Education for Sustainable Development in Pakistan: Knowledge, Attitudes and Practices

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PIDE2016FMPHILPP07

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2020

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CERTIFICATE

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DEDICATED TO

I dedicated my thesis to my parents, brother and mentors. I am nothing without my Parents who give support at every stage of my life. They guide me and I found a way to move forward. I am also nothing without the support of my Brother who supports me during my whole education. The parents make the Child, but few are those who are helpful to polish abilities and skills, and those are my mentors, without them maybe I am not here.

Acknowledgement

All admirations for Almighty Allah, who enables us to know about certain unknown things in the universe and helps us to overcome a lot of difficulties. All the respect for Holy Prophet Muhammad (PBUH) who clearly mentioned the difference of right and wrong path, to ensure the success in our lives.

I am deeply grateful and wish my utmost appreciation and gratitude to my research supervisor Dr. Junaid Alam Memon for his encouragement, technical discussion, inspiring guidance, remarkable suggestions, keen interest, constructive criticism and financial support which enabled me to complete this research study. His guidance helped me in all the time of research and writing of this thesis. I could not have imagined having a better advisor and mentor for my MPhil study. I would like to thank Dr. Usman Ahmad and Dr. Shujaat Farooq for their insightful comments and encouragement.

I am thankful to my Uncle Dr Arshad Mahmood Uppal and Mr. Hilal Ahmad, and my cousins Shazia Azmat, Saida Matloob, Faisal Sadiq, Saud Ahmed, Talha Hameed, Humza Aziz and Muhammad Ismail and fellows Sadia Cheema, Muhammad Ahmad Yar Khan and Mehran Latif, who help me in the process of data collection.

I cannot find proper words to express my heartiest gratitude to my mother, my father, my brother and my respected teachers, whose cooperation have created incredible impression in my thesis and in my life in general.

Hina Kanwal

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List of Acronym

A-Level	Advanced Level
BC	British Council
BISE	Board of intermediate and secondary education
CNG	Compressed Natural Gas
CS	Cambridge System
Com. Studies	Computer Studies
EA	Environmental Attitude
EK	Environmental Knowledge
EP	Environmental Practices
ES	Environmental Sustainability
ESD	Education for Environmental Sustainability
FB	Federal board
FS	Federal System
GHG	Greenhouse Gases
GK	General Knowledge
GS	General Science
HSSC	Higher Secondary School Certificate
ICS	Intermediate of Computer Studies
ICom	Intermediate of commerce
IEA	International Energy Agency
KAP	Knowledge, Attitude and Practices
No.	Number

O-level	Ordinary Level
Pak-study	Pakistan Studies
Pre-Eng.	Pre-engineering
Pre-med	Pre-medical
SD	Sustainable Development
SS	Social Studies
TOC	Table of Content
TV	Television
UK	United Kingdom
UNEP	United Nation Environmental Program
UNDESA	United Nation Department of Economics and Social Affairs
WHO	World Health Organization

Abstract

UN decade 'Education for Sustainable Development' brought optimism that through education human behaviors can be changed to cope with issues of global concerns such as climate change. Although this optimism is plausible, the question is, Is the incorporation of aspects related to sustainable development in curriculum brings desired changes in their attitude and practices and results in sustainable lifestyle? To investigate this, we assumed that, a formally educated individual already has at least some knowledge of sustainable development concept because in their curriculum imbeds these concepts directly or indirectly. So, we analyzed the curriculum content of primary, secondary, and higher secondary education systems to find those concepts and develop 'an ideal type' of environmental knowledge, Attitude and Practices that people should ideally have. In additionally, conducted a KAP survey from 1109 respondents of Cambridge and federal system collages of Islamabad to investigate their actual environmental behavior. This study also investigates the impact of self-declared interest on environmental sustainability on environmental attitude and practices, and to investigate difference in the environmental attitude and practices of male and female, public and private students, Cambridge and federal students, and academic disciplines of pre-medical, pre-Eng., Business Studies and Computer Studies. The result of Study shows due to increase in environmental knowledge, environmental attitude increases, but there is no statistically significant relationship between the environmental knowledge and practices. The result of the study also shows the students whose self-declared interests on environmental sustainability are high their environmental attitude and Practices both are high. This study contributes to find out the factors which help to develop interest in individual on environmental sustainability. The study shows the there is no difference in the environmental attitude of male and female, but the environment practices of male are better than the female. There is statistically no difference in the environmental attitude of public and private students, and federal and Cambridge student but the environmental practices of students of public system are better than private system, and environmental practices federal system students are better than the Cambridge system students, and the students who belongs to pre-medical group their environmental attitude and practices are better than students of Business Studies. The students of Pre-Engineering's environmental attitude are better than the students of Business Studies, but the environmental practices of both groups are not statistically different. The environmental attitude and practices of Students of Business Studies and Computer Studies *are not sadistically different. The environmental attitude and practices of students of Computer Studies and Pre-medical do not have difference similarly the environmental attitude and practices of students of* Computer Studies and Pre-Engineering do not have

difference. Environmental attitude and practices of Pre- Engineering and Pre-medical groups students are also have not statistically difference.

Keyword: *Environmental Education, Environment Knowledge, Environmental attitude, Environmental Practices, Self-declared interest on Environment, Cambridge System, Federal System, Gender, Public System and Private System, Academic Disciplines.*

Chapter 1

Introduction

Education helps to change the attitude, skills, values, beliefs, and behavior. The education for sustainable development is means to change the people attitude, behavior, and values in such a way that the people try to secure their need without compromising on the need of future generation. Sustainable development comprises three main pillars, one is economic development, second is social equity and third one is environmental protection (Drexhage & Murphy, 2010). The focus of this piece of research is on education for environmental sustainability.

1.1. Background of Study

Human growth and expanded economic activity over the last century have resulted in global warming, ozone layer depletion, pollution, diseases, famine, and resource depletion which effect on the current and future generation. It is expected that by 2040, the climate change induced the sea level will rise by 1. 7 ft (0.5 m), global temperature will increase by 2.6 °C compared to the level of 1996 and the availability of water will decrease wellbeing of 2 billion people (Lafferty & Eckerberg, 2013; Pink, 2018). Only 2.4 percent fresh water of total world water and only 0.009 percent surface water is available till 2050. People are at high risk, when they face the problem of water scarcity because they are forced to drink contaminated water which are the major cause of diseases and leads to poor health and bad life (Connor, 2015; UNDESA & UNECLAC, 2015). Globally, 2 billion people use contaminated drinking water which results into 4, 85,000 diarrhoeal deaths yearly (WHO and UNICEF 2017). Worldwide the unsafe sanitation, drinking water, and lack of hygiene causes 11. 7 per, 0.1 million population deaths annually (UNEP, 2018). It

is estimated that, half of the population will be living in the water stressed areas by 2025 (WHO & UNICEF, 2017)

Over 80% population exposed to air pollution which exceeds the WHO (world health organization) air quality limit[1]. In 2016, 4.2 million people died due to ambient pollution and 3.8 million people died due to indoor pollution (WHO, 2017). The main cause of indoor air pollution is the use of unclean stove for cooking. Biomass fuel combustion effects the respiratory health and cause of lungs cancer (Sood et al., 2018; WHO, 2017). 50 percent people of developing countries lives without the access of clean cooking fuels (IEA, 2017)

Transports, industry, energy, municipal, and agriculture waste are the main source of ambient (outdoor) air pollution. Over the past 25 years ambient air pollution contributed to the universal burden of diseases (Cohen et al., 2017) as well as responsible for the climate change (De Sario, Katsouyanni, & Michelozzi, 2013). It is necessary to reduce the car dependency by more relying on walking, cycling and public transport (Buehler, Pucher, Gerike, & Götschi, 2017). Every year transport emission is responsible for 1 trillion US $ health damage and 400,000 deaths (UNEP, 2018). If the emission of Carbon dioxide from transport continued on the same path, then it became doubled by 2050.

Worldwide the demand for energy will be increased more than double by 2030 (IEA, 2017). Most of the countries rely on conventional energy sources such as coal, gas and petroleum which are the non-renewable energy sources that are responsible for GHG emission (Shafiei & Salim, 2014). Energy related emission of Carbon dioxide in 2017 increased by 1.6% from last three years which is the cause of global warming and millions

[1] https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health

of premature deaths (IEA, 2018). Population within the 5 KM radius of industries are more exposed to respiratory and lungs problems (Fernández-Navarro, García-Pérez, Ramis, Boldo, & López-Abente, 2017).

If we are trying to reduce the pollutants like carbon dioxide, methane, lead, nitrogen and sulphur dioxide from the air by controlling on our daily activities then it is possible to reduce 0.5 °C temperature, prevents 2.4 billion premature deaths and 1.3 billion eatable food lost (UNEP, 2018). Instead of number of consequences human activities are still the same because they are just trying to escape from abject poverty and want to enjoy decent and secure lifestyles. The greatest sustainability challenge of the century is to meet these aspirations without any further harm to the earth's primary production systems and compromise over the intergenerational welfare of humanity (Gough, 2017). This implies implanting a new value system to bring desired behavioral changes at various levels of social organization and a mechanism of intergenerational transfer of sustainability values.

In the 1992 UN conference held in Rio de Janeiro on "Environment and development" and subsequent developments in Rio+5 in 1997 Rio+10 in 2002 and Rio+20 in 2012 consistently emphasize the importance of education in bringing the desired social and behavioral change for sustainable development (Lafferty & Eckerberg, 2013; UNESCO-UNEP, 1994). The UN 2005 to 2014 decade for promoting "Education for sustainable development (ESD)" UNESCO (2005) stressed on the importance of formal and non-formal educational settings for training and raising public awareness for sustainable development (UNESCO, 2014).

Education has a critical role in shaping humans into environmentally responsible citizens (Bansal, 2017) It could be possible through capacity building workshops, motivational activities, awareness or incorporation of aspects related to sustainable

development in the curriculum (Cebrián, 2017). The study conducted by Arcury (1990) founded as the environmental knowledge increases it would increases the and environmental attitude. Another studies conducted by (Liu, Hsueh, & Chen, 2018) found a positive relationship between environmental knowledge and environmental attitude and practices. But a study conducted by (Paulos, 2017) found a positive relationship between environment knowledge and environmental attitude but do not found a positive relationship between environmental knowledge and practices. Environmental knowledge, environmental attitude and environmental responsible behavior was studied in the Dutch National Assessment Program founded a week relationship between environmental knowledge, environmental attitude and environmentally responsible behavior (Kuhlemeier, Van Den Bergh, & Lagerweij, 1999).

Many determinants such as personality traits, place attachment, *culture, economic orientation, age, gender, knowledge, and education* level and educational discipline may lead to responsible for environmental attitude and behavior among citizens (Ernst, Blood, & Beery, 2017; Hines, Hungerford, & Tomera, 1987; Vaske & Kobrin, 2001). Interest on the environment aspects also leads to the environmental attitude (Le Hebel, Montpied, & Fontanieu, 2014). Gender play potential role, according to the (Tikka, Kuitunen, & Tynys, 2000) female is more concern about the environment. Another study shows female behavior and attitude are more environmentally friendly then male (Félonneau & Becker, 2008). While other studies founded male are more concern about environment (MacDonald & Hara, 1994) and their behavior are better than female (Patel, Modi, & Paul, 2017). Another study does not found a significant difference between the environmental attitude of male and female (Chen & Chai, 2010).

1.2. Problem Statement

Misuse and overuse of resources will affect welfare of society. To enjoy the life and escape from abject poverty human use resources, and pollute the planet in such a way, it will affect the intergenerational use of "Resources and Environment". This kind of behavior will change by supplying knowledge in such a way, it will reflect in their attitudes and practices. Significant researches have been conducted in various dimensions of educational for sustainable development and tried to find out the relationship between environmental knowledge, environmental attitude and practices but unable to find out the clear-cut. According to few researches the attitude and behavior towards environment become positive when the knowledge on environment increases. And other researchers found environment knowledge helps to increase the environmental attitude but do not change the behavior towards environment. And none of these studies access the impact of the student knowledge what they already learnt in their earlier class's curriculum in their attitude and practices. In this backdrop, the study attempted to answer research question: what is the impact of student's knowledge, what they already had learnt in their previous classes curriculum in their attitude and practices through the case study of Islamabad, Pakistan. Moreover, the study is also attempted to find out other background factors such as difference in environmental attitude and practices of Cambridge system and federal system, public and private system, gender, academic disciplines. Difference between the attitude and practices of students of Cambridge and federal system, and public and private towards environment were tried to find out because of presence of multiple education systems in Pakistan and the present literature is not contributed knowledge towards these aspects. The study also contributed in literature two find out the environmental attitude and environmental practices of students of four different academic disciplines (pre-medical, pre-engineering, computer studies and business studies) from which the students

of both system FS system and CS belongs. The literature also shows a gap to clearly find out, who have more environmental attitude and practices from male and female, in this scenario this study tried to find out who have more attitude and behavior towards environment. Like the other background factor, self-declared interest on environmental sustainability, affecting on the environmental attitude and practices but according to my knowledge the there is no study founded who helps to find out the both relationship i.e impact self-declared interest on ES on environmental attitude, and impact of self-declared interest on ES on environmental practices. In addition, this study also finds out the factors which are responsible for generating interests on environment of FS and CS students

1.3. Research Objectives

A broader research objective is to analyze the impact of students' knowledge on their sustainability attitudes and practices.

1.3.1. Research Hypothesis

To access the impact of students' Environmental knowledge (EK) on Environmental attitude (EA) and Environmental practices (EP). I develop two models. One for addressing the impact of student EK on students' EA and other for addressing the impact of EK on students EK on environmental practices (EP) with the introduction of other Independent variable such as Gender, Education system either Federal system or Cambridge system, either public or private, either pre-medical, pre-engineering, Business Studies, Computer Studies and self-declared interest on ES. These background factors help to find out the other objectives of the study. Research hypothesis of study are:

H_1: Students with better environmental knowledge exhibit more environment-friendly attitude

H_2: Students with higher levels of self-declared interest in environmental sustainability exhibit more environment-friendly attitude

H_3: There is no gender-based differences in environmental attitudes of students

H_4: The environmental attitude federal- and Cambridge- System students do not differ.

H_5: Environmental attitude of students in public and private schools do not vary.

H_6: There are no differences in the EA because of student's differences in major streams (i.e. Pre-medical, Pre-Engineering, Computer Studies, and Business Studies).

H_7: Students with better environmental knowledge exhibit more environment-friendly practices

H_8: Students with higher levels of self-declared interest in environmental sustainability exhibit more environment-friendly practices

H_9: There is no gender-based differences in environmental Practices of students

H_{10}: The environmental Practices federal- and Cambridge- System students do not differ.

H_{11}: Environmental practices of students in public and private schools do not vary.

H_{12}: There are no differences in the EP because of student's differences in major streams (i.e. Pre-medical, Pre-Engineering, Computer Studies, and Business Studies).

1.4. Significance and Scope of Study

Education for sustainable development is needed for enhancing the attitude, skills, values, and behavior of the people. With reference to ESD, this is a grey area as none of the studies is defined the clear-cut relationship of knowledge, attitude and practices of students in our knowledge. This study also contributed in literature by providing them whose environmental attitude and environmental practices are more environmentally friendly from male and female because previous studies do not display the same picture. This study also contributes to find out pro-environmental subjects and academic disciplines which helps to change the attitude. Thus, the findings of the research will help curriculum designers in incorporating sustainability concepts in the academic disciplines which are not pro-environmental and do not contributed to change the attitude and practices towards environmentally friendly.

This study also contributed by another factor "Self-declared-interest on environmental sustainability" which is also a helpful factor to change attitude, and behavior. In additionally, this piece of research also the find out factors such as media, knowledge authorities such as parents, teachers, and self-study through other material other than curriculum, which are responsible for generating interests on ES in the federal and Cambridge students. In the context of Pakistan, this study will be helpful to find out from multiple prevailing education systems (federal system and Cambridge system) in Pakistan,

the pro-environmental education system and it will be helpful for curriculum designer to use the pro-environmental contexts of curriculum which is better.

Moreover, this study will help policy maker to design more environmentally friendly education policy as well as give future direction for research.

1.5. Conceptual Framework

Towards achieving the study objective, we assumed that students may have formally learnt and internalized different sustainability and related concepts throughout their educational journey. Therefore, we reviewed curriculum to identify SD concepts already available in the curriculum from class one to class 2nd year of FS and class one to A-Level of CS. This information used to develop '*an ideal type'* - a stock of sustainable development knowledge that ideally a person should show through their behavior (Neuman, 2014).

I conducted KAP survey to access the effect of environmental knowledge on environmental attitude and practices with the other background factors such as Gender, Education system either Federal or Cambridge, private or public, and academic disciplines either pre-engineer, pre-medical, computer studies or business studies student and self-declared interest on ES. Data was collected from students of both FS and CS collages, whose year of schooling is same and almost the age group is same. KAP survey is also used to compare the ideal type and actual environmental behavior at present. The below figure depicts overall conceptual framework of the study:

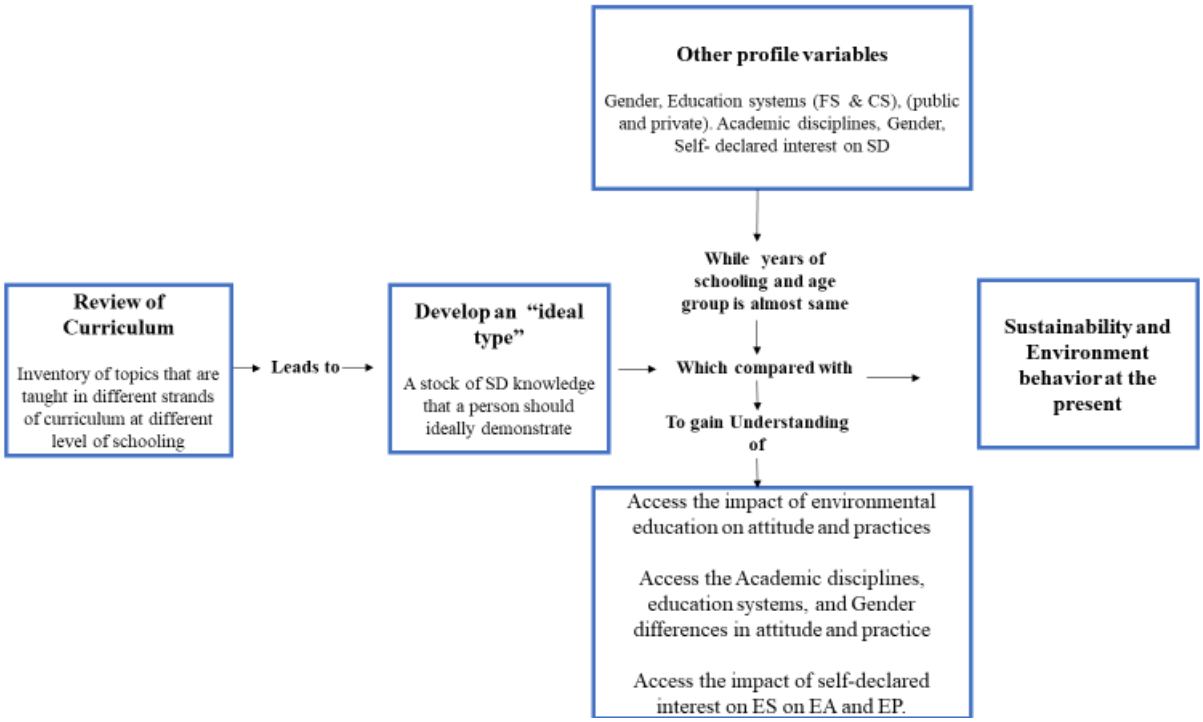

Figure 1.1: Conceptual Framework

This conceptual framework is not based on any theory. Basically, the purpose of this framework is to show the basic connections between the Concepts and setps involved in the research. For this, I did not rely on the any theory. I develop conceptual framework myself just to elaborate basic concept of research.

1.6. Organization of Study

This specific piece of work divided into six chapters. Chapter 1 is an introductory chapter. This chapter describes research is about what. Why this research conducted, what are the main objectives of this research what is the research gap and what the significance is. chapter 2 is about the review of the already published literature. Review of literature includes the detail about the unsustainable lifestyle of human, which type of interventions required to change this type of behavior and how formal and non-formal education change Attitudes and behavior. How environmental knowledge effect on environmental attitude

and practices. From male and female who have more environmental attitude and practices. Which academic disciplines are pro-environmental? With the help of this detailed literature review, research gap found. Chapter 3 related to methodology 1) for the review of curriculum, 2) for the construction of ideal type of knowledge, Attitude and Practices, 3) and for accessing the student's knowledge, attitude and practices. Chapter 4 is about the curriculum analysis which helps to find out to concepts which are the part of curriculum and the difference between the curriculum of FS and CS with respect to environmental sustainability. Chapter 6 is about the result and discussions of environmental knowledge attitude, and practices (KAP) survey. And Chapter 6 is about the conclusion, recommendations, and the limitations of research.

Chapter 2

Literature Review

Literature reviewed in this is session is about the behavior of human. How they use resources for satisfying their own needs and pollute the planet, but they are not focusing on their health effected by their activities and needs of future generation. Even they do not consider "resources and Environment" as an issue. Therefore, to save planet it is necessary to intervene through policies, strategies, awareness, and education. for realizing them, it is necessary to intervene through by providing them awareness. The focus of literature is on interventions through formal and non-formal settings of education. In non-formal settings, it is not possible that the maximum people get benefit. To cover maximum people, it is necessary to incorporate aspects in formal educational settings. Therefore, the numbers of studies were conducted at this and suggest the number of ways. And these formal settings are caused to change Attitude and behavior of individuals.

2.1. Unsustainable Lifestyle of Human:

Sustainable development advocates satisfying current human needs without compromising over earth's capacity to perform its primary production functions for future generations. The nineteenth and twentieth century's growth trends, however, suggest that humans have overused resource and polluted earth unprecedentedly. They have indulged in overconsumption and lavish life style (Oskamp, 2000). They are continuously making choices, even the people of the developed countries are trying to make choices (Thøgersen, 2014). Mahatma Ghandi once said, *"Earth provides enough for every man's need, but not enough for every man's greed."*

Overconsumption compromises the needs of future generation but few human activities such as due to deforestation, industries, private cars, burning of solid waste, production of inorganic food effects on the climate change and health of human beings as well as other living organisms (Berry & Rondinelli, 1998; Lambooy, 2011; Matsumoto, King, & Mori, 2007; Pittock, 2011; Sakai et al., 2011) .

