ENVIRONMENTAL AWARENESS AMONG SUSTAINABLE SCIENCE STUDENT IN UMK JELI, KELANTAN

by

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A report submitted in fulfilment of the requirements for the degree of

Bachelor of Applied Science (Sustainable)

FACULTY OF EARTH SCIENCE

UNIVERSITY MALAYSIA KELANTAN

2017

DECLARATION

I declare that this thesis entitled "Environmental Awareness among Sustainable Science student in UMK Jeli" is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature : _____

Name : _____

Date : _____

ACNOWLEDGEMENT

In the name of Allah, Most Gracious, Most Merciful. Praise to Allah, which granted me to complete this studied. Special thanks to my beloved father Shafii Bin Mat Adam and my mother Zarina Binti Saadan for inspiring me by giving dedication to my studies. Not to forget all my family members that never give up supported and encouraged me to finish up the thesis. Without them, I would not be into this stage.

Next, I dedicated sincerely thanks to my supervisor, Dr. Norashikin Binti Mohd Fauzi that never give up providing the knowledge and sacrifices time in order to guide me to complete this study. Special thanks to my co supervisor Miss Hanisah Binti Abdul Malek for providing me with so much information for statistical analysis.

My utmost thanks to all sustainable science students in UMK Jeli that give full cooperation to answered and fulfilled the questionnaire survey. Their willingness to be a respondent makes my survey conducted easier.

Not to forget for all my colleges, Syahirah Atiqah Binti Adnan, Intan Nur Syakirin Binti Rosli, Nurul Izzah Binti Awaluddin and other friends that help me during this period and also willing to spent time to discuss the problem on this study. Their comment and suggestion had given me more understanding towards this study. Last but not least, my thanks to all parties and individual that involved directly and indirectly helping me to complete this study.

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATION

ANOVA	Analysis of Variance
COPD	Chronic Obstructive Pulmonary
EE	Environmental Education
EI	Emotional Intelligence
EQ	Emotional Quotient
FIAT	Faculty of Agro-Based Technology
FSB	Faculty of Earth Science
QOL	Quality of Life
SPSS	The Statistical Package for Social Science
SS	Sustainability Science
UMK	University Malaysia Kelantan
UNFCCC	The United Nations Framework Convention on Climate Change
UNFCT	The United Nations Framework Convention Treaty
UNESCO	United Nations Educational, Scientific, and Cultural Organisation
UV	Ultraviolet
WHO	World Health Organization

LIST OF APPENDICES

Environmental Awareness (Knowledge, Attitude and Practices) among Sustainable Science student in UMK Jeli, Kelantan.

ABSTRACT

Human activities such as deforestation, mining, open burning and others had cause pollution towards the environment. Thus, the environmental awareness needs to be implemented so as not to give implications to human health and the environment. A total of 110 respondents from Sustainable Science student in UMK Jeli have been involved in the study. The objectives of this study were to determine the knowledge, attitude and practices of Sustainable Science student in UMK Jeli. The results for environmental knowledge, attitude and practices were analysed using SPSS version 20 and were tested by using Cronbach Alpha test to test reliability before the actual studies. In this study, the result of independent t-test had shown that the environmental awareness of male is higher than female. Besides, the second-year and third-year student has higher environmental awareness compared to first-year student. Chinese students were recorded to the highest environmental awareness compared to Malay, Indian and other races. The result shows that the duration of study has affected the student awareness. Thus, environmental education has played an important role to spread awareness among students. Therefore, the government and NGO's should conduct a campaign which involves the community at all age to raise the awareness of public. Early sustainable education also should be taught to the students so that they will have more knowledge about the environment.

Kesedaran Alam Sekitar (Pengetahuan, Sikap dan Amalan) di kalangan pelajar Sains Kelestarian dalam UMK Jeli, Kelantan.

ABSTRAK

Aktiviti manusia seperti penebangan hutan, perlombongan, pembakaran terbuka dan lain-lain telah menyebabkan pencemaran terhadap alam sekitar. Oleh itu, kesedaran alam sekitar perlu dilaksanakan supaya tidak memberikan implikasi kepada kesihatan manusia dan alam sekitar. Seramai 110 responden yang terdiri daripada pelajar Sains Kelestarian dalam UMK Jeli telah terlibat dalam kajian ini. Objektif kajian ini adalah untuk menentukan tahap pengetahuan, sikap dan amalan pelajar Sains Kelestarian dalam UMK Jeli. Keputusan bagi pengetahuan alam sekitar, sikap dan amalan dianalisis dengan menggunakan SPSS versi 20 dan telah diuji dengan menggunakan ujian Cronbach Alpha untuk menguji kebolehpercayaan sebelum kajian sebenar. Dalam kajian ini, hasil daripada ujian-t bebas telah menunjukkan bahawa kesedaran alam sekitar daripada lelaki adalah lebih tinggi berbanding perempuan. Selain itu, pelajar tahun dua dan pelajar tahun tiga mempunyai kesedaran alam sekitar yang lebih tinggi berbanding pelajar tahun pertama. Cina mencatatkan kesedaran alam sekitar yang paling tinggi berbanding Melayu, India dan lain-lain kaum. Hasil kajian menunjukkan bahawa tempoh pengajian telah memberi kesan kepada kesedaran pelajar. Konklusinya, pendidikan alam sekitar telah memainkan peranan yang penting untuk menyebarkan kesedaran terhadap pelajar. Justeru, kerajaan dan badan bukan kerajaan perlu menjalankan kempen yang melibatkan masyarakat di semua peringkat umur untuk meningkatkan kesedaran awam. pendidikan lestari awal juga perlu diajar kepada pelajar supaya mereka akan mempunyai lebih banyak pengetahuan tentang alam sekitar.

CHAPTER 1

INTRODUCTION

1.1 Background of study

Environmental awareness is defined as the sum total of responses that people make to various thematic aspects of the construct environmental education. In simple terms it means knowledge and understanding of facts and concepts related to environment and consequences of various environmental problems like pollution, population explosion, deforestation, ecological disruption, energy crises and others.

Environment has become the concern of all academicians, intellectuals, scientists, policy makers and government across the continents. Widespread and systematic concern for environmental issues has grown world over. The U.N. World conference on the environment in Stockholm in 1972, the Earth Summit held in Rio de Janeiro in 1992, the Global Forum 1992 and the activities organized by the international NGO forum, show that environment is in the agenda of International Community (Toili, 2007).

Following this detrimental effects resulting from environmental degradation, it has become more important to find a preventive way slow down the effects and eventually sustainably mitigating long-term environmental damage. One of the best ways of preservation is by creating environmental awareness among society especially students as they are future leaders, future custodians, planners, policy makers, and educators of the environment and its issues (Jackson, 2005).

Apart from that, education is useful to enhance human's life by improving knowledge, skills, attitudes, values and awareness (Aminrad *et al.,* 2013). Through the introduction of environmental education, the community will be more concerned about the serious issues that threatened the environment and ecosystem.

According to Harun *et al.,* (2011) students who received environmental knowledge will be more aware towards environmental issues by motivating them to give responsibility to protect the environment. The society should receive knowledge at their early stage as it is important to behave and act in eco-friendly. Therefore, it is a must to strengthen student's environmental knowledge, attitude and practices as they will be the leaders for next generation (Gambro and Switzky, 1996; Harun *et al.*,2011).

1.2 Problem statement

The environmental issues had been increased from time to time. Issues such as deforestation, greenhouse effect, climate change and many types of pollution are harmful towards human and ecosystem. Although this problem has been a serious matter, the government yet neglecting the implementation because there is no support from the community. To cope with this problem, environmental education through sustainability science has been introduced by the university.

Sustainability science is designed to provide essential knowledge towards student for advanced training in the future. This programme is an interdisciplinary exploration of sustainability issues related to science, appealing to students with interests in the environment, advanced technology and sustainable development.

So far, there is no record about the environmental awareness of sustainable science student in UMK Jeli. Thus, the purpose of this study is to determine the knowledge, attitude and practices of sustainable science student in University Malaysia Kelantan which received more education about the environment.

The information received from this study can be used for further research to improve the learning effectiveness and thus enhancing the environmental awareness among society. With successful and responsible student that arise from sustainability science it may help in managing better environmental system in Malaysia to reduce environmental issues in the future.

1.3 Objective

1. To determine the environmental awareness (knowledge, attitude and practices) among sustainable science student in University Malaysia Kelantan.

1.4 Significance of study

This study will provide useful information about the environmental awareness of sustainable science student in University Malaysia Kelantan. Thus, the data can be used as a guideline for the university to take further action in extracting the sense of awareness and public concern through education. The awareness of society will be increased if sustainable science student take their roles to promote the importance of sustainability in order to save the Earth. Furthermore, the result of this study can also be used for further research. Hence, it is hoped that the future study will find an effective way to improve the environmental awareness especially for students who are studying in advance.

1.5 Limitation of study

This study will focus on the environmental awareness of sustainable science student in University Malaysia Kelantan. The questionnaire will be distributed to the students in order to determine their knowledge, attitude and practices towards the environment as a primary data collection for this study.

The respondents of this study are sustainable science student in UMK Jeli, Kelantan. The students should consist of first-year student, second-year student, third-year student and fourth-year student. Unfortunately, fourth-year student are being excluded in this study because they currently not available. As a result, the respondents are limited to first-year, second-year, and third-year sustainable science student.

CHAPTER 2

LITERATURE REVIEW

2.1 Types of Pollution and Its Effect

Pollution is the contamination of physical and biological components of the earth or atmosphere system to such an extent that normal environmental processes are adversely affected (Kemp, 1998). There are seven main types of pollution such as air pollution, water pollution, soil pollution, noise pollution, thermal pollution, radioactive pollution and light pollution. All of them may come from point sources or non-point sources.

Water pollution is the common issue which involve the contamination of pollutants in water bodies. This type of pollution may occur when industrial wastes are dumped and released to water bodies, excessive oil spills that released from boat or oil tank, fertilizers that used on plants into groundwater. It had caused deaths to people because of contaminated water drinking and also untreated sewage treatment in most countries.

