct answer selection increased very much higher. The distribution from East zone was 57 (64.8%), South 39 (92.8%) and North 70 (92.1%). Question no. 6 asked about the convention which emphasized on the conservation of wetlands of international importance. This indicated that students had less knowledge on the convention on wetlands before they participated in the camp.

The table shows similar results for question no. 10 which tested students on the importance of wetlands for migratory birds. The frequency of correct answer selection for question no. 10 was low in the pre-test from the Eastern zone was 17 (19.3%); 10 (23.8%) from Southern zone and 10 (13.2%) from Northern zone. The result in the post-test shows that the frequency of correct answer selection was higher; Eastern zone 58 (65.9%), Southern zone 33 (78.6%) and Northern zone 55 (72.4%).

Similarly in question no. 13 which tested students on the day World wetlands Day is celebrated? The frequency of correct answer selection from the Eastern zone was 15 (17.0%), Southern zone 13 (30.9%), and Northern zone was 45 (59.2%) in the pre-test. The frequency of correct answer selection increased highly in the post-test with the Eastern zone 74 (84.0%), Southern zone 40 (95.2%) and Northern zone was 72 (94.7%).

Table 4.29 Frequency Distribution of Correct Answer Selection by Students on Knowledge regarding Wetlands by Zone. (Questions No. 1-12)

(Numbers in parentheses indicate total)

Zone	Group	Question No.											
		1	2	3	4	5	6	7	8	9	10	11	12
		A	B	C	A	D	C	B	D	D	A	C	D
East (88)	Pre-test	37	42	54	50	56	15	40	49	77	17	42	60
	Post-test	73	61	68	54	71	57	65	58	82	58	54	69
South (42)	Pre-test	13	25	24	21	13	7	23	18	38	10	21	29
	Post-test	42	33	40	34	36	39	36	38	41	33	40	32
North (76)	Pre-test	28	53	50	23	34	16	46	48	66	10	36	57
	Post-test	75	74	73	73	68	70	67	67	75	55	54	59
Students with Correct answer	Pre-test	78	120	128	94	103	38	109	115	181	37	99	146
	Percentage	37.9	58.3	62.1	45.6	50.0	18.4	52.9	55.8	87.9	17.9	48.0	70.8
	Post-test	190	168	181	161	175	166	168	163	198	146	148	160
	Percentage	92.2	81.6	87.9	78.2	84.9	80.6	81.6	79.1	96.1	70.9	71.8	77.7

Alphabets (A, B, C, D) indicate correct answer selection to the question.

Frequency Distribution of Correct Answer Selection by Students on Knowledge regarding Wetlands by Zone.
(Question No.13-24)

(Numbers in parentheses indicate total)

Zone	Group	Question No.											
		13	14	15	16	17	18	19	20	21	22	23	24
		A	C	C	A	A	B	D	B	B	A	D	A
East (88)	Pre-test	15	32	48	36	43	42	34	35	57	63	53	45
	Post-test	74	58	69	56	75	66	62	74	77	73	69	62
South (42)	Pre-test	13	16	30	22	21	28	24	13	19	21	31	24
	Post-test	40	36	38	41	41	41	39	34	40	36	36	35
North (76)	Pre-test	45	29	61	49	37	43	40	23	47	44	50	51
	Post-test	72	70	64	68	73	65	68	70	72	67	61	54
Students with correct answers	Pre-test	73	77	139	107	101	113	98	71	123	128	134	120
	Percentage	35.4	37.4	67.5	51.9	49.0	54.9	47.6	34.5	59.7	62.1	65.0	58.3
	Post-test	186	164	171	165	189	172	169	178	189	176	166	151
	Percentage	90.3	79.6	83.0	80.1	91.7	83.5	82.0	86.4	91.7	85.4	80.0	73.3

Alphabets (A, B, C, D) indicate correct answer selection to the question.

Table 4.30 shows the frequency distribution of correct answer to “level of knowledge on wetlands” by zone. Results from Table 4.30 (a), 4.30 (b) and 4.30 (c) show the highest score of valid answers (24) was scored by students in the post-test group. None of the students from the pre-test group scored a maximum of 24 valid answers. A total of 3 (3.4%) students from the Eastern zone (Table 4.30.a), 11 (26.2%) students from the Southern zone and (Table 4.30.b) and 10 (13.2%) students from the Northern zone (Table 4.30.c) scored a maximum of 24 valid answers (all correct answers). The Eastern zone students mostly scored 22 (27.3%) valid answers in the post-test. From the Southern zone, the results showed 8 (19%) students equally scored 22 and 23 valid answers. Most of the students (21, 27.6%) from the Northern zone scored 23 valid answers.

Table 4.30 (a) Frequency Distribution of Correct Answer on Knowledge regarding Wetlands by Zone (East)

ZONE	No. of valid answers	GROUP	
		Pre-test	Post-test
East	0	0	0
	1	0	0
	2	0	1
	3	0	1
	4	0	0
	5	0	0
	6	5	4
	7	3	2
	8	3	0
	9	10	0
	10	14	1
	11	8	2
	12	11	0
	13	7	2
	14	5	5
	15	10	4
	16	3	3
	17	6	6
	18	1	9
	19	2	4
	20	0	3
	21	0	8
	22	0	24
	23	0	6
	24	0	3
	Total	88	88

Table 4.30 (b) Frequency Distribution of Correct Answer on Knowledge regarding Wetlands by Zone (South)

ZONE	No. of valid answers	GROUP	
		Pre-test	Post-test
South	0	0	0
	1	0	0
	2	0	0
	3	0	0
	4	0	0
	5	1	0
	6	0	0
	7	1	0
	8	1	0
	9	4	0
	10	5	1
	11	8	0
	12	5	0
	13	4	0
	14	3	0
	15	5	1
	16	4	1
	17	1	0
	18	0	3
	19	0	3
	20	0	1
	21	0	5
	22	0	8
	23	0	8
	24	0	11
	Total	42	42

Table 4.30 (c) Frequency Distribution of Correct Answer on Knowledge regarding Wetlands by Zone (North)

ZONE	No. of valid answer	GROUP	
		Pre-test	Post-test
North	0	0	0
	1	0	0
	2	1	0
	3	0	0
	4	0	0
	5	0	0
	6	1	0
	7	1	0
	8	3	0
	9	2	0
	10	6	0
	11	8	0
	12	9	0
	13	10	2
	14	14	2
	15	5	0
	16	5	2
	17	5	1
	18	2	4
	19	1	10
	20	0	1
	21	2	12
	22	1	11
	23	0	21
	24	0	10
	Total	76	76

4.3.3 Performance by Location and Gender

Table 4.31 shows the frequency of correct answer selection (Question No. 1-24) by group, gender (male and female) and location (rural and town).

Table 4.31 Frequency Distribution of Correct Answer Selection by Group, Gender and Location of Schools on Knowledge regarding Wetlands.(Question No.1-12)
(R= rural, T= Town, M= male, F=female, *Numbers in parentheses indicate total)*

Loc	Sex	Test	Question No.											
			1	2	3	4	5	6	7	8	9	10	11	12
			A	B	C	A	D	C	B	D	D	A	C	D
R (130)	M (67)	Pre-test	31	42	45	27	34	16	37	45	58	18	27	47
		Post-test	61	51	55	51	54	50	50	50	59	43	43	49
	F (63)	Pre-test	20	40	42	32	35	8	34	36	59	8	31	49
		Post-test	57	56	56	50	57	50	52	54	59	46	45	51
Total		Pre-test	51	82	87	59	69	24	71	81	117	26	58	96
		Percentage	39.2	63.0	66.9	45.4	53.0	18.5	54.6	62.3	90.0	20.0	44.6	73.8
		Post-test	118	107	111	101	111	100	102	104	118	89	88	100
		Percentage	90.8	82.3	85.4	77.7	85.4	76.9	78.5	80.0	90.8	68.5	67.7	76.9
T (76)	M (33)	Pre-test	7	13	17	13	14	7	19	15	28	5	15	22
		Post-test	29	24	29	20	24	26	27	22	29	21	24	24
	F (43)	Pre-test	20	24	23	22	19	7	18	19	42	6	25	28
		Post-test	41	35	39	38	38	38	37	35	42	35	35	34
Total		Pre-test	27	37	40	35	33	14	37	34	70	11	40	50
		Percentage	35.5	48.7	52.6	46.0	43.4	18.4	48.7	44.7	92.1	14.5	52.6	65.8
		Post-test	70	59	68	58	62	64	64	57	71	56	59	58
		Percentage	92.1	77.6	89.5	76.3	81.6	84.2	84.2	75.0	93.4	73.7	77.6	76.3
Students with correct answers		Pre-test	78	119	127	94	102	38	108	115	187	37	98	146
		Post-test	188	166	179	159	173	164	166	161	189	145	147	158

Alphabets (A, B, C, D) indicate correct answer selection to the question.