2.2. Interventions Required to Change Behaviour

Government required policies and strategies to deal with problem of climate change and to mitigate the impact of environment on health. For this purpose, multiple policies and strategies for multilevel departments are required such as Climate change policy, Water policy, Energy policy, Transportation policy, Waste management and recycling policy, Industrial policy, Agriculture policy and forest policy are required to minimize the climate change by the reduction GHG from air (Berry & Rondinelli, 1998; Lambooy, 2011; Matsumoto, King, & Mori, 2007; Pittock, 2011; Sakai et al., 2011) Mont, Neuvonen, and Lähteenoja (2014) stated that government also required to make policy for environmental friendly business to promote environmentally friendly technologies, it helps to reduce environmental degradation (Mont et al., 2014). other than these policies few governmental strategies are required to save the environment such as efficient utilization of energy resources, green production strategy, sustainable rural development programs, waste minimization and recycling funds, and environment active funds (Lucas, Brooks, Darnton, & Jones, 2008). A Malaysian study found that even those for whom 'sustainable development' is an alien concept, are recycling and using green technologies (Sharipah Norbaini Syed Sheikha, 2012).

Government policies and strategies help to change the individual's behavior. A research conducted in Netherland by Steg and Vlek (2009) found two strategies to change

the individual behavior to pro-environmental behavior, one is structural strategy and other is informational strategy, according to them for some cases, structural strategy may work for short term to change human behavior such as when the government decrease the prices of organic food as compared to normal food then public automatically switch towards organic foods but it is not possible for the government to bear the cost of organic food through subsidy for long term it is required to change the mind set of public through information strategy which may give long lasting result.

2.3. Interventions to Change Behaviour Through Information Strategy:

Research on human behavior suggests a possible way to change individual and social behavior to pro-environmental behaviors through an intervention such as awareness raising, capacity building and exposure to best practices (Robert, Yuko, Rosalyn, & Charles, 2016; Weber, 2010). The irony of the issue is, a common person is not much concerned about environmental problems such as climate change because they cannot feel these changes promptly (Weber, 2010). They even do not know exactly about the climate change and global warming (Whitmarsh, 2009). Currently, only those people consider Environment under threat, who are a victim of extreme environmental events (Whitmarsh, 2008) and are often those living on the margins of society and are not directly responsible for human-induced climate change. So, the low level of understanding about the such issues shows that the common man required effective communication and information about the issue (Whitmarsh, 2009). Awareness about the climate change, local dimensions of climate and which type of actions helps to control climate change with the basic education are highly required (Lee, Markowitz, Howe, Ko, & Leiserowitz, 2015). According to the Sadik and Sadik (2014) the television and internet are more effective in the provision of environmental awareness. Nevertheless, education may accelerate the change in public feelings towards sustainable development.

2.4. Intervention to Change Behaviour Through Formal Education:

The question is how many people could be covered through these kinds of episodic treatments such as training and workshop, how long that impact will last and is there any alternate way to manage this. Perhaps, it is possible to incorporate the aspects of SD in the formal education. In fact contemporary research stress introduction of sustainability concepts at various rungs of the educational ladder (UNESCO, 2010; Watson, 2017). Schools, colleges, and universities can re-orient their curriculums such that it presents the concept of "sustainable development" (Nolet, 2009).

Church and Skelton (2010) even goes farther to suggest four possibilities to achieve ESD objective: (1) by introducing a separate subject; (2) by integrating SD ideas in core subjects; (3) through class projects related to sustainability; and, (4) though specialized schools for "sustainable development."

2.5. Intervention to Change Behaviour Through Informal Education in Formal Settings

The educational environment may also have positive externality for ESD agenda. For example 1) the Encounter of students with the nature through school, college and universities field trip helps to increase the knowledge of students and their attitude towards environment (Ballantyne & Packer, 2005) 2) the international conferences and national conferences at higher education institute may promote "sustainable development" thinking by sensitizing future leaders to global sustainability challenges (Berchin et al., 2018) and the aim of higher education, in general, is to develop a leadership cadre that can cope with challenges related to "sustainable development" (Church & Skelton, 2010).

Thus, it should be possible to cultivate attitudes and behaviors, which are kind and *environmentally responsible* though knowledge. This may trigger use of fuel efficient cars, recycled products, mass transportation and home insulations (Oskamp, 2000).

2.6. Difference in Environmental Attitude and Practices

Literature shows that knowledge or information on the issue like climate change is required to educate the people. But new question is debatable? If a common man has knowledge about the issue on climate change and global warming, they will actually change their attitude and practices for sustainable environment.

Attitude and Practices are two different term. In everyday English, Attitude is actually what a people feel about an object, issue or person (Petty & Cacioppo, 1981) while a Practices are, what actually a people practice in their life. Dunlap and Jones (2002) refers environmental attitude as environmental concern. Other researchers define "environmental attitude as a psychological tendency expressed by estimating the natural environment with some degree of favour or disfavour" (Milfont & Duckitt, 2010). As there is the difference between both the term, so, there is the possibility that the intervention of environmental knowledge impact on environmental Attitude and Environmental Practices in the different way. To evaluate the environmental knowledge, Attitude and Practices, the technique of KAP survey have been widely used by different researchers of environmental educations (Salas-Zapata, Ríos-Osorio, & Cardona-Arias, 2018). According to the Arnold, Cohen, and Warner (2009) Knowledge, Attitude and practices of any society are basic component towards sustainable environment.

2.7. Relationship Between Environmental Knowledge, Attitude and Practices

Arcury (1990) founded positive relationship between environmental knowledge and environmental attitude, more we have environmental knowledge, then more we are encouraged towards the environmental attitude. A 10-days Experimental study in Texas also found as the environmental Knowledge increases, environmental attitude also increases (Bradley, Waliczek, & Zajicek, 1999)

The Arnold et al. (2009) and studies on the Island of Mexico (Tran, 2006) and USA (Ian Oakley, 2008; Wynveen, 2017) found positive change in *environmental behaviors* through environmental education from formal and informal sources. educational intervention are successful to change individual behavior, when it more focused on local conditions, tangible and practically applicable dimensions on SD (Anderson, 2012). The study conducted to find out the relationship between environmental knowledge, attitude and practices by Bradley et al. (1999) by collecting data from the high school students found a positive relationship between relationship between environmental knowledge and environmental attitude, and environmental knowledge and environmental practices. Janmaimool and Khajohnmanee (2019) concluded, through the environmental knowledge from the formal education in higher education institutions, it is possible to change the environmental attitude of students but maybe it is not possible to directly change environmental practices. The relationship between environmental knowledge, attitude and practices is not clear till yet. Study bySadik and Sadik (2014) and Paulos (2017) found positive relationship between environmental knowledge and environmental attitude but do not found a significant relationship between environmental knowledge and environmental practices. A study conducting in France shows, other than knowledge, those who have high

interest on the environmental issue the have high corn for environment (Le Hebel et al., 2014).

2.8. Gender Affecting on Environmental Knowledge, Attitude and Practices

Gender is potentially affecting on the environmental knowledge, attitude and environmental practices. According to Scott and Willits (1994) and Vicente-Molina, Fernández-Sainz, and Izagirre-Olaizola (2018) environmental attitude of women are pro-environmental and according to Davidson and Freudenburg (1996) their environmental practices are also pro-environment. A study conducted in China found women practices are more pro-environmental then man inside the home while outside the home, in practices there is no gender difference exhibit, however the women have low level of environmental attitude then men (Xiao & Hong, 2010). The men have more environmental knowledge then women (Diamantopoulos, Schlegelmilch, Sinkovics, & Bohlen, 2003). A study conducted in India that the men behaviour are more pro-environmental then women (Patel, Modi, & Paul, 2017). Like the relationship of environmental knowledge, attitude and practices the effect of gender on environmental practices and environmental attitude is also not clear till yet.

2.9. Academic Discipline Affecting on Environmental Knowledge, Attitude and Practices

The Academic Subjects effects on the environmental knowledge. the students who studied subjects related to environment, they have more environmental knowledge (Guagnano, Stern, & Dietz, 1995). The science and engineering student's behaviour are more pro-environmental then social science student's behaviour. Another study shows the attitude of biology students are more environmental (Tikka et al., 2000)

The students from business group of studies are less concerned about environment then the students from non-business group of studies and their practices are also worst then then students of non-business group of studies The students who studied the subjects which have more environmental concepts, their EA and EP are high then the students who studied those subjects which have no or minimum environmental concepts. The students who studied Pre-medical their environmental Attitude and Practices are better than the students who studied the subjects related to business. It is seen during the books review the students who belongs to business did not get concrete knowledge from their curriculum. The result of my study shows the curriculum helps to change the attitude but not necessarily the practices and the students of Business groups attitude and practices both are not environmentally friendly The students who studied the subjects which have more environmental concepts, their EA and EP are high then the students who studied those subjects which have no or minimum environmental concepts. The students who studied Pre-medical their environmental Attitude and Practices are better than the students who studied the subjects related to business. It is seen during the books review the students who belongs to business did not get concrete knowledge from their curriculum. The result of my study shows the curriculum helps to change the attitude but not necessarily the practices and the students of Business groups attitude and practices both are not environmentally friendly (Benton Jr, 1994).

As the literature does not truly depicts the relationship between environmental knowledge, attitude and practices, and gender, environmental attitude and practices so there is the need to find out the relationship of environmental knowledge, attitude, and practices and need to find out the difference in the environmental attitude and practices of gender. The literature shows the role of both formal and informal modes of environmental education, according to my knowledge there is no study which access the relationship

between environmental knowledge, attitude and practices on the basis on what they studied on ES in their curriculum from primary to higher secondary education especially in the Pakistan. This study is going to contribute in literature in the finding of relationship of environmental knowledge, attitude and practices on the basis of what they already have learnt and the difference in gender environmental attitude and practices on the bases of what they have learnt. And what are the difference in the environmental attitude and practices of students who belongs to different Academic streams (Pre-medical, Pre-Eng., Business Studies and Computer Studies). This study is going to contributed, how self-decleared interest on ES matter to change environmental attitude as well as practices. And what are the informal factors which are responsible to generate the interest.

Chapter 3

Methodology

The chapter has methodological notes on different analyses conducted to attain the study objectives. It has three major divisions: (1) methodology for the review and analysis of different curriculums; (2) methodology for the construction of an ideal-type knowledge, attitude and practices-set that a student with twelve years of schooling should ideally demonstrate based on the concepts formally learnt so far; finally, (3) methodology assessing the students' knowledge in comparison with the ideal type and to the extent it may have impacted their attitudes and practices related to sustainable development.

Towards achieving the study objective, I assumed that students may have formally learnt and internalized different sustainability and related concepts throughout their educational journey. Therefore, I reviewed curriculum to identify SD concepts already available in the curriculum at a different level of schooling.

3.1 Methodology for the Review and Analysis of FS and CS Curriculum

3.1.1. Selection of Curriculum

Broadly speaking, two parallel educational systems prevail in Pakistan: (1): Schools following the curriculum of the British Council (BC), commonly called Cambridge system (CS); and, (2) Schools affiliated with government boards. The latter however may demonstrate provincial variation as education is a devolved subject and each province (federating unit) and the federation has its own textbook boards[2] that designs the

[2] Federal Board of Intermediate and Secondary Education follows the curriculum of National Book Foundation whereas each province has its own text book board (e.g., Sindh Textbook Board dealing Sindh Province). Coordination between different BISEs takes place through Inter-board Committee of Chairman, which among other tasks ensures to a fair measure of uniformity of academic evaluation and curricular standards (See: http://www.ibcc.edu.pk/AimsObjectives.php)

curriculum for the Boards of Intermediate and Secondary Education (BISE) in their respective jurisdictions. There are some 27 BISEs in Pakistan (one in Islamabad that deals the federal territory, 9 in Punjab, seven in Sindh, eight in KP and one in each Quetta and Azad Kashmir).

The CS curriculum derives from the United Kingdom's national curriculum and is always taught in private schools that are accessible to children of well-off families. School affiliated with the federal and provisional boards resort on the curriculum of Capital and their respective provincial boards, respectively. Private and public schools and collages affiliated with Federal board (FB) used the curriculum of the FB.

It was not possible to review curriculum of schooling year 1 – 12 and their revisions for all five textbooks boards as this would imply unsurmountable piles of book. Thus I chose to review the curriculum of the Federal Board due to two reasons: (1) I assume that the Federal system best represents the country; and (b) Observably, physics, chemistry, mathematics, Biology, and general science subjects of matric and intermediate level of all the boards are somewhat similar.

I reviewed the curriculum of CS of 2007 and 2013 (Published and implemented in 2007 and 2013, respectively) for schooling year 1 to A-level (year 11 and 12). Whereas, from Federal system (FS) I reviewed the curriculum of 2006-07 and 2009-10 from class 1 to 12 (called HSSC or intermediate).

3.1.1.1. Reasons to Review 2007 and 2013 Curriculum in the CS

In the CS, I reviewed the Curriculum of 2007 and 2013 because I surveyed the students of last year of college assuming that they learnt the SD concepts from the 2007 curriculum of 2007 in classes 1 to 7 during their schooling and the 2013 curriculum

during O- Level to A-level subject that if there were no gap in the respondents schooling and they progressed normally during these years of their educational activity.

3.1.1.2 Reasons to Review 2006-07 and 2009-10 Curriculum in the FS

In the FS, I reviewed the curriculum published and implemented 2006-07 and 2009-2010, because I surveyed the students of last year of collage assuming that they learnt the SD concepts from the curriculum of 2006-07 in classes 1 to 2 during their schooling and 2009-10 during the their schooling of class 3 to 10 that if there was no gap in the respondents schooling and they progressed normally during these years of their educational activities.

I reviewed the curriculum of 1st year and 2nd year (often called intermediate or HSSC), published in 2000, because that curriculum has persisted since that year and was also applicable on the student of the last year collage (our survey respondents)

3.1.2. Selection of the Textbooks

I select books from both systems i.e. FS and CS from class 1st to 2nd year/ A-level, in which student learnt the concepts related to SD.

3.1.2.1. Selection of Textbook from FS:

I selected only those books which held the SD concepts. To start with, the table of contents (TOCs) of all the books in the qualified curriculums were reviewed. Subjects that qualified or disqualified for in-depth reviewing are detailed in Table 3.1.

Table 3.1: Primary to HSSC Subjects in the FS Curriculum

Subjects/ classes	Primary		Secondary	SSC	HSSC
	Year 1 - 2	Year 3 - 5	Year 5 - 8	Year 9 -10	Year 11-12
General Knowledge	✓				
Urdu	✓	✓	✓	✓	✓
English	✓	✓	✓	✓	✓
Mathematics	✓	✓	✓	✓	✓ *
General Science		✓	✓	✓**	
Social study		✓			✓
Geography			✓		
History			✓		
Islamic study		✓	✓	✓	✓
Computer science			✓*	✓*	✓*
Physics				✓*	✓*
Chemistry				✓*	✓*
Biology				✓*	✓*
Economics					✓*
Accounting					✓*
Arts and design				✓*	✓*
Home economics				✓*	✓*

Notes:
✓ for the student learnt that particular Subject in their particular classes
✓* for the students have options to choose and not to choose.
✓** For the students must be read that subject, if they do not select combination of pure sciences (Physics, Chemistry and Biology) at the level of matric

In the FS, class 1st and 2nd, the students learnt 4 subjects, namely: English, Urdu, Basic Mathematics and General knowledge (Table 3.1). I reviewed all the subjects other than mathematics. But I only found the SD concepts such as environmental issues related to water, deforestation, transportation, industries, solid waste, Fossil fuel and Energy and Food and Agriculture in the subject of General knowledge. I did not review the Mathematics subject considering that its purpose was to supply skills instead of knowledge, and like other topics, SD concepts also reside outside the domain of this subject. From class 3rd to 5th the students learnt six subjects, that is English, Urdu, Mathematics, Sciences, Islamic studies, and social studies. the Mathematics subject was excluded for the reasons above. I found the concepts related to the responsible factors mostly in Science and Social Studies. The concepts related to responsible factors were also founded in the Urdu and English.

During the 6th to 8th years of their schooling, the students might have learnt 7 main subjects in public and private sector affiliated with federal boards. These subjects were: English, Urdu, Mathematics, Islamic studies, Science, Geography and History. In the public sector, they also have the options of two more subjects like a Computer and Home Economics – but the latter exclusively offered to female students. As usual, Mathematics was excluded and among the reviewed subjects, the SD concepts were located in subjects, namely, Science and Geography, and occasionally in the Urdu and English.

In Matric (9th and 10th year of schooling), all the students learn English, Urdu, Mathematics, Islamic studies, and Pak-studies, beside choosing a specialization. Those opting for Sciences specialization would learn Physics, Chemistry, Biology; while biology would be replaced with Computer Science in case if student intend to specialize in Computer Sciences. Other than this those opting General science as a major have choice to choose two other subjects i.e. Arts and Design, Home Economics or Economics according to their future direction.

In the nutshell, the students had several options to choose major fields from, according to their interest's and future plans. I dealt this plethora of subjects by thoroughly scanning the TOC of each subject (that students from all available career orientation could possibly choose) to see if there is topic related to SD. Resultantly, from optional subjects found the concepts of ES in Physics, Chemistry, Biology, and General Sciences and reviewed all of them thoroughly. Other than this, from the main subjects, I had found few concepts of ES also in the Urdu and English and reviewed these too from Matric level of the federal system.

At the level of intermediate (1st year and 2nd year), students learnt the four compulsory subjects, namely, Urdu, English, Islamic Studies and Pak-Studies and three

others major (Special field) subjects that students may according to their interest and future plans. If they are interested in medical their majors were: Physics, Chemistry and Biology; those interested in the Engineering stream, their major subjects were: Mathematics, Biology and Chemistry. Those interested in commerce, their majors were: Economics, Accounting, Business Studies and Business Mathematics. Table 3.1 ✓* shows that the students have options to choose these subjects. I reviewed all where I found anything related to SD, be it related to any natural resources, environmental issue such as pollution, atmosphere, water, deforestation, transportation, industries, solid waste, Fossil fuel and Energy and Food and Agriculture and so on.

Table 3.2: Primary to A-Level Subjects in CS Curriculum

	Primary	Secondary	O-Level	A-Level
	Year	Year	Year	Year
Subjects/classes	1-5	6-8	9-11	12-13
English	✓	✓	✓	
Urdu	✓	✓	✓	
Mathematics	✓	✓	✓	
Science	✓	✓		
Geography	✓	✓	✓	✓*
History	✓	✓	✓*	✓*
Music	✓	✓		✓
Information and communication technology (ICT)	✓	✓	✓*	✓*
Islamic Studies	✓	✓	✓	
Physical education	✓	✓		
Languages (foreign Language)	✓*	✓*	✓*	✓*
Arts and Design	✓	✓	✓*	✓*
Physics			✓*	✓*
Chemistry			✓*	✓*
Biology			✓*	✓*
Accounting			✓*	✓*
Business Studies			✓*	✓*
Economics			✓*	✓*
Politics			✓*	✓*

Notes:
✓ for the student learnt that particular Subject in their particular classes
✓* for the students have options to choose and not to choose.

In Pakistani Cambridge schools, from class 1 to class 8, students learned different subjects such as English, Urdu, Mathematics, Islamic Studies, Science, Geography, History, Information and Communication Technology, Physical Education, Music, Arts and design, foreign language (optional). I reviewed those subjects in-depth, in which I have found any topic relevant ES and those appear to be Geography, Science, Urdu and English.

In the O-Level of Pakistan, the student of Cambridge System learnt five core subjects that are subjects that are English, Urdu, Mathematics, Islamic study, Geography and History. From these core courses, I reviewed TOC of all except mathematics because I assumed no concepts related to SD there and found SD concepts only in Geography and reviewed it in depth. From the optional subjects, the students could choose any stream like pre-engineering, pre-medical, humanities, and commerce, each having its own set of subjects. I founded the concepts of sustainable development in physics, Biology and somehow in Chemistry and Economics, compelling me to review all these subjects in detail.

In A-Level, the students have options to choose minimum three subjects according to their field of interest. Those interested in pre-engineering would have chosen Physics, Chemistry and Mathematics. Those interested in pre-medical, would have chosen Biology, Physics and Chemistry. Those opting for humanities, commerce and other streams, I found the concepts of SD in their books of Physics, Chemistry, Biology and somehow in the Economics by looking at the TOC and indexes of these books, and whenever found something relevant, reviewed it in detail.

3.1.3 Review of Curriculum:

3.1.3.1 Priority Areas of Study and ES:

Both the curriculum FS and CS discussed different perspectives on environment and environmental conditions. I worked on different areas such as Water, Deforestation, Transportation, industries, solid waste, Fossil fuel and Energy, and Food and Agriculture which are directly and indirectly linked with environment. These topics ended up being the seven priority areas of my study.

Out of seven, five Priority areas are directly and indirectly are also the part of *"UK national framework for sustainable school, 2006"* designed by the Government of UK, aiming that all the school become the model for sustainable development till 2020. These are Food and Agriculture, Energy, water, Transportation, and solid waste (Blewitt, 2012).

These priority area come under the 17 goals of SDGs such as Water is the subject of Goal 6: *Clean Water and Sanitation*, when goes in more detail about the water and life below the water, it is the subject of Goal 14: *Life Below Water*; Forests comes under the SDGs Goal 15: Life on Land, under the Goal 15 there are number of targets which are related to forest such as sustainably forest management by planting the green and, halt biodiversity loss etc.; Transports is comes under the Goal 11: *Sustainable Cities and Communities*, under the Goal 11 there are number of targets which are about sustainable transports such as access to sustainable transport system by expanding public transport, promote walking and bicycling by the provision of separate tracks for them; solid waste also comes under the Goal 11, *Sustainable Cities and Communities*, under the Goal 11 there is the target related to solid waste management is as, reduce the per capita environmental impact of the city by paying special attention to air quality and waste management; Fossil fuel and Energy is the subject of Goal 7: *Affordable and Clean Fossil*

fuel and Energy, Industry is the subject of Goal 9; *Build Resilient Infrastructure and Promote Sustainable Industrialization*, Food and Agriculture is the subject under the Goal 2; *Zero Hunger* targeting to end hunger, end malnutrition and ensure sustainable food production system (UN Assembly, 2015).