In most developing countries, the growing number of vehicles had cause air pollution. Emitted gases such as carbon monoxide and sulphur dioxide from factory will lead to acid rain. In 2014, World Health Organization (WHO) stated that air pollution is a significant factor for a number of health conditions including respiratory infections, heart disease, Chronic Obstructive Pulmonary (COPD), stroke and lung cancer. The health effects of air pollution will cause difficulty in breathing, wheezing, asthma, coughing and affect cardiac and respiratory condition.

Pesticide is a mixture of substances to kill pest and herbicides are used to kill weeds. Use of pesticides, insecticides, herbicides and other chemical absorbs the nitrogen for the growth of plants led to soil pollution. The contaminated soil will affect both human health and ecosystem.

On the other hand, thermal pollution happen when there is a rise in temperature in ecosystem due to release of heat energy by artificial methods or natural disasters. This has been the main cause of rise of water levels and melting of ice. Therefore, several steps should be taken by the government and public to prevent the environmental pollution from increasing.

2.2 Environmental Education

Organized efforts that provide the function of environmental and the way of human beings act sustainably towards ecosystem is known as Environmental Education (EE). This type of teaching implies education from primary to post-secondary, in multi-disciplinary field such as physics, biology, mathematics, earth science, ecology and others.

The United Nations Educational, Scientific and Cultural Organisation (UNESCO) states that environmental education is vital in imparting an inherent respect for nature amongst society and in enhancing public environmental awareness. UNESCO emphasises the role of environmental education in safeguarding future global developments of societal quality of life (QOL), through the protection of the environment, eradication of poverty, minimization of inequalities and insurance of sustainable development (UNESCO, 2014).

The aim of Environmental Education is to engage the citizens in all demographics to think critically, ethically, and creativity when evaluating environmental issues by making fair judgement, develop skills and to enhance the appreciation of environment thus resulting positive environmental behaviour change (Bamberg & Moeser, 2007; Wals et al., 2014).

Environmental education is delivered through curriculum, field trips, community-based participation and project at elementary and secondary school level. On the other side, at undergraduate and graduate level, it has been more specified into field such as environmental science, environmental law and regulations or ecology studies. This kind of studies helps to reduce the burden of initial-costs for green schools.

2.3 Sustainability Science

Sustainability science (SS) is as elusive as the definition of "sustainability" and "sustainable development". Sustainable development is a process of meeting human development while sustaining the environment and sustainability is a practice of maintaining processes productivity without harming the natural biotic systems. Therefore, sustainability science is the study of concepts of sustainable development and environmental science.

Kieffer et al., (2003) stated more broad-based definition of sustainable science as “the cultivation, integration, and application of knowledge about Earth systems gained especially from the holistic and historical sciences coordinated with

knowledge about human interrelationships gained from the social sciences and humanities, in order to Evaluate, mitigate and minimize the consequences, regionally and worldwide, of human impacts on planetary systems and on societies across the globe and into the future that is, in order that humans can be knowledgeable Earth stewards."

This field focus on relation of human and environment to bring further understanding and solutions to worldwide challenges that threaten the Earth such as global warming, acid rain, climate change, loss of biodiversity and other types of pollution. With the aid of this field, the student can find an effective way to save the planet and natural resources.

2.4 Awareness

Awareness is an internal feeling such as visceral feeling or sensory perception to directly know and perceive, feel or to be conscious about something. There are four types of awareness which is mental, emotional, environmental and physical awareness. Mental awareness is the ability to know what is happening around the situation. Lack of mental awareness will prevent the human development from the ability to solve problems.

Emotional quotient (EQ) or known as emotional intelligence (EI) is the capacity of individuals to recognize their own, and other people's emotions, to discriminate between different feelings and label them appropriately, and to use emotional information to guide thinking and behaviour (Coleman and Andrew, 2008). People that have greater mental health, job performance and leadership skills are likely to attribute to general intelligence and personality traits rather than emotional intelligence. Awareness enable human to contact with surrounding and

understand more about serious issues that harm the environment such as oil drilling, deforestation, production of plastic goods and others. Lastly, physical awareness is the relationship of mind and body to develop conscious awareness.

2.4.1 Environmental Knowledge

Environmental knowledge is an effort to improve the value of awareness, attitude, concern, practices, skills and behaviour towards environmental among students (Abdullah *et al.*, 2011). Palmer (1998) states that students gained a suitable range of knowledge about the environment by understanding the concept of environment to achieve critical judgement. According to Tanaka (2000), environmental knowledge referred to the understanding of individual towards environmental function, interaction, problem and solution.

Environmental knowledge is examined as a set of ecological knowledge that an individuals have about environmental topics. It is influenced by ecological ethnocentrism, degree of information, past behaviour and perceptions about green practices. Besides, it is the reflection of a person regarding the amount of knowledge towards environmental concern (Chan *et al.*, 2000). Based on previous study by Besar et al. (2013) and Ahmad et al. (2012) stated that the level of environmental knowledge and understanding among Malaysian youth is good.

2.4.2 Environmental Attitude

Eagly (1998) define an attitude as an enduring evaluation, positive or negative of people, objects or ideas. On the other hand, environmental attitudes referred to individual concern for the physical environment. Based on Katz (1960), this helps

the person to achieve rewards and gain approval from others, structure the world, create or maintain sense of one self and express important aspects of the self-concept.

There are three components of attitudes which is affective, cognitive and behavioural component. Affective component is value-expressive. It describes the affectively-based attitudes are based on people's feelings and values than on their beliefs. Cognitive function as knowledge or utilitarian. It is based on primarily on a person's beliefs about the properties of attitude object while behaviourally-based attitudes are based on observations of how one behaves towards attitude object.

There are several study that was conducted to study environmental attitudes of Malaysian. In 2011, a survey of 1200 students was done in Sabah to determine the environmental attitude of students. More than 80% indicated that the environment was a major part of their lives n their family's life. In addition, more than 80% feel that more national parks should be set up to conserve wildlife (Harun, Lim & Othman, 2011).

In another study done in Kedah and Penang by Muda et al. (2010) on school principals environmental attitudes, it was found that the majority of them had positive environmental attitudes. Thang and Kumarasamy (2006) did a survey on 100 Form 5 students from a Malaysian secondary school. They found that the students, regardless of gender, had generally positive attitudes towards the environment. The students also indicated that they were concerned about the environment and they wanted to take action to conserve it.

2.4.3 Environmental Practices

Practices show something that is done regularly or habitually. It refers to the participation of people to the activities of environmental improvement and protection (Gough, 1997; Anthman and Monroe, 2000; Lavega, 2004). Environmental practices refer to people who behave environmentally in beneficial ways. There are many practices which contribute to the environment such as 3R (Reduce, Reuse, Recycle), public transportation, use of organic products or joining in community-based activity to save the environment.

With the presence of knowledge and attitude, it increases human behaviour towards environmental practices. In order to improve individual's practice, the knowledge should be associated with environmental sensitivity, personal beliefs, decision making and problem-solving skills (Morrone *et al.*, 2001).

In a study involving university students in the United States, Emanuel et al. (2010) found that sustainable programs and practices are being implemented on a number of college campuses in Alabama and Hawaii. He found that the students were concerned about wasteful consumption and pollution. However, a large number of students surveyed expressed concern for and willingness to participate in sustainable practices, and there seems to be a "commitment gap" among students.

CHAPTER 3

MATERIALS AND METHOD

3.1 Study area

This study was conducted at UMK Jeli, Kelantan. UMK has three branches which are located at Jeli, Pengkalan Chepa and Bachok in Kelantan. The reason of selecting UMK Jeli is because this campus provide Sustainable Science program. The students in UMK Jeli consist of different races like Malay, Chinese, Indian and others. There are two faculties available in UMK Jeli which is Faculty of Earth Science (FSB) and Faculty of Agro-Based Technology (FIAT), whereby Sustainability Science programme lies under Faculty of Earth Science. Figure 3.1 shows the location of study area in Jeli, Kelantan.

Figure 3.1: Location of study area in Jeli, Kelantan

3.2 Sampling

There are several types of sampling such as simple random sampling, stratified sampling, systematic random sampling, cluster random sampling and multi-stage sampling. Stratified is used in this study as the population have different characteristics or heterogeneous. However, characteristics within each group are homogenous.

The sample size was determined using Survey System sample size calculator software. The total population of sustainable science student is 139. Thus, the sample size required is 102 with 95% of confidence level. Table 3.1 shows the required sample size for survey listed by Zina O'leary (2004).

Table 3.1: Required Sample Size

Population	Confidence Level (%)	Confidence Level (%)
	95	99
30	28	29
100	28	29
500	217	286
1000	278	400
5000	357	588
10000	370	624
50000	381	657
100000	383	661
1000000	384	663

The population was divided into three strata which is first-year, second-year and third-year. The sample was selected randomly from the strata. From each strata, the number of categories are 37, 49 and 53 respectively. The number of sample selected was calculated by using the formula:

$$\frac{number\ of\ categories}{N} X\ n$$

where:

N= total population

n=sample size

3.3 Participants

The target sample for this study was Sustainable Science students in UMK Jeli. Specifically, the students were divided into three groups which is first-year, second-year, and third-year student. The student's demographic information such as gender, races and year of study were included. The participants were tested based on environmental knowledge, attitude and practices.

3.4 Study Instrument

This study was conducted using a set of questionnaire as primary data collection to determine environmental awareness of the students. The questionnaires consist of 30 close-ended questions that covered three components of awareness which is knowledge, attitude and practices.

There were two sections in the questionnaire, the first section include demographic information of the respondent such as their gender, races, and year of study. The second section is the environmental awareness that comprises into three components which is knowledge, attitude and practices of the student. Thus, ten questions that related to environment were prepared to test each of the components. The questionnaires were shown in Appendix A.

3.5 Statistical Analysis

The collection of data was analysed using The Statistical Package for the Social Sciences (SPSS) Version 20 software. This software helps to identify descriptive statistics such as percentage and frequencies for each question. Furthermore, this software also used to tabulate and compute the data into graph or chart such as pie chart and bar chart to illustrate the result of environmental awareness for more understanding.

In this study, Pearson Correlation Coefficient was used to determine the relationship between knowledge, attitude and practices among Sustainable Science students. One-way ANOVA was used to compare differences of means among more than 2 groups for year of study and race of students. Independent t-

test also was used to determine two sets of data that are significantly different from each other like gender.