Frequency Distribution of Correct Answer Selection by Group, Gender and Location of Schools on Knowledge regarding Wetlands. (Question No.13-24)
(R= rural, T= Town, M= male, F=female, *Numbers in parentheses indicate total)*

Loc	Sex	Test	Question No.											
			13	14	15	16	17	18	19	20	21	22	23	24
			A	C	C	A	A	B	D	B	B	A	D	A
R (130)	M (67)	Pre-test	23	18	49	37	32	34	27	24	37	39	45	45
		Post-test	59	28	53	50	57	54	52	55	60	57	48	51
	F (63)	Pre-test	21	17	41	29	32	36	34	22	39	44	41	36
		Post-test	56	26	57	49	60	49	49	58	59	56	54	42
Total		Pre-test	44	35	90	66	64	70	61	46	76	83	86	81
		Percentage	33.8	26.9	69.2	50.8	49.2	53.8	46.9	35.4	58.5	63.8	66.2	62.3
		Post-test	115	54	110	99	117	103	101	113	119	113	102	93
		Percentage	88.5	41.5	84.6	76.2	90.0	79.2	77.7	86.9	91.5	86.9	78.5	71.5
T (76)	M (33)	Pre-test	12	13	21	16	15	20	19	10	16	16	21	15
		Post-test	28	28	26	25	29	29	29	24	27	26	25	22
	F (43)	Pre-test	17	16	28	24	21	23	17	15	30	29	26	27
		Post-test	41	30	34	39	41	38	37	39	41	35	37	31
Total		Pre-test	29	29	49	40	36	43	36	25	46	45	47	42
		Percentage	38.2	38.2	64.5	52.6	47.4	56.6	47.4	32.9	35.4	59.2	61.8	55.3
		Post-test	69	58	60	64	70	67	66	63	68	61	62	53
		Percentage	90.8	76.3	78.9	84.2	92.1	88.2	86.8	82.9	89.5	80.3	81.6	69.7
Students with correct answers		Pre-test	73	64	139	106	100	117	97	71	122	128	133	123
		Post-test	184	112	170	163	187	170	167	176	187	174	164	146

Alphabets (A, B, C, D) indicate correct answer selection to the question.

The results for question no.6 which tested the convention that emphasized on the conservation of wetlands, showed that the correct answer selection for rural and town area male and female was low in the pre test and increased highly in the post test. For example, the frequency of correct answer selection for rural male in the pre test was from 16 (23.8%) to 50 (74.6%) in the post-test, rural female was from 8 (12.7%) in the pre-test to 50 (79.4%) in the post-test, town male score was from 7 (21.2%) in the pre-test to 26 (78.8%) in the post-test and town female score was from 7 (16.3%) in the pre –test to 38 (88%) in the post-test.

In question no.9, the frequency of correct answer selection in the pre-test and post-test was similarly high in the pre-test and post-test for the rural and town male and female students. For example, the rural male score was from 58 (86.6%) in the pre-test to 59 (88.0%) in the post-test and town male score was from 28 (84.8%) to 29 (97.7%). The frequency of correct answer selection in the pre-test and post-test by rural and town female in questions no.9 showed no differences. For example, the frequency of correct answer selection in the pre-test and post-test for rural female was 59 (93.6%) and town female was 42 (97.7%). Question no.9 tested students on the causes of water pollution. The results indicated students were knowledgeable on the causes of water pollution (oil spill, animal waste, sewage and industrial waste).

For question no. 10 which tested students on the importance of wetlands for migratory birds, the results showed that in the pre-test, the rural male (18, 26.9%) and female (8, 12.7%) students scored a low frequency of correct answer selection but the

frequency of correct answer selection increased highly in the post-test, for example the rural male scored 43 (64.2%) and the rural female score 46 (73%) in the post- test. The frequency of correct answer selection for question no.10 by town male (5, 15.2%) and female (6, 13.9%) in the pre-test also showed a low score but increased highly in the post-test with 21 (63.6%) town male and 35 (81.4%) town female correct. The total frequency of correct answer selection for question no.10 among the rural area students increased from 26 (20%) in the pre-test to 89 (68.5%) in the post- test and among the town area students increased from 11 (14.5%) in the pre-test to 56 (73.7%) in the post test. This indicated that students were not familiar that migratory birds depend on wetlands for food (fishes and shellfishes) and as roosting sites.

Result from Table 4.32 shows the frequency of correct answers by gender. The male and female students who scored maximum 24 valid answers (all correct) were from the post-test group. A total of 11 (11%) male students and 13 (12.3%) female students scored all correct answers. Most male students (21, 21%) from the post-test group obtained 22 valid answers and 24 (22.6%) female students scored 23 valid answers in the post-test. The results shows that female students have scored slightly better compared to the male students.

Table 4.32 Frequency Distribution of Correct Answer on Knowledge regarding Wetlands by Gender

Gender	No. of Valid answer	GROUP	
		Pre-test	Post-test
Male	0	0	0
	1	0	0
	2	1	0
	3	0	0
	4	0	0
	5	1	0
	6	2	3
	7	2	0
	8	3	0
	9	7	0
	10	12	0
	11	13	0
	12	14	0
	13	9	4
	14	14	4
	15	9	5
	16	5	3
	17	5	2
	18	1	12
	19	1	10
	20	0	2
	21	0	12
	22	1	21
	23	0	11
	24	0	11
	Total	100	100

Gender No. valid answer	No. of Valid answer	GROUP	
		Pre test	Post test
Female	0	0	0
	1	0	0
	2	0	0
	3	0	0
	4	0	0
	5	0	0
	6	4	0
	7	3	0
	8	4	0
	9	9	0
	10	13	1
	11	11	2
	12	11	0
	13	12	2
	14	8	5
	15	11	2
	16	7	3
	17	7	5
	18	2	4
	19	2	7
	20	0	3
	21	2	13
	22	0	22
	23	0	24
	24	0	13
	Total	106	106

4.3.4. Performance by Level of Education

Table 4.33 (a) and 4.33 (b) shows the frequency of correct answer selection on knowledge regarding wetlands by level of education in the pre-test and post-test. The frequency of correct answer selection by level of education shows that students from lower secondary and upper secondary students were able to score all correct answers compared to primary school students. From a total of 24 students who scored all correct answers on the knowledge of wetlands, students of 17 years old were the most to score all correct answers (8, 33.3%) followed by students of 16 years old (7, 29.2%). The result shows that the primary school students from the ages of 10 to 12 years old were not able to score better in the pre-test and post-test. From a total of 43 students who scored 22 valid answers in the post-test, only 3 (6.9%) students consisted of 12 years old from primary school and mostly (15, 34.9%) scored by students of 16 years old from upper secondary level. The secondary school students were able to score better after participating in the camp, most likely they were exposed to Science and Geography subjects in schools. This result is similar to Dimopoulos' study (2003) in which was stated that knowledge and understanding (concern) significantly increased with grade level.

Table 4.33 (a) Frequency Distribution of Correct Answer on Knowledge regarding Wetlands by Level of Education (Pre-test)

Group	Total no. of answer	Primary			Lower Secondary			Upper Secondary			Total
		10	11	12	13	14	15	16	17	19	
Pre test	0	0	0	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	1	0	0	1
	3	0	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	1	0	0	1
	6	1	0	3	0	2	0	0	0	0	6
	7	0	0	1	0	1	1	2	0	0	5
	8	1	1	1	0	1	0	3	0	0	7
	9	0	3	2	2	4	2	1	1	1	16
	10	1	1	4	1	4	2	5	7	0	25
	11	0	1	0	0	7	2	4	8	2	24
	12	1	0	3	0	3	1	6	11	0	25
	13	0	0	1	0	6	4	4	5	1	21
	14	0	1	1	0	3	1	6	8	2	22
	15	0	1	0	0	1	2	10	6	0	20
	16	0	0	1	1	1	2	5	0	2	12
	17	0	0	0	0	0	0	8	4	0	12
	18	0	0	0	0	0	0	1	2	0	3
	19	0	0	0	0	0	0	0	3	0	3
	21	0	0	0	0	0	0	2	0	0	2
	22	0	0	0	0	0	0	1	0	0	1
	23	0	0	0	0	0	0	0	0	0	0
	24	0	0	0	0	0	0	0	0	0	0
	Total	4	8	17	4	33	17	60	55	8	206

Table 4.33 (b) Frequency Distribution of Correct Answer on Knowledge regarding Wetlands by Level of Education (Post-test)

Group	Valid answer	Primary			Lower Secondary			Upper Secondary			Total
		10	11	12	13	14	15	16	17	19	
Post test	0	0	0	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	0	0	0	0
	2	0	0	1	0	0	0	0	0	0	1
	3	1	0	0	0	0	0	0	0	0	1
	4	0	0	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0	0	0
	6	1	0	2	1	0	0	0	0	0	4
	7	0	0	1	0	1	0	0	0	0	2
	8	0	0	0	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0	0	0	0
	10	0	1	0	0	0	0	1	0	0	2
	11	0	0	2	0	0	0	0	0	0	2
	12	0	0	0	0	0	0	0	0	0	0
	13	1	0	0	0	0	0	1	1	0	3
	14	1	0	2	0	2	0	1	0	0	6
	15	0	2	2	0	1	0	0	0	0	5
	16	0	0	0	1	1	0	2	1	0	5
	17	0	3	2	0	0	0	0	1	1	7
	18	0	1	1	1	1	0	6	5	0	15
	19	0	0	1	0	1	4	6	5	3	20
	20	0	0	0	0	0	1	2	3	0	6
	21	0	1	0	0	6	2	5	10	1	25
	22	0	0	3	0	7	4	15	13	1	43
	23	0	0	0	0	8	4	14	8	1	35
	24	0	0	0	1	5	2	7	8	1	24
	Total	4	8	17	4	33	17	60	55	8	206

4.3.5 Discussion

Interestingly, results from Table 4.25 and Figure 2 showed mean score for pre-knowledge level on wetlands for town male was lesser (9.39) compared to rural male (12.14), town female (11.74) and rural female (11.18). This could be linked with their low interest towards environmental affairs because in the town there are various interesting leisure games and better sports facilities which in this case influenced their lack of environmental knowledge. Both upper secondary (12.97) and lower secondary (11.41) school students showed significant higher mean score than the primary school students (8.98) due to exposure to Geography and Science related subjects in the school curricular. The Eastern zone students from the states of Pahang, Kelantan and Terengganu had significantly the lowest mean score (11.69) than the rest. There are more environmental access such as recreational forests, educational forests, environmental education and interpretation centres, institute of scientific research and easy accessibility to nature base sites in the West Coast compared to the East Coast hence the influence on the level of knowledge among the students from the Eastern zone.