3.1.3.2. Data Coding:

The curriculum of both systems is reviewed through content analysis, for content analysis, I used scale to summarize data for each Priority area of study. Before assigning scale, I set criteria based on which I assigned scale. The scale 0 is for, the students who do not study any topic on SD from that particular book in the particular class. Scale 1 assigned for, who learn the basics on that priority area such as uses, importance and advices to the students linked with priority areas of ES (for more detail see Scale 1 of Appendix A), Scale 2 assigned for, who learn other topics which are little advance concepts such as how it is effected by environment or how it effect environment for detail see scale 2 Of Appendix A, Scale 3 assigned for, who learn topics which give them more knowledge like which type of pollutant (chemicals) is produced by that particular environmental issue such as industries and transport release which type of chemical and what is the way through which they effect on present generation. How these issues are the causes of diseases (for more detail See Scale 3 Appendix A(1)-(7)), Scale 4 is assigned for those who read more advance topics on environmental issue such as how these issue are effecting future generation due to Global warming and creating the problem of resource scarcity. Scale 5 assigned for those who learn knowledge on how to tackle with these issues (for more detail see Scale 5 on Appendix A (1) – (7)).

During the coding, I also assigned the Scale as Scale 1+1, 1+1 means here the student of that particular class study the concepts of criteria of Scale 1 as well as Scale 2 this way helps the reader to distinguish that the student in particular class students do not

only study the concepts of little advance level they also read the concepts of initial level. Similarly, I used the scale 2+1, which means they read the concept of scale 3 and 2.

3.1.4 Analysis of the Textbooks:

By using scales, we gauge the knowledge of students on the particular SD priority areas of my study in the class one to HSSC of FS and A-Level of CS. Through Content analysis we gauge the students by keeping in mind the different questions such as how in depth knowledge they have, is they study the concept in that particular book in next level by repeating the concepts of pervious level or they just study the concepts of additional level? And in each class, how many topics from one level they study? To find out the difference in the curriculum of FS and CS.

The scaling also helps to find out the difference in both FS and CS curriculum for example if in class one the student of CS reads the concept of Scale 1 like importance of water and the advice to students do not waste water such as close tap while brushing or using soap on hand but in contrast in the class one of FS students read the concept of water management (Scale 5) such as building of Dams to overcome the problem of water Scarcity which is not in hand of individuals and may be advance concept for class one students. So, by this way different scales for both curriculum in same class and same subject shows different approach of both curriculums.

3.2 Methodology for Ideal Type

Ideal type was developed to compare the student's actual environmental knowledge, attitude and practices score with the ideal environmental knowledge, attitude and score. These scores are also helpful to access the relationship between environmental knowledge, attitude, and practices.

3.2.1 Methodology for the construction of An Ideal-Type Knowledge, Attitude and Practices-Set

This section of Methodology is about the construction of ideal-type knowledge-set and their scores and the ideal score for Environmental Attitude (EA) and Environmental Practices (EP) that a student with 12 years of schooling should ideally demonstrate based on the concepts formally they learnt.

3.2.1.1. Ideal-Type Knowledge Set's Score on SD Priority Areas

As it is mentioned in the section 3.1.3.1, priority areas of study and ES, there are seven priority area of studies such as water, deforestation, transportation, solid waste, Industries, Energy, and food and Agriculture. After the Review of FS and CS curriculum from class one to HSSC/A-Level, I made a set of questions on each priority area for ideal Environmental knowledge (EK). I made twelve questions on each priority area. In additionally, I randomly select one question for one mark from each priority area. By this way, I made seven set of questions and each set had seven questions (one question on each priority area), one question for one mark. So, total marks for one set of questions were 7[3]. On the bases of environmental knowledge, the students who gained the seven out seven marks have the ideal environmental knowledge and student who gained the zero have the

[3] Priority areas = 7
Set of questions = 7
Priority areas = 7
Set of questions = 7
In each set of questions there are one question from each priority area= 7*1 = 7 total questions
One-mark for each question. 7*1=7 marks for ideal Environmental knowledge.

worst environmental knowledge. The seven set of questions are divided into seven different questionnaires.

3.2.1.2. Ideal Environmental Attitude Score for SD Priority Areas

For environmental Attitude (EA), different questions on each priority area were designed after the review of FS and CS curriculum. Questions were related to how you feel (Attitude) about Environmental issues. All the questions have five options, I gave the score 1 to 5 to them, 1 for the least EA and 5 for the most EA. 20 questions were made on the priority areas with the sub-questions. The student who gained the ideal score on EA his/her score should be (20*5) = 100 and the student who had the least EA his/her score should be (20*1) = 20 (see Appendix B: Questionnaires B).

3.2.1.3. Ideal Environmental Practices Score for SD Priority Areas

For environmental Practices (EP), different questions on each priority area were designed. Questions were related to what they actually Practice about Environment. the question was designed after the review of FS and CS curriculum. 24 questions were asked about their EP. All the questions have five options except question no. 17 A, 17 B and five parts of question no. 18 from 18.1 to 18.5. I gave the 1 to 5 score to remaining 17 questions expect the question no. 17 A, 17 B and all the five parts of question no. 18. 1 score for the least EA and 5 for the most EA. So, for the remaining 17 questions the minimum score would be (17*1) 17 and maximum score would be (17*5) 85.

In question no. 17 A and question no. 17 B, the minimum score were zero and maximum were five because question 17 A were related about how many trees they planted in their life and when they planted no tree in their life then their score were zero and if they planted 1 to 10 trees then their score would be 1, if they planted 11 to 20 then

there score were 2 and similarly 3 more scales were developed for score 3,4 and five. In question no. 17 B were about how many of those trees have survived and if no of them were survived then their score was zero. and if 1 to 10 trees were survived then their score would be 1, if 11 to 20 trees were survived then their score were 2 and similarly 3 more scale developed for score 3,4 and 5. The minimum score for question no. 17 A and 17 B were 0 and maximum score were 5. So, in these 2 questions the minimum score was (2*0) 0 and maximum were (2*5) 10. The question 18 and their sub parts were about the mode of mode of transportation used by respondents in different situation. For the mode of transportation, I gave six options different options to the respondents. I gave 1 score for the relatively most pollution created mode of transportation and 6 score for the most environmentally friendly. So, in these five questions the minimum score was (5*1) 5 and maximum score was (5*6) 30 (see Appendix B: Questionnaires)

The maximum score for 24 questions on the EP were (85 + 10 +30) 125 and the minimum score for 24 questions on the EP were (17 + 0 + 5) 22, So, the ideal score for EP were 125.

3.3 Methodology Assessing the Students' Knowledge, Attitude and Practices:

In this part of chapter 3, after the review of the literature, and the development of ideal type set of score on KAP the methodology is proposed to assessing the students' knowledge and how they transform students learning into most environmental responsible feeling and actions. This is not adequately handled in existing literature, and the proposed research will bring new insights on the issue.

3.3.1. Research Design

After the review of curriculum of FS and CS, through the correlational study, it was tried to know that how the student's EK affects their attitude and practices. For this the ideal type was developed after the review of curriculum then a KAP survey by assuming that the Attitude and Practices of students depends upon the knowledge of the students. The study is correctional as well as descriptive in nature. Correlational study helps to find out the relationship between environmental knowledge, Attitude and Practices. And to find out the how many respondents have ideal EK, EA and EP, through descriptive study it is easily possible to find out the frequency of respondents who have ideal score of EK, EA and EP. To find out the relationship between the several factors simple linear regression model is used.

3.3.2 Population:

The data was collected through survey from the 2nd year students of FS often called intermediate and Last year students of A-level of CS within the territory of Islamabad

Specifically, I surveyed from the 2nd year or last year A-Level student because the students of collage learnt concepts of ES from class 1 to intermediate or A-level. I reviewed the textbooks of FS and CS till the level of intermediate and A-level respectively, based on review, analyzed both curriculums and then developed "ideal type" questions-set. Based on that" KAP survey was conducted from the students of both systems, i.e., CS and FS.

Study Area of research was the collages of FS and CS of Metropolitan city Islamabad. Islamabad is the education hub with the 83% literacy rate (PSLM, 2014-2015). There are 151 federal and their affiliated collages in Islamabad as well as there are 41 collages which are affiliated with UK universities education board, A-Level.

3.3.3. Sample Size and Sampling Technique:

There are 151 collages of FS from which 81 are private 61 are public and nine others such as Bharia, Fazia. Etc. Out of 151, 37 collages are female collages, 27 are male collages, and 87 are either the coeducational institutes, or they have wings for both genders such as female and male[4]. And There are 41 collages of CS with the representation of male as well as female students[5].

Cluster sampling technique was used to collect data. cluster sampling technique was used because I want to compare the attitude and practices of two different education system working in Pakistan based on their knowledge, i.e., FS and CS. I considered them as two cluster. From each cluster, randomly eight collages were selected. From 8, 8 collages of both systems, I surveyed from whole targeted population[6]. So, in total from 16 collages, I surveyed from 1109 students of 12 year of schooling. From 1109, 765 respondents from FS and 344 respondents from CS which was a dependent upon the present strength of respondents in the classes. The data collection was started after December 31, 2018 because I reviewed books till of 12 year of schooling of FS and last year of A-Level of CS, and till the 31st December, they at least completed their course one time.

3.3.4. Data Collection Instrument:

To know the student's environmental attitudes, who are presently in the last year of college, a self-administered Knowledge, Attitudes, and Practices (KAP) survey questionnaire was personally presented to respondents. The survey was developed on the

[4] https://www.fbise.edu.pk/inst-detail_search_city_hssc.php?city=Islamabad

[5] https://www.paked.net/q/detail/list-of-a-level-schools-in-islamabad_12188.html

[6] Targeted population: students of Pre-medical group, Pre- Engineering group, Intermediate in Computer Studies, Intermediate in Business Studies

common concepts which is present in the Federal as well as Cambridge system curriculum because we want to check the difference between the attitude and practices of students of both systems.

3.3.4.1 Questionnaire Design:

The Questionnaire was divided into five major parts. Part 1, questions was about the knowledge of students related to ES. Questions of part 2 and 3 were related to the environmental Attitude and Practices of the students, Part 4 was related to General information. And Part 5 was about personal information of respondents.

Part One, Knowledge

In Part 1, questions were designed in such a way to know the EK of students, who already learnt the concepts of ES in their earlier classes. To know the knowledge of students about ES, seven questions were asked from students which directly or indirectly linked with seven priority areas of my study such as water, transport, deforestation, energy, solid waste, industries, and Food and Agriculture.

Part one of the questionnaire divided into seven sections. In the Questionnaire attached in the appendix, section 1 was used. (for Questionnair see Appendix B). The technique of cluster sampling was used for data collection, and for that data was collected from all the population of 2^{nd} year of college, so, to avoid dishonesty of students in the knowledge section, I designed seven different sections for Knowledge with different questions, out of seven first section is present in the attached Questionnaire.

Part Two, Attitude

In the Part two, questions were about the EA. To know the environmental attitude of students, questions were designed on the priority area of studies in such a way it depicts

the feeling of students about the issues of ES. By using Bogardus social distance scale, I asked the question about the leakage of water. Similarly, I asked the question about the burning of wood when there is no LPG, gas, or any energy source to cook food. In question 9, I asked the question about which mode of transportation, a healthy person should prefer when they are covering, 3 km, 5 km, 1.5 km by lifting 3 kg weight, 10 km, and 22 km. Question number 10, 11 and 12 was designed by using Bogardus distance scale about the preference of hybrid and normal gasoline car in different situation, use of plastic bags and cloth bag. Question number 13 and 14 were about the energy, and food and agriculture had the 5,5 subsections which was designed on Likert scale from very unhappy, to very happy.

Part Three, Practices

In the 3rd part of questionnaire, questions were about the environmental practices of students, what they actually do at the seven priority areas of my study. Question number 16 was designed by using bogardus social distance scale[7] about the use of water in such a way, how long they take shower. In question number 17 A and B about the numbers of tree planted and how many of them survived. Question number 18 was designed to know modes of transportations used by students for covering the distance of 3,5, 2, 20, and 15 km. Question number 19 was about the use of products manufactured in industries in such a way how often they change shoes, bags, cloths, cell phone, notebooks, etc. Qestion number 20 was designed to know how often they manage solid waste by sort out waste as per type, take waste to the dumpster, throw wrappers or canes anywhere, remain watchful on street dumps. Question number 21 was designed how often they try to save energy by closing lights when they leave room or premises, buy energy efficient appliances, watchful

[7] Bogardus Social Distance Scale, used it with one group to learn how much distance its members feel toward a target or "outgroup." http://letrunghieutvu.yolasite.com/resources/w-lawrence-neuman-social-research-methods_-qualitative-and-quantitative-approaches-pearson-education-limited-2013.pdf

on electricity bills and buy solar appliances. Question 22 was about how often they try to save food and agriculture product, was they order excess food, preserve leftover food for later use or prefer meat over vegetable.

Part Four, General Information

In the 4th part of the questionnaire, questions were designed to know the general information of students such as their self-declared interest on environmental issues, and from different information source such as curriculum, teachers. Parents and siblings, friends and relatives, internet search, tv program, Radio, and newspapers, how many percentages of knowledge they obtained.

Part Five, Respondents Profile

In the 5th part of the questionnaires, the questions were about the Name, year of birth, Gender, Year of Schoolings, Education system, either it is Cambridge or Federal, Private, or public and subjects, pre-medical, pre-engineering or any other.

3.3.5. Econometric Model

It is assumed that the student who gain the higher score in the EK get the higher score in the EA and EP. The two different regression model was regressed to assess the real impact of EK on the EA and EP. I used the simple regression model to access the impact of environmental knowledge on environmental attitude and practices. Regression analysis is used to find out the dependency of one variable, on another variable. I used this model to access the dependency of environmental knowledge on environmental attitude, as well as environmental practices. There are number of studies which used the simple linear regression model to access the dependency of environmental knowledge on environmental behavior, and attitude such as Kollmuss and Agyeman (2002) and Zsóka, Szerényi,

Széchy, and Kocsis (2013) also used simple regression to access pro-environmental behavior.

Simple Linear Regression Models

In the first model environmental knowledge (EK) was regressed on environmental attitude (EA), EA was introduced in the model as dependent variable and EK was introduced as the independent variables with the other independent variables such as self-declared interest of students on SD, and dummy variables such as Gender (male and female), Education systems (Federal and Cambridge), (Private, public), (Pre-medical, Pre-Eng., Business Studies, Computer Studies) while Age and year of Schooling are almost same because our sample population was the students who are in last year of college, and their age is between the 16-18 years, so we do not included these variables in the model.

General Model of Study to Access the EK on EA is

$$EA = \beta_o + \beta_1 EK + \beta_2 GD + \beta_3 ES_1 D + \beta_4 ES_2 D + \beta_5 ES_3 D + \beta_6 S_{DI} + e$$

Where;

EA = Environmental Attitude, EK = Environmental Knowledge, GD = Dummy for Gender, (Male or Female), $ES_1 D$ = Dummy for Education System (Federal or Cambridge), ES_2 D= Dummy for Education System (Private or Public), ES_3 D= Dummy for Education system (Pre-medical, Pre- engineering, Computer Studies, or Business Studies), and S_{DI} = Self-declared interest at sustainable environmental.

To access the impact of EK on EA, the difference between the EA of male and female, the difference between the attitude of students of Private and Public system, difference between the attitude of students of CS and FS, to access the difference between

the EA of students due to differences in major streams (i.e. Pre-medical, Pre-Engineering, Computer Studies, and Business Studies) model was developed by changing Reference Category.

$$EA = \beta_o + \beta_1 EK + \beta_2 DF + \beta_3 DFS + \beta_4 DPbS + \beta_5 DPM + \beta_6 DPE + \beta_7 DICS + \beta_8 S_{DI} + e \ldots. (1)$$

Where;

EA = Environmental Attitude

EK = Environmental Knowledge

S_{DI} = Self-declared interest at sustainable environmental

Gender

DF = Dummy for Female

(Reference Category; Male)

Education System 1

DFS= Dummy for Federal System

(Reference Category; Cambridge System)

Education System 2

DPbS= Dummy for Public System

(Reference Category: Private System)

Education System 3

DPM= Dummy for Pre-medical

DPE= Dummy for Pre- Engineering

DICS= Dummy for intermediate in Computer Studies

(Reference Category: Intermediate in Business Studies)

General Model of Study to Access the EK on EP

In the second model EK was regressed on EP, EP was introduced in the model as dependent variable and EK was introduced as the independent variables with the other independent variables such as and self-declared interest of students on SD, and dummy variables Gender (male or female), Education systems (Federal or Cambridge), (Private, public), (Pre-Medical, Pre-Eng., Business studies, Computer studies) while the year of schooling and age group is almost same.

$$EP = \beta_o + \beta_1 EK + \beta_2 GD + \beta_3 ES_1 D + \beta_4 ES_2 D + \beta_5 ES_3 D + \beta_6 S_{DI} + e$$

Where;

EP = Environmental Practices, EK = Environmental Knowledge, GD = Dummy for Gender, (Male or Female), $ES_1 D$ = Dummy for Education System (Federal or Cambridge), ES_2 D= Dummy for Education System (Private or Public), ES_3 D= Dummy for Education system (Pre-medical, Pre- engineering, Computer Studies, or Business Studies), and S_{DI} = Self-declared interest at sustainable environmental.

To access the impact of EK on EP, the difference between the EP of male and female, the difference between the EP of students of Private and Public system, difference between the EP of students of CS and FS, to access the difference between the EP of students due to differences in major streams (i.e. Pre-medical, Pre-Engineering, Computer Studies, and Business Studies) model was developed by changing Reference Category.

$$EP = \beta_o + \beta_1 EK + \beta_2 DF + \beta_3 DFS + \beta_4 DPbS + \beta_5 DPM + \beta_6 DPE + \beta_7 DICS + \beta_8 S_{DI} + e \quad \ldots. (2)$$

Where;

EP = Environmental Practices

EK = Environmental Knowledge

S_{DI} = Self-declared interest at sustainable environmental

Gender

DF = Dummy for Female

(Reference Category; Male)

Education System 1

DFS= Dummy for Federal System

(Reference Category; Cambridge System)

Education System 2

DPbS= Dummy for Public System

(Reference Category: Private System)

Education System 3

DPM= Dummy for Pre-medical

DPE= Dummy for Pre- Engineering

DICS= Dummy for intermediate in Computer Studies

(Reference Category: Intermediate in Business Studies)

3.3.5.1. Mode of Analysis

Data was analyzed through simple regression analysis. Co-efficient values were calculated, t-test were performed for each independent variable and dummy variable in the model to know the significance of variable. To know the overall significance of the model F-test were performed.

Chapter 4

Curriculums Review

This chapter is focuses on the content analysis of the books related the priority areas of my study, i.e., Water, Forests, Transportations, Industry, Solid Waste, Energy, and Food and Agriculture.

I reviewed the curriculum of FS and CS from class one to HSSC/A-Level., after the selection of books by looking at the TOC, as it is mentioned in the chapter 3. I reviewed curriculum at seven priority areas of my study. This chapter is about how these seven priority areas of my study are detailed in the curriculum of both systems.

4.1 Water

Water's concept is discussed in detail in both FS and CS. The key concepts that the students of both curriculums studied, are displayed in the figure 4.1.

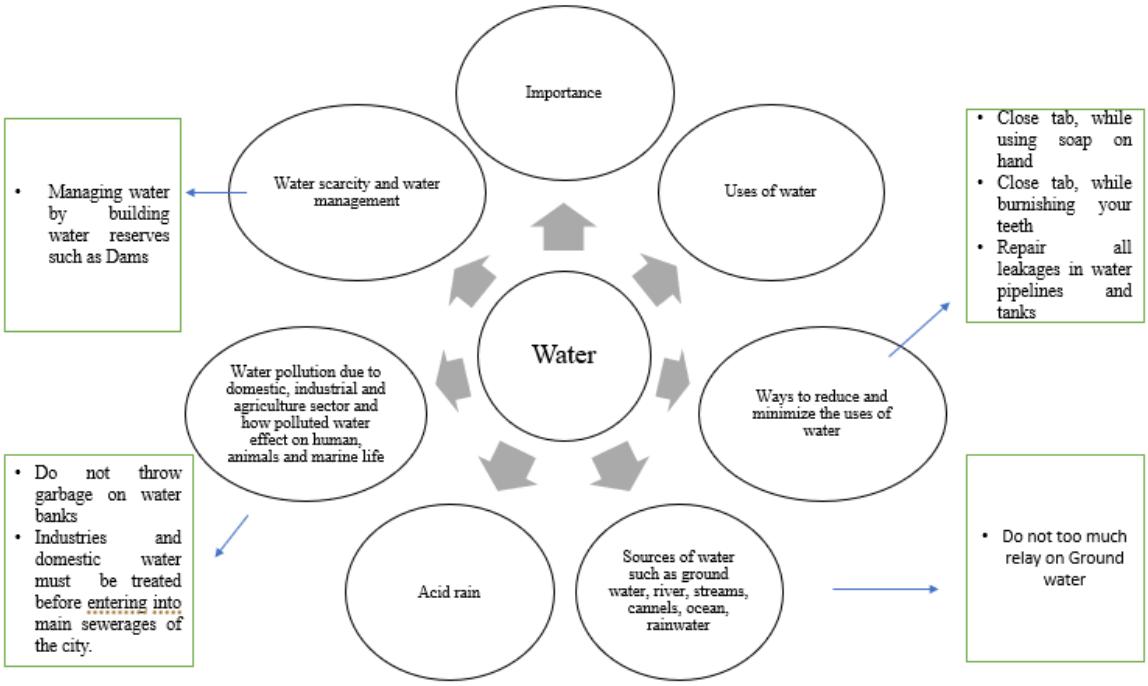

Figure 4.1: Knowledge, Attitude and Advices for Practices about water in FS and CS curriculum

Source: Curriculum Review

Figure 4.1 shows what are the main topic and issues related to water about which student of FS as well CS had learnt throughout their educational journey up to class HSSC/A-Level. Inner circles in Figure 4.1 show that multidimensional knowledge has been imparted to students including the topics like: the importance of water, uses of water, ways to reduce and minimizes the uses of water, what are the sources of water, water pollution and how it effect the life under the water, acid rain how effects marine life, water scarcity and management of water.