3.6 Methods

This study involves quantitative data for data collection. A survey was conducted by distributing the questionnaires in order to collect information about the environmental awareness among sustainable science student. The questionnaire was made based on the relationship of environment in knowledge, attitude and practices. Likert scale was used to measure the response of respondents. Typically, each scale item has five specific responses ranging from "Strongly Disagree" to Strongly Agree".

3.7 Pilot Test

Pilot test has been made in order to assess the validity of the questionnaire to be used in testing the awareness. It was designed to test the feasibility of methods and procedures for later use. The purpose of validity test is to assess the viability of the steps that need to be taken in this study.

A lot study was frequently carried out before large-scale quantitative research, in an attempt to avoid time and money being wasted on an inadequately designed project. A pilot study is usually carried out on members of the relevant population, but not on those who will form part of the final sample. This is because it may influence the later behaviour of research subjects if they have already been involved in the research (Haralambos and Holborn, 2000).

The test has been carried out started from May 2016. 10 respondents were selected to answer the questionnaires during pilot study. This number was obtained from 10% of sample size which is 102. The validity of the questionnaire was analysed using SPSS software. Reliability test using Cronbach Alpha obtained a value of 0.866. Thus, the value obtained is 0.866 which shows that the questionnaires were reliable. The reliability statistics were shown in Appendix B. Based on George and Mallery (2003), the internal consistency of the Cronbach's Alpha was provided in Table 3.2 while Figure 3.2 shows the research flow chart of analysis methodology.

Table 3.2: Internal Consistency of Cronbach's Alpha

Cronbach's Alpha	Internal Consistency
≥ 0.9	Excellent
≥ 0.8	Good
≥ 0.7	Acceptable
≥ 0.6	Questionable
≥ 0.5	Poor
< 0.5	Unacceptable

3.8 Analysis Methodology

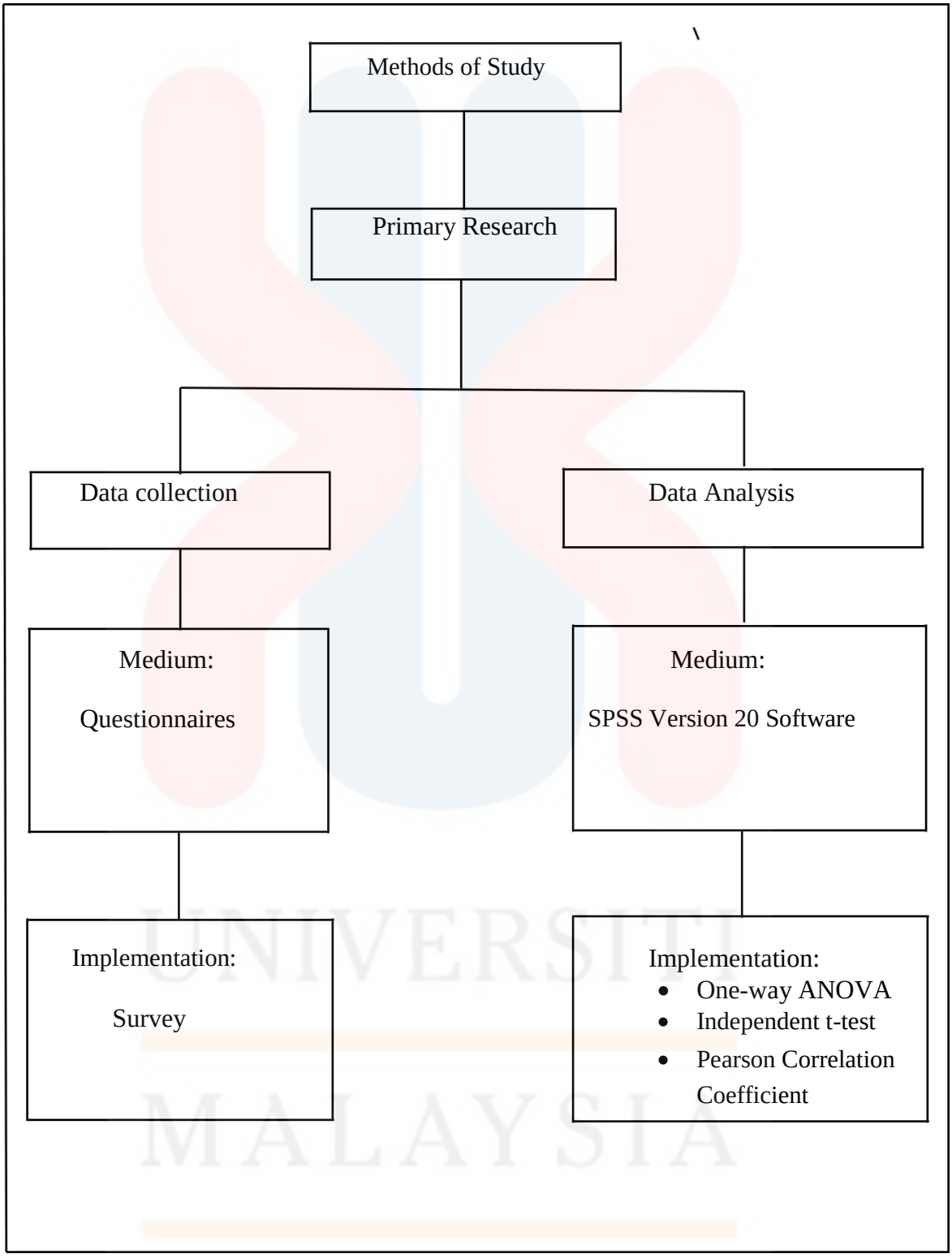

Figure 3.2: Research flow chart

CHAPTER 4

RESULT AND DISCUSSION

4.1 Introduction

The questionnaire was distributed after completing pilot study on May 2016. As the internal consistency of Cronbach's Alpha was over than 0.7 which is acceptable, the questionnaires were distributed to the respondents of this study on October 2016. The questionnaire was distributed equally to sustainable science students in University Malaysia Kelantan.

With total of 110 questionnaires, the data was analysed and tabulated into pie chart and bar chart using IBM SPSS Software Version 20 to give clear explanation. In order to determine the relationship between knowledge, attitude and practices among student, Pearson Correlation Coefficient test was used in this study. Other tests such as one-way ANOVA and independent t-test were used to illustrate result.

4.2 Demographic Section

The study used stratified random sampling to test 110 sets of questionnaire. In the questionnaire, demographic section was included. Demographic section was used to analyse any kind of dynamic living population. It covers gender, year of study and race that may affect their knowledge, attitude and practices of the student. Based on Figure 4.1, there were 5.45% of men and 94.55% of female out of 110 respondents in UMK Jeli. From the level of percentage, there was a huge differences

between the number of male and female, that leads by the female which may be the majority in that course.

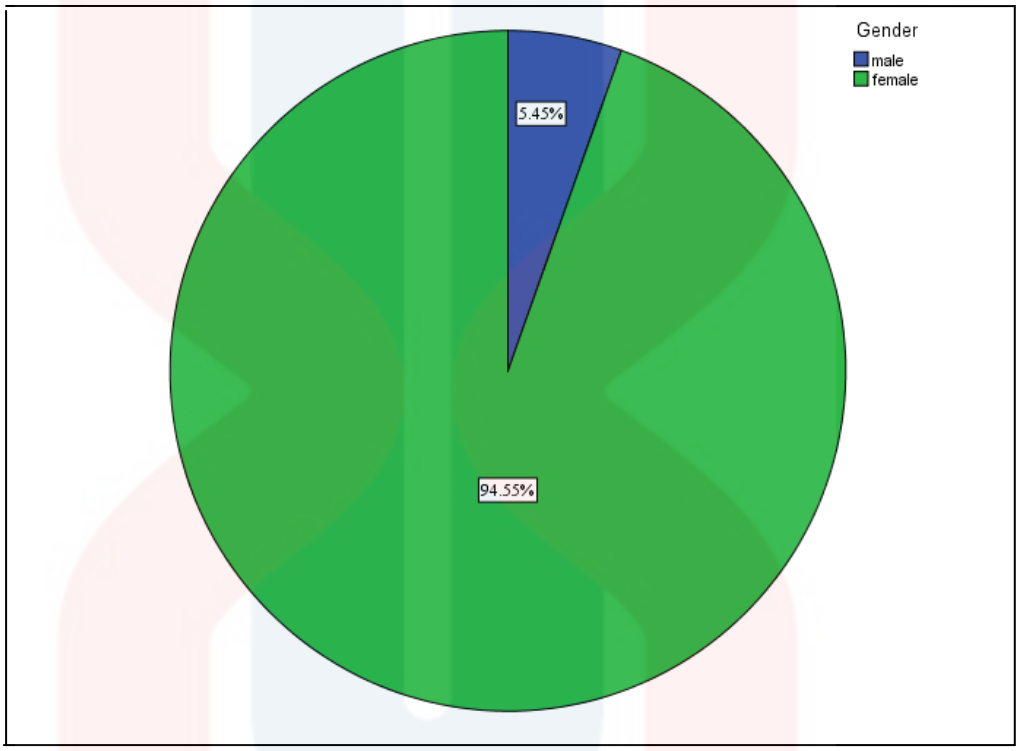

Figure 4.1 Percentage of respondents by gender

In UMK Jeli, the students were divided based on the year of study. For bachelor of degree, there are first-year, second-year, third-year and fourth year student. But in this study, the limitation was until third-year student because the fourth-year student was unavailable in the university. According to Figure 4.2, it was 30 respondents from first-year student, 40 respondents from second-year student and 50 respondents were from third-year student. The chart shows that the highest number of respondents was from third-year and the lowest number of respondents was from first-year student.