Generally, the results from Table 4.29 showed the score of correct answer selection obtained by students in the post-test on knowledge of wetlands were above 70%. In the pre-test, students score of correct answer selection was as low as 18% (questions no. 6 and 10) on knowledge of wetlands but in the post-test, the score for question no.6 and 10 rose very highly to above 70%. However, the score obtained in the post-test by students on knowledge of wetlands improved to mostly above 80%.

Table 4.30 (a) showed that none of the students from the three zones (East, South and North) scored maximum correct answers on the knowledge of wetlands in the pre-test. However, in the post-test there were 3 (3.4%) students from the Eastern zone, 11 (26.2%) students from the Southern zone and 10 (13.2%) students from the Northern zone who had scored the highest valid answers. The results from Table 4.32 showed that the male and female students did not score maximum valid answers in the pre-test but in the post test, 11 (11%) male and 13 (12.3%) female students were able to score maximum valid answers.

The results from Table 4.31 showed that the rural area had scored as low as 20% for question no.10 and the town area students had scored as low as 14.5%, also question no.10), in the pre-test on knowledge of wetlands. The post-test results for the rural area students in question no.10 showed a high increase to 68.8% and for the town area students to 73.7%. The post-test results for rural area students showed that most of them had scored above 70% on the knowledge of wetlands. The results showed that students from the town area had mostly scored above 80% on the knowledge of wetlands showing improvement in the knowledge gained on wetlands after participating in the camp.

The results from Table 4.33 showed that in the pre-test none of the camp participants from all level of education were able to answer all the questions on the knowledge of wetlands correctly whereas in the post-test a total of 24 (11.7%) students had answered all questions correctly. The results further affirmed that the level of education had contributed to students' knowledge and understanding on the issues of

wetlands in the post test as 8 (33.3%) upper secondary level students (17 years old) had scored maximum 24 valid answers.

In conclusion, Wilcoxon test on knowledge regarding wetlands showed there was a significant change ($p<0.01$) with higher acquisition of knowledge on wetlands after participants attended the camp. More than 50% of the students scored above 22 correct answers (maximum of 24) as compared to the same percentage who had scored above 12 correct prior to camp ((Figure 4.4)

Present result is similar to the result of Bexell's (2006) study which was to determine whether participation in a wildlife conservation education camp in Chengdu, China was effective in positively changing student's knowledge on animals. The results indicated that there was significant increase in knowledge of animals after attending a five day camp.

A study by Stepath and Carl in 2006 explored the high school students' reef experiences. The students were surveyed and interviewed after training in the classroom and at Great Barrier Reef sites. This presupposes that learning where a gain in knowledge (awareness) leads to a change in attitude, and thereby improves personal actions toward marine environments. The pre-test and post-test survey results shows that the reef experiential education had a positive effect on students' environmental knowledge (awareness) towards reef environments.

Prokop (2007) conducted a one day field for improving students' knowledge in ecology. The results show that students portrayed better understanding of ecology concept after the trip.

Conaway (2006) studied the effects of the Mississippi River Programme on the environmental knowledge and awareness of middle school adolescents. A mixed-methods approach entailed quantitative assessment of mean pre-test and post-test scores and a qualitative analysis of reflective papers. Results of ANOVA indicated a significant improvement in mean scores from pre-test to post-test for the experimental group, with no significant difference in scores for the comparison group (p=.0002). Student reflective papers written about experiences during this event were qualitatively assessed. Quantitative results indicated that the programme participants improved significantly in knowledge of environmental content areas; and awareness of a personal relationship with, and responsibility to, the environment.

Volk (2003) evaluated the impact of an environmental education programme on students, parents and community. The study indicated that students who were involved in the environmental education programme were more skilled in the use of critical thinking and other cognitive thinking strategies than were their non-environmental education programme peers. Students who were involved in the environmental education camp appear to be more knowledgeable about ecology, the environment and environmental issues.

4.4 Pre-camp Attitude on Wetland Issues: Effects of Gender, School Location and Level of Education

From Table 4.34, location of schools individually had a significant difference to students' attitude on wetlands issues ($p < 0.05$) but the level of education did not have significant difference ($p > 0.05$) on the attitude of students on wetlands issues. Students from the rural area had significantly higher mean score (R, 56.44) regarding wetlands issues compared to the town area students (T, 51.51) (Table 4.35 and Figure 4.5). Table 4.36 and Figure 4.6 show that location of schools had effects on gender on the attitude of students regarding wetlands issues. The male students from the rural area (M, R, 57.80) had significantly higher mean score compared to the male students from the town area (M, T, 46.92). On the other hand, the female students from the town area (F, T, 56.10) had significantly higher mean score compared to the female students from the rural area (F,R,55.08). Alas, the town area male students had significantly the least mean score compared to the rest of them (town male, rural female and town female).

Table 4.34 ANOVA Summary Table of the Effects of Gender, Location of Schools and Level of Education on Students' Attitude regarding Wetlands Issues.

Effect	SS	Deg of freedom	MS	F	p
Sex	210.9	1	210.9	2.108	0.148
Loc	490.2	1	490.2	4.9	.028*
Level	530.4	2	265.2	2.651	0.073
Sex*Loc	713.4	1	713.4	7.13	.008**
Sex*Level	258.2	2	129.1	1.29	0.278
Loc*Level	59.7	2	29.8	0.298	0.742
Sex*Loc*Level	484.1	2	242	2.419	0.092

*Results with * indicate significant results at 5% significant level; ** at 1% significant level.*

Table 4.35 Mean Score by Location of Schools on Students' Attitude regarding Wetlands Issues.

Loc	Pre _Attd Mean	Pre _Attd Std.Err.	N
R	56.44478	1.043231	130
T	51.51467	1.967821	76

Figure 4.5 Mean Score by Location of Schools on Students' Attitude Regarding Wetlands Issues. (R = rural, T = town)

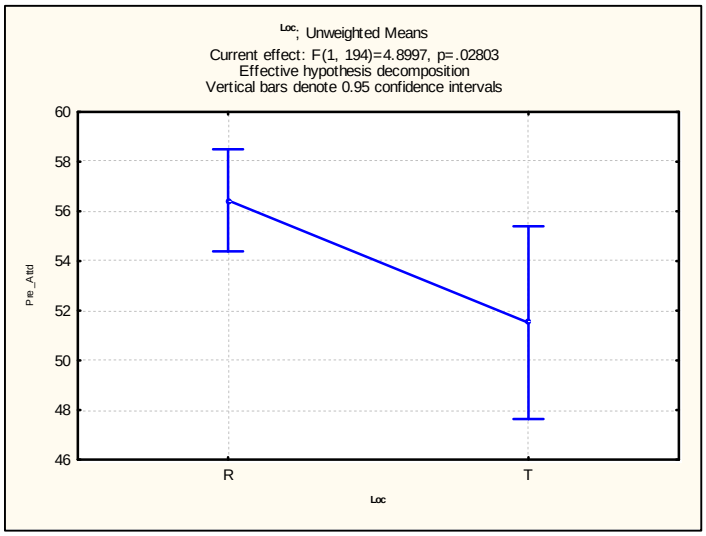
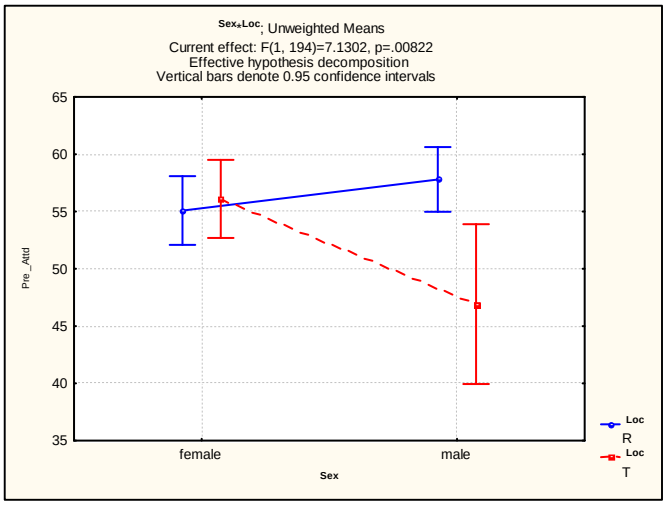


Table 4.36 Mean Score by Gender and Location of Schools on Students' Attitude regarding Wetlands Issues.