The Outer Rectangular boxes in figure 4.1, represents the topic which are presents in the books of FS and CS which directly helps them to change their practices from non-environmentally friendly to environmentally friendly.

4.1.1. Concepts of Water in CS

Table 4.1: Scale and Topic related to water in particular subject and Class in CS.

Scales/classes	Scale (Geography)	Scale (Science)	Scale (Urdu)	Scale (Biology)
Class 1	1 (2)	0	0	-
Class 2	1+1 (2+1)	0	0	-
Class 3	1+1+1 (1+1+1)	1+1+1 (2+2+3)	1 (1)	-
Class 4	1+1+1+1 (1+1+1+2)	1+1+1+1 (2+1+2+1)	0	-
Class 5	2+1+1 (1+1+2)	2+2 (1+2)	0	-
Class 6	2 (2)	3+1 (1+2)	0	-
Class 7	2+1 (2+2)	3+1 (1+1)	0	-
Class 8	3+1 (1+1)	3+1 (1+2)		
O level	1+1+3 (1+3+2)	-	0	2+1 (1+1)
A Level	2+1+1+1 (1+2+2+7)	-	0	3 (1)

Notes

- ✓ Scale 0 means the concepts related to water is not present in the book of particular class.
- ✓ Blank box represented by - shows the student of level do not reads those books.
- ✓ Scale 1 means the students just read the concept of water of scale 1 mentioned in Appendix A (1).
- ✓ Scale 1+1 means the students reads the concepts of Scale 1 as well as scale 2 mentioned in Appendix (1)
- ✓ Scale 1+1+1 means the students reads the concepts of Scale 1, 2 and 3 mentioned in Appendix (1)
- ✓ Sale 1+1+1+1 means the students reads the concepts of Scale 1, 2,3 and 4 mentioned in Appendix (1)
- ✓ Scale 2 means students reads the concept of only scale 2 of Appendix (1).
- ✓ Scale 2+2 means the students reads the concept of Scale 2 and 4 of Appendix (1).
- ✓ Scale 2+1 means the students reads the concept of scale 2 and 3 of Appendix (1).
- ✓ Scale 1+1+3 means the students reads the concept of scale 1, 2 and 5 of Appendix (1).
- ✓ Scale 2+1+1+1 means student reads the concept of scale 2,3,4 and 5 of Appendix (1)
- ✓ Scale 3 means the students only reads the concept of scale 3 of Appendix (1).
- ✓ Scale 3+1 means the students reads the concept of Scale 3 and 4 of Appendix (1).
- ✓ The text inside the parenthesis ( ) shows from particular scale how many topics student reads.

The students of Cambridge systems read the concepts of water in 4 main subjects science, Urdu, Geography and Biology.

In the Geography and Sciences, the student of CS more studied about water, their importance and related issue which is concerned for present and future generation. Other than these subjects they also studied concepts in Urdu as it is seen from table 4.1. but in Urdu they studied concepts just in one class. In Geography concepts about water is founded about water in class 1 to O/A level. In General Science, the related concepts are founded in class 3 to 8.

The students of CS studied those topics which helps to increase their knowledge on the importance of water, availability of water from different sources, human activities for the production of industrial good, energy and agriculture goods are how responsible to pollute water, and low level of water table and water scarcity, such type of topic not only help to increase the knowledge of students also helps to increase their consciousness by keeping in the mind the importance of water and their sources of pollution, water borne diseases and how in future we are going to face the problem of water scarcity. With these topics the students also studied few topics at the earlier level of education (primary classes) which directly guide them the ways to reduce the use of water, In advance classes they are also aware about the role of government institution through the building of water reserves, the topics guide them to reduce the use of water, helps to change their practices from non-sustainable environmental behavior to more sustainable environmental behavior and the topic which aware the about the role of government or any other institution helps to develop their knowledge and attitude but do not change their practices at this level.

The Students who studied Geography and Biology in O/A Level, he/she are more aware about the more advanced concepts on water because they studied concepts in these

subjects especially the students who studied Geography in their O/A Level, they should had more knowledge on these concepts of water, because the conceptual presence of water in Biology is not strong as it is present in the Geography. The student who studied Geography in O/A-Level, they even studied about the water sustainability in more detail then the other students.

4.1.2 Concepts of Water in FS

Table 4.2: Scale and Topic related to water in particular subject and Class in FS

Scales /classes	Scale (social study)	Scale (Science)	Scale (Urdu)	Scale (Geography)	Scale (Other sciences)
Class 1	0 GK	0	0	-	-
Class 2	1+1+3 Gk (2+1+1)	0	0	-	-
Class 3	1+4 (1+1)	1+1+1 (1+1+1)	2+1+2 (1+1+1)	-	-
Class 4	3+2 (1+2)	2+1 (1+1)	0	-	-
Class 5	2 (1)	1+1+1+1 (2+2+1+1)	0	-	-
Class 6	-	1+1+1+1 (1+1+1+2)	0	1+2 (1+1)	-
Class 7	-	1+1+1+1 (1+1+1+2)	0	2 (1)	-
Class 8	-	2+1+1 (1+1+1)	0	1+1+1+2 (1+1+1+2)	-
SSC	-	1+2 GS (1+1) -	0	0	3+1 B (2+1) 3+1 C (2+1)
HSSC	-		0	1+4 PS (1+1)	1+1+1+1 B (1+1+1+1) 3+1 C (1+1)

Notes:

- ✓ Scale 0 means the concepts related to water is not present in the book of particular class.
- ✓ Blank box represented by - shows the student of particular level do not reads those books.
- ✓ Scale 1 means the students just read the concept of water of scale 1 mentioned in Appendix A (1).
- ✓ Scale 1+1 means the students reads the concepts of Scale 1 as well as scale 2 mentioned in Appendix (1)
- ✓ Scale 1+1+1 means the students reads the concepts of Scale 1, 2 and 3 mentioned in Appendix (1)
- ✓ Sale 1+1+1+1 means the students reads the concepts of Scale 1, 2,3 and 4 mentioned in Appendix (1)
- ✓ Sale 1+1+1+1 means the students reads the concepts of Scale 1, 2,3 and 4 mentioned in Appendix (1).
- ✓ Scale 1+2 means student reads the concept of scale 1 and 3 mentioned in Appendix (1).
- ✓ Scale 1+4 means the student reads the concept of scale 1 and 5 mentioned in Appendix (1).
- ✓ Scale 1+4 PS means the student reads the concept of water in the Pak-studies of particular class of scale 1 and 5 mentioned in Appendix (1).
- ✓ Scale 2 means students reads the concept of only scale 2 of Appendix (1).
- ✓ Scale 2+1 means the students reads the concept of scale 2 and 3 of Appendix (1).
- ✓ Scale 2+1+1 means the students reads the concept of scale 2, 3 and 4 of Appendix (1).
- ✓ Scale 2+1+2 means the student reads the concept of water of scale 2, 3 and 5 of Appendix (1)
- ✓ Scale 1+1+3 means the students reads the concept of scale 1, 2 and 5 of Appendix (1).
- ✓ Scale 2+1+1+1 means student reads the concept of scale 2,3,4 and 5 of Appendix (1)
- ✓ Scale 3+1 C means the students reads the concept of water in chemistry of scale 3 and 4 of Appendix (1)

in particular class.

- ✓ Scale 3+1 +1 C means the students reads the concept of water in chemistry of Scale 3, 4 and 5 of Appendix (1) in particular class.
- ✓ Scale 3+1 B means the students reads the concept of water in chemistry of Scale 3 and 4 of Appendix (1) in particular class.
- ✓ Scale 1+1+1+1 B means the students reads the concept of water in chemistry of Scale 1,2,3 and 4 of Appendix (1) in particular class.
- ✓ Sale 3+2 means student reads the concept of Scale 3 and 5 of Appendix (1).
- ✓ The text inside the parenthesis ( ) shows from particular scale how many topics student reads.

Source: FS's curriculum Review

The students of FS studied on water in Geography, Social Study, Pak-Study. Unlike CS, the FS does not offer Geography per se, but it appears throughout the curriculum under various guises. In the class 3 to 5, student read history and Geography jointly in the Social Sciences course. In class one and two they read the Geography content in the General Knowledge course as which is represented in the table with GK. In class 6 to 8, they read Geography separately. In Matric (SSC) and Intermediate (HSSC), geography knowledge is imparted in Pakistan Studies course. Other than these they studied on water in General Science, Urdu and Biology.

The students of FS like the CS studied about Water more in Geography and related subjects and General Science. Other then this they studied about water somewhere in Urdu and Biology and Chemistry but in Urdu they studied about water just in one class.

The students of FS studied about the concepts which helps to increase their knowledge, but they comparatively studied less about the accepts which directly helps to change their practices about water. They studied about the importance of water, sources of water, hard water, soft water, pollutant in water, sources of water pollution, role of household, industries, and agriculture in the water pollution, and these effect on the health of human beings and other living organisms, presence of such type of topics in curriculum give knowledge about the water pollution but unfortunately the students of FS are less aware about the problem of water scarcity. But from the class 2 they studied about the role of government to save water in the foam of dam building, this concept give them the

knowledge about the role of government but did not give them the knowledge how the problem is sever.

Perhaps owing to the nature of the general discourse on dams in the country, FS students are constantly taught about the surface and groundwater sources and importance of the government's dam building initiatives for water security. While this certainly affects FS students' knowledge and attitudes about water but not necessarily implant practices which may lead to water conservation – perhaps due to the supply driven focus of the concept. Focus on what individuals can do to conserve water quantity seems grossly missing from FS curriculum.

The students of FS studied the concepts on water in Chemistry, in which they studied the way to purify the polluted water by boiling and using other chemicals. Although it is not possible to keep the all polluted water clean before it goes into sea, but it is possible to make the water drinkable by using different techniques and process. The students who belongs to General Science group in matric they are unaware about these processes. The students who belongs to Pre-Medical and Pre-Eng., groups in-depth read about the process to make the water drinkable. The students of FS more studied about water pollution and purification of polluted water (quality of water) as compared to the issue of water scarcity and water sustainability. The one reason behind is the students of FS do not studied updated course of Pak-studied or any other alternative subject which give them the knowledge on water sustainability and severity of water scarcity issue.

The students who studied Chemistry and Biology in the HSSC, they studied more on water as compared the students who study other subjects at the intermediate level as it is shown in the table 4.2.

4.2. Forest (deforestation)

The students of FS and CS both read forest and environment link and how to avoid the deforestation. The role of common human being is to save forest such type of knowledge may help students to change their Attitude and Practices. The below figure displayed the main concepts that students read from class one to HSSC/A-Level.

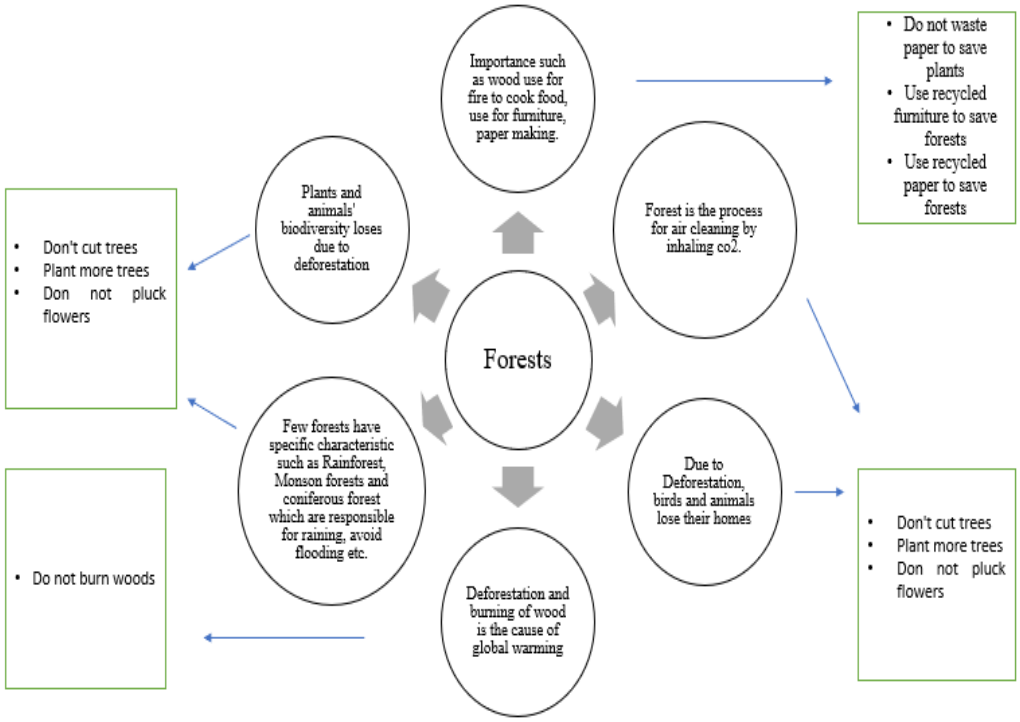

Figure 4.2: Knowledge, Attitude and Advices for Practices about Forests in FS and CS curriculum

Source: Curriculum Review

Figure 4.2 shows what are the main topic and issues related to Forests about which students of FS as well CS had learnt throughout their educational journey up to class HSSC/A-Level. Inner circles in Figure 4.2 show that multidimensional knowledge has been imparted to students including the topics like: uses of Forests, the importance of

Forests, effect of deforestation on global temperature, home for number of species , afforestation and rain, floods and droughts etc.

The Outer Rectangular boxes in figure 4.2, represents the topic which are presents in the books of FS and CS which directly helps them to change their practices from non-environmentally friendly to environmentally friendly.

4.2.1. Concepts of Forests in CS:

Table 4.3: Scale and Topic Related to Forest in Particular Subject and Class in CS

Scales /classes	Scale (Geography)	Scale (Science)	Scale (Urdu)	Scale (Other's Sciences)
Class 1	1 (1)	0	0	-
Class 2	1 (2)	0	0	-
Class 3	1+1 (1+1)	1+1 (1+1)	1+1 (1+1)	-
Class 4	1+1+2 (2+2+1)	1+1+2 (1+1+1)	1 (1)	-
Class 5	0	1+1+2 (1+1+1)	0	-
Class 6	3 (1)	0	0	-
Class 7	2+1+1 (1+1+1)	0	0	-
Class 8	2+1+1 (1+1+2)	0		
O level	3+1+1 (1+1+1)	-	0	5 B (1)
A Level	1+1+1+1+1 (2+3+1+2+3)	-	0	2+2 B (2+1) 2 E (1)

- ✓ Scale 0 means the students do not read any topic about the forests in their books
- ✓ Blank space shows with – shows the students do not read that particular subject at particular level.
- ✓ Scale 1 shows the student reads the concept of scale 1 only of Appendix A (2)
- ✓ Scale 1+1 means the student reads the concept of scale 1 and scale 2 of Appendix A (2)
- ✓ Scale 1+1+2 means the students read the concept of scale 1,2, and 4 of Appendix A (2)
- ✓ Scale 1+1+1+1+1 means the students read the concepts of scale 1,2,3,4 and 5 of Appendix A (2).
- ✓ Scale 1+1+2 means the students read the concept of scale 1, 2 and 3 of Appendix A (2)
- ✓ Scale 2+1+1 means the student read the concept of scale 2,3 and 4 of Appendix A (2)
- ✓ Scale 3+1+1 means the students read the concept of scale 3,4 and 5 of Appendix A (2)
- ✓ Scale 2 E means students read the concept of scale 2 of Appendix A (2) in Economics.
- ✓ Scale 5 B means the students read the concept of scale 5 of Appendix A (2) in Biology
- ✓ Scale 2+2 B means the student read the concept of scale 2 and 4 of Appendix A (2) in Biology.
- ✓ The text inside the ( ) shows how many topic students read from the particular scale.

Source: CS's Book Review

Students of CS studied concepts about forest, deforestation in Geography, Science and somehow in Urdu. From the optional subjects' students studied about forests in Biology and somewhere in Economics.

The students of CS studied concepts which helps to increase the knowledge and attitude of students on Forests, such as importance of forests in terms of provision of wood, and cleaning of air, how these forests are home for the wild animals and birds, how forests play role in the raining process, avoiding floods, droughts, soil erosion. It seems through the curriculum analysis of CS that the students of CS studied about the distinct kinds of forests in-detail in the geography from class 6 to A-Level. With the time they get more advance knowledge on the forests and their characteristics, such kind of knowledge is helpful for them which type of plant is required for which kind of soil and condition. In the subjects of science, they also studied about effect of deforestation and the burning of wood on global warming and climate change. The curriculum of CS well covered the concept of sustainable forestation by keeping in mind needs of future generation. Other than this in the primary classes the students of CS studied concepts which directly guide them to change their practices about the afforestation and deforestation.

Through the review of curriculum of CS, it seems the students who studied Geography in O/A-Level they studied more and advanced concepts as it is shown in the table 4.3. the students who studied Biology they studied about the biodiversity in-detail. The students who studied Economics in A-Level they just studied about effect of increase in increase in population on plants biodiversity.

4.2.2. Concepts of Forests in FS

The students of FS studied the concept of Forests in Social study, Geography, General Science, and other Sciences, and somehow in Urdu. The Table 4.4 shows to what extend the students of FS studied the concepts of Forests.

Table 4.4: Scale and Topic Related to Forests in Particular Subject and Class in FS

Scales/classes	Scale (social study)	Scale (Science)	Scale (Urdu)	Scale (Geography)	Scale (Other sciences)
Class 1	0	0	0	-	-
Class 2	1+1 GK (1+1)	0	0	-	-
Class 3	0	1 (1)	1 (1)	-	-
Class 4	2+2 (1+1)	1 (1)	2 (1)	-	-
Class 5	0	2 (1)	0	-	-
Class 6	-	2 (1)	0	1 (3)	-
Class 7	-	2 (1)	0	0	-
Class 8	-	2+1+1 (1+2+1)	0	1+1+1 (2+2+2)	
SSC	-	2+1+1 (1+1+1)	0	0	1+1+3 B (1+2+1) 1+3+1 C (1+1+1)
HSSC	-	-	0	0	2+1+2 B (1+1+1) 5 C (1)

Notes

- ✓ Blank space represented with – shows student do not read these books in particular class
- ✓ Scale 0 means the student do not read the concept about forest in the particular book
- ✓ Scale 1 means the students read the concepts related to forest of Scale 1 mentioned in Appendix A (2)
- ✓ Scale 1 PS means the students read the concepts related to forest of Scale 1 mentioned in Appendix A (2) in the Pakistan studies.
- ✓ Scale 1+1 GK means the students reads the concepts of scale 1 and 2 mentioned in Appendix A (2) in the subject of General Knowledge.
- ✓ Scale 1+1+1 means the students read the concept of scale 1, 2 and 3 mentioned in Appendix A (2)
- ✓ Scale 1+3+1 C means the students read the concept of scale 1, 4 and 5 mentioned in Appendix A (2) in the Chemistry.
- ✓ Scale 1+1+3 B means the students read the concept of scale 1,2 and 5 mentioned in Appendix A (2) in the Biology.
- ✓ 5 C means students just read the concepts of scale 5 of Appendix A (2) in the chemistry.
- ✓ Scale 2 means the students read the concept of scale 2 mentioned in Appendix A (2)
- ✓ Scale 2+1 C means the students read the concept of scale 2,3 and 4 mentioned in Appendix A (2) in the Chemistry.
- ✓ Scale 2+1+1 means the students read the concept of scale 2,3 and 4 mentioned in Appendix A (2)
- ✓ Scale 2+2 means the student read the concept of scale 2 and 4 mentioned in Appendix A (2)
- ✓ Scale 2+1+2 B means the student reads the Concept of scale 2,3 and 5 mentioned in Appendix A (2)
- ✓ Text in the parenthesis ( ) shows how many topics they read from particular scale.

Source: FS's Book Review

This student of FS studied the concepts about forests which increases their knowledge. The students studied about the important of forests, in terms of furniture making and making other wooden products in the subject of social science and in the subject of general science they studied about how trees are the source of food as well as oxygen. Further they studied the forests are not only important for human beings, these are also important for the animal and plants biodiversity. The forests are the source of raining, avoiding flooding and droughts, and soil erosion. Moreover, they studied in-detail how deforestation and burning of wood are responsible for diseases and global warming, and climate change. And how the increases in population are responsible for clearing of forests. With all these concepts they studied about different types of forests. But during the review of curriculum, it become clear the student of FS do not studied about the characteristics of different type of forests in-detail, while in CS, in the subject of geography from class 6 they started to study about this and in the geography of O/A-Level they studied about forests types in-detail. The students of FS do not have knowledge about which forests are important for raining, which are play important role in soil erosion, flooding, and droughts. Even they do not studied about the forests of hill areas, plan areas and coastal areas. Few important for knowledge and few topics directly guide students about the environmental practices. Through the review of curriculum, this study explores the students of FS studied advices about deforestation in their earlier classes. In the secondary classes they studied advices about using of recycled products like furniture and paper.

Review of the curriculum shows the student of FS do not studied about the sustainable forestation as the students of CS studied. They are also unaware about the role of national and international institution for the forest the forests conservation like the

students of CS. Review of curriculum of both systems shows content about forests are more in the curriculum of CS as compared to FS.

The students from FS at the level of intermediate studied more about in the academic disciplines of pre-medical because at the level of intermediate, they only studied about forests in the biology and chemistry. The students of pre-engineering studied concepts in chemistry only. While the students of computer studies and business studies do not studied about forests.

4.3. Transportation

Transportations' concept is discussed in detail in both FS and CS. The key concepts that the students of both curriculums read, are displayed in the figure 4.3.