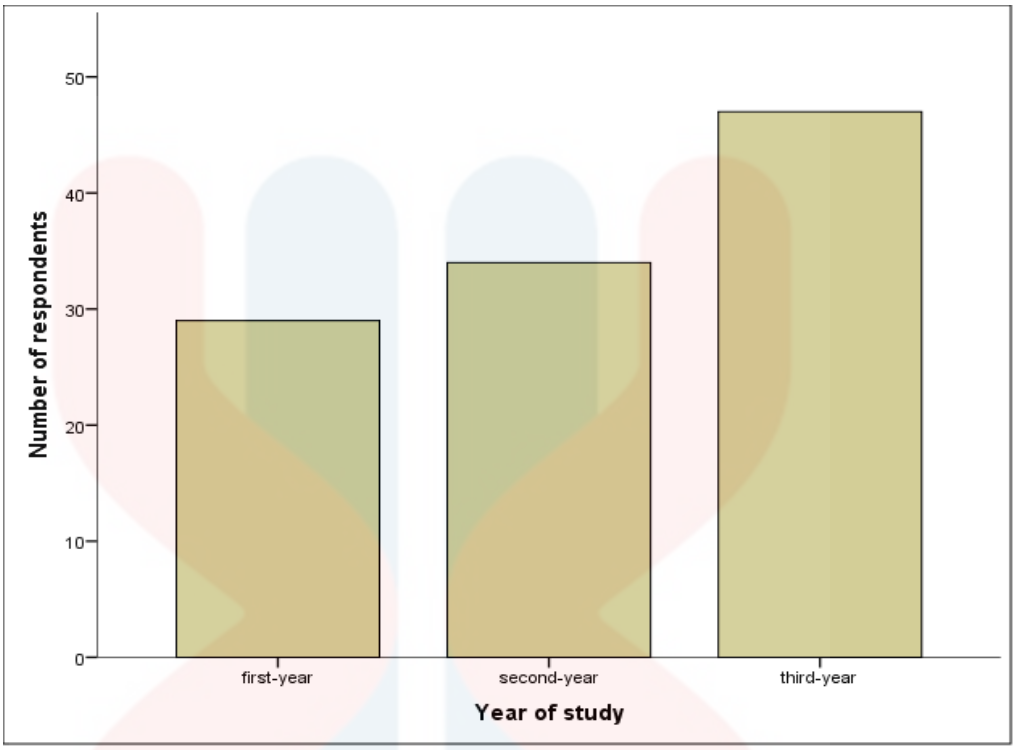

Figure 4.2 Year of study of respondents

Malaysia has been recorded as 41st most populated country in the world which estimated to be 28,334,000 in July 2010 (Department of Statistics Malaysia, 2010). In Malaysia, there are multi racial include Malay, Indian, Chinese, Iban, Bajau and others. However, Malays is the largest community that was formed in Malaysia. They have made up almost half of the total population in the country. Based on Figure 4.3, the majority of population of UMK Jeli student was Malay, while Indian and other races were the least. The highest number of percentage of the respondent was Malay which is 81.8% .Second highest was Chinese which is 16.4% while Indian and other races recorded the least percentage at 0.9% each and Chinese has 16.4% of respondents.

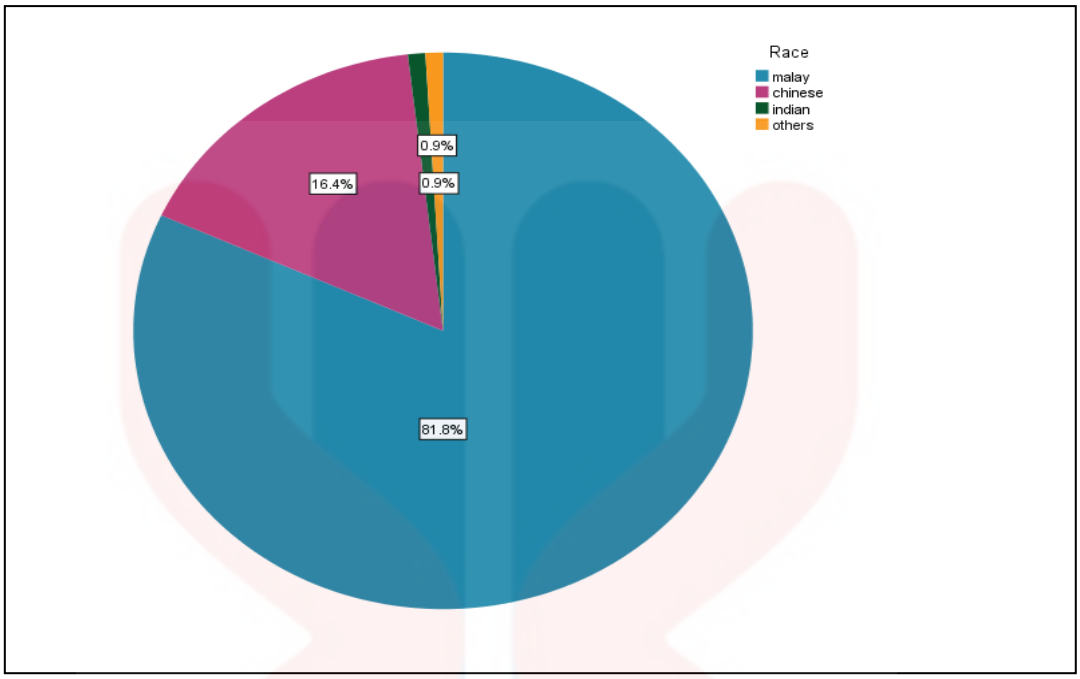

Figure 4.3 Percentage of respondents by races

4.3 Environmental Awareness (Knowledge, Attitude and Practices)

In this section, the results were discussed about the environmental awareness (knowledge, attitude and practices) of sustainable science student to achieve the objective of this study. There are some tests that were used in order to determine the environmental awareness of student in UMK Jeli which is independent t-test, one-way ANOVA and Pearson Correlation test.

Independent t-test was used to compare two different groups that are unrelated to each other such as gender between men and women. Besides, the correlation test was used to determine the relationship between knowledge, attitude and practices of sustainable science student. One-way ANOVA was between first-year, second-year and third-year students and to compare the environmental awareness between Malay, Chinese, Indian and others.

4.3.1 Independent t-test for Environmental Knowledge

The most crucial part of awareness is knowledge. Without knowledge, people will have lack of awareness and exposure on how to protect the environment and their impacts. Thus, the university provide environmental syllabus to sustainable science student to make them aware and spread the awareness towards the community. Independent t-test was used to test the environmental awareness between male and female and it was shown in Appendix C.

Table 4.1 shows statistical mean of knowledge for gender. Based on the table, there are some differences of male and female knowledge of recycling and separating the products based on the materials. Female has higher knowledge of recycling and separating products based on the materials at 4.04 than male at 4.00.

Table 4.1 Statistical Mean of Knowledge for Gender

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Knowledge of recycling and separating the products based on the materials	Male	6	4.0000	1.0955	0.4472
	Female	104	4.0385	0.7494	0.0735

Table 4.2 had shown that F value for Levene's Test is 4.76, and significant value is 0.03 meaning that it less than α=0.05, so the variances are not equal. Thus, the t-value for equal variances not assumed was used which is -0.09 and the corresponding significant value is 0.94. Therefore, there is no statistically significant difference for the mean knowledge of recycling between male and female.

Table 4.2 Independent t-test of Knowledge for Gender

		Levene's Test for Equality of Variances		t-test for Equality of means	
		F	Sig.	t	Sig. (2-tailed)
Knowledge of recycling and separating the products based on the materials	Equal variances Assumed	4.755	0.031	-0.119	0.905
	Equal variances not assumed			-0.085	0.935

4.3.2 Independent t-test for Environmental Attitude

Attitudes of in this study were describing the behaviour towards environment. Therefore, there were also ten statements in this section to describe the attitudes in the questionnaire. Thus, the mean score also were used to analyse in independent sample t-test as shown as table below. Table 4.3 had shown mean of interest to organize sustainability programme of male is higher at 4.67 than female at 3.96.

Table 4.3 Statistical mean of Attitudes for Gender

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Interest to organize sustainability programme	Male	6	4.6667	0.5164	0.2108
	Female	104	3.9615	0.9022	0.0885

Table 4.4 had shown that F value for Levene's Test is 1.06, and significant value is 0.31 meaning that it more than α=0.05, so the variances are equal. Thus, the t-value for equal variances assumed was used which is 1.89 and the corresponding significant value is 0.06. Therefore, there is no statistically significant difference for the interest to organize sustainability programme between male and female.

Table 4.4 Independent t-test of Attitudes for Gender

		Levene's Test for Equality of Variances		t-test for Equality of means	
		F	Sig.	t	Sig. (2-tailed)
Interest to organize sustainability programme	Equal variances Assumed	1.063	0.305	1.891	0.061
	Equal variances not assumed			3.084	0.018

4.3.3 Independent t-test for Environmental Practices

The practices is important to measure that the respondent application of their knowledge. There were ten statements in this section. Thus, Table 4.5 had shown statistical mean of practices for gender. Table 4.5 shows that the mean of plastic straw usage of male is lower at 3.33 than female which is 2.46. This shows that female use more plastic straw than male. The disposal of hazardous products or chemicals at approved hazardous sites of male also is higher at 4.33 than female at 3.46.

Table 4.5 Statistical Mean of Practices for Gender

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Restriction on plastic straw usage when drinking	Male	6	3.3333	0.8165	0.3333
	Female	104	2.4615	1.0421	0.1022
Disposal of hazardous products or chemicals at approved hazardous collection sites	male	6	4.3333	0.8165	0.3333
	female	104	3.4615	0.9022	0.0885

Table 4.6 Independent t-test of Practices for Gender

		Levene's Test for Equality of Variances		t-test for Equality of means	
		F	Sig.	t	Sig. (2-tailed)
Restriction on plastic straw usage when drinking	Equal variances Assumed	1.045	0.309	2.011	0.047
	Equal variances not assumed			2.501	0.047
Disposal of hazardous products or chemicals at approved hazardous collection sites	Equal variances Assumed	0.212	0.646	2.311	0.023
	Equal variances not Assumed			2.528	0.047

Table 4.6 had shown that F value for Levene's Test for restriction on plastic straw usage when drinking was 1.05 and significant value was 0.31 meaning that it is more than α=0.05, so the variances were equal. Thus, the t-value for equal variances assumed was used which is 2.01 and the corresponding significant value is 0.05. Therefore, there were a statistically significant difference of restriction on plastic straw usage when drinking between male and female.

Besides, F value for Levene's Test for disposal of hazardous products or chemicals at approved hazardous collection sites was 0.21 and significant value was 0.65 meaning that it is more than α=0.05, so the variances were equal. Thus, the t-value for equal variances assumed was used which is 2.31 and the significant value is 0.02. Therefore, there was a statistically significant difference of disposal of hazardous products or chemicals at approved hazardous collection sites between male and female. The findings shows similar result to the opinion found by Azizan (2008) which says that "students had a good awareness about environmental problems but yet had no changed in practice".