Sex	**Loc**	Pre _Attd Mean	Pre _Attd Std.Err.	N
Female	R	55.08796	1.518926	63
Female	T	56.10516	1.725590	43
Male	R	57.80159	1.430450	67
Male	T	46.92418	3.537177	33

Figure 4.6 Mean Score by Gender and Location of Schools on Students' Attitude regarding Wetlands Issues. (R = rural, T = town)



4.5 Effects of Environmental Education Camp: Level of Attitude on Wetlands

4.5.1 Results of Wilcoxon pair test, Box and Whisker Plot on students' attitude regarding wetlands before and after camp

The Wilcoxon pair test from Table 4.37 on attitude level of students before and after education camp showed there was highly significant difference ($p<0.001$) on the students' attitude level on wetlands between the pre-test and post-test. The Box and Whiskers plot from Figure 4.7 further shows the difference between the pre-test and post-test performance regarding the level of positive attitude on wetlands. The pre-test distribution on the level of attitude shows the median and mode at 58. The distribution of post-test shows the median and mode at 61, illustrating the significant improvement of

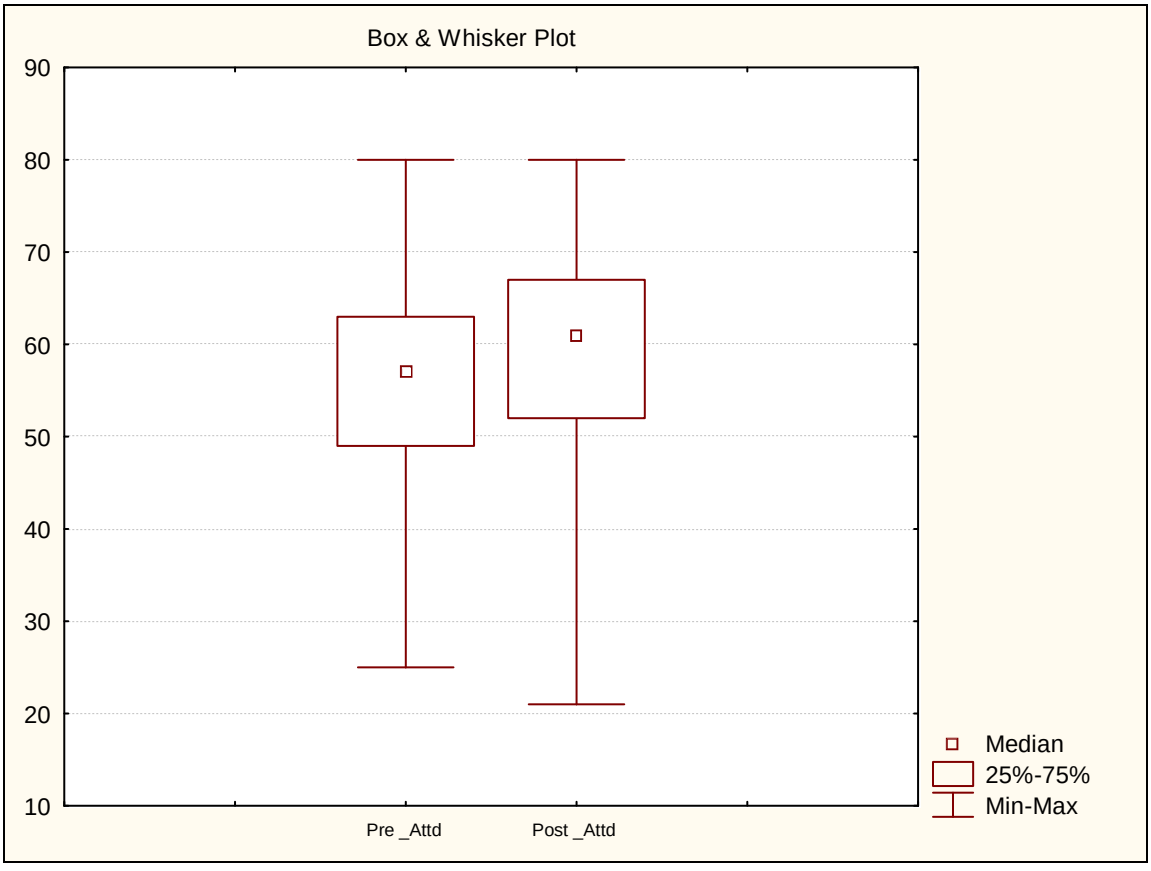
positive attitude after students had undergone the education camp although the medians are not very different.

Table 4.37 Wilcoxon Matched Pair Test on Students' Attitude regarding Wetlands

Pair of Variables	N	T	Z	p-level
Pre _Attitude & Post _Attitude	206	6391.500	4.640254	< 0.001

Results indicate significant results at 1% significant level.

Figure 4.7 Box and Whisker Plot Analysis on Students' Attitude regarding Wetlands Issues



4.5.2 Students' Response in the Pre-Test and Post-Test on Attitude towards Wetlands

Table 4.38 shows how students had responded to statements (no.1 to 29) in the pre-test and post-test on attitude towards wetlands.

Table 4.38 Frequency Distribution on Students' Attitude towards Wetland Issues based on Groups.

Students' Attitude towards Wetlands (Pre test = Post test : 206 students)						
Statement no	Group	Strongly disagree	Disagree	No comment	Agree	Strongly agree
1*	Pre test	130	56	9	8	3
	Post test	144	48	7	5	2
2	Pre test	2	9	23	80	92
	Post test	4	4	18	110	70
3	Pre test	11	25	40	62	68
	Post test	3	13	30	84	76
4	Pre test	4	21	52	64	65
	Post test	4	12	32	87	71
5	Pre test	12	31	54	83	26
	Post test	10	20	40	95	41
6	Pre test	6	2	21	102	75
	Post test	4	9	9	112	72
7*	Pre test	121	56	10	9	10
	Post test	130	44	8	14	10
8	Pre test	5	11	55	94	41
	Post test	3	10	48	98	47
9	Pre test	1	11	40	95	59
	Post test	2	11	37	99	57
10	Pre test	1	3	6	68	128
	Post test	3	2	6	85	110
11	Pre test	8	16	53	78	51
	Post test	5	13	28	95	65
12 *	Pre test	98	64	26	11	7
	Post test	94	69	16	19	8

13	Pre test	6	12	62	81	45
	Post test	5	16	45	96	44
14	Pre test	10	14	30	67	85
	Post test	8	15	24	75	84
15*	Pre test	45	66	53	30	12
	Post test	52	84	30	28	12
16	Pre test	5	8	23	100	70
	Post test	3	7	13	108	75
17*	Pre test	86	82	23	7	8
	Post test	87	91	15	5	8
18	Pre test	11	13	26	64	92
	Post test	8	7	22	68	99
19	Pre test	7	9	22	62	106
	Post test	5	17	14	60	108
20	Pre test	0	0	5	54	147
	Post test	3	0	7	57	138

** indicates negative statement*

In statement no. 1, most of the students in the pre-test and post-test group strongly disagreed to peat swamp and mangrove cleared for development purposes. 130 (63.1%) students from the pre-test and 144 (69.9%) from the post-test groups chose the option.

The result was familiar in statement no. 2 where students showed interests in forestation such as planting mangrove trees because this can prevent landslide and soil erosion. Thus, 110 (53.4%) students from the post-test group agreed to the statement compared to 80 (38.8%) students in the pre-test.

In statement no. 3, students were saddened that animals are kept in the cage. For this statement, the results showed both groups (pre-test and post-test) chose between ‘strongly agree’ and ‘agree’, for example 84 (40.8%) students in the post-test agreed

compared to 62 (30.1%) students in the pre-test and 76 (36.9%) students in the post-test strongly agreed compared to 68 (33%) students in the pre-test.

Students chose between 'strongly agree' and 'agree' to statement no.4 that they felt guilty buying products made from threatened flora and fauna. In the pre-test, 65 (31.6%) students strongly agreed and 64 (31.1%) students agreed to the statement. In the post-test 71 (34.5%) students strongly agreed and 87 (42.2%) students agreed to the statement.

In response to statement no. 5, students from the pre-test and post-test groups fairly agreed that they were willing to reduce the usage of water while taking bath with 95 (46.1%) students from the post-test group compared to 83 (40.3%) students in the pre-test. However, there were quite a high number of students who chose not to comment in the pre-test (54, 26.2%) but the frequency of students who chose 'no comments' for statement no.5 decreased in the post-test (40, 19.4%). Hence, for statement no 6, many students agreed that they were willing to turn off the sink tap while brushing teeth. To this statement 102 (49.5%) were from the pre-test group and 112 (54.36%) students from the post-test group.

The results showed that students strongly disagreed to throw rubbish wherever they want to rather than finding a dustbin. In this statement no.7, 121 (58.7%) pre-test and 130 (63.2%) post-test students strongly disagreed to do so. Students agreed to pick up the rubbish thrown in the jungle; for example 94 (45.6%) students in the pre-test and 98 (47.6%) students in the post-test agreed to statement no. 8.

To statement no. 9, students mostly agreed to contribute RM5.00 to an organization which helps to conserve wetlands. In this statement, 95 (46.2%) students were from the pre-test and 99 (48%) students were from the post-test group.

There was relatively large number of students from the groups who strongly agreed and agreed that they joined the nature club (no.10) to know ways they can help to care for the environment. More than 100 students from the pre test (128, 62.1%) and post test (110, 53.4%) strongly agreed to statement no 10. The number of students who chose to agree statement no 10 was higher in the post test (85, 41.3%) group compared to pre test (68, 33%) group.