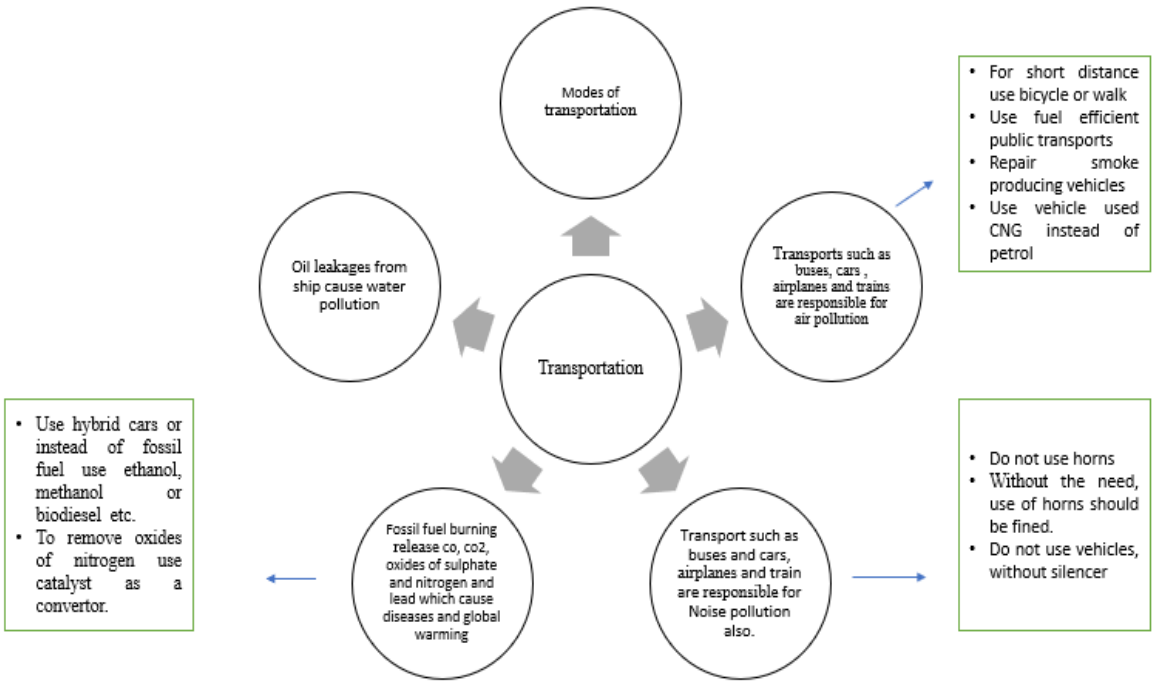

Figure 4.3: Knowledge, Attitude and Advices for Practices about Transportation in FS and CS curriculum

Source: Curriculum Review

Figure 4.3 shows the concept that students of FS and CS both read the concepts of Transportation. The inner circle of figure 4.3 shows the concept that the students read which helps to increase their knowledge about transportation in which they read about what are the mode of transportation, which mode of transportations are more responsible for polluting air, water, and land. Which types of chemicals are released by transports and how it is responsible for global warming? How transportations damage the health of human life. The outer rectangular boxes of figure 4.3 shows the advices which are present in the curriculum helps to change the attitude and behavior towards environmentally friendly.

4.3.1 Concepts of Transportations in CS

Table 4.5: Scale and Topic Related to Transportation in Particular Subject and Class in CS

Content/classes	Scale (Geography)	Scale (Science)	Scale (Urdu)	Scale (Other subjects)	Scale English
Class 1	0	0	0	-	0
Class 2	2 (1)	0	0	-	0
Class 3	2 (2)	3 (1)	3 (1)	-	0
Class 4	3 (1)	0	0	-	0
Class 5	3+1 (1+1)	0	0	-	0
Class 6	4 (1)	0	0	-	3+1 (1+1)
Class 7	1+3 (1+1)	0	3 (1)	-	0
Class 8	1+1+1 (1+1+1)				
O level	1+1+1 (1+1+1)	-	0	3 B (1+1) 3+1 C (1+1) 3+2 P (1+1)	0
A Level	1+1 (1+1)	-	0	3+1 (1+1)	0

Notes

- ✓ Scale 0 means the concepts related to Transportation is not present in the book of particular class.
- ✓ Blank box represented by - shows the student of particular level do not reads those books.
- ✓ Scale 1+1 means the students read the concept of Transportation of Scale 1 and 2 mentioned in Appendix A (3).
- ✓ Scale 1+1+1 means the students read the concept of Scale 1, 2 and 3 mentioned in Appendix A (3).
- ✓ Scale 1+3 means the students read the concept of Scale 1 and 4 mentioned in Appendix A (3).
- ✓ Scale 2 means the students read the concept of Scale 2 mentioned in Appendix A (3).
- ✓ Scale 3 means the students read the concept of Scale 3 mentioned in Appendix A (3).
- ✓ Scale 3+1 means the students read the concept of Scale 3 and 4 mentioned in Appendix A (3).
- ✓ Scale 3 B means the students read the concept of Scale 3 mentioned in Appendix A (3) in the Biology.
- ✓ Scale 3 +1 C means the students read the concept of Scale 3 and 4 mentioned in Appendix A (3) in the Chemistry.
- ✓ Scale 3+2 P means the student read the concept of Scale 3 and 5 mentioned in Appendix A (3)in Physics.
- ✓ Scale 4 means the student read the concept of Scale 4 mentioned in Appendix A (3)
- ✓ The text inside the parenthesis ( ) shows from particular scale how many topics student reads.

Source: CS's Book Review

The students of CS studied about transportation in four main subjects that are Geography, Science, Urdu, and English. Other than these subjects at O/A-Level the students also studied about the transportation in other sciences such as Biology, Chemistry and Physics.

The students of CS studied concepts about transportation which helps to increase their knowledge. They studied about the different modes of transportation, they also study how these transports are responsible for air, water, and noise pollution. With these they studied in -detail how burning of fuel in the transports are responsible for polluting air by releasing pollutants in air, and how these pollutants are responsible for diseases in human beings. They also studied about Hybrid technology and CNG which is comparatively clean fuel. It would give them knowledge, which helps to change their practices towards more environmentally friendly. The had knowledge about the water pollution of due to leakages of oil tanks from ships into water and how it effects on marine life, how the pollutants are responsible for acid raining and GHG emission and climate change. In the Geography, the study about Pakistan railway, Karachi circular railway and engine modification of Pakistan railway from coal based to fuel based, and different ports of Pakistan which are used for shipping.

With these topics on transportation, they also studied topics which directly guide them to change their practices to save environment. In the earlier classes, they studied advices about walking instead of car, using of cycling for short distances, for long distance using of public transports etc.

The students who choose Biology, Chemistry and Physics in O/A-Level they studied little more concepts instead those who choose Business Study and Computer

studies etc. In Biology, they study how the pollution from transport effects are the cause of acid rain which effects on the marine life. In Chemistry they read which type of pollutant from the fuel burning in the cars emit in the air and pollute environment. In physics they studied about how convertors used in in transports helps to reduce the smoke comes out from cars. It means the students who choose physics they know the detail how to reduce the pollution from the cars but other do not have in-detail knowledge about this process.

4.3.2. Concepts of Transportation in FS

Table 4.6: Scale and Topic Related to Transportation in Particular Subject and Class in FS

Content/classes	Scale (social study)	Scale (Science)	Scale (Urdu)	Scale (Geography)	Scale (Other sciences)
Class 1	0	0	0	-	-
Class 2	1 Gk (1)	0	0	-	-
Class 3	1 (1)	0	1 (1)	-	-
Class 4	2+1 (1+1)	1 (1)	0	-	-
Class 5	1 (1)	2+1 (1+1)	0	-	-
Class 6	-	2+1 (1+1)	1+1 (1+1)	1 (1)	-
Class 7	-	3 (2)	2 (1)	2 (1)	-
Class 8	-	3+1+1 (1+1+1)	1 (1)	2+1+1+1 (1+2+1+1)	
SSC	-	3+1 (2+1)	0	0	3 B (1) 4+1 C (2+1)
HSSC	-	-	0	0	2+1+1 B (1+2+1) 2+1 C (1+1) 5 P (1)

- ✓ Scale 0 means the concepts related to Transportation is not present in the book of particular class.
- ✓ Blank box represented by - shows the student of particular level do not reads those books.
- ✓ Scale 1 means the students read the concept of Scale 1 mentioned in Appendix A (3).
- ✓ Scale 1+1 means the students read the concept of Scale 1 and 2 mentioned in Appendix A (3).
- ✓ Scale 2+1 means the students read the concept of Scale 2 and 3 mentioned in Appendix A (3).
- ✓ Scale 2 means the students read the concept of Scale 2 mentioned in Appendix A (3).
- ✓ Scale 3 means the students read the concept of Scale 3 mentioned in Appendix A (3).
- ✓ Scale 3+1 means the students read the concept of Scale 3 and 4 mentioned in Appendix A (3).
- ✓ Scale 3+1+1 means the students read the concept of Scale 3, 4 and 5 mentioned in Appendix A (3)
- ✓ Scale 2+1+1+1 means the student read the concept of Scale 2,3,4 and 5 mentioned in Appendix A (3)

- ✓ Scale 4+1 C means the student read the concept of Scale 4 and 5 mentioned in Appendix A (3) in Chemistry.
- ✓ Scale 2+1 C means the student read the concept of Scale 2 and 3 of Appendix A (3) in Chemistry
- ✓ 3 B means the student read the concept of scale 3 of Appendix A (3) in Biology
- ✓ 2+1+1 B means the students read the concept of Scale 2,3 and 4 of Appendix A (3) in Biology.
- ✓ 5 P means students read the concepts in of scale 5 of Appendix A (3) in Physics.
- ✓ Scale 1 GK means student reads the concept of scale 1 of Appendix A (3) in the General Knowledge.
- ✓ The text inside the parenthesis ( ) shows from particular scale how many topics student reads.

Source: FS's Book review

The students of FS studied about transportation in Social Science, Geography, General Science and Urdu. Other than these subjects in matric and at intermediate level, students of FS studied about transportation in the subjects of Physics, Chemistry and Biology.

The students of FS studied concepts about transportation which helps to increase their knowledge. They studied about the different modes of transportation, they also study how these transports are responsible for air, water, and noise pollution. With these they studied in -detail how burning of fuel in the transports are responsible for polluting air by releasing pollutants in air, and how these pollutants are responsible for diseases in human beings. The had knowledge about the water pollution of due to leakages of oil tanks from ships into water and how it effects on marine life, how the pollutants are responsible for acid raining and GHG emission and climate change. In the CS's earlier classes students' study about the effect of transportation on environment and advices to avoid the use of cars etc. than in the higher classes' geography they in-detail study about the mode of transportation of Pakistan. In contrast the students of FS in earlier classes studied about mode of transportations and in secondary classes and higher classes students of FS studied about the effects of transportation on environment with the different solutions in-detail like Hybrid technology, uses of convertor in car engine, use of other fuels like ethanol, methanol and biodiesel which are more environmental friendly. Comparatively the students of FS studied more techniques to control pollution from transports as compared to the students of Cambridge system which increases their knowledge and helpful to change

their environmental practices. Like the students of CS, the students of FS do not read about the sustainable transportation and roles of institutions to control the harmful impact of transportation in these subjects.

The students of FS who belongs to pre-medical group study about transportation in three subjects, the students of pre-engineering studied about transportation in two subject's physics and chemistry. While the students of FS of Computer Studies study concepts about transportation only if they choose physics as optional.

4.4. Industry

Concepts about Industry is discussed in detail in both FS and CS. The key concepts that the students of both curriculums read, are displayed in the figure 4.4.

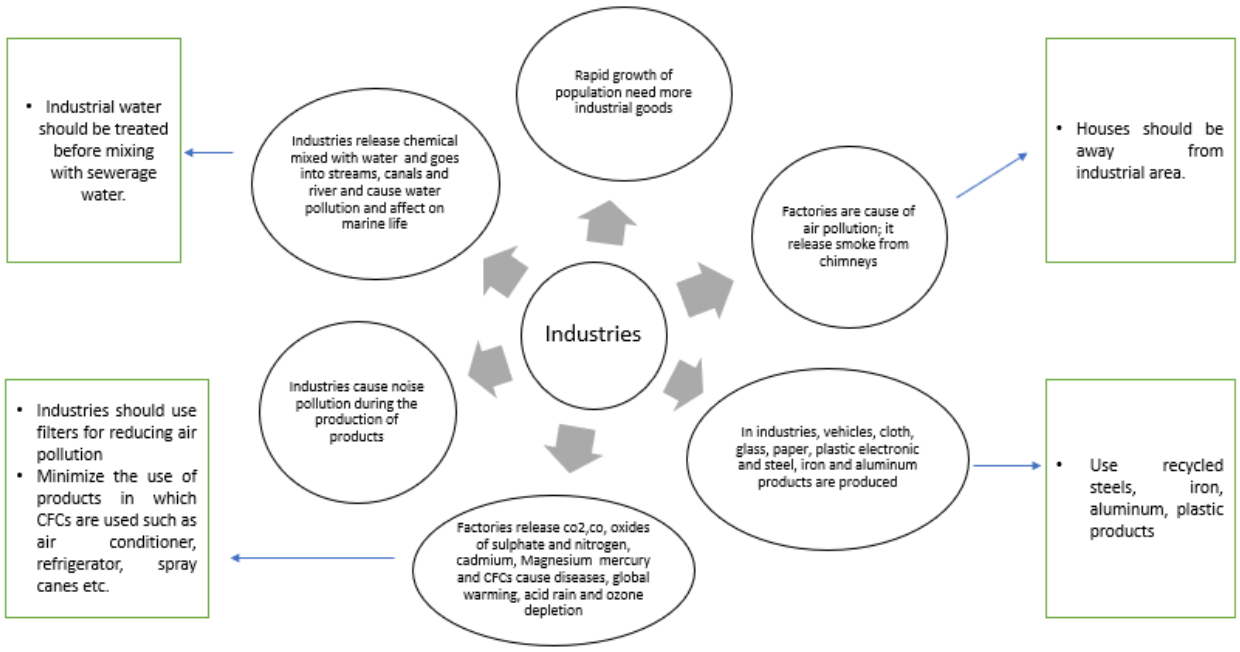

Figure 4.4: Knowledge, Attitude and Advices for Practices about Industry in FS and CS curriculum

Source: Curriculums Review

Figure 4.4 shows the concept that students of FS and CS both read about industries and their effect on environment. The inner circle of figure 4.4 shows the concepts which helps to increase the knowledge of industry such as how the increases with the passage of time effects the environment, which type of industries are more responsible for polluting air, water, and land. Which type of chemicals are released by industries and how it handles global warming. How industries damage the health of human life and cause of GHG emission, Ozone layer depletion, Acid Rain and Global warming. The outer rectangular boxes of figure 4.4 shows the advices which are in the curriculums helps to change their attitude and behavior towards more environmentally friendly.

4.4.1. Concepts Related to Industries in CS

The student of CS studied about the concepts of industries and their effects on environment in the subject of Geography, General Science, and other sciences, and somehow in the subject of Urdu.

Table 4.7: Scale and Topic Related to Industry in Particular Subject and Class in CS

Content/classes	Scale (Geography)	Scale (Science)	Scale (Urdu)	Scale (Other subjects)
Class 1	1 (1)	0	0	-
Class 2	1 (1)	0	0	-
Class 3	1 (1)	1 (1)	0	-
Class 4	2 (1)	1+1 (1+1)	0	-
Class 5	1+1 (1+1)	1+1 (1+1)	0	-
Class 6	0	1+1+1 (1+1+1)	1+1 (1+1)	-
Class 7	0	2+1+1 (2+1+1)	0	-
Class 8	0	2+1+1 (1+1+1)	0	-
O level	3+1 (1+2)	-	0	3+1 C
A Level	1+1+1+1+1 (1+1+2+1+1)	-	0	3+1 C 5 E (1)

- ✓ Scale 0 means the concepts related to industry is not present in the book of particular class.
- ✓ Blank box represented by - shows the student of particular level do not reads those books.
- ✓ Scale 1 means the students only read concept of industry of Scale 1 mentioned in Appendix A (4).
- ✓ Scale 1+1 means student read the concept of Scale 1 and 2 mentioned in Appendix A (4).
- ✓ Scale 1+1+1 means the students read the concept of Scale 1, 2 and 3 mentioned in Appendix A (4).
- ✓ Scale 1+1+1+1+1 means the students read the concept of Scale 1, 2, 3, 4 and 5 mentioned in Appendix A (4).
- ✓ Scale 2 means the students read the concept of Scale 2 mentioned in Appendix A (4).
- ✓ Scale 2+1+1 means the student reads the concept of scale 2,3 and 4 in Appendix (4).
- ✓ Scale 5 E means the student read the concept of Scale 5 mentioned in Appendix A (4) in Economics
- ✓ Scale 3+1 C means student reads the concept of Scale 3 and 4 of Appendix 4) in Chemistry.

The text inside the parenthesis ( ) shows from particular scale how many topics student reads

Source: CS's Book Review

The students of CS studied about industries in 4 main subjects. Geography. General Science and somehow in Urdu. In the O/A-Level they studied about industries in the Chemistry and Economics, if they choose to study.

The students of CS studied about Industries, which helps to increase the knowledge and attitude of students. The students study these industries pollute water, air, and land. The pollutant releases in water pollutes water and smoke comes out of chimney pollutes air. These pollutants are responsible for diseases as well as acid rain, GHG emission and global warming. Water releases from industries when observe in soil, then how it effects on the agriculture. Industries are not only effect human beings; it also effects other living organisms. The also studied about the process of taxation for environmentally polluting industries in the subject of Economics. They studied about the different industries of Pakistan, industrial zones of Pakistan, role of industries in the economy. With all these they also in-detail studied about how with the other industries, brick kiln industry polluting Pakistan. In future, how it would damage the environment in-detail. With all these they also studied about the sustainable industrial development. This kind of knowledge directly helps to increases the knowledge and attitude of CS students, in the earlier classes they studied about advices on selection of residential area. They advices residential house should be away from the factories. They studied about role of International institutions who working for the environment, which give them awareness about the role of the world.

Curriculum Review of CS explores at the topic of industries the students are aware about the industrial important and how it become cause of environment and health. With these they are known about the new terminologies like sustainable industrial development. But it is also observed from the review that the students of CS do not study about the solution to control environmental pollution in detail.

In the O/A-Level the students who study Chemistry, they studied about industries. It means the students of pre-engineering and pre-medical groups studied about industries and those who choose Geography to study in their intermediate. The students of Business group of CS studied about Industries in Economics.

4.4.2. Concepts Related to Industry in FS

Table 4.8: Scale and Topic Related to Industry in Particular Subject and Class in FS

Content/classes	Scale (social study)	Scale (Science)	Scale (Urdu)	Scale (Geography)	Scale (Other sciences)
Class 1	0	0	0	-	-
Class 2	0	0	0	-	-
Class 3	0	1 (1)	1 (1)	-	-
Class 4	1 (1)	1+1+1 (1+1+1)	0	-	-
Class 5	1 (1)	1+1+1+1 (1+1+1+2)	0	-	-
Class 6	-	2+1+1 (1+1+1)	1+1+1 (1+1+1)	0	-
Class 7	-	3+1 (1+2)	1+2 (1+1)	1 (2)	-
Class 8	-	3+1 (2+2)	0	1+1+1 (2+1+1)	
SSC	-	3+1 (2+1)	0	0	3 B (2) 3+1 C (2+2)
HSSC	-			1 PS (1)	2+1+1 B (1+2+1) 1+1+1+1 C (1+1+1+1)

- ✓ Scale 0 means the concepts related to industry is not present in the book of particular class.
- ✓ Blank box represented by - shows the student of particular level do not reads those books.
- ✓ Scale 1 means the students read the concept of Scale 1 mentioned in Appendix A (4).
- ✓ Scale 1+1+1 means the students read the concept of Scale 1, 2 and 3 mentioned in Appendix A (4).
- ✓ Scale 1+1+1+1 means the students read the concept of Scale 1, 2, 3 and 4 mentioned in Appendix A (4).
- ✓ Scale 1+2 means the students read the concept of Scale 1, and 3 mentioned in Appendix A (4).
- ✓ Scale 2+1+1 means the students read the concept of Scale 2, 3 and 4 mentioned in Appendix A (4).
- ✓ Scale 3+1 means the students read the concept of Scale 3 and 4 mentioned in Appendix A (4).
- ✓ Scale 2+1+1+1 B means the students read the concept of Scale 2,3, 4 and 5 mentioned in Appendix A

(4) in Biology.

- ✓ Scale 3+1 C means the student read the concept of Scale 3 and 4 mentioned in Appendix A (4) in Chemistry.
- ✓ Scale 1+1+1+1+1 C means the student read the concept of Scale 1,2 ,3,4 and 5 of Appendix A (4) in Chemistry
- ✓ 3 B means the student read the concept of scale 3 of Appendix A (4) in Biology
- ✓ 2+1+1 B means the students read the concept of Scale 2,3 and 4 of Appendix A (3) in Biology.
- ✓ Scale 1 PS means student reads the concept of scale 1 of Appendix A (4) in the Pakistan study.
- ✓ The text inside the parenthesis ( ) shows from particular scale how many topics student reads.

Source: FS's Book Review

The students of FS read related to industries in three main subjects Geography and Social science, Science and Urdu. Other than these they read concepts of industry in SSC/HSSC Biology, Chemistry and Economics.

The study of FS studied about Industries, which helps to increase the knowledge and attitude of students. The students study these industries pollute water, air, and land. The pollutant releases in water pollutes water and smoke comes out of chimney pollutes air. These pollutants are responsible for diseases as well as acid rain, GHG emission and global warming. Water releases from industries when observe in soil, then how it effects on the agriculture. Industries are not only effect human beings; it also effects other living organisms. They in-detail studied about the different pollutants released from different industries, how they affect environment. The effect of industrial production on Ozone layer was also part of FS curriculum. Main areas of Pakistan which effected by industrial pollution. The also studied about the process of taxation for environmentally polluting industries in the subject of Economics. They also study about the major industries of Pakistan and their role in the development of Pakistan. In addition, the students of CS also studied concepts which directly helpful to change their practices, such as curriculum advices about using of recycled products, wastage of industrial products. And Industries should be far away from their residential area.

Student of FS do not studied about the role of institutions to prevent the industrial pollution and save the human from the circumstances of industrial pollution. And they also unaware about new terminologies like sustainable industrial development as the discussed the curriculum of CS.

The students of FS studied about the Industries and their effect on environment and health studied in Biology and Chemistry, the students of pre-medical studied about industries in two subject while the students of Pre-engineering studied about industries just in one subject. The student of FS of Business group and Computer studies group do not studied about industries at the level of intermediate.