4.3.4 One-way ANOVA for Environmental Knowledge (Year of study)

One-way ANOVA was used to test the environmental knowledge between years of study. The result of ANOVA Test was shown in Appendix D. In Table 4.7 had shown the comparison of environmental knowledge between first-year, second-year and third-year of sustainable science student in UMK Jeli.

Table 4.7 Statistical mean of Knowledge for Year of study

	Year of study	N	Mean	Std. Deviation	Std. Error Mean
Knowledge of proper ways of waste disposal	First-year	29	3.5862	0.9070	0.1684
	Second-year	34	3.5000	0.7487	0.1284
	Third-year	47	3.9149	0.7469	0.1089
Knowledge to differentiate biotic and abiotic components	First-year	29	3.8621	0.9151	0.1699
	Second-year	34	4.4118	0.6089	0.1044
	Third-year	47	4.2766	0.7133	0.1040

The mean of knowledge of proper ways of waste disposal of third-year student is 3.92 which is higher than first-year and second-year student at 3.59 and 3.50 respectively. However, the knowledge to differentiate biotic and abiotic components of second-year is 4.41 which is higher than first-year and second-year at 3.86 and 4.28 respectively.

Table 4.8 ANOVA of Knowledge for Year of study

		Sum of Squares	df	Mean Square	F	Sig.
Knowledge of proper ways of waste disposal	Between groups	3.906	2	1.953	3.110	0.49
	Within groups	67.194	107	0.628		
	Total	71.100	109			
Knowledge to differentiate biotic and abiotic components	Between groups	5.103	2	2.552	4.620	0.12
	Within groups	61.695	107	0.577	1.872	0.16
	Total	63.855	109			

Table 4.9 Post-Hoc Tests of Knowledge for Year of study

Dependent Variable	(I) Year of study	(J) Year of study	Mean difference (I-J)	Std. Error	Sig.
Knowledge of proper ways of waste disposal	First-year	Second-year	0.0862	0.2003	0.668
		Third-year	-0.3287	0.1871	0.082
	Second-year	First-year	-0.0862	0.2003	0.668
		Third-year	-0.4149	0.1871	0.022
	Third-year	First-year	0.3287	0.1871	0.082
		Second-year	0.4185	0.1784	0.022
Knowledge to differentiate biotic and abiotic components	First-year	Second-year	-0.5497	0.1878	0.004
		Third-year	-0.4145	0.1755	0.020
	Second-year	First-year	0.5497	0.1878	0.004
		Third-year	0.1352	0.1673	0.020
	Third-year	First-year	0.4145	0.1755	0.020
		Second-year	-0.1352	0.1673	0.421

In Table 4.8, the ANOVA of waste disposal knowledge had shown the p-value $0.49<\alpha=0.05$, at $F=3.11$ so there is significant difference between first-year, second-year and third-year student in their knowledge about proper ways of waste disposal. The knowledge to differentiate biotic and abiotic components had shown the p-value $0.12<\alpha=0.05$, at $F=4.62$ so there is significant difference between first-year, second-year and third-year.

Since the ANOVA test for waste disposal and biotic abiotic knowledge was significant, the post-hoc tests were shown in Table 4.9 to compare each of the year of study. Based on the table, the knowledge of waste disposal between second-year and third-year has significant difference p=0.02 with mean difference of -0.42. The knowledge of biotic and abiotic components of first-year and second-year has significant difference p=0.00 at mean difference of -0.55. Besides, the knowledge of biotic and abiotic components of first-year and third-year also has significant value p=0.02 with mean difference -0.41.

4.3.4 One-way ANOVA for Environmental Attitude (Year of study)

One-way ANOVA was used to test the environmental attitude between years of study. In Table 4.10 had shown the comparison of environmental attitude between first-year, second-year and third-year of sustainable science student in UMK Jeli. Table 4.10 had shown the descriptive mean of environmental attitudes for year of study. The mean of motivation to work in environmental sector of second-year student is 4.29 which is higher than first-year and second-year student at 3.59 and 4.26 respectively. However, the interest to organize sustainability programme of second-year is 4.18 which is higher than first-year and second-year at 3.62 and 4.11 respectively.

Table 4.10 Statistical mean of Attitudes for Year of study

	Year of study	N	Mean	Std. Deviation	Std. Error Mean
Motivation to work in environmental sector	First-year	29	3.5862	1.1501	0.2136
	Second-year	34	4.2941	0.6755	0.1159
	Third-year	47	4.2553	0.8452	0.1224
	Total	110	4.0909	0.9340	0.0891
Interest to organize sustainability Programme	First-year	29	3.6207	1.1153	0.2071
	Second-year	34	4.1765	0.7165	0.1229
	Third-year	47	4.1064	0.8139	0.1187
	Total	110	4.0000	0.8985	0.0857

Table 4.11 ANOVA of Attitudes for Year of study

		Sum of Squares	df	Mean square	F	Sig.
Motivation to work in environmental sector	Between groups	10.061	2	5.031	6.331	0.003
	Within groups	85.029	107	0.795		
	Total	95.091	109			
Interest to organize sustainability programme	Between groups	5.763	2	2.882	3.749	0.027
	Within groups	82.237	107	0.769		
	Total	88.000	109			

In Table 4.11, the ANOVA of motivation to work in environmental sector had shown the p-value 0.00<α=0.05, at F=6.33 so there is significant difference between first-year, second-year and third-year. The interest to organize sustainability programme had shown the p-value 0.27>α=0.05, at F=3.75 so there is no significant

difference between first-year, second-year and third-year. Since the ANOVA test for motivation to work in environmental sector and interest to organize sustainability programme were significant, the post-hoc tests were shown in Table 4.12 to compare each of the year of study.

Table 4.12 Post-Hoc Tests of Attitudes for Year of study

Dependent Variable	(I) Year of study	(J) Year of study	Mean difference (I-J)	Std. Error	Sig.
Motivation to work in environmental sector	First-year	Second-year	-0.7079	0.2253	0.002
		Third-year	-0.6691	0.2105	0.002
	Second-year	First-year	0.7079	0.2253	0.002
		Third-year	0.0388	0.2007	0.847
	Third-year	First-year	0.6691	0.2105	0.002
		Second-year	-0.0388	0.2007	0.847
Interest to organize sustainability programme	First-year	Second-year	-0.5558	0.2216	0.014
		Third-year	-0.4857	0.2070	0.021
	Second-year	First-year	0.5558	0.2216	0.014
		Third-year	0.0701	0.1974	0.723
	Third-year	First-year	0.4857	0.2070	0.021
		Second-year	-0.0701	0.1974	0.723

Based on Table 4.12, the motivation to work in environmental sector of first-year and second-year has significant difference p=0.00 with mean difference of -0.71. Then, first-year and third-year also has significant difference p=0.00 at mean difference of -0.67. Besides, the interest to organize sustainability programme of first-year and second-year has significant value p=0.01 with mean difference -0.56. The first-year and third-year also has significant difference p=0.02 with mean difference -0.49.

4.3.6 One-way ANOVA for Environmental Practices (Year of study)

One-way ANOVA was used to test the environmental practices between years of study. Table 4.13 had shown the descriptive mean of environmental practices for year of study. The discipline to throw rubbish into recycle bin of second-year is 4.38, which is higher than first-year and second-year at 3.76 and 4.17 respectively.

Table 4.13 Statistical mean of Practices for Year of study

	Year of study	N	Mean	Std. Deviation	Std. Error Mean
Discipline to throw the rubbish into recycle bin	First-year	29	3.7586	1.1230	0.2085
	Second-year	34	4.3824	0.7392	0.1268
	Third-year	47	4.1702	0.8678	0.1266
	Total	110	4.1273	0.9297	0.0887

Table 4.14 ANOVA of Practices for Year of study

		Sum of Squares	df	Mean Square	F	Sig.
Discipline to throw the rubbish into recycle bin	Between groups	6.240	2	3.120	3.795	0.026
	Within groups	87.978	107	0.822		
	Total	94.218	109			

In Table 4.14, the ANOVA of throwing rubbish into recycle bin had shown the p-value 0.26 < α=0.05, at F=3.795 so there is significant difference between first-year, second-year and third-year. The post-hoc tests were shown in Table 4.15 to compare each of the year of study. Based on the table, the discipline to throw rubbish

into recycle bin of first-year and second-year has significant difference p= 0.01 with mean difference of -0.62.

Table 4.15 Post-Hoc Tests of Practices for Year of study

Dependent Variable	(I) Year of study	(J) Year of study	Mean difference (I-J)	Std. Error	Sig.
Discipline to throw rubbish into recycle bin	First-year	Second-year	-0.6237	0.2292	0.008
		Third-year	-0.4116	0.2141	0.057
	Second-year	First-year	0.6237	0.2292	0.008
		Third-year	0.2121	0.2042	0.301
	Third-year	First-year	0.4116	0.2141	0.057
		Second-year	-0.2121	0.2042	0.301

4.3.7 One-way ANOVA for Environmental Knowledge (Races)

One-way ANOVA was used to test the environmental knowledge between races. In Table 4.16 had shown the comparison of environmental knowledge between Malay, Chinese, Indian and others of sustainable science student in UMK Jeli.

Table 4.16 Statistical mean of Knowledge for Races

	Races	N	Mean	Std. Deviation	Std. Error Mean
The factors of pollution are mostly caused by human activities	Malay	90	4.3889	0.7374	0.0777
	Chinese	18	4.5000	0.7071	0.1667
	Indian	1	2.0000		
	Others	1	4.0000		
Pollution can give adverse impacts towards human health	Malay	90	4.5556	0.6017	0.0777
	Chinese	18	4.6667	0.4851	0.1667
	Indian	1	3.0000		
	Others	1	4.0000		

Table 4.17 ANOVA of Knowledge for Races

		Sum of Squares	Df	Mean Square	F	Sig.
Agreement that pollution are mostly because of human activities	Between groups	6.302	3	2.101	4.650	0.004
	Within groups	47.889	106	0.452		
	Total	54.191	109			
Pollution can give adverse impacts towards human health	Between groups	2.951	3	0.984	2.878	0.039
	Within groups	36.222	106	0.342		
	Total	39.173	109			

Table 4.16 had shown the statistical mean of environmental knowledge for races. The mean of agreement that the factors of pollution are mostly caused by human activities of Chinese is 4.00 which is higher than Malay, Indian and others at 4.39, 2.00 and 4.00 respectively. Besides, the agreement that pollution can give adverse impacts towards human health of Chinese is 4.67 which is higher than Malay, Indian and others at 4.56, 3.00 and 4.00 respectively.