In responding to statement no 12, most of the students from the pre-test (98,47.6%) and post-test (94, 45.6%) groups strongly disagreed to buy products from companies which are environmentally irresponsible. There were 64 (31.1%) students from the pre test and 69 (33.5%) students from the post test groups who disagreed.

Statement no.13 asked if students were willing to pay RM 5.00 a month to buy reading materials on environmental issues. To this statement, there was an increase from 81 (24.8%) students in the pre-test to 96 (46.6%) students in the post-test who agreed to do so.

Most students agreed they were worried that food they consumed such as fish, prawns and cockles may be contaminated in statement no.14. There was an increase in the number of students from 67 (32.5%) in the pre-test group to 75 (36.4%) in the post-test. There were a high number of students who disagreed that they were not worried that

fisheries products have reduced (no.15). There was an increase in the number of students from the pre-test (45, 21.8%) to (52, 25.2%) in the post-test who chose to strongly disagree to this statement. Similarly, students who chose to disagree with the statement increased from 66 (32%) students in the pre-test to 84 (40.8%) students in the post-test.

In statement no. 16, 100 (48.4%) students from the pre-test group and 108 (52.4%) students from the post-test agreed that they were sad to see that many people still do not want to separate recyclable items such as glasses, plastics and paper into appropriate containers.

In responding to statement no.17, most of the students chose options 'strongly disagree' and 'disagree' that they do not want to separate recyclable items for recycling. There were 86 (41.7%) students from the pre-test and 87 (42.2%) students from the post-test strongly disagreed to the statement no 17. The number of students who disagreed to the statement increased from 82 (39.9%) students in pre-test group to 91 (44.2%) students in the post-test. Hence, the students were willing to separate recyclable items such as glasses, plastics and papers for recycling.

The result for statement no. 18 showed that most students strongly agreed or agreed that environmental issues such as flood, global warming shortage of water supply and pollution are increasing in the country. There were 92 (44.7%) students in the pre-test and 99 (48.1%) students in the post-test who strongly agreed to the statement. Furthermore, 106 (51.5%) students from the pre-test and 108 (52.4%) from the post-test groups strongly agreed that environmental degradation were caused by humans who

lacked the knowledge and responsibility on the environment in responding to statement no. 19.

In statement no.20, 147 (71.4%) students from the pre-test and 138 (66.9%) students from the post-test group strongly agreed that environmental education activities should be organized so as to educate the public to be responsible towards the environment.

The overall results on the frequency on students attitudes towards wetlands issues based on groups appears that students in the pre-test and post-test groups chose positive answer selection for positive statement and negative answer selection for negative statement. On the whole, the results for statement no. 1 and no.20 showed that students highly supported forestation projects in wetlands areas and that environmental education functions as a catalyst in educating public to be responsible towards the environment.

4.5.3 Discussion

The results from Table 4.38 and Figure 7 showed that after attending the camp, there were changes in the attitude of students and in this case higher positive attitude shown by students towards conservation of wetlands. Students showed support towards conservation of wetlands habitats, forestation projects, water conservation practices and considered environmental education as a channel to create environmental awareness.

Survey results from Stepath and Carl's study (2006) revealed that the reef experiential education had a positive effect on students' environmental knowledge,

awareness and attitude towards reef education. Their pre-test and post-test survey questionnaires and interviews collected responses, and results were compared. Results show reef experiential education to have a positive effect on students' environmental awareness and attitudes towards reef environments and stated intention to act. The reef experience alone caused the greatest change in environmental attitudes and ecological intention to act.

Prokop (2007) conducted a one day field on ecology and the results show that students displayed significant and positive increase in attitude towards biology concept after the trip. This study is similar to Lee's study (1997) assessed student's attitudes towards biology field trips. The results showed that students in the field trip had higher achievement in positive attitude than those in the laboratory groups.

Conaway's study (2006) on the effects of the Mississippi River Programme on the environmental knowledge and awareness of middle school adolescents revealed that there was significant improvement in mean scores from pre-test and post-test based on ANOVA test. The programme participants (experimental group) improved significantly in attitude of a personal relationship with, and responsibility to, the environment.

4.6 Pre-Camp Expectations Regarding Camp's Programme: Effects of Gender, School Location and Level of Education.

Table 4.39 shows that the level of education had a significant effect on students' expectations on the camp before they participated in the camp ($p<0.05$) with upper secondary level (U, 54.16) students and lower secondary level (L, 54.81) scoring significantly higher mean score than the primary school students in their expectations towards the camp's programme (Table 4.40 and Figure 4.8).

Location of schools and level of study had significant interaction effects on gender ($p <0.05$). The results from Table 4.41 and Figure 4.9 (Level U) shows that the town male students from upper secondary level (M,T,U, 47.82) had scored significantly lower mean score than the rural male students from upper secondary level (M,R,U, 59.33), rural female from upper secondary level (F,R,U,55.47) and town female from upper secondary level (F,T,U,55.83). Interestingly, for primary school level, the results shows the same trend in that rural male (M, R, P, 48.5) scored higher than the town male (M,T, P, 38.00).

Table 4.39 ANOVA Summary Table of Effects of Gender, Location of School and Level of Education on Students' Expectations regarding Camp's Programme.

Effect	SS	Deg of freedom	MS	F	p
Sex	18	1	18.1	0.128	0.721
Loc	63	1	62.8	0.445	0.505
Level	1182	2	590.8	4.186	.017*
Sex*Loc	206	1	205.7	1.458	0.229
Sex*Level	120	2	60.1	0.425	0.654
Loc*Level	711	2	355.5	2.518	0.083
Sex*Loc*Level	908	2	454.1	3.217	.042*

*Results with * indicate significant results at 1% significant level; ** at 5% significant level;*

Table 4.40 Mean score by Level of Education on Students' Expectations regarding Camp's Programme.

Level	Pre _Exp Mean	Pre _Exp Std.Err.	N
U	54.61630	1.147666	123
L	54.81310	1.622371	54
P	44.38690	3.434794	29

Figure 4.8 Mean Score by Level of Education on Students' Expectations regarding Camp's Programme.
(U = upper secondary, L = lower secondary, P = primary)

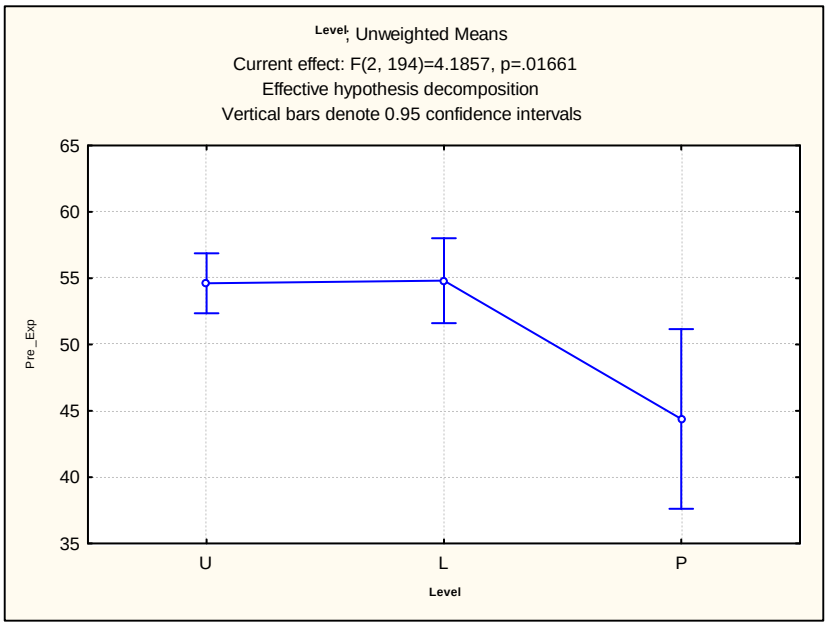
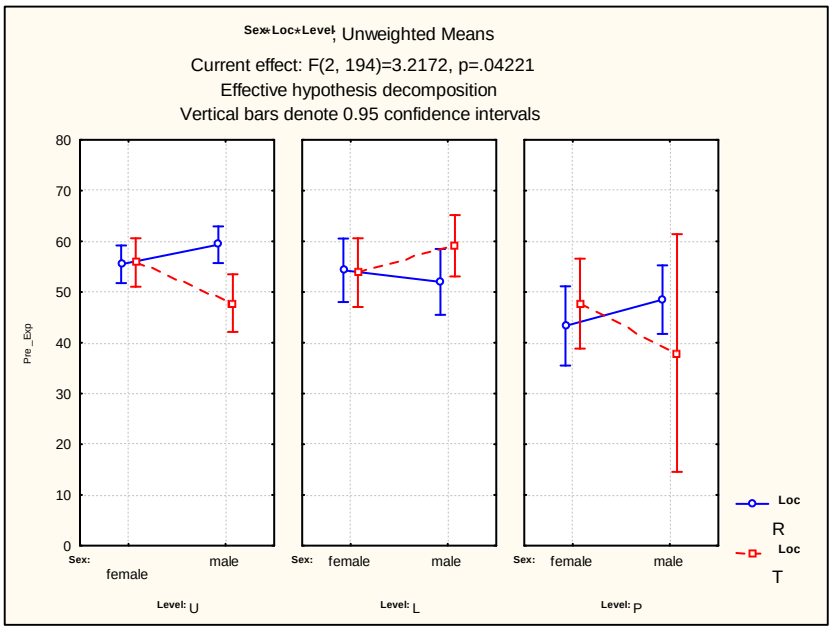


Table 4.41 Mean Score by Gender, Location of Schools and Level of Education on Students' Expectations regarding Camp's Programme.