4.5. Solid Waste

Concepts about Solid wastes are present in detail in both FS and CS. The key concepts that the students of both curriculums read, are displayed in the figure 4.5.

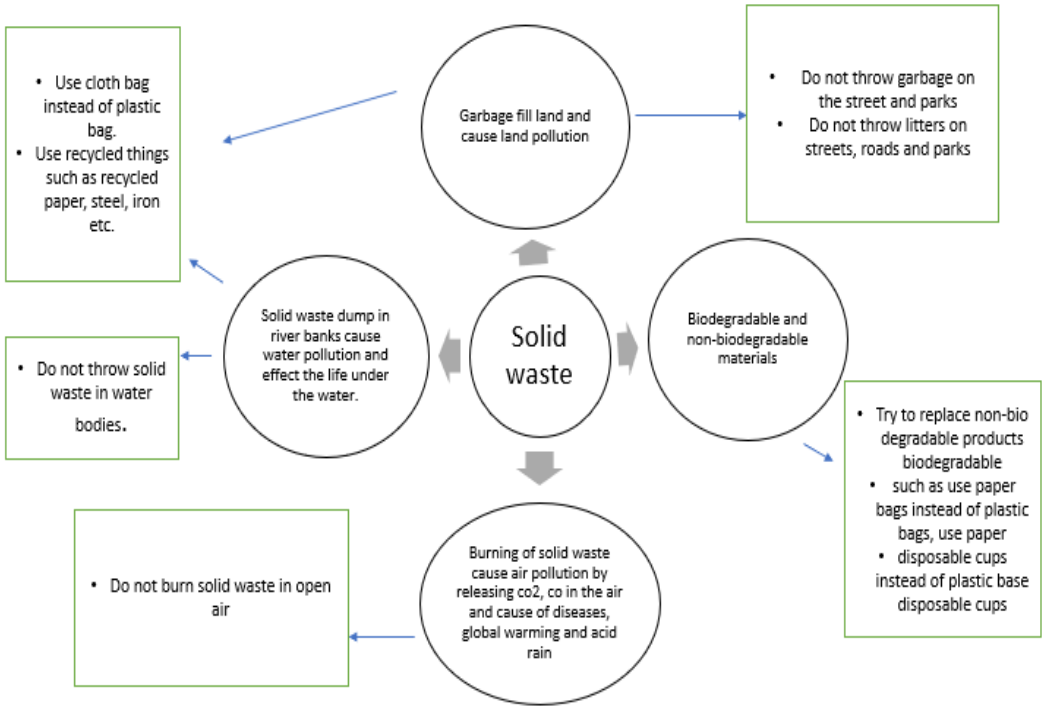

Figure 4.5: Knowledge, Attitude and Advices for Practices about Solid Waste in FS and CS curriculum

Source: Curriculums Review

Figure 4.5 shows the concept that students of FS and CS read which helps to change their Knowledge and behavior. The inner circle of figure 4.5 shows the concept how garbage fills the land and cause of Land pollution. And how the solid wastes are also responsible for Air and water pollution. What are biodegradable and non-biodegradable material. From these which types of waste are easily decomposable. How burning of solid waste responsible for global warming and acid rain and effect on human health and marine life. The outer rectangular boxes of figure 4.5 show the knowledge which directly helps individuals to change their behavior.

4.5.1. Concept Related to Solid Waste in CS

Table 4.9: Scale and Topic Related to Solid Waste in Particular Subject and Class in CS

Content/classes	Scale (Geography)	Scale (Science)	Scale (Urdu)	Scale (Other subjects)
Class 1	1 (1)	0	0	-
Class 2	1+1	0	0	-
Class 3	2+1 (3+1)	1+1 (2+1)	0	-
Class 4	3 (1)	1+1 (2+1)	0	-
Class 5	2+1 (1+1)	3 (1)	1+1 (1+1)	-
Class 6	0	2+1+1+1 (3+1+1)	0	-
Class 7	0	2+1+1+1 (1+1+1+1)	0	-
Class 8	0	2+1+1+1 (3+1+1)	0	-
O level	0	-	3	0
A Level	0	-	-	5 C (1)

Notes
- ✓ Scale 0 means the concepts related to solid waste is not present in the book of particular class.
- ✓ Blank box represented by - shows the student of particular level do not reads those books.
- ✓ Scale 1 means the students read the concept of Scale 1 mentioned in Appendix A (5).
- ✓ Scale 1+1 means the students read the concept of scale 1 and 2 mentioned in Appendix A (5).
- ✓ Scale 2+1 means the student read the concept of scale 2 and 3 mentioned in Appendix A (5).
- ✓ Scale 2+1+1+1 means the students read the concept of scale 2,3,4 and 5 of Appendix (5)
- ✓ Scale 3 means student read the concept only of Scale 3 mentioned in Appendix (5)
- ✓ Scale 4 C means the students read the concept of scale 4 mentioned in Appendix A (5) in chemistry.
- ✓ The text inside the parenthesis ( ) shows from particular scale how many topics student reads.

Source: CS's Book Review

The students of CS studied concepts on Solid waste in three main subjects such as Geography, Science and Urdu. Other than this they studied about solid waste in of A level's Chemistry.

The students of CS who studied about solid waste in helps to increase their knowledge, when they studied about effect of solid waste on environment. They studied how the solid waste cause pollution by filling land and also a cause of water pollution when filled the water bodies with solid waste. Additionally, they studied how the open-air burning process of solid waste pollute air, effect on human health by causing diseases, and effecting on climate change by producing GHG, and cause of Acid rain. This concept gives them knowledge about how the solid waste is the problem for current and future generation. With all these they also studied about the biodegradable and non-biodegradable material in-detail, such a kind of kind would be helpful for students to change their practices to reduce the effect of solid waste on environment. In their earlier classes, they studied advices about where to dump garbage by individual, it would help to change the practices of students. in advanced classes they studied about the process of recycling and how it would be useful to save planet.

In the A-Level, the students of CS studied about the concept of solid waste just in Chemistry.

4.5.2. Concepts Related to Solid waste in FS

Table 4.10: Scale and Topic Related to Solid Waste in Particular Subject and Class in FS

Content/classes	Scale (social study)	Scale (Science)	Scale (Urdu)	Scale (Geography)	Scale (Other sciences)
Class 1	1 GK (1)	0	0	-	-
Class 2	0	0	0	-	-
Class 3	1 (1)	1+1 (1+1)	0	-	-
Class 4	1+1 (1+1)	1+1 (1+1)	0	-	-
Class 5	0	1+1+2 (1+1+1)	0	-	-
Class 6	-	2 (1)	0	0	-
Class 7	-	3 (1)	2+2 (1+1)	1+1 (1+1)	-
Class 8	-	3+1 (1+1)	0	1+1 (1+1)	
SSC	-	2+3 (1+1)	0	0	3 B (1) 5 C (1)
HSSC	-	-	0	0	2+1+2 B (1+1+1) 2+3 C (1+1)

Notes
- ✓ Scale 0 means the concepts related to solid waste is not present in the book of particular class.
- ✓ Blank box represented by - shows the student of particular level do not reads those books.
- ✓ Scale 1 means the students read the concept of Scale 1 mentioned in Appendix A (5).
- ✓ Scale 1+1 means the students read the concept of scale 1 and 2 mentioned in Appendix A (5).
- ✓ Scale 1+1+2 means the students read the concept of scale 1,2 and 4 mentioned in Appendix A (5).
- ✓ Scale 2+3 means the students read the concept of scale 2 and 5 mentioned in Appendix A (5).
- ✓ Scale 2+2 means the students read the concept of scale 2 and 4 of Appendix (5)
- ✓ Scale 3 means students read the concept only of Scale 3 mentioned in Appendix (5)
- ✓ Scale 3+1 means the student read the concept of scale 3 and 4 mentioned in Appendix A (5)
- ✓ Scale 3 B means the students read the concept of scale 3 mentioned in Appendix A (5) in the Biology.
- ✓ Scale 5 C means the students read the concept of scale 5 mentioned in Appendix A (5) in chemistry.
- ✓ Scale 2+1+2 B means the students read the concept of scale 2,3 and 5 of Appendix A (5) in Biology
- ✓ Scale 2+3 C means student read the concept of scale 2 and 5 of Appendix A (5) in Chemistry
- ✓ The text inside the parenthesis ( ) shows from particular scale how many topics student reads.

Source: Book Review

The students of FS studied about Solid waste in three main subjects Social Science and Geography, Science and Urdu. Other than these they studied concepts of Solid waste in SSC/HSSC Biology and Chemistry.

The students of FS who studied about solid waste in helps to increase their knowledge, when they studied about effect of solid waste on environment. Like the CS, They studied how the solid waste cause pollution by filling land and also a cause of water pollution when filled the water bodies with solid waste. Additionally, they studied how the open-air burning process of solid waste pollute air, effect on human health by causing diseases, and effecting on climate change by producing GHG, and cause of Acid rain. This concept gives them knowledge about how the solid waste is the problem for current and future generation. With all these they also studied about the biodegradable and non-biodegradable material in-detail, such a kind of kind would be helpful for students to change their practices to reduce the effect of solid waste on environment. In their earlier classes, they studied advices about where to dump garbage by individual, it would help to change the practices of students. in advanced classes they studied about the process of recycling and how it would be useful to save planet.

The students of FS systems studied in-detail about the dumping of garbage, they studied about the different techniques like incineration used in the west. Additionally, they studied about the role of government and local authorities in the dumping process. This information will be helpful for them to know the role of institutions while the students of CS do not studied about process of dumping and role of government in-detail. The students of FS studied about solid waste in more detail as compared to the students of CS.

The students of FS who belong to pre-medical group studied about solid waste in two subjects Biology and Chemistry, and students of Pre-Eng., group studied about the

solid waste just in Chemistry. While the students of Computer Studies and Student of Business studies do not studied about solid waste in the level of intermediate.

4.6. Energy

Concepts about Energy are discussed in detail in both FS and CS. The key concepts that the students of both systems read, are displayed in the figure 4.6.

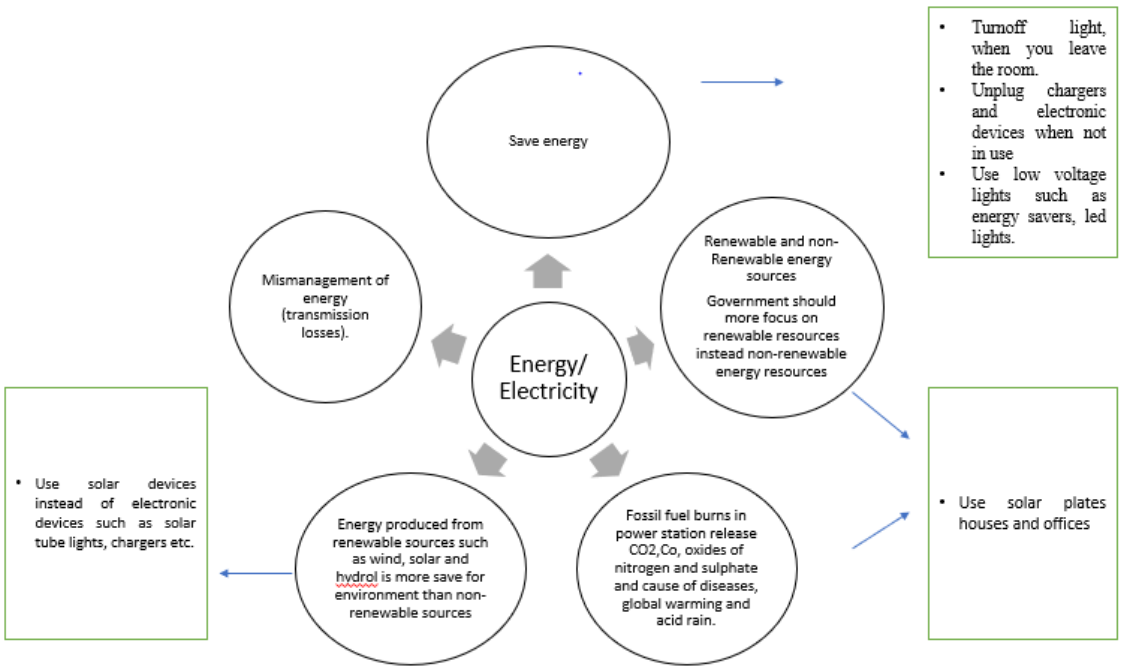

Figure 4.6: Knowledge, Attitude and Advices for Practices about Energy in FS and CS curriculum

Source: Curriculum Review

Figure 4.6 shows the concept that students of FS and CS read about the energy in their throughout educational journey. The inner circle of figure 4.6 shows the concept about the knowledge of energy, which type of energy resource is renewable and which is non-renewable. How burning of fossil fuels pollute air and cause of Global warming and Acid rain. How such types of pollutant and other pollutants from the resources of energy effect on the health of living organisms? What is way to save energy, which type of resources should be used by government. The outer rectangular boxes of figure 4.6 shows

the advices which are present in the curriculum which helps to change behavior of the students.

4.6.1. Concepts Related to Energy in CS

Table 4.11: Scale and Topic Related to Energy in Particular Subject and Class in CS

Content/classes	Scale (Geography)	Scale (Science)	Scale (Urdu)	Scale (English)	Scale (Other subjects)
Class 1	0	0	0	0	-
Class 2	0	2	0	0	-
Class 3	0	2 (1)	0	0	-
Class 4	1+1 (1+1)	1+3 (1+2)	0	0	-
Class 5	1+2 (2+1)	2+1+1 (1+1+1)	0	0	-
Class 6	0	3+1 (2+1)	0	4+1 (3+1)	-
Class 7	0	3+1 (2+2)	3 (2)	0	-
Class 8	0	3+1 (2+3)	0	0	-
O level	3+1+1 (3+1+4)	-	0	0	3+1+1 P (2+1+3)
A Level	3+1+1 (4+2+4)	-	0	0	3+1+1 P (2+3+2)

Note:

- ✓ Scale 0 means the concepts related to Energy is not present in the book of particular class.
- ✓ Blank box represented by - shows the student of particular level do not reads those books.
- ✓ Scale 1+1 means the students read the concept of scale 1 and 2 mentioned in Appendix A (6).
- ✓ Scale 1+2 means the students read the concept of scale 1 and 3 mentioned in Appendix A (6).
- ✓ Scale 1+3 means the students read the concept of scale 1 and 4 mentioned in Appendix A (6).
- ✓ Scale 2 means the students read the concept of scale 2 only mentioned in Appendix A (6).
- ✓ Scale 2+1+1 means the students read the concept of scale 2, 3 and 4 mentioned in Appendix A (6).
- ✓ Scale 3+1 means the student read the concept of scale 3 and 4 mentioned in Appendix A (6)
- ✓ Scale 3+1+1 means the students read the concept of scale 3, 4 and 5 of Appendix A (6)
- ✓ Scale 3+1+1 B means the students read the concept of scale 3,4 and 5 mentioned in Appendix A (6) in the Biology.
- ✓ Scale 3+1+1 P means the students read the concept of scale 3,4 and 5 mentioned in Appendix A (6) in the Physics

- ✓ Scale 4+1 means student read the concept of scale 4 and 5 of Appendix A (6)
- ✓ The text inside the parenthesis ( ) shows from particular scale how many topics student reads.

Source: CS's Books Review

The students of CS studied about Energy in four main subjects such as Geography, Science, Urdu, and English. Other than this they read about Energy in Chemistry of O/A level's Biology and Physics.

The students of CS studied about Energy which helps to increase their knowledge and attitude, they studied about how the production of energy effecting environment, they studied about different sources of energy such as renewable and non-renewable source of energy. The students of CS studied about how these sources of energy are the causes of acid rain, GHG emission and global warming. The student of CS in-detail studied about the different type of energy production with their effects on environment, this kind of knowledge increase the awareness in students about the environmentally friendly energy sources. They also studied in-detail about the potential of different source of energy in Pakistan. In additionally, they studied mismanagement of energy, transmission loss, grid system of Pakistan in-detail such kind of knowledge helps students to increase knowledge on the wastage of power at the production side. They studied the role of national institution in the production and transmitting of power.

The study of CS, also studied the concepts which directly helps the students to change their practices towards environmentally friendly practices through the advices on the energy wastages such as when leave the room, close lights, use energy saving lights, use solar devices etc.

The students of CS who studied about energy in the Physics of O/A-Level, which is studied by the group of pre-medical, pre-engineering, and computer science etc. the student of Business Studies do not studied about concepts of energy.

4.6.2. Concepts Related to Energy in FS

Table 4.12: Scale and Topic Related to Energy in Particular Subject and Class in FS

Content/classes	Scale (social study)	Scale (Science)	Scale (Urdu)	Scale (Geography)	Scale (Other sciences)
Class 1	0	0	0	-	-
Class 2	1 GK (1)	0	0	-	-
Class 3	1 (1)	0	0	-	-
Class 4	1 (1)	0	0	-	-
Class 5	0	3 (1)	0	-	-
Class 6	-	3+1 (1+1)	0	1 (1)	-
Class 7	-	4 (1)	0	3 (1)	-
Class 8	-	2+1+1 (1+1+1)	0	3+1 (1+1)	
SSC	-	3+1 (1+2)	0	-	3 B (1) 3+1 C (1+1)
HSSC	-	-	0	1 PS (1)	1+1+1+1 B (1+1+1+1) 2+1 C (1+1)

- ✓ Scale 0 means the concepts related to Energy is not present in the book of particular class.
- ✓ Blank box represented by - shows the student of particular level do not reads those books.
- ✓ Scale 1 means the students read the concept of scale 1 mentioned in Appendix A (6).
- ✓ Scale 1 GK means the students read the concept of scale 1 mentioned in Appendix A (6) in the subject of General Knowledge.
- ✓ Scale 2+1+1 means the students read the concept of scale 2, 3 and 4 mentioned in Appendix A (6).
- ✓ Scale 3 means the students read the concept of scale 3 only mentioned in Appendix A (6).
- ✓ Scale 3+1 means the student read the concept of scale 3 and 4 mentioned in Appendix A (6)
- ✓ Scale 4 means the students read the concepts of only scale 4 of Appendix A (6).
- ✓ Scale 3+1 C means the student read the concept of scale 3 and 4 mentioned in Appendix A (6) in the Chemistry.
- ✓ Scale 2+1 C means the student read the concept of scale 2 and 3 mentioned in Appendix A (6) in the Chemistry
- ✓ Scale 1+1+1+1 B means the students read the concept of scale 1,2, 3 and 4 of Appendix A (6) in the Biology
- ✓ Scale 1 PS means the students read the concept of scale 1 mentioned in Appendix A (6) in the Pakistan studies.
- ✓ Scale 3 B means student read the concept of scale 3 of Appendix A (6) in the Biology.
- ✓ The text inside the parenthesis ( ) shows from particular scale how many topics student reads.

Source: FS's Books Review

The students of FS studied about Energy in three main subjects Social Science and Geography, Science and Urdu. Other than these they studied concepts of Energy in SSC/HSSC Biology and Chemistry.

The students of FS studied about Energy which helps to increase their knowledge and attitude, Just like the CS, they studied about how the production of energy effecting environment, they studied about different sources of energy such as renewable and non-renewable source of energy. The students of CS studied about how these sources of energy are the causes of acid rain, GHG emission and global warming. Unlike the CS, the student of FS does not in-detail study about the different type of energy production with their effects on environment, expect the few types of energy and their effects on environment. this kind of knowledge is required to increase the awareness in students about the environmentally friendly energy sources. They also studied in-detail about the potential of different source of energy in Pakistan. Additionally, they studied about mismanagement of energy, transmission losses, grid system of Pakistan. They studied the role of national institution in the production and transmitting of power. Like the CS, the study of FS, also studied the concepts which directly helps the students to change their practices towards environmentally friendly practices through the advices on the energy wastages such as when leave the room, close lights, use energy saving lights, use solar devices etc.

The students of FS who studied about energy in the Chemistry in the intermediate. which are studied by the group of pre-medical, pre-engineering. The student of pre-medical group studied both subjects while the students of Pre-Engineering group only studied chemistry. The student of Business Studies and Computer Studies does not studied about concepts of energy.

4.7. Food and Agriculture:

Concepts about Food and Agriculture are discussed in detail in both FS and CS. The key concepts that the students of both curriculums studied, are displayed in the figure 4.7.

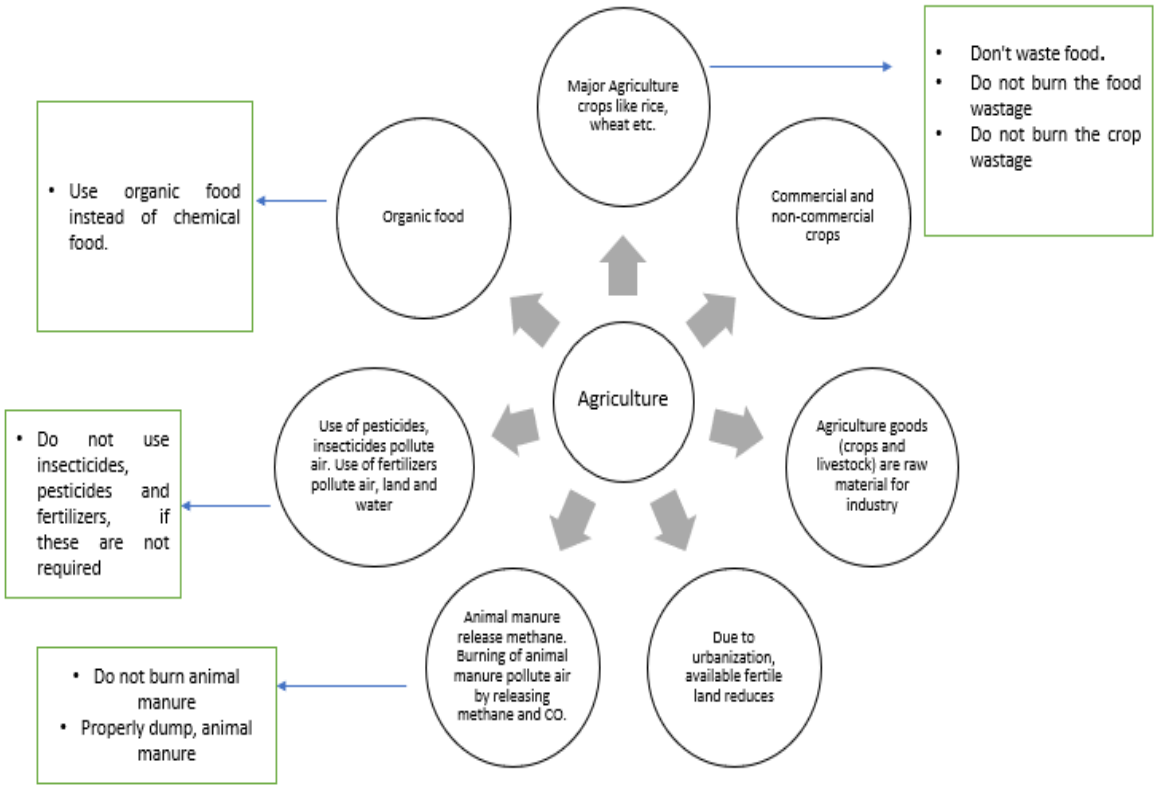

Figure 4.7: Knowledge, Attitude and Advices for Practices about Food and Agriculture in FS and CS curriculum

Source: Book Review

Figure 4.7 shows the concept that students of FS and CS read food and agriculture. The inner circle of figure 4.7 shows the concept about the knowledge of Food and Agriculture, commercial and non-commercial crops, how agriculture good used as raw material for industry. how the pesticides and chemical fertilizers handle air, land, and water pollution and how it effects on human health. How the burning of crops and animal manure increases pollute air and cause of climate change. How to organic food is better

than chemical food. The outer rectangular boxes of figure 4.7 shows the advices which are present in the curriculum helps to change the attitude and behavior of the students.