In Table 4.17, the ANOVA of agreement that pollution are mostly because of human activities had shown the p-value 0.00 < α=0.05, at F=4.65 so there is significant difference between Malay, Chinese, Indian and others. The statement that pollution can give impacts towards human health had shown the p-value 0.04 < α=0.05, at F=2.88 so there is significant difference between Malay, Chinese, Indian and others.

4.3.8 One-way ANOVA for Environmental Attitude (Races)

One-way ANOVA was used to test the environmental attitude between races. Table below had shown the comparison of environmental attitude between Malay, Chinese, Indian and others in UMK Jeli.

Table 4.18 Statistical descriptive mean of Attitudes for Races

	Races	N	Mean	Std. Deviation	Std. Error Mean
Encouraging people about the importance of protecting the environment	Malay	90	3.9000	0.8618	0.0908
	Chinese	18	4.4444	0.6157	0.1451
	Indian	1	3.0000		
	Others	1	4.0000		

Table 4.19 ANOVA of Attitudes for Races

		Sum of Squares	Df	Mean square	F	Sig.
Encouraging people about the importance of protecting the environment	Between groups	5.419	3	1.806	2.639	0.053
	Within groups	72.544	106	0.684		
	Total	77.964	109			

Table 4.18 had shown the statistical mean of environmental attitudes for races. The mean of encouraging people about the importance of protecting the environment of Chinese is 4.44 which is higher than Malay, Indian and others at 3.90, 3.00, and 4.00. In Table 4.19, the ANOVA of encouraging people about the importance of protecting the environment had shown the p-value $0.05 < \alpha=0.05$, at $F=2.64$. Since the p-value is less than 0.05, there is a significant difference in encouraging people

about the importance of protecting the environment between Malay, Chinese, Indian and others.

4.3.9 One-way ANOVA for Environmental Practices (Races)

One-way ANOVA was used to test the environmental practices between races. Table 4.20 had shown the descriptive mean of environmental practices for races. The mean of restriction to open burning of Chinese is 4.56 than Malay, Indian and others at 3.22, 3.00 and 2.00 respectively. Besides, Chinese is the highest to dispose hazardous products or chemicals at approved sites at 4.00 than Malay, Indian and others at 3.43, 3.00 and 2.00 respectively. However, Indian is the highest to dispose hazardous products or chemicals at approved sites at 4.00 than Malay, Indian and others at 3.02, 3.28 and 2.00 respectively.

Table 4.20 Statistical mean of Practices for Races

	Races	N	Mean	Std. Deviation	Std. Error Mean
Restriction to open burning	Malay	90	3.2222	1.1395	0.1201
	Chinese	18	4.5556	0.7048	0.1661
	Indian	1	3.0000		
	Others	1	2.0000		
Dispose hazardous products or chemicals at approved sites	Malay	90	3.4333	0.8875	0.0936
	Chinese	18	4.0000	0.9075	0.2139
	Indian	1	3.0000		
	Others	1	2.0000		
Saving the electricity and water	Malay	90	3.0222	0.8738	0.0921
	Chinese	18	3.2778	1.1785	0.2778

Indian	1	4.0000
Others	1	2.0000

In Table 4.21, the ANOVA of restriction to open burning had shown the p-value 0.00 < α=0.05, at F=8.24 so there is significant difference between Malay, Chinese, Indian and others. The disposal of hazardous products or chemicals at approved sites had shown the p-value 0.03 < α=0.05, at F=3.11 so there is significant difference. Besides, the p-value of saving electricity and water is 0.37 < α=0.05, at F=2.94 so there is significant difference between all races.

Table 4.21 ANOVA of Practices for Races

		Sum of Squares	df	Mean Square	F	Sig.
Restriction to open burning	Between groups	28.918	3	9.639	8.240	0.000
	Within groups	124.000	106	1.170		
	Total	152.918	109			
Dispose hazardous products or chemicals at approved sites	Between groups	7.391	3	2.464	3.105	0.030
	Within groups	84.100	106	0.793		
	Total	91.491	109			
Saving the electricity and water	Between groups	6.664	3	2.221	2.939	0.037
	Within Groups	80.100	106	0.756		
	Total	86.764	109			

4.3.10 Correlation of Environmental Knowledge, Attitude and Practices

In this section the correlation between knowledge, attitude and practices were discussed. The correlation results were shown in Appendix E. Table 4.22 shows the data for first correlation of knowledge, attitude and practices. The statement that the factors of pollution are mostly because of human activities and the statement that urbanization cause too much harmful towards the environment shows weak correlation because r=0.29.

Since p= 0.00 < 0.01, thus, there is significant difference between factors of pollution are mostly because of human activities and urbanization cause too much harmful towards the environment. On the other hand, the correlation between the statement that the factors of pollution are mostly because of human activities and the restriction to open burning at r=0.84, there was strong correlation at the 99% of confidence level. Since p=0.38>0.01, thus, there is no significant difference between the agreement that the factors of pollution are mostly because of human activities and the restriction to open burning. Besides, there was a strong correlation between the statement that the urbanization cause too much harmful towards the environment and never done an open burning at r=-0.06, p=0.54 > 0.01.

Table 4.22 Pearson Correlation Coefficient 1

		The factors of pollution are mostly because of human activities	Urbanization cause too much harmful towards the environment	Restriction to open burning
The factors of pollution are mostly because of human activities	Pearson Correlation	1	0.286	0.084
	Sig. (2-tailed)		0.002	0.384
	N	110	110	110
Urbanization cause too much harmful	Pearson Correlation	0.286	1	-0.059

towards the environment	Sig. (2-tailed)	0.002		0.541
	N	110	110	110
Restriction to open burning	Pearson Correlation	0.084	-0.059	1
	Sig. (2-tailed)	0.384	0.541	
	N	110	110	110

Table 4.23 shows the data for second correlation of the statements of knowledge, attitude and practices. There are weak correlation between knowledge of waste disposal and angry feeling towards people that littering waste because r= 0.21. Since p= 0.03 < 0.05, thus, there is significant difference between knowledge of waste disposal and angry feeling towards people that littering waste.

The correlation between the knowledge of waste disposal and disposal of hazardous products or chemicals at approved sites shows medium correlation at r=0.35. Since p=0.00, there is significant difference between knowledge of waste disposal and disposal of hazardous products or chemicals at approved sites. Besides, there was a weak correlation between angry feeling towards people that littering waste and disposal of hazardous products or chemicals at approved sites at r=0.19, p=0.43 < 0.05 so there is a significant difference.

Table 4.23 Pearson Correlation Coefficient 2

		Knowledge of proper ways of waste disposal	Angry feeling towards people that littering waste	Disposal of hazardous products or chemicals at approved hazardous collection sites
Knowledge of proper ways of waste disposal	Pearson Correlation	1	0.210	0.345
	Sig. (2-tailed)		0.002	0.384
	N	110	110	110
Angry feeling towards people that littering waste	Pearson Correlation	42 0.210	1	0.193
	Sig. (2-tailed)	0.027		0.043
	N	110	110	110
Disposal of hazardous products or chemicals at approved hazardous collection sites	Pearson Correlation	0.345	0.193	1
	Sig. (2-tailed)	0.000	0.043	
	N	110	110	110

CHAPTER 5

CONCLUSION

5.1 Conclusion

Issues such as deforestation, greenhouse effect, climate change and many types of pollution are harmful towards human and ecosystem. Although this problem has been a serious matter, the government yet neglecting the implementation because there is no support from the community. Thus, sustainable science was designed to create the environmental awareness among the community by delivering knowledge towards the student.

Based on the result, it was found that there is no significant difference between male and female environmental knowledge and attitude. However, there is significant difference of male and female practices, which indicates that male has higher environmental practices than female. Overall, male sustainable science student has higher environmental awareness than female student because of the practices.

In comparison between years of study, the second-year and third-year student has higher environmental awareness compared to first-year student. This result shows that the duration of study has affected the environmental awareness of the student. Besides, the mean score between races of the student in UMK Jeli shows that Chinese has higher environmental knowledge, attitude and practices than Malay, Indian and others. The statement that the factors of pollution are mostly because of human activities and the statement that urbanization cause too much

harmful towards the environment shows weak correlation while there are a strong correlation between the statement that the factors of pollution are mostly because of human activities and never done an open burning. The statement of urbanization cause too much harmful towards environment and never done an open burning also shows a strong correlation.

Besides, there is weak correlation between the knowledge of waste disposal and angry feeling towards people that littering waste and also the angry feeling towards people that littering waste with disposal of hazardous products at approved sites. Last but not least, the correlation between the knowledge of waste disposal and disposal of hazardous or chemicals at approved sites shows a medium correlation due to at the stage of proliferation awareness among the respondents. In conclusion, the objective to determine the environmental awareness among sustainable science student in UMK Jeli was achieved through this study.

5.2 Recommendation

The university should find ways to manage and enlighten the student about the importance of environmental knowledge, attitude and practices to raise the awareness. First, they have to make a campaign which involves all students. The students can be sensitized by celebrating special day like world environmental day, wildlife day, world water day, forest conservation day and others to help them practising sustainably in their daily life.

Then, the university should impose compound to student that dispose waste or cause an environmental pollution. The compound should be high so that the students will be more aware and cautious. The university must set rules for students to save

the electricity and water. For example, they have to turn off the lamp before 12.00 a.m. and switching on after 5.00 a.m. for weekdays. This rule can help reducing the consumption of electricity.

Next, Sustainable Science programme should be restructured in terms of theoretical and practical of the subject. The university should increase the field trips to engage the student with environment. The training of curriculum is essential to help orienting them towards handling the environmental issues. This will enhance consistency in the learning process among students. The lecturer should be trained to make sure that the knowledge will be efficiently delivered to the students.

In terms of further studies, the questionnaire should be improved by conducting more specific question and better illustration to attract students. The question must be clear and easy to understand to give accurate result. Graphic and design should be included in the questionnaire for more attractive look. Besides, further studies on how early education will affect environmental awareness should be done to investigate the findings from this study. This includes the examining of effectiveness of other existing environmental programs and how they can be enhanced and focused.