Sex	Loc	Level	Pre _Exp Mean	Pre _Exp Std.Err.	N
Female	R	U	55.47500	1.87852	40
Female	R	L	54.28571	3.17528	14
Female	R	P	46.85786	3.61932	9
Female	T	U	55.83333	2.42516	24
Female	T	L	53.83333	3.42969	12
Female	T	P	47.71429	4.49052	7
Male	R	U	59.33333	1.83325	42
Male	R	L	52.00000	3.29514	13
Male	R	P	48.50000	3.42969	12
Male	T	U	47.82353	2.88152	17
Male	T	L	59.13333	3.06761	15
Male	T	P	38.00000	11.88081	1

Figure 4.9 Mean Score by Gender, Location of Schools and Level of Education on Students' Expectations regarding Camp's Programme.
(R = rural, T = town, U = upper secondary, L = lower secondary, P = primary)



4.7 Effects of Environmental Education Camp: Expectations and Perception on the Camp.

4.7.1 Results of Wilcoxon pair test, Box and Whisker Plot on students' expectations and perception before and after camp.

The Wilcoxon pair test from Table 4.42 on students expectations and perception before and after participating in the camp showed there was highly significant difference ($p<0.001$) in positive perception by students on the environmental education camp on wetlands after participating in it. The Box and Whiskers plot from Figure 4.10 further shows the difference between the pre-test and post-test performance regarding the

expectations of students on the camp before participating in the camp and perception of students after participating in the camp. The distribution of pre-test shows the median and mode at 57. The post-test shows the median and mode at 61, illustrating the marked increase of positive perception on the camp after they had participated in the activities.

Table 4.42 Wilcoxon Matched Pair Test on Students' Expectations and Perceptions regarding Environmental Education camp

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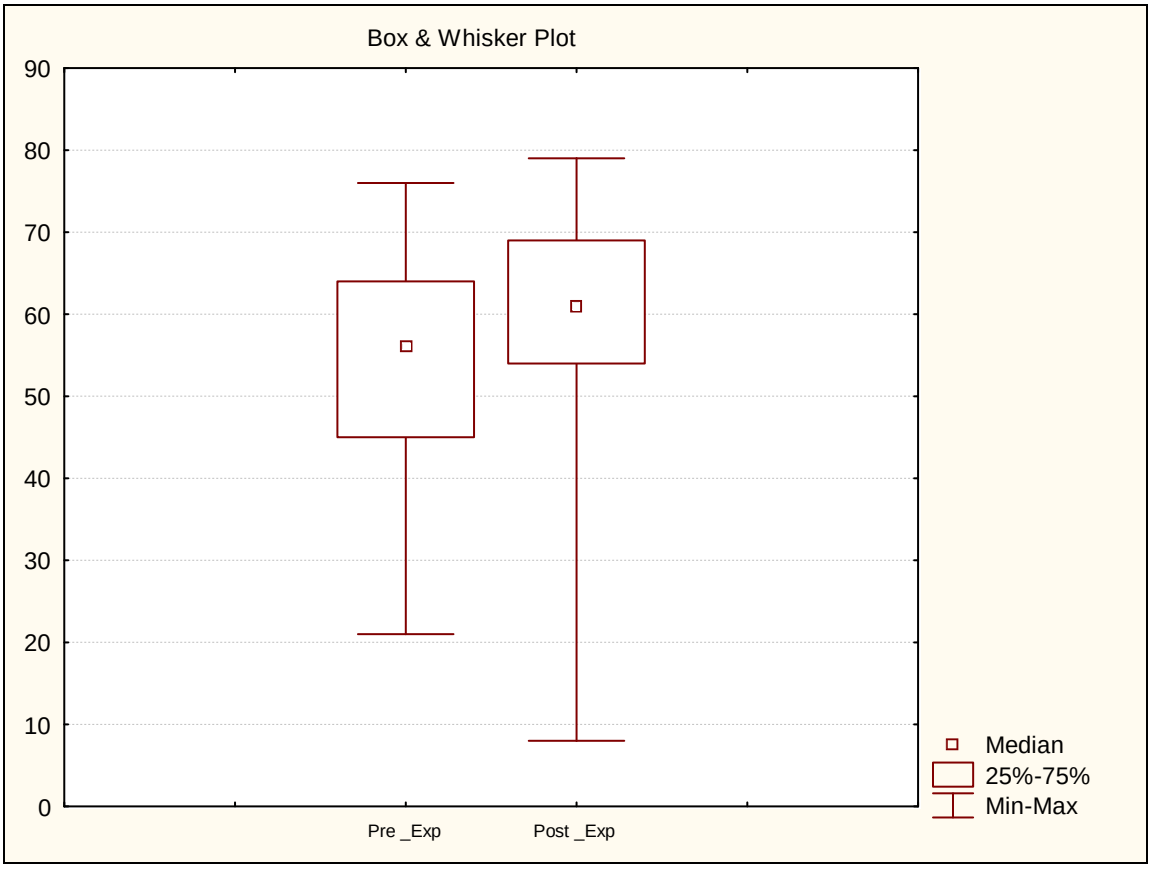
Pair of Variables	N	T	Z	p-level
Pre _Expectations & Post _Expectations	206	4480.000	6.579238	<0.001

Results indicate significant results at 1% significant level.

Figure 4.10 Box and Whisker Plot Analysis on Students' Expectations and Perceptions regarding Camp's Programme.



4.7.2 Students' Response on their Expectations and Perceptions of the Environmental Education Camp

The result from Table 4.43 shows the frequency of students' expectations and perception on the education camp. Out of the 19 statements, only one statement was a negative statement (no. 16). In the pre-test, students commented on their expectations on the activities of the environmental education camp before participating in the programme. Students commented their actual feelings (perception) towards the activities in the post-test after participating in the activities of the environmental education camp.

Table 4.43 Frequency Distribution on Students' Expectations and Perceptions on Environmental Education Camp based on Groups

Students' Expectations towards Wetlands (Pre test = Post test : 206 students)						
Expectation & Perception	Group	Strongly disagree	Disagree	No comment	Agree	Strongly agree
1	Pre test	2	1	9	94	100
	Post test	0	0	5	57	144
2	Pre test	1	5	5	95	100
	Post test	0	1	5	67	133
3	Pre test	2	1	14	86	103
	Post test	1	4	3	60	138
4	Pre test	0	4	16	89	97
	Post test	1	2	10	71	122
5	Pre test	2	9	40	86	69
	Post test	1	5	14	86	100
6	Pre test	0	6	30	86	84
	Post test	1	6	16	103	80

7	Pre test	3	4	12	90	97
	Post test	2	6	15	76	107
8	Pre test	2	6	23	86	89
	Post test	1	3	18	78	106
9	Pre test	1	2	12	90	101
	Post test	1	4	9	68	124
10	Pre test	1	4	11	75	115
	Post test	2	3	9	83	109
11	Pre test	2	3	15	80	106
	Post test	1	4	11	71	119
12	Pre test	2	1	23	88	92
	Post test	2	4	15	87	98
13	Pre test	2	4	33	89	78
	Post test	2	2	16	92	94
14	Pre test	0	11	75	84	36
	Post test	3	10	51	85	56
15	Pre test	5	7	63	81	50
	Post test	2	9	33	96	66
16*	Pre test	35	65	63	23	20
	Post test	50	87	34	23	12
17	Pre test	4	23	69	60	50
	Post test	5	22	36	81	62
18	Pre test	4	3	25	102	72
	Post test	1	2	13	98	92
19	Pre test	0	12	66	78	50
	Post test	3	12	46	94	51

** Indicates negative statement*

. In responding to statement no. 1, students strongly agreed that the camp will provide opportunity to know about wetlands areas. The results showed that 100 (48.5%) students in the pre-test and 144 (69.9%) students in the post-test strongly agreed to the statement. There was an increase of students who chose to strongly agree to statement no.2 that the camp will increase their knowledge and awareness on wetlands. Students

from the pre-test group (100, 48.5%) and post-test (133, 64.6%) strongly agreed on statement no. 2.

Students from the post-test group (138, 66.9%) strongly agreed that the camp provided awareness on the importance of mangroves in responding to statement no. 3. A similar result was seen to statement no. 4 in which 122 (59.2%) students from the post-test group strongly agreed that the camp provided awareness on the importance of the peat swamp forest. For statement no. 3 and no 4, there was an increase of students who chose to strongly agree in the post- test group.

Students strongly agreed to statement no. 5 that the camp provided opportunities to use tools while carrying out experiments. The result shows a high increase of students from 69 (33.5%) in the pre-test group to 100 (48.5%) students in the post-test group who strongly agreed to statement no.5. Many students from the post-test group agreed (103, 50%) that they were taught to use tools (water quality monitoring kit, binoculars, field guide book on birds etc) when responding to statement no. 6.

To the statement no. 7, students chose to strongly agree that they were exposed to a variety of plants and animals. The result showed that the students who strongly agreed increased from 97 (47.1%) students in the pre-test group to 107 (51.9%) students in the post-test group.

There was an increase of students in the post test (106, 51.5%) compared to the pre test (89, 43.2%) groups who strongly agreed that they had fun learning about the wetland's ecosystem in responding to statement no.8. The result for statement no. 9

showed that 124 (60.2%) students from the post-test who strongly agreed to the statement that they understood better when they learnt in a natural surrounding.