4.7.1. Concepts Related to Food and Agriculture in CS

Table 4.13: Scale and Topic Related to Food and Agriculture in Particular Subject and Class in CS

Content/classes	Scale (Geography)	Scale (Science)	Scale (Urdu)	Scale (Other subjects)
Class 1	0	0	0	-
Class 2	1 (1)	0	0	-
Class 3	3 (1)	0	0	-
Class 4	4 (1)	0	3 (1)	-
Class 5	0	4 (1)	0	-
Class 6	4 (1)	3+1 (1+1)	0	-
Class 7	4 (2)	3+1 (1+1)	0	-
Class 8	4 (3)	4 (2)	0	-
O level	1+1+1+1 (1+1+1+1)	-	0	0
A Level	1+1+1+1+1 (1+1+1+1+1)	-	0	0

Notes
- ✓ Scale 0 means the concepts related to Food and Agriculture is not present in the book of particular class.
- ✓ Blank box represented by - shows the student of particular level do not reads those books.
- ✓ Scale 1 means the students read the concept of scale 1 mentioned in Appendix A (7).
- ✓ Scale 3 means the students read the concept of scale 3 mentioned in Appendix A (7).
- ✓ Scale 4 means the students read the concept of scale 4 only mentioned in Appendix A (7).
- ✓ Scale 3+1 means the student read the concept of scale 3 and 4 mentioned in Appendix A (7)
- ✓ Scale 1+1+1+1 means the students read the concept of scale 1,2,3 and 4 of Appendix A (7)
- ✓ Scale 1+1+1+1+1 means the students read the concept of scale 1,2, 3,4 and 5 mentioned in Appendix A (7).
- ✓ The text inside the parenthesis ( ) shows from particular scale how many topics student reads.

Source: CS's Books Review

The students of CS studied about Food and Agriculture in three main subjects such as Geography, Science, and Urdu.

The students of CS studied about the food and Agriculture, which helps to increase their knowledge and attitude towards environment. They studied how animal waste and fertilizers and pesticides used in cropping responsible for land, water and air pollution. And how these chemicals are responsible for global warming and acid rain. The chemical released from fertilizers industry and burning of crop wastage are the major factor of GHG emission. Additionally, they studied about how these fertilized food effect on the health of human beings. Other than these they also studied about how the animal waste are also cause of land pollution and burning of animal waste cause air pollution and also cause of global warming. the over grazing by animals converts the fertile land into dessert. In the Geography of O/A level students studied how the population pressure increase the demand for food and the concept of Organic agriculture, sustainable agriculture in-detail. The students of CS also studied those concepts which helps to increase their practices towards more environmental oriented. They studied advices such as do not waste food, do not burn the animal waste, do not burn the crops wastes etc.,

The students of Intermediate of CS, do not studied about agriculture in the subject of Biology, and Chemistry etc.

4.7.2. Concepts Related to Food and Agriculture in FS

Table 4.14: Scale and Topic Related to Food and Agriculture in Particular Subject and Class in FS

Content/classes	Scale (social study)	Scale (Science)	Scale (Urdu)	Scale (Geography)	Scale (Other sciences)
Class 1	0	0	0	-	-
Class 2	1 GK (1)	0	0	-	-
Class 3	1 (1)	0	1 (2)	-	-
Class 4	1 (1)	0	0	-	-
Class 5	1 (1)	2+1+1 (1+1+1)	0	-	-
Class 6	-	2+1+1 (1+1+1)	0	1 (2)	-
Class 7	-	3+1 (1+2)	1 (2)	1 (2)	-
Class 8	-	3+1 (1+1)	0	2+1+1 (1+1+1)	
Matric	-	1+1+1+1 (1+2+2+1)	0	0	4 C (1)
Intermediate	-	-	0	0	3+1 B (2+2) 2+1 C (1+1) 3+1 B (2+3)

- ✓ Scale 0 means the concepts related to Food and Agriculture is not present in the book of particular class.
- ✓ Blank box represented by - shows the student of particular level do not reads those books.
- ✓ Scale 1 means the students read the concept of scale 1 mentioned in Appendix A (7).
- ✓ Scale 2+1+1 means the students read the concept of scale 2,3 and 4 mentioned in Appendix A (7).
- ✓ Scale 3+1 means the student read the concept of scale 3 and 4 mentioned in Appendix A (7)
- ✓ Scale 1+1+1+1 means the students read the concept of scale 1,2,3 and 4 of Appendix A (7)
- ✓ Scale 4 C means the students read the concept of scale 4 only mentioned in Appendix A (7) in Chemistry.
- ✓ Scale 2+1 C means the students read the concept of scale 2 and 3 of Appendix A (7) in the Chemistry.
- ✓ Scale 3+1 B students read the concept in scale 3 and 4 of Appendix A (7) in Biology.
- ✓ The text inside the parenthesis ( ) shows from particular scale how many topics student reads.

Source: FS Book Review

The students of FS studied about Food and Agriculture in three main subjects Social Science and Geography, Science and Urdu. Other than these they studied concepts of Food and Agriculture in SSC/HSSC Biology and Chemistry.

The students of FS just like the students of CS studied about the food and Agriculture, which helps to increase their knowledge. they studied how animal waste and fertilizers and pesticides used in cropping responsible for land, water and air pollution. And how these chemicals are responsible for global warming and acid rain. The chemical released from fertilizers industry are the major factor of GHG emission. Additionally, they studied about how these fertilized food effect on the health of human beings. Other than these they also studied about how the animal waste are also cause of land pollution and the over grazing by animals converts the fertile land into dessert. But they do not study the concepts like sustainable agriculture and organic agriculture unlike the CS.

Students of FS, studied about the different crops of Pakistan, and their effect on the economy of Pakistan in-detail. It seems from the review of textbooks of FS, the students of FS at their primary and secondary classes more studied the crops of Pakistan, but in the curriculum of CS, they more studied about the effects of fertilizers, pesticides and other animal wastes on the environment. but in the matric and intermediate biology and Chemistry. They repeatedly studied about the effects of fertilizers, pesticides on the health of environment and on human beings. Like the students of CS, the students of FS studied about those concepts which helps to increase their practices towards more environmental oriented. They studied advices such as do not waste food, do not burn the animal waste, do not burn the crops wastes etc.,

The students of pre-medical group of FS studied about agriculture and food in two subjects, Biology and Chemistry. And Students of Pre-Engineering studied about

agriculture, just in Chemistry. While the students of Business Studies and Computer Studies do not study about food and agriculture in their curriculum.

4.8. Conclusion

The review of books of FS and CS through the content analysis, shows both the curriculum contain the concepts on seven priority areas of study such as Water, Transportation, Forestation, Solid Waste, Industry, Energy, Food and Agriculture.

The students of CS mainly studied the concepts on environmental sustainability in the Geography and General Science before the O/A-level and in the O/A-Level they studied most of the concepts in Geography, Physics and Chemistry. While the students of FS mainly studied the concepts in Social Science, Geography and General Science before the SSC/HSSC. In the SSC and HSSC, they studied most of the concepts in Biology, Physics, and Chemistry. Additional students from both systems somehow studied the concepts on environmental sustainability in Urdu and English. And in the subject of Urdu and English they mostly studied those concepts which are already studied by them in the Geography or General Sciences.

The students of both systems studied almost all the main concepts but, I found that some concepts are in more detail present in the books of CS and other are in more detail present in the FS such as the concepts about water, forestation, Energy and Food and Agriculture are more detail present in CS as compared to FS while the transportation and solid waste are in detail present in the FS. it is also found the students of Federal Systems was unaware about the sustainability terms, in contrast the students of CS were not only aware about the sustainability term they were also studied in-detail about agriculture sustainability, water sustainability, industrial environment sustainability. The students of CS were also studied about the new world scenarios such as wind power generation by Europe and organic farming by west in-depth. the course of intermediate level of federal

system was update before 2001 which is almost 2 decades and due to this reason, there is the huge gap in the present knowledge of FS students and CS students at the higher secondary level.

By the curriculum review it is also founded, the students who belongs to pre-medical group studied more concepts on environment sustainability. They studied concepts in three subjects Biology, Chemistry and somewhere in Physics while the students who belongs to pre-engineering group studied concepts on environmental sustainability in two subjects Physics and Chemistry. Students of Pre-Engineering and Premedical studied more than the students of Business Study. The students of Computer studies studied the concepts on environmental sustainability just in Physics or Economics. And students who belongs to Business Study just studied the few concepts on environmental Sustainability in Economics.

Chapter 5

Environmental Knowledge, Attitude and Practices

I compared the ideal score of environmental knowledge, environmental attitude and practices with the current score of environmental knowledge, environmental attitude and practices. For comparison after the review of book and development of ideal type EK score and EA ideal and EP ideal score as the mention in the section 3.2, chapter 3, I surveyed from 1109 last year students of FS and CS. 765 from FS and 344 from CS. In FS out 765, 384 respondents were female, and 381 respondents were male. In CS out of 344, 148 were female and 196 were male.

Table 5.1: Gender Ratio of Respondents in FS and CS

		Education system (Federal/Cambridge)		Total
		Federal	Cambridge	
Gender	Female	384	148	532
	Male	381	196	577
Total		765	344	1109

Source: Field Survey

In FS out of 765, 413 students were those who studied in public sector collages and 352 were those who studied in Private sector collages. CS is the private system, so all the 344 respondents were belonging to private sector.

Table 5.2: Public/Private Ratio of Respondents in FS and CS.

		Education system (Federal/Cambridge)		Total
		Federal	Cambridge	
Private/ Public	Public	413	0	532
	Private	352	344	577
Total		765	344	1109

Source: Field Survey

In the FS, out of 765, 260 respondents were belonging to Pre-medical group, 332 belonging to Pre-Eng. Group, 133 were belonging to ICS group and 40 were belonging to commerce/ business group of studies. In the CS, out 344 respondents, 122 students were

belonging to pre-medical group, 147 were belonging to Pre-Eng. Group, 33 were belonging to Computer studies, and 42 were belonging to Business group of studies.

Table 5.3: Pre-Eng., Pre-med, ICS and ICom Respondents ratio in FS and CS

Major Subjects of Study	Education system (Federal/Cambridge)		Total
	Federal	Cambridge	
Pre-medical	260	122	382
Pre-Eng.	332	147	479
ICS/Com. Studies	133	33	166
ICom/Business	40	42	82
Total	765	344	1109

Source: Field Survey

5.1. Ideal Scores and their comparison with respondent's knowledge, Attitude and Practices

The actual score on EK, EA and EP of students of FS and CS are compared with the ideal score (for ideal score see section 3.2 of Chapter 3.) of EK, EA and EP.

In the section 3.2.1.1, it is mention that the ideal score for EK is 7 Of both system (FS and CS), only 27 students from FS out of 765 and 25 students from CS out of 344 have ideal EK.

Table 5.4: Respondent's EK in FS and CS

Environmental Knowledge	Education system (Federal/Cambridge)		Total
	Federal	Cambridge	
00	8	1	9
1.00	34	10	44
2.00	71	16	87
3.00	143	48	191
4.00	245	84	329
5.00	159	101	260
6.00	78	59	137
7.00	27	25	52
Total	765	344	1109

Source: Field Survey

Table 5.4 shows only 3.5% respondents of FS have ideal EK while the 7.26% respondents of CS have ideal EK, the more students from CS have ideal EK as compared

to FS. This comparison also shows that from both systems there are only 0.8% students who had no environmental knowledge.

Table 5.5: Respondent's EA in FS and CS

Environmental Attitude	Federal/Cambridge		Total
	Federal	Cambridge	
41-50	6	9	15
51-60	119	54	173
61-70	428	165	593
71-80	203	109	312
81-90	9	7	16
Total	765	344	1109

Source: Field Survey

In the section 3.2.1.2, it is mention that the ideal score for EA is 100 and minimum score for EA is 20. The result of the table 5.5 shows from both system FS and CS, no one have the ideal score 100 in EA and no one exactly at the minimum score 20 in EA.

Table 5.6: Respondent's EP Score of FS and CS

Environmental Practices	Federal/Cambridge		Total
	Federal	Cambridge	
31-40	3	2	5
41-50	12	28	40
51-60	70	82	152
61-70	254	118	372
71-80	299	87	386
81-90	110	22	132
91-100	15	3	18
101-110	2	1	3
111-120	0	1	1
Total	765	344	1109

Source: Field Survey

In the section 3.2.1.3, it is mention that the ideal score for EA is 125 and minimum score for EA is 22. The result from the table 5.6 shows that from both system FS and CS, no one have the ideal score 125 of EP and no one exactly at the minimum score 22 for EP.

Conclusion:

It is shown by the calculation of percentage the more respondents of CS are presently have more ideal knowledge as compared to respondents belongs to FS. but not a single one student from FS and CS have Ideal EA and EP.

5.2. Accessing the Impact of Knowledge, Attitude and Practices "Results and Discussions"

5.2.1. The Impact of EK and Other factors on EA of Students

To access the impact of EK on EA, I developed a model which also includes some background factors those helps to find out the difference between the EA of male and female, Private and Public system, EA of CS and FS students, EA of students of ICom /Business Studies and Pre-Medical, ICom/Business Studies and Pre-Eng., ICom/Business Studies and ICS.

In this model male, Private system, CS and ICom/Business Studies was used as a Reference Category. The econometric model is as the below.

$$EA = \beta_o + \beta_1 EK + \beta_2 DF + \beta_3 DFS + \beta_4 DPbS + \beta_5 DPM + \beta_6 DPE + \beta_7 DICS + \beta_8 S_{DI} + e \ldots. (1)$$

5.2.1.1. Results and Analysis

Table 5.7: ANOVA table, The Impact of EK and other factors on EA of students.

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	3783.094	8	472.887	11.420	.000[b]
	Residual	45550.179	1100	41.409		
	Total	49333.273	1108			

a. Dependent Variable: Environmental Attitude
b. Predictors: (Constant), Self-declared interest, Pre-Engineering, Federal System, Female Environmental Knowledge, ICS, Public System, Pre-Medical

Source: Field Survey

Table 5.8: Summary of the model, The Impact of EK and other factors on EA of students.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.277[a]	.077	.070	6.43500

a. Predictors: (Constant), ICS, Public/ Private, Female/Male, Self-declared interest, Environmental Knowledge, Pre-engineering, Federal/ Cambridge, Premedical

Source: Field Survey

The model is overall significant as shown in table 5.7, The table 5.8 shows the value of R square is 7 percent which shows that the 7% variation in Environmental Attitude is due to independent variables.

Table 5.9: Coefficients, The Impact of EK and other factors on EA of students.

	Unstandardized Coefficients		Standardized Coefficients	t
	B	Std. Error	Beta	
(Constant)	58.985	1.090		54.093
Environmental knowledge	0.873	0.154	0.190	5.683
Self-declared interest	0.700	0.207	0.100	3.390
Female	-.415	.397	-.031	-1.045
Federal System	-.306	.491	-.021	-.623
Public System	.545	.463	.040	1.177
Pre-medical*	2.433	.847	.173	2.872
Pre-Engineering*	1.763	.790	.131	2.231
ICS*	1.297	.879	.069	1.475
Pre-medical**	1.266	.661	.090	2.017
Pre-Engineering**	0.605	.592	.045	1.023
Business Studies**	-0.961	.900	-0.36	-1.068
Pre-medical***	.702	.467	.050	1.503
Business Studies***	-1.491	.819	-0.56	-1.821
Computer Studies***	-.389	.598	-021	-6.51

Dependent Variable: Environmental Attitude.
Reference Categories: Male, Cambridge System, Private
*Reference Category: Business Studies
**Reference Category: Computer Studies
***Reference Category: Pre-Engineering

Source: Field Survey

5.2.1.1.1. The Impact of EK on EA

The table 5.9 shows the result is significant because the value of $|tcal| \geq 2$, Which means as the environmental knowledge increases by one score then the environmental attitude increase by 0.8 score and vice versa.

5.2.1.1.2. The Impact of SDI (Self-declared interest on Environment) on EA

The result is significant because the value of |tcal| ≥ 2, which means as the self-declared interest on Environmental sustainability increases, the one level increase in self-declared interest on environmental sustainability leads to 0.7 score increase in environmental attitude.

5.21.1.3. Access the Impact of Male and Female on EA

The male as reference category used in this model, therefor the value of β_o is the co-efficient for male which is 58.98 as shown in table 5.9. It shows that on average environmental attitude of male will be increase by 58.985 Score. And the dummy assigned for Female =1. Therefore, there value of coefficients is 58.57. It shows that the on average environmental attitude of female is 58.57 score. The difference between male and female Score on environmental attitude is -.415, but the result is not significant as shown in table 5.9 the value |tcal| is -1.045 < than 2 which shows there is difference no between environmental attitude of female and male.

The Impact of Education systems on EA

5.2.1.1.4. The Impact of Education system (Federal and Cambridge) on EA

The reference category in this case is Cambridge System (CS), the value of β_o is the 58.98 as shown in table 5.9. It shows that on average environmental attitude of students of CS will be increase by 58.985. And the dummy assigned for Federal (FS)=1. It shows on average environmental attitude of FS student will be increase by 58.68. The difference between environmental attitude of FS and CS is -.306. But the result is not significant as shown in the table 5.9 because the value |tcal| is < than 2 which shows there is no difference between environmental attitude of Students of FS and CS.

5.2.1.1.5. The Impact of Education system (Public, Private) on EA

The Reference Category is Private system. It shows on average environmental attitude of Private system's students will be increased by 58.985. And the dummy assigned for Public System (PbS) =1 It shows that the on average environmental attitude of public system is 59.53. The difference between environmental attitude of public system and private System Score is 0.545. But the results are not significant as shown in table 5.9 because the value |tcal| is less than 2 which shows there is no difference between environmental attitude of Students of Public and Private System.

5.2.1.1.6. The Impact of Education system (Pre-Medical, Pre-Engineering, ICS (Computer studies), ICom (Business studies)) on EA

5.2.1.1.6.1. Difference between the EA of ICom/Business Studies and Premedical group's Students

The base category is ICom/Business Studies, therefore the value of β_o is the co-efficient for ICom/Business Studies (ICom) and their value is 58.985, it shows on average environmental attitude of ICom/Business Studies students will be increased by 58.985 and the dummy assigned for Pre-medical =1 and others zero. So, it shows the on average environmental attitude will be increased by 61.418 of Pre-Medical Students. The difference between the environmental attitude of students of pre-medical and ICom is on average 2.43 scores. The result is significant, as it is shown in the table 5.9 that the value of t |tcal| is 2.872 > than 2 which means "there is difference between environmental attitude of Students of Pre-medical and ICom/Business". On average the 2.43 scores environmental attitude of pre-medical students are better than the students of ICom/Business Studies.

5.2.1.1.6.2. Difference between the EA of ICom/Business Studies and Pre-engineering group's Students

The reference category is ICom/Business Studies. On average score of environmental attitudes will be increased by 58.985 and the dummy assigned for Pre-Engineering =1. It shows that the on average score of environmental attitudes will be increased by 60.75 of Pre-Engineering Students. So, the difference between the environmental attitude of ICom and Pre-Eng. groups students is on average 1.765 scores. And the result is significant as shown is table 5.9, |tcal| is 2.231 > than 2 which shows "there is difference between environmental attitude of Students of Pre-engineering and ICom". It means the environmental attitude of students of Pre-Eng., is on average 1.76 score better than the student of ICom/Business Studies.

5.2.1.1.6.3. Difference between the EA of ICom/Business Studies and ICS/Computer Studies' students

The reference category is ICom/Business Studies. On average score of environmental attitudes will be increased by 58.985 and dummy assigned for ICS/Computer Studies =1. It shows that the on average environmental attitude of ICS will be increased by 60.28 score. But the result is not significant as the table 5.9 shows the |tcal| is 1.475 < than 2 which shows there is no difference between environmental attitude of Students of ICS and ICom.

5.2.1.1.6.4. EA of ICS/Computer Studies and Premedical group's Students

The reference category in this model is ICS/Computer Studies, the value of β_o is the 60.045, it shows on average environmental attitude of ICS/Computer Studies students will be increased by 60.045 score and the dummy assigned for Pre-medical =1. So, it shows the on average environmental attitude will be increased by 61.305 of Pre-Medical Student. The result is significant, as it is shown in the table 5.9 that the value of |tcal| is greater than 2 which means "there is difference between environmental attitude of Students of Pre-medical and ICS, when the reference category is ICS".