Lastly, further studies on the reason of lack awareness among the communities in Malaysia compared to developed country. The questionnaire should be distributed in larger population to represent full community with higher response. The demographic information of respondent should be added and classified more specifically.

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APPENDIX A- Set of Questionnaire Environmental Awareness

FACULTY OF EARTH SCIENCES

BACHELOR OF APPLIED SCIENCE

(SUSTAINABLE SCIENCE)

DISCLAIMER:

I am the student of University Malaysia Kelantan which is doing a survey of "Environmental Awareness among Sustainable Science student in UMK Jeli, Kelantan." I will anonymously your responses and never be used for other purposes except for this research. I will not use your name or any other information that keeps your personal be identified by others. I hope that this form will be kindly filled and be used to generate data from this study. I appreciate your precious time and your responses for these questions. If there any question regarding the questionnaire, please contact me at:

NAME: INTAN SHAFIINA BINTI SHAFII CONTACT NUMBER: 012-500426

SECTION 1 : DEMOGRAPHIC

Instruction: Please choose your demographic information by placing a tick (√) in the given space.

1.1 GENDER:

Male ☐

Female ☐

1.2 YEAR OF STUDY:

First-year ☐

Second-year ☐

Third-year ☐

1.3 RACE:

Malay ☐

Chinese ☐

Indian ☐

Others, please state _____

SECTION 2 : THE ENVIRONMENTAL AWARENESS OF SUSTAINABLE SCIENCE STUDENT

Instruction: For the following statement, please state the extent of your agreement or disagreement by placing a tick (√) in the appropriate box.

1= strongly disagree

2= disagree

3= neutral

4= agree

5= strongly agree

A) Environmental Knowledge

STATEMENTS	1	2	3	4	5
1) I know the definition of environment.					
2) I understand and know about the government rules and regulation of the environment.					
3) I agree that the factors of pollution are mostly because of human activities.					
4) I know about the current issues that related to the environment.					
5) I know the proper ways of waste disposal.					
6) I know about the remediation techniques to treat waste.					
7) I know to recycle and separate the products based on the materials.					
8) I know the differences between biotic and abiotic components.					
9) I understand the source and effect of greenhouse gases.					
10) Pollution can give adverse impacts towards human health.					

B) Environmental Attitude

STATEMENTS	1	2	3	4	5
1) I am very concerned about the issues that related to the environment.					
2) I encouraged people about the importance of protecting the environment.					
3) For me the urbanization cause too much harmful towards the environment.					
4) For me everyone is responsible to protect and preserve the environment.					
5) I am grateful that I get higher education about sustainability.					
6) I am determined to save the Earth.					
7) I am motivated to work in environmental sector.					
8) I am interested to organize sustainability programme.					
9) I feel angry towards people that littering waste.					
10) I believe that sustainability is rewarding.					

C) Environmental Practices

STATEMENTS	1	2	3	4	5
1) I often bring a bag when I shop.					
2) I often eat at the restaurant rather than takeout.					
3) I always throw the rubbish into recycle bin.					
4) I never use plastic straw when drinking.					
5) I never done an open burning.					
6) I use organic fertilizers when planting.					
7) I dispose hazardous products or chemicals at approved hazardous collection sites.					
8) I choose eco-friendly products than hazardous products.					
9) I always pick up the waste whenever I see it.					
10) I always save the electricity and water.					

THANK YOU FOR YOUR COOPERATION

APPENDIX B- Reliability Statistics

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.872	.883	30

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
I know the definition of environment	111.5000	160.056	.068	.	.874
I understand and know about the government rules and regulation of the environment	112.3000	163.567	-.130	.	.878
I agree that the factors of pollution are mostly because of human activities	111.2000	157.511	.386	.	.870
I know about the current issues that related to the environment	112.3000	161.789	-.033	.	.877

I know the proper ways of waste disposal	112.0000	150.222	.544	.	.865
I know about the remediation techniques to treat waste	112.1000	147.878	.534	.	.865
I know to recycle and separate the products based on the materials	111.5000	150.278	.634	.	.864
I know the differences between biotic and abiotic components	111.7000	155.122	.369	.	.869
I understand the source and effect of greenhouse gases	111.5000	151.167	.582	.	.865
Pollution can give adverse impacts towards human health	111.2000	158.844	.259	.	.871

I am very concerned about the isuues that related to the environment	112.0000	142.667	.809	.	.858
I encouraged people about the importance of protecting the environment	112.2000	147.289	.535	.	.864
For me the urbanization cause too much harmful towards the environment	112.0000	155.778	.262	.	.871
For me everyone is responsible to protect and preserve the environment	111.2000	151.511	.634	.	.865
I am grateful that I get higher education about sustainability	111.3000	148.678	.768	.	.862
I am determined to save the Earth	112.0000	147.333	.592	.	.863

I am motivated to work in environmental sector	112.1000	153.656	.339	.	.870
I am interested to organize sustainability programme	112.7000	163.567	-.117	.	.879
I feel angry towards people that littering waste	111.8000	156.178	.252	.	.871
I believe that sustainability is rewarding	111.3000	148.678	.768	.	.862
I often bring a bag when I shop	113.4000	147.600	.657	.	.862
I often eat at the restaurant rather than takeout	112.6000	140.711	.526	.	.865
I always throw the rubbish into recycle bin	111.9000	151.211	.282	.	.873

I never use plastic straw when drinking	113.6000	139.600	.828	.	.856
I never done an open burning	113.1000	140.767	.689	.	.859
I use organic fertilizers when planting	113.2000	152.844	.356	.	.869
I dispose hazardous products or chemicals at approved hazardous collection sites	113.0000	149.333	.440	.	.867
I choose eco-friendly products than hazardous products	112.3000	154.233	.173	.	.877
I always pick up the waste whenever I see it	112.3000	156.456	.137	.	.876
I always save the electricity and water	112.7000	150.678	.384	.	.869

APPENDIX C- Independent t-test of Knowledge, Attitudes and Practices

Group Statistics of Knowledge

	Gender	N	Mean	Std. Deviation	Std. Error Mean
I know the definition of environment	male	6	4.6667	.51640	.21082
	female	104	4.1731	.87514	.08581
I understand and know about the government rules and regulation of the environment	male	6	4.0000	.89443	.36515
	female	104	3.4904	.72400	.07099
I agree that the factors of	male	6	4.6667	.81650	.33333

pollution are mostly because of human activities	female	104	4.3750	.69934	.06858
I know about the current issues	male	6	4.1667	.98319	.40139
that related to the environment	female	104	3.7788	.72349	.07094
I know the proper ways of	male	6	3.6667	1.21106	.49441
waste disposal	female	104	3.7019	.78678	.07715
I know about the remediation	male	6	3.8333	1.16905	.47726
techniques to treat waste	female	104	3.5673	.82161	.08057
I know to recycle and separate	male	6	4.0000	1.09545	.44721
the products based on the materials	female	104	4.0385	.74941	.07349
I know the differences between	male	6	4.3333	.81650	.33333
biotic and abiotic components	female	104	4.2019	.76805	.07531

I understand the source and effect of greenhouse gases	male	6	4.1667	.75277	.30732
	female	104	4.1827	.77290	.07579
Pollution can give adverse impacts towards human health	male	6	4.5000	.54772	.22361
	female	104	4.5577	.60462	.05929

Group Statistics of Attitudes

	Gender	N	Mean	Std. Deviation	Std. Error Mean
I am very concerned about the issues that related to the environment	male	6	4.5000	.54772	.22361
	female	104	4.0385	.76225	.07475
I encouraged people about the importance of protecting the environment	male	6	4.5000	.54772	.22361
	female	104	3.9519	.85195	.08354

For me the urbanization cause too much harmful towards the environment	male	6	4.0000	.89443	.36515
	female	104	3.9519	.76805	.07531
For me everyone is responsible to protect and preserve the environment	male	6	4.6667	.51640	.21082
	female	104	4.5096	.68259	.06693
I am grateful that I get higher education about sustainability	male	6	4.5000	.54772	.22361
	female	104	4.3365	.74535	.07309
I am determined to save the Earth	male	6	4.5000	.83666	.34157
	female	104	4.2212	.83558	.08194
I am motivated to work in environmental sector	male	6	4.3333	.81650	.33333
	female	104	4.0769	.94193	.09236
I am interested to organize	male	6	4.6667	.51640	.21082

sustainability programme	female	104	3.9615	.90224	.08847
I feel angry towards people that	male	6	4.6667	.51640	.21082
littering waste	female	104	4.3462	.82166	.08057
I believe that sustainability is	male	6	4.5000	.54772	.22361
rewarding	female	104	4.4808	.63827	.06259

Group Statistics of Practices

	Gender	N	Mean	Std. Deviation	Std. Error Mean
I often bring a bag when I shop	male	6	3.5000	.83666	.34157
	female	104	3.0385	.93397	.09158
I often eat at the restaurant	male	6	4.1667	.98319	.40139
rather than takeout	female	104	3.4615	.86936	.08525

I always throw the rubbish into recycle bin	male	6	4.6667	.81650	.33333
	female	104	4.0962	.92976	.09117
I never use plastic straw when drinking	male	6	3.3333	.81650	.33333
	female	104	2.4615	1.04206	.10218
I never done an open burning	male	6	4.1667	.98319	.40139
	female	104	3.3846	1.18492	.11619
I use organic fertilizers when planting	male	6	4.0000	.89443	.36515
	female	104	3.3558	.95448	.09359
I dispose hazardous products or chemicals at approved hazardous collection sites	male	6	4.3333	.81650	.33333
	female	104	3.4615	.90224	.08847
I choose eco-friendly products than hazardous products	male	6	4.3333	.81650	.33333
	female	104	3.9038	.85354	.08370

I always pick up the waste	male	6	3.5000	.54772	.22361
whenever I see it	female	104	3.4615	.89142	.08741
I always save the electricity and	male	6	4.0000	1.09545	.44721
water	female	104	3.7692	.88384	.08667

APPENDIX D - One-way ANOVA

ANOVA test for Environmental Knowledge (Year of study)