When students were asked if the camp will create co-operation among the individuals in statement no.10, 115 (55.8%) students from the pre-test group strongly agreed. The result showed there was an increase of students who chose to agree statement no.10 in the post test (83, 40.3%) compared to the pre-test (75, 36.4%) students agreed.

Statements no. 11, 12, 13, and 14 were related to the role of the camp facilitators. For statement no. 11, many students strongly agreed that the facilitators helped to assist the participants to learn and gain knowledge. For example, the result showed an increase from 106 (51.5%) students in the pre-test to 119 (57.8%) students in the post-test who strongly agreed to the statement. When asked if the facilitators will be able to convey the messages clearly and easily understood by the participants, many students from the pre-test groups chose to strongly agree (92, 44.7%) and agree (88, 42.7) to statement no. 12. The result shows an increase of students who strongly agreed (98, 47.6%) in the post-test group compared to the pre-test (92, 44.7%) group.

To statement no. 13, many students from the pre-test group chose to strongly agree (78, 37.9%) and agree (89, 43.2%) that the facilitators will use language proficiently. In the post- test, the result shows an increase in the number of students who strongly agreed (94, 45.6%) that facilitators used language proficiently. For statement no. 14, many students from the pre- test group chose not to comment (75, 36.4%) and (84, 40.8%) agreed that they will easily asked questions and get along with the facilitators.

The result in the post-test showed students who chose statement ‘agree’ was 85 (41.3%) and ‘strongly agree’ was 57 (27.7%) increased. This indicated that students were able to ask questions easily and got along with the facilitators of the camp.

For statement no. 16 which asked if the activities in the camp will be tiring for the participants and that they may not be able to concentrate, students in the pre-test group (65, 31.6%)) chose to disagree with 63 (30.6%) students chose not comment on that statement. In the post-test, the number of students who chose not to comment decreased (34, 16.5%) and number of students who strongly disagreed (50, 24.3%) and disagreed (87, 42.2%) increased. Hence, the activities were not tiring for the participants and that they were able to concentrate in the activities.

When asked if they will not be afraid of the jungle in statement no.17, the results in the pre-test shows majority of the students did not comment (69, 33.5%) on the statement. The post-test result shows more positive answer options from the students. There was a decrease in the number of students who chose not to comment from 69 (33.5%) students to 36 (17.5%) students. There was an increase in the number of students who strongly agreed (62, 30%) and agreed (81, 39.3%) in the post- test that they fear the jungle. The post-test result indicated that after participating in the camp, number of students who stated that they were not afraid of the jungle increased.

Students in the pre-test and post-test agreed that they will realize the real situations affecting the environment. For this statement, 102 (students from the pre-test agreed to statement no. 18. The post-test result shows more students strongly agreed (92,

44.6%) and agreed (98, 47.6%) that from the camp they realized the real situations that are affecting the environment.

For statement no. 19, the pre-test result shows more students agreed (78, 37.9%) that they will be able to voice out their opinions about the environment. The post-test results showed an increase in the number of students who agreed (94, 45.63%) that they were able to voice out their opinions about the environment.

The result above showed that there was more positive response from the students (post- test group) after participating in the camp. For example, result for statements no. 1, 2, 3, and 5 showed an increase of more than 30 (>15%) students in the post-test group who strongly agreed to these statements.

4.7.3 Discussion

The results from Table 4.40 and Figure 4. 8 showed that the upper secondary and lower secondary students had higher expectations towards the camp as students from this age categories are usually interested to join adventurous / outdoor activities thus influencing the results. Furthermore, in secondary school, co-curricular activities (indoor and outdoor activities) are compulsory for students to join as it carries marks for their participations. Through their participations in co-curricular activities, they would have had some views and ideas on the camp's programme compared to their primary counterparts who lacked the exposure to outdoor activities.

Results from Table 4.42 and showed significant difference ($p<0.001$) in the expectations and perception of students regarding the camp's programme before and after participating in the camp. Most of the students showed higher positive perception on the camp after attending its programme (Table 4.43). From Table 4.43, the number of students who chose 'no comment' option declined in the post test with increase in the number of students who chose either 'strongly agree' or 'agree' to positive statements and 'strongly disagree' and 'disagree' to negative statements. The results from Table 4.43 showed that most of the students supported the statement that the camp provided opportunity for them to know about wetlands, awareness on the importance of wetlands, understood better in a natural surrounding. The facilitators were helpful, proficient in their language usage and conveyed messages clearly. Importantly, the camp was well organized based on the students' perception.

Results from Table 4.42, 4.43 and Figure 4.10 showed that after attending the camp's programme, students had positive perception of the environmental education camp on wetlands ($p<0.001$) unlike research by Moey (1999) who studied students' perception on the effectiveness of environmental education camp at Bukit Rengit, Lanchang, Pahang. The average difference of pre-test and post-test results on the camp's programme was -0.2444. Moey's study showed that the three days environmental education programme found that the camp was effective in instilling environmental knowledge and attitude among the students of the camp but the camp's programme was not up to the participants expectations.

4.8 Relationship between Students' Knowledge and Attitude regarding Wetlands

The Spearman's Correlation results in Table 4.44 shows that there were positive correlations between students' pre-test knowledge with students' pre-test attitude on wetlands ($r = 0.32$, $p<0.05$). The result indicated that with an increase in knowledge, student's positive attitude towards wetlands issues also increased. Students' pre-test knowledge was positively correlated with students' frequency of involvement in environmental activities ($r = 0.16$, $p< 0.02$) while pre-test attitude was not significantly correlated to students' involvement in environmental activities (r-0.08, p=0.24).

Table 4.44 Spearman Rank Order Correlations.

	Valid N	Spearman R	t(N-2)	p-level
Pre _Knowledge & Pre _Attitude	206	0.321264	4.845433	0.000**
Pre_Knowledge & Environmental Activities	206	0.175359	2.544045	0.011**
Pre _Knowledge & Frequency of Involvement in Environmental Activities	206	0.160884	2.328211	0.020*
Pre_Attitude & Environmental Activities	206	0.072101	1.032498	0.303
Pre _Attitude & Frequency of Involvement in Environmental Activities	206	0.083088	1.190847	0.235

*Results with * indicate significant results at 5% significant level; ** at 1% significant level.*

4.8.1 Discussion

Based on Table 4.25 and Figure 4.2, male students from the town area had significantly the least mean score (9.39) than the male rural, female rural and female town area students on the knowledge level of wetlands whereas in Table 4.36 and Figure 4.6 the male town students again portrayed significantly the least means score (46.92) on the attitude regarding wetlands issues. From Table 4.44, the results showed that students' pre-test knowledge is significantly correlated to students' pre-test attitude on wetlands issues. Hence, the lack of environmental knowledge among the male students from the town area had attributed to their low level of attitude towards wetlands issues. As the results (Table 4.44) showed that pre-test knowledge was correlated to involvement in environmental activities ($r = 0.17$, $p < 0.05$) and frequency of involvement ($r = 0.16$, $p = 0.02$), the lack of exposure to environmental activities could have contributed to students' low level of knowledge on wetlands. However, the pre-test attitude was not correlated to students' frequency of involvement in environmental activity ($r=0.08$, $p=0.24$). The results showed that although their involvement in environmental activities such as hiking, canoeing, jungle tracking (Table 4.18) increased the level of environmental knowledge, it did not necessarily improve their attitude level towards the environment.

Futer (2005) investigated the apparent effectiveness of environmental education essential elements in school field trip programming. It was concluded that (1) the educational programming appeared to significantly increase environmental knowledge, and (2) the environmental attitude were most strongly correlated with students'

background (gender and location). Dimopoulos (2003) conducted a survey regarding sea turtle conservation in Zakynthos, Greece. On the overall, the study showed significant positive correlation between knowledge and attitude.

CHAPTER 5

GENERAL DISCUSSION

Despite the level of education showed very high significant effect ($p<0.0001$) from Table 4.23, none of the primary, lower secondary and upper secondary level students were able to obtain maximum score in the pre test (Table 4.33.a) when tested on the knowledge of wetlands although Table 4.15 showed that majority of the students had some basic knowledge in Science subject. Results from Table 4.30 (a), 4.30 (b) and 4.30 (c) showed none of the students from the Eastern, Southern and Northern zones were able to obtain the maximum score in the pre-test. Table 4.32 showed none of the male and female students were able to obtain the maximum score in the pre-test. In the post test (Table 4.33.b), 24 (11.7%) of them had obtained the maximum score on the knowledge of wetlands. The contributing factors to these results is viewed from the pedagogical approaches used in the camp.

5.1 Pedagogical Approaches

Some of the methods and strategies used in the teaching and learning of environmental education in this wetlands camp consisted of inductive, deductive, discussion and demonstration basis.

The induction stage is the stage of introducing a lesson without telling the students the topic of the lesson. For example, environmental games, songs, questions and answers were used as induction before the lessons (presentations and activities) were carried out. Brian (1982) stated that ' in learning by induction, students experiences a mental process in which he observes many particular instances and then makes a general rule incorporating the truth of the fact therefore'. Kamaruddin (1990) explained that students are not directly introduced to the subject of learning instead students are stimulated to discover, observe and learn on their own the lessons that will be taught. This approach uses aids or samples, explanation on how it works and functions and helps students to link a suitable conclusion later on. This approach uses the discovery method in which activities such as observation, experiments, reasoning, investigation, analysis at the beginning of the lessons. This approach was similarly applied in the camp where students were given water monitoring kit, worksheets and questionnaire. They carried out experiments and investigations. From their results, they concluded their observations and gave reasoning.