5.2.1.1.6.5. EA of ICS/Computer Studies and Pre-engineering group's Students

The Base Category is ICS/Computer Studies. The value for base category is 60.045 it means on average score of environmental attitude of students of ICS/Computer Studies is 60.045 and the dummy assigned for Pre-Engineering =1 and others zero It shows that the on average score of environmental attitude will be increased by 60.65 of Pre-Engineering Students. But the result is not significant as shown is table 5.9, |tcal| is less than 2 which shows "there is no difference between environmental attitude of Students of Pre-engineering and ICS/Computer Studies.

5.2.1.1.6.6. Difference between the EA of Pre-medical and Pre-Eng. Students

The Reference Category is Pre-Engineering and the value of co-efficient for reference category is 60.488. It means on average score of environmental attitudes of Pre-Eng. students is 60.488 and dummy assigned for pre-medical =1, It shows that the on average environmental attitude of pre-medical students will be increased by 61.006 score. But the result is not significant as the table 5.9 shows the |tcal| is 1.50 which is less than 2. It shows there is no difference between environmental attitude of Students pre-medical and Pre-Eng.

5.2.1.1.6.7. Difference between the EA of Pre-Eng., and ICS/ Computer Studies

The Reference Category is Pre-Engineering and the value of co-efficient for reference category is 60.488. It means on average score of environmental attitudes of Pre-Eng. students is 60.488 and dummy assigned for Computer Studies/ICS =1, It shows that the on average environmental attitude of Computer studies/ICS students will be increased by 60.099 score. But the result is not significant as the table 5.9. It shows there is no difference between environmental attitude of Students ICS/Computer and Pre-Eng.

5.2.2. The Impact of EK and other factors on EP of Students

To access the impact of EK on EP, I developed a model which also includes some background factors those helps to find out the difference between the EA of male and female, Private and Public system, EA of CS and FS students, EA of students of ICom /Business Studies and Pre-Medical, ICom/Business Studies and Pre-Eng., ICom/Business Studies and ICS.

In this model male, Private system, CS and ICom/Business Studies was used as a Reference Category. The econometric model is as the below

$$EP = \beta_o + \beta_1 EK + \beta_2 DF + \beta_3 DFS + \beta_4 DPbS + \beta_5 DPM + \beta_6 DPE + \beta_7 DICS + \beta_8 S_{DI} + e \ldots. (2)$$

Results and Analysis

Table 5.10: ANOVA Table, Impact of EK and Other Factors on EP of Students.

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	15849.903	8	1981.238	20.777	.000b
Residual	104892.159	1100	95.357		
Total	120742.061	1108			

a. Dependent Variable: Environmental Practices
Predictors: (Constant), Self-declared interest on ES, Pre-Engineering, Federal System, Female, Environmental Knowledge, ICS, Public System, Pre-medical

Source: Field Survey

ANOVA table shows the overall model is significant.

Table 5.11: Model Summary, Impact of EK and Other Factors on EP of Students.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.362a	.131	.125	9.76507

a. Predictors: (Constant), ICS, Public/ Private, Female/Male, Self-declared interest on ES, Environmental Knowledge, Pre-engineering, Federal/ Cambridge, Premedical

Source: Field Survey

The results of table 5.11 show the value of R square which is 13%. It shows the 13% variation in Environment Practices is due to the independent variables of the model.

Table 5.12: Coefficients, Impact of EK and Other Factors on EP of Students.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	56.338	1.655		34.047	.000
Environmental Knowledge	56.338	.233	-0.27	-.841	.400
Self-Declared Interest on ES	2.469	.313	.226	7.876	.000
Female	-1.233	.602	-.059	-2.048	.041
Federal System	4.923	.745	.218	6.608	.000
Public System	1.063	.702	.049	2.021	.130
Pre-Medical*	3.586	1.286	.163	2.789	.005
Pre-Engineering*	2.539	1.199	.098	1.722	.085
Computer Studies*	2.066	1.334	.087	1.903	.057
Premedical**	1.206	1.002	.055	1.203	.229
Business studies**	-2.201	1.366	-.053	-1.611	.107
Pre –engineering**	-.297	.898	-.014	-.331	.741
Premedical***	1.549	.709	.071	2.185	.029
Business studies***	-1.841	1.242	-.044	-1.482	.139
Computer Studies***	.550	.908	.019	.605	.545

Dependent Variable: Environmental Practices
Reference Category: Male, Cambridge System, Private System, Intermediate in Commerce
*Reference Category: Business Studies
** Reference Category: Computer Studies
*** Reference Category: Pre-Engineering

Source: Field Survey

5.2.2.1.1 The Impact of EK on EP

The result is not significant, the value for |tcal| is 0.841 which is less than 2, it shows there is no Positive relationship between environmental knowledge and environmental practices.

5.2.2.1.2. The Impact of SDI (Self-declared interest on Environment) on EP

The result is significant as it is shown in the table 5.12, The value of $|tcal| \geq 2$. It shows there is positive relationship between self-declared interest on environment sustainability and environmental practices. It means as the interest on environmental sustainability increases by one level (very low to low, low to moderate, moderate to high, high to very high) then the score of environmental practices increases by 2.469 and vice versa.

5.2.2.1.3. The Difference Between the EP of Male and Female

The reference category is male, the value of β_o is is 56.38 as shown in table 5.12. It shows that on average environmental practices will be increases by 58.985 Score when the gender is male. And the dummy assigned for female =1, there value of coefficients is 55.105. It shows that the on average score of environmental practices will be increased by 55.105, when the Gender is female. The difference between male and female Score on environmental practices is -1.233. And the result is significance it shows in the table 5.12 that the value of |tcal| is > than 2 which shows "there is difference between environmental practices of female and male**".** It means the on average female environmental practices will be (-1.233 score) less than the male.

The Impact of Education systems on EP

5.2.2.1.4. The Impact of Education system (Federal and Cambridge) on EP

The reference category is Cambridge system (CS), the value of β_o is 56.338 as shown in table 5.12. It shows on average score of environmental practices o CS's students will be increases by 56.338. And the dummy assigned for FS =1, Therefore, there value of coefficients is 61.261. It shows that the score of EPs will be increased by 61.261, when the Education system is FS. The difference between EP of FS and CS is 4.923. And the results is significant as shown in table 5.12 because the value of |tcal| is greater than 2 which shows "there is difference between environmental practices of Students of FS and CS" Which shows the on average score on Environmental Practices of FS will be (4.923 scores) more than the on average practices of CS students.

5.2.2.1.5. The Impact of Education system (Public, Private) on EP

The reference category is private system, the value of β_o is 56.338 as shown in table 5.12. It shows that on average score of environmental practices of private system will

be increases by 56.338. And the dummy assigned for public system (PbS) =1, Therefore, there value of coefficients is 57.401. It shows that on average score of environmental practices will be increase by 57.401, when the education system is public. The difference between environmental practices of public system and private system score is 1.063. And the results are significant as shown in table 5.12 because the value of |tcal| ≥ 2, which shows "there is difference between environmental practices of students of private and public system". It means environmental practices of students of public sector is 1.063 score higher than the students of private system.

5.2.2.1.6. The Impact of Education system (Pre-Medical, Pre-Engineering, ICS (Computer studies), ICom (Business studies)) on EP

5.2.2.1.6.1 Difference between the EP of ICom and Pre-Medical students

The reference category is ICom/Business Studies, the value of β_o is 56.338 as shown in table 5.12. It shows that on average score of environmental practices will be increases by 56.338 of ICom/Business Students. And the dummy assigned for Pre-medical =1, Therefore, there value of coefficients is 59.924. It shows that on average Score of environmental practices will be increased by 59.924 of Pre-Medical Students. The difference between EP of students of pre-medical and ICom/Business Studies is 3.586 score. And the result is significant as shown in table 5.12 the value of |tcal| > than 2 which shows "there is difference between environmental practices of Students of Pre-Medical and ICom/Business Study group". It means environmental practices of students of Pre-Medical group is 3.586 score better than the ICom/Business group students.

5.2.2.1.6.2. Difference between the EP of ICom and Pre-Engineering students

The reference category is ICom/Business Studies and the value of their co-efficient is 56.338 as shown in table 5.12. Dummy assigned for Pre-Engineering =1, Therefore,

value of coefficients is 58.877. It shows that on average score of environmental practices will be increase by 58.877 of Pre-Engineering Students. the result is not significant as shown in the table 5.12 the value of |tcal| is less than 2 which shows "there is no difference between EP of Students of Pre-engineering and ICom/Business Studies".

5.2.2.1.6.3. Difference between the EP of ICom and ICS/Computer Studies

The reference category is ICom/Business Studies and the value of their co-efficient is 56.338 as shown in table 5.12. And the dummy assigned for ICS/Computer Studies =1, Therefore, there value of coefficients is 58.404. It shows that the on average score for environmental practices will be increase by 58.404 of ICS/Computer Studies Students. But the result is not significant because the value of |tcal| is 1.903 < than 2 it means "there is no difference between environmental practices of students of ICS/Computer Studies and ICom/Business Studies".

5.2.2.1.6.4. Difference between the EP of ICS and Pre-Medical students

The reference category is ICS/Computer studies and the value of their co-efficient is 58.525 as shown in table 5.12. The dummy assigned for Pre-medical =1, Therefore, the value of coefficients is 59.731. It shows on average score environmental practices will be increased by 59.731 of Pre-medical students. And difference between the environmental practices of students of pre-medical is 1.206 score higher than the students of ICS. But the results are not significant as shown in table 5.12 the |tcal| is less than 2 which shows there is no difference between environmental practices of students of ICS/Computer Studies and Pre-medical.

5.2.2.1.6.5. Difference between the EP of ICS and Pre-Engineering students

The reference category is ICS and the value of their co-efficient is 58.525 as shown in table 5.12. The dummy assigned for Pre-Eng. =1, the value of coefficients is 58.404. It shows that the on average score of environmental practices will be increased by 58.404 of Pre-engineering Students. The result is not significant as shown in table 5.12. The value of |tcal| is < than 2 which shows there is no difference between environmental practices of Students of ICS/Computer Studies and Pre-Engineering.

5.2.2.1.6.6. Difference between the EP of Pre-Medical and Pre-Engineering students

The Reference category is Pre-Engineering and the value of their co-efficient is 58.132 as shown in table 5.12. And the dummy assigned for Pre-medical =1, Therefore, there value of coefficients is 59.681. It shows that the on average score for environmental practices will be increased by 59.681 of Premedical Students. But the result is not significance which is shown in table 5.12 because the value of |tcal| is less than 2 which shows "there is no difference between environmental practices of students of Pre-engineering and Pre-medical".

5.3. Discussion

The result of the study explores a positive relationship between the environmental knowledge and attitude but not a statistically significant relationship between environmental knowledge and environmental practices. The result of the study is consistent with many studies such as Janmaimool and Khajohnmanee (2019), Pe'er, Goldman, and Yavetz (2007) and (Pothitou, Hanna, & Chalvatzis, 2016) according to them the relationship between environmental knowledge and environmental attitude is positive but not a statistically significant between environmental knowledge and practices. The result of the study is also inconsistent with many researches on this issue like Bradley et al. (1999),

their study found a positive relationship between environmental knowledge, and attitude as well as environmental knowledge and environmental practices. The result of this study shows the students who have knowledge on ES, their attitude towards environment is positive they have feels for saving water, energy, plantation of trees, solid waste, use of fuel efficient public transport to visit desired destination, walk for the short distance travelling, use of energy efficient devices, prefer organic farming etc. But they do not practically do this.

The background factors are useful to find out the difference in the environmental attitude and practices of male and female students, Cambridge and federal systems students, public and private system students, and different academic disciplines such as pre-medical, pre-engineering, Business studies and computer studies. The result of the study shows the male practices are more environmentally friendly as compared to female and their environmental attitude are not significantly different. The result of study about gender difference on environmental attitude is not consisted with few researches such as (Schahn & Holzer, 1990; Vicente-Molina et al., 2018) according to them females attitudes and practices are more environmentally friendly then male. The study is consisted with other side studies of studies according to them the male have more environmental friendly behavior (Levine & Strube, 2012). This study is based on KAP survey from the collages students of intermediate which shows the male practices are more towards environment as compared to girls. KAP survey shows the male students more use public transports as compared to female, the walk more as compared to girls, they purchase less shoes and cloths as compared to girls, they more preferred the energy saving and solar devices in their home as compared to girls.

This study explores the students who studied the subjects which have more environmental concepts, their environmental attitude and practices are better than the

students who studied those subjects which have no or minimum environmental concepts. The students who studied Pre-medical their environmental Attitude and Practices are better than the students who studied the subjects related to business. It is seems during the books review the students who belongs to business did not get concrete knowledge from their curriculum. Another study also shows the non-business student environmental attitude and practices are better than the Business studies students (Benton Jr, 1994).

Environmental Attitude of pre-medical students are also better than the students who studied computer sciences. But there is no difference between the environmental practices of students who studied pre-medical and computer studies. Through the curriculum review, it is clear that the students who study physics, chemistry and biology they studied more concepts related to environment than those who studied computer sciences. The students of computer science group have choices to choose economics, statistics, or physics at the intermediate level, and during the book review. I found the concepts related to environment just in the Physics or somehow in the economics. And these two subjects do not have competed content which helps to change their attitude.

Students who belong to pre-Engineering group, their environmental attitude are better than the students of Business studies, but not a clear difference between practices. Again, the difference the attitude is due to the difference in subjects. The students of pre-engineering group studied two main subjects i.e. Chemistry and Physics in which concepts on environmental sustainability is present while the students of Business Studies studied only one subject which contained the concepts of environment i.e. Physics, or Economics etc. or do not study any subject which have the concepts on environment especially who choice the statics instead of economics or physics.

Students who belong to pre-Engineering group, their environmental attitude and practices are not different then the students who study ICS/Computer studies. The reason behind is their approaches, the students of computer science group and pre-engineering group approaches are not different. It means the subject choice affect the environmental attitude and environmental practices of individuals.

The students who studied Computer Studies and Business Studies their environmental attitude and practices are not different. The students who studied computer studies both group studied only one subject who has the concepts on environmental sustainability.

The environmental attitude and practices of student of FS and CS are same. It means the different stands of curriculum do not differently affect at their environmental attitude but environmental practices of students of FS are more environmental as compared to the students of CS. It means both curriculums change the attitude of students in the same way, it is possible the main reason behind is students from both the stands almost studied the same concepts on environmental sustainability in their curriculum excepts the few concepts and questionnaire is also designed from common environmental concepts . But the reason behind the difference in their environmental practices is due to the affordability because most of the students of Cambridge System belongs upper or upper middle class of the society, and they have the number of facilities in their life. The have easily excess for personal Car, they have the affordability to pay the higher cost for electricity. They also have the affordability to buy the new shoes, new clothes, new cellphones yearly or even monthly so there is chance their purchasing power effects their score for environmental practices.

This study explores another relationship between environmental attitude, environmental practices and self-declared interest on ES. The result of this study shows the students who have more interest on ES, their environmental attitude as well as their environmental practices are more increases.

5.3.1. Factors Generating Interest on Environment Sustainability of FS and CS

Students obtained Environmental knowledge from the various sources such as Curriculum, Teachers, Parents and Siblings, Friends and Relatives, Self-Study through internet or books, TV programs, Ratio, Newspapers and other. AS the results of Study shows those students who have more interest on environment, their environmental Attitude and environmental Practices are high. So, to find out those students whose interest rate is high, from where they get EK. I compare the mean of Self-declared interest of Student (high, medium, low) with the EK from the diverse sources.

Table 5.13: Self-Deceived Interest of Students and their EK from Different Sources

(In Percentage)

	Federal System			Cambridge System		
	Low	Medium	High	Low	Medium	High
EK from Media	8.5	32.9	31	5.8	26.3	35.7
EK from Self Study through internet	2.4	24	28.6	3.3	29.4	29.2
EK from Knowledge Authorities	18.3	23	23.9	15.1	19.7	23.2
EK from Curriculum	60.4	15.7	10	67.4	20.9	8
EK from other sources	9.9	4.4	3.5	9.1	3.3	3.9

Source: Field Survey

I separately compare the mean of self-declared interest and Environmental knowledge from various sources such as curriculum, self-study, media, knowledge authorities of FS and CS. The result shows the students of both systems who have high interest on environmental sustainability get more knowledge from the other sources such as media, self-study from internet and knowledge authorities as compared to those students who have less interest on environmental sustainability. The students who have less interest on environmental sustainability get more knowledge from the curriculum.

The students of both systems get more environmental knowledge from Media (TV programs, Newspaper and Radio), Self-study, and knowledge authorities' such as parents and siblings, friends and relatives, and teachers have high interest on environmental sustainability. Such type of students gets minimum knowledge from the curriculum. As the result of my study shows the curriculum helps to change the environmental attitude but not the practices and practices are changed with the interest. It means the media, knowledge authorities, and self-study helps to develop their interest on environmental issues. And as the interest on environmental sustainability are high then the environmental attitude and practices both will be high. The students who get more environmental knowledge from curriculum as compared to media, self-study, and knowledge authorities their environmental interests will be low. It means the curriculum do not helps to them to develop their interest on environmental sustainability.

Comparatively the students of CS get more Environmental knowledge from Media and Self-study as compared to the students of FS. and students of FS get little bit more environmental knowledge from the knowledge authorities.

To develop the interest of students on environmental sustainability, with the curriculum the policy maker should be focus on the other sources within the formal settings. It is possible for the education policy maker they should develop the skills in the teachers by providing training to them on the environmental issues, it is also possible for them to encourage students through seminars and conferences on the environmental issues which motivate them and helps to develop their interest on environmental sustainability. And as the interest on environmental sustainability developed the practices will be environmentally friendly and it will give the long-lasting results.

Chapter 6

Conclusion and Recommendations

This chapter is about the conclusion, recommendations, and limitations of the study.

6.1. Conclusion

The unsustainable lifestyle of human being required education and awareness on the issue of environment sustainability. By recognizing the importance of issue UN announced the decade (2005-2014) for ESD. This study is accessing the impact of the student knowledge (what they already learnt in their earlier class's curriculum) in their environmental attitude and practices with other background factors self-declared interest on ES, Gender, education system either private or public , either Cambridge and federal system by controlling other factors such as age, level of schooling.

The KAP survey was designed from the common concepts of the curriculum of FS and CS. The common concepts derived by developing ideal type after the review of textbooks of federal and Cambridge system. It seems from the review of textbooks of FS and CS curriculum, the students of both systems studied about environmental aspects of water, forestation/deforestation, transportations, solid waste, industry, energy, and agriculture in-detail but I found that some concepts are in detail present in the books of CS and other are in detail present in the FS such as the concepts about water, forestation, Energy and Food and Agriculture are more detail present in CS as compared to FS while the transportation and solid waste are in detail present in the FS. It's also seems from review of textbooks the students of Cambridge systems more studied about the new concepts such as sustainability, organic agriculture in the as compared to the students of federal system. The course of federal system is not updated, due to which there are the

loopholes in their curriculum especially on the new terminologies, the curriculum of intermediate level was updated in 2001.

This study explores the students who have more environmental knowledge, their attitude is more towards environment, but their practices are not statistically significant. The environmental attitude of students of federal system is not statistically different from the attitude of students of Cambridge system but their environmental practices are better as compared to the students Cambridge system. The study also explores the environment attitude of students of public and private system is not different but the environmental practices of students of public system are better than the students of private system.

The result of study shows that the subjects matter to change the environmental attitude and practices. The Students who belongs to the Pre-medical group their environmental attitude and practices are better than the students who belongs to the group of ICS/Business Studies. the students of Pre-Engineering's environmental attitude are also better than the students of ICom, but the environmental practices of both groups are not different. The environmental attitude and practices of Students of Business Studies and Computer Studies are also same. The environmental attitude and practices of students of Computer Studies and Pre-medical do not have difference similarly the environmental attitude and practices of students of Computer Studies and Pre-Engineering do not have difference. Environmental attitude and practices of Pre- Engineering and Pre-medical groups students are also have no difference.

This study also explores environmental attitude of male are female are not different, but the environmental practices of male are better than the female. Other than these background factor this study explores the students whose self-declared interest on environmental sustainability is high, their environmental attitude and practices are also

high. There are the factors which are responsible for generating interest in the students of FS and CS.

Study shows the media (TV programs, radio, and newspaper), Knowledge Authorities (Parents and siblings, Friends and relatives, and Techers), and self-study generating interest on the issue of environmental sustainability. This study explores the student who have less interest on ES, they get environmental knowledge just from curriculum which is the necessary for them to study during their education but the students who have high interest on ES, they get more knowledge on ES from tv programs, radio, newspaper , teachers, parents and self-study from internet on the environmental sustainability.

6.2. Policy Recommendations

This Study helps to recommend few policies intervention in the education policy and other policies which helps to change environmental attitude and practices.

1) Update curriculum of FS as soon as possible especially the curriculum of Intermediate level which is published in 2000 by updating new terms such as sustainable agriculture, sustainably forestation, organic agriculture etc. just like the curriculum of Cambridge system contain and update statistics.

2) In the curriculum of Business Studies and Computer Studies introduce the special course/subjects related to environment or add the concepts on environmental sustainability which helps them to change their attitude.

3) Give special training to teachers and guide them the diverse ways which help their students to increase the interest on environmental sustainability.

4) Increase interest of students in formal education settings through informal way such as arranges seminars for students in which there are the opportunities for the students to watch documentaries on the environmental issues.

5) Other than the formal education sector, there should be programs in the Radio, TV on daily bases or weekly bases related to environmental issues.

6.3. Limitations of the study

There are Few Limitations of my study. These are following.

1. This study does not study the environmental attitude and practices of students who belongs to Arts and social at the intermediate level

    i. In textbooks of Arts, politics, and phycology, I do not found the concepts which are related to environmental accepts there is no concept about the environment on the priority areas of this study in the subjects of arts group . and the targeted Population of this study are those, who's throughout their education studied somehow studied about the environment, that why I do not survey from the students of Arts group. if in future someone survey from the students of Arts group the results for those students will founded who do not studied anything from the previous two year, after the metric/O-level.

    ii. The second main reason to not include the students of social sciences in study is their availability, during the field survey I do not found the students from the all the social science groups in federal system. Normally students choose pre-medical, pre- engineering, computer studies, Business Studies for study at the intermediate level. Even the private collages of federal system do not offer degrees in the social sciences.

2. The second limitation of study is, as it is mentioned in the tittle this