		Sum of Squares	df	Mean Square	F	Sig.
I know the definition of environment	Between Groups	3.630	2	1.815	2.491	.088
	Within Groups	77.970	107	.729		
	Total	81.600	109			
I understand and know about the government rules and regulation of the environment	Between Groups	.095	2	.048	.086	.918
	Within Groups	59.368	107	.555		
	Total	59.464	109			
I agree that the factors of pollution are mostly because of human activities	Between Groups	1.880	2	.940	1.923	.151
	Within Groups	52.311	107	.489		
	Total	54.191	109			
I know about the current issues that related to the environment	Between Groups	.376	2	.188	.339	.713
	Within Groups	59.224	107	.553		
	Total	59.600	109			

I know the proper ways of waste disposal	Between Groups	3.906	2	1.953	3.110	.049
	Within Groups	67.194	107	.628		
	Total	71.100	109			
I know about the remediation techniques to treat waste	Between Groups	2.783	2	1.392	2.013	.139
	Within Groups	73.980	107	.691		
	Total	76.764	109			
I know to recycle and separate the products based on the materials	Between Groups	2.159	2	1.080	1.872	.159
	Within Groups	61.695	107	.577		
	Total	63.855	109			
I know the differences between biotic and abiotic components	Between Groups	5.103	2	2.552	4.620	.012
	Within Groups	59.088	107	.552		
	Total	64.191	109			
I understand the source and effect of greenhouse gases	Between Groups	.855	2	.427	.720	.489
	Within Groups	63.509	107	.594		
	Total	64.364	109			
Pollution can give adverse impacts towards human health	Between Groups	.512	2	.256	.708	.495
	Within Groups	38.661	107	.361		

	Total	39.173	109			

ANOVA test for Attitudes (Year of Study)

		Sum of Squares	df	Mean Square	F	Sig.
I am very concerned about the issues that related to the environment	Between Groups	1.101	2	.551	.959	.387
	Within Groups	61.453	107	.574		
	Total	62.555	109			
I encouraged people about the importance of protecting the environment	Between Groups	.304	2	.152	.210	.811
	Within Groups	77.659	107	.726		
	Total	77.964	109			
For me the urbanization cause too much harmful towards the environment	Between Groups	2.094	2	1.047	1.787	.172
	Within Groups	62.679	107	.586		
	Total	64.773	109			
For me everyone is responsible to protect and preserve the	Between Groups	1.935	2	.968	2.178	.118
	Within Groups	47.529	107	.444		

environment	Total	49.464	109			
I am grateful that I get higher education about sustainability	Between Groups	2.997	2	1.499	2.870	.061
	Within Groups	55.876	107	.522		
	Total	58.873	109			
I am determined to save the Earth	Between Groups	.209	2	.104	.148	.863
	Within Groups	75.646	107	.707		
	Total	75.855	109			
I am motivated to work in environmental sector	Between Groups	10.061	2	5.031	6.331	.003
	Within Groups	85.029	107	.795		
	Total	95.091	109			
I am interested to organize sustainability programme	Between Groups	5.763	2	2.882	3.749	.027
	Within Groups	82.237	107	.769		
	Total	88.000	109			
I feel angry towards people that littering waste	Between Groups	.603	2	.302	.456	.635
	Within Groups	70.851	107	.662		
	Total	71.455	109			
I believe that sustainability is	Between Groups	.764	2	.382	.958	.387

rewarding	Within Groups	42.699	107	.399		
	Total	43.464	109			

ANOVA test for Environmental Practices (Year of study)

		Sum of Squares	Df	Mean Square	F	Sig.
I often bring a bag when I shop	Between Groups	2.415	2	1.208	1.402	.250
	Within Groups	92.139	107	.861		
	Total	94.555	109			
I often eat at the restaurant rather than takeout	Between Groups	.086	2	.043	.054	.948
	Within Groups	85.414	107	.798		
	Total	85.500	109			
I always throw the rubbish into recycle bin	Between Groups	6.240	2	3.120	3.795	.026
	Within Groups	87.978	107	.822		
	Total	94.218	109			

I never use plastic straw when drinking	Between Groups	.937	2	.468	.423	.656
	Within Groups	118.554	107	1.108		
	Total	119.491	109			
I never done an open burning	Between Groups	7.448	2	3.724	2.739	.069
	Within Groups	145.470	107	1.360		
	Total	152.918	109			
I use organic fertilizers when planting	Between Groups	.130	2	.065	.069	.933
	Within Groups	100.061	107	.935		
	Total	100.191	109			
I dispose hazardous products or chemicals at approved hazardous collection sites	Between Groups	.005	2	.002	.003	.997
	Within Groups	91.486	107	.855		
	Total	91.491	109			
I choose eco-friendly products than hazardous products	Between Groups	.058	2	.029	.039	.962
	Within Groups	79.360	107	.742		
	Total	79.418	109			
I always pick up the waste whenever I see it	Between Groups	.118	2	.059	.076	.927
	Within Groups	83.237	107	.778		

	Total	83.355	109			
I always save the electricity and water	Between Groups	2.183	2	1.092	1.381	.256
	Within Groups	84.580	107	.790		
	Total	86.764	109			

ANOVA test for Environmental Knowledge (Races)

		Sum of Squares	Df	Mean Square	F	Sig.
I know the definition of environment	Between Groups	2.700	3	.900	1.209	.310
	Within Groups	78.900	106	.744		
	Total	81.600	109			
I understand and know about the government rules and regulation of the environment	Between Groups	2.564	3	.855	1.592	.196
	Within Groups	56.900	106	.537		
	Total	59.464	109			
I agree that the factors of pollution are mostly	Between Groups	6.302	3	2.101	4.650	.004

because of human activities	Within Groups	47.889	106	.452		
	Total	54.191	109			
I know about the current issues that related to the environment	Between Groups	4.033	3	1.344	2.565	.059
	Within Groups	55.567	106	.524		
	Total	59.600	109			
I know the proper ways of waste disposal	Between Groups	1.000	3	.333	.504	.680
	Within Groups	70.100	106	.661		
	Total	71.100	109			
I know about the remediation techniques to treat waste	Between Groups	3.197	3	1.066	1.535	.210
	Within Groups	73.567	106	.694		
	Total	76.764	109			
I know to recycle and separate the products based on the materials	Between Groups	3.255	3	1.085	1.898	.134
	Within Groups	60.600	106	.572		
	Total	63.855	109			
I know the differences between biotic and abiotic components	Between Groups	2.591	3	.864	1.486	.223
	Within Groups	61.600	106	.581		
	Total	64.191	109			

I understand the source and effect of greenhouse gases	Between Groups	3.464	3	1.155	2.010	.117
	Within Groups	60.900	106	.575		
	Total	64.364	109			
Pollution can give adverse impacts towards human health	Between Groups	2.951	3	.984	2.878	.039
	Within Groups	36.222	106	.342		
	Total	39.173	109			

ANOVA test for Attitudes (Races)

		Sum of Squares	Df	Mean Square	F	Sig.
I am very concerned about the issues that related to the environment	Between Groups	1.177	3	.392	.677	.568
	Within Groups	61.378	106	.579		
	Total	62.555	109			
I encouraged people about the importance of	Between Groups	5.419	3	1.806	2.639	.053

protecting the environment	Within Groups	72.544	106	.684		
	Total	77.964	109			
For me the urbanization cause too much harmful towards the environment	Between Groups	2.539	3	.846	1.442	.235
	Within Groups	62.233	106	.587		
	Total	64.773	109			
For me everyone is responsible to protect and preserve the environment	Between Groups	.964	3	.321	.702	.553
	Within Groups	48.500	106	.458		
	Total	49.464	109			
I am grateful that I get higher education about sustainability	Between Groups	1.139	3	.380	.697	.556
	Within Groups	57.733	106	.545		
	Total	58.873	109			
I am determined to save the Earth	Between Groups	3.299	3	1.100	1.607	.192
	Within Groups	72.556	106	.684		
	Total	75.855	109			
I am motivated to work in environmental sector	Between Groups	.758	3	.253	.284	.837
	Within Groups	94.333	106	.890		
	Total	95.091	109			

I am interested to organize sustainability programme	Between Groups	.600	3	.200	.243	.866
	Within Groups	87.400	106	.825		
	Total	88.000	109			
I feel angry towards people that littering waste	Between Groups	.455	3	.152	.226	.878
	Within Groups	71.000	106	.670		
	Total	71.455	109			
I believe that sustainability is rewarding	Between Groups	.530	3	.177	.436	.727
	Within Groups	42.933	106	.405		
	Total	43.464	109			

APPENDIX E-Pearson Correlation Coefficient

Descriptive Statistics

	Mean	Std. Deviation	N
I agree that the factors of pollution are mostly because of human activities	4.3909	.70510	110
For me the urbanization cause too much harmful towards the environment	3.9545	.77087	110
I never done an open burning	3.4273	1.18445	110

Correlations

		I agree that the factors of pollution are mostly because of human activities	For me the urbanization cause too much harmful towards the environment	I never done an open burning
I agree that the factors of pollution are mostly because of human activities	Pearson Correlation	1	.286**	.084
	Sig. (2-tailed)		.002	.384
	N	110	110	110
For me the urbanization cause too much harmful towards the environment	Pearson Correlation	.286**	1	-.059
	Sig. (2-tailed)	.002		.541
	N	110	110	110
I never done an open burning	Pearson Correlation	.084	-.059	1
	Sig. (2-tailed)	.384	.541	
	N	110	110	110

**. Correlation is significant at the 0.01 level (2-tailed).

Descriptive Statistics

	Mean	Std. Deviation	N
I know the proper ways of waste disposal	3.7000	.80765	110
I feel angry towards people that littering waste	4.3636	.80966	110
I dispose hazardous products or chemicals at approved hazardous collection sites	3.5091	.91617	110

		I know the proper ways of waste disposal	I feel angry towards people that littering waste	I dispose hazardous products or chemicals at approved hazardous collection sites
I know the proper ways of waste disposal	Pearson Correlation	1	.210*	.345**
	Sig. (2-tailed)		.027	.000
	N	110	110	110
I feel angry towards people that littering waste	Pearson Correlation	.210*	1	.193*
	Sig. (2-tailed)	.027		.043
	N	110	110	110
I dispose hazardous products or chemicals at approved hazardous collection sites	Pearson Correlation	.345**	.193*	1
	Sig. (2-tailed)	.000	.043	
	N	110	110	110