Brian (1982) added that learning by deduction the students starts with a general truth and applies it to a particular case. In this approach, students collect facts, information, suggestions, and move from having general information to specific information in their lesson. Their findings will then be presented to their teachers. This approach was integrated in the birdwatching, water quality monitoring and ecological studies where students are requested to collect information via samples, methodology,

experiments, observation, illustrations and discussion among members in groups in order to present their findings. This approach enabled participants to use their cognitive and intellectual skills to carry out, evaluate and conclude their findings and linked with the issues.

The discussion technique in teaching and learning involves communication among students under the supervision of a facilitator. This camp provided frequent discussion sessions in order for participants to be engaged actively in sharing their ideas, views and developing cooperation within members to complete group tasks. During the discussion session, students were encouraged to participate actively in the discussion to state their opinions, perception on certain topics. In my observation, the participants from primary and lower secondary level were shy at first to voice out their ideas and opinions. The facilitator guided students with ideas and stimulated the discussion session. Upon guidance from the facilitator they were able to. The discussion approach provided opportunity for students to develop their social and personal growth. They were encouraged to think clearly, voice their ideas, logic, developing cooperation and mutual students understanding with other participants in problem solving. Hence, Table 4.43 showed that the camp created co-operation among the group members/individuals (statement no. 10) and were able to voice out their opinions about the environment (statement no.19). Generally, the discussion approach encouraged students to be active and attentive in the topic discussions.

The demonstration techniques involved someone to show how to create or produce something. The technique emphasizes centralized attention of students towards the procedures and rules of an activity in order for students to carry out an activity in a systematic, step to step and effective approach (Kamaruddin, 1990). Demonstration techniques are widely used in the teaching and learning in schools in which students' activities involves experiments, investigation, skill work and projects. The demonstration techniques were used to teach participants of this camp on how to use the instruments for water quality testing, binoculars, field guide books, answering questionnaire, safety tips in the trail and simple ways to sketch and label parts of a bird. Hence, result from Table 4.43 on statement no.6 showed that participants were taught how to use tools.

5.2 Role of Facilitators

In a camp, facilitators play essential roles in the effectiveness of a programme. Facilitators of this camp were environmental education officers from the Malaysia Nature Society (MNS) who had more than two years of experiences in the field of environmental education with professional qualifications in environmental science. This is seen as an advantage to the participants because facilitators must be able to impart knowledge freely, convey correct information, use language proficiently and able to assist participants in conducting experiments and discussing their findings. Failure of facilitators to do so will attract negative perception towards the camp and seen as hindrance in conveying environmental messages effectively.

Facilitators in camps too, are directly involved with the students throughout the activities. Results from Table 4.43 showed that MNS' facilitators were knowledgeable and proficient on the subject matter (statements no.11, 12 and 13), helpful, communicative and informative with regards to the use of instruments (statement no.5), guided participants in carrying out their tasks as well as to build positive relationship with participants (statement no.14).

The important role played by facilitators in camps, particularly their direct involvement in imparting knowledge to the students throughout the activities has been recognized in Moey's study (1999) which stated that the camps were effective to instill environmental knowledge and attitude among the students of the camp but the camp's programme were not up to the participants expectations. The study commented that facilitators should be at times sent for appropriate courses. The courses should include public speaking, interpersonal communication, ecological seminars and many others in order to improve the quality of the programme. As facilitators do play a vital role in the overall effectiveness of the programme, the management and planners should focus on improving the quality of these facilitators.

5.3 Role of Teachers

Teachers played a vital role in involving students in environmental education activities. The results from Table 4.14 showed that students considered teachers to be an influential figure in supporting them to participate in this camp. Apart from the

facilitators, teachers helped to supervise the students and assisted the facilitators when they were needed during the camp. Despite teachers being an influential figure, teachers are also facing challenges in carrying out environmental activities. Many teachers are not equipped with updated environmental knowledge, instruments, trainings and teaching aids or access to environmental related agencies to attain information. In some schools, environmental based activities are carried out via school clubs during the weekly co-curricular activities, usually for an hour a week. Some of these teachers are assigned to be Nature Club advisors. They lack environmental educational resources (knowledge, instruments, training aid etc) pose challenges in the form of hindrance to environmental education activities to be carried out interestingly or effectively for the students. Without giving proper environmental educational resources to teachers, it is unfair to blame them completely for the ineffectiveness of environmental activities at school level. Hence, as field trips or camping opportunities come along, teachers provide support for students' participation.

As part of its syllabus, trainee teachers in the teachers training colleges were introduced to environmental education as a minor subject. They were guided to prepare lesson plans about the environment. Not much hands on experiences, field trips or aids (except for theoretical notes) provided for these teacher trainees.

Jaya Mary (2007) had reported that teachers lacked and teaching strategies and approaches resulting in their inability to organize environmental education activities at school level. She added that teachers could not conduct environmental education

activities due to lack of materials, aids, trainings and exposure to environmental activities. Therefore, teachers need to be given opportunities in environmental activities through environmental camping experiences for them to understand environmental issues and be able to pass on the knowledge to their students. Although the Environmental Education Unit of the Malaysian Nature Society (MNS) manages the environmental education programme by conducting camps, workshops, talks, trainings, road shows, printed materials as well as managing their centers yet the volume of these activities depend on the fund generated by Government and Non Government agencies.

5.4 Present School Curricular System

Environmental studies is not a subject of its own in the national education system but is integrated into other subject such as Science, English, Malay, Geography, Health Education and Arts etc. Hence, trained teachers when posted to schools give emphasis on subjects that are important for evaluation in the school and national level examination system. In the present study, the researcher came to know that upon querying participants from the secondary school, the term ‘wetlands’ do not exist in their school syllabus – in Geography, Biology, Chemistry or Science subjects. The researcher via conversation with the students discovered from the participants of this camp that they were not aware that rivers, mangroves, peat swamp forest, paddy fields, man made lakes and ponds fall in the category of ‘wetlands’ but they surely had learnt on mangrove and peat swamp forests in the school curricular. However, by attending this camp, students positively commented

(Table 4.43) that the camp had provided opportunity to know more about wetlands (statement no.1), increased their knowledge and awareness on wetlands (statement no.2), provided awareness on the importance of mangroves (statement no.3) and peat swamp forests (statement no.4), exposed to a variety of plants and animals in wetlands (statement no.7). Importantly, they understood better when they learnt in natural surroundings (statement no.9).

From this study, it showed that camp, apart from imparting environmental knowledge of students; also provided opportunities for students to develop positively their self-esteem. For example, the camp helped them to adjust to changes from their personal environment, improved their personal communication skills through teamwork and was able to make decisions on their own, provided leadership skills and opportunities to develop healthy relationships with students representing different socio-economic, ethnic or cultural backgrounds. Marsh (1999) reviewed a number of studies on camps and stated in his results that camp had a positive influence on self-esteem particularly among younger campers and increase the likelihood of the individual adopting to healthy living habits.

CHAPTER 6

CONCLUSION

This study in an environmental education camp on wetlands showed that school pupils gained a positive increase in knowledge and understanding of wetlands.

Female students showed better knowledge and understanding gained on wetlands compared to their male counterparts. The town area students fared better in knowledge gained on wetlands compared to the rural area students after participating in the camp. The level of education had contributed to students' knowledge and understanding on the issues of wetlands as upper secondary level students (17 years old) had showed better knowledge gained on wetlands.

On attitude level, the results varied by location of schools with rural area students showing higher positive attitude towards wetlands issues as compared to their urban counterparts. This study identified the town males to have lower positive attitude concerning environmental attitudes.

The students who attended this camp gave positive comments from the experiences they had undergone in the camp. The lower and upper secondary level students showed higher expectations on the camp's programme as compared to their primary counterparts.

One of the major failures of environmental management of natural resources is the poor understanding and appreciation of their functions and values, and the need to protect and conserve them for future posterity. This study shows that the present environmental knowledge and attitude of school pupils is worrying, and that environmental education is vital to instill environmental stewardship among the young and to create a caring society.

6.1 Recommendations

This study gives the following recommendations:

i. The school curriculum must integrate a variety of environmental education learning activities into the existing primary school education system. This is because the study shows that the primary school students were generally weak in their knowledge of the environment.

ii. Extra effort must be paid to town area students to encourage and expose them to environmental education activities, e.g. nature activities, field trips, nature clubs, and reading materials. This is because students from the town showed low knowledge or poor attitude towards environmental issues.

iii. Increase drastically the number of environmental education activities and establish more environmental educational centers in the East Coast (Pahang, Kelantan and Terengganu) to further enhance the level of knowledge and attitude among the Eastern zone students.

iv. The education department should strengthen the capacity of teachers to organize and conduct environmental education activities through the provision of more environmental educational resources such as more in-service seminars, workshops, training, and teaching aids so that they will be more able to carry out environmental education activities in schools, effectively and efficiently.

v. Schools should develop more partnerships between other Government, Non-Governmental Organizations (NGOs) and Corporate Sectors in the development and implementation of awareness raising projects on the environment in order to optimize the utilization of environmental resources which are available in these organizations.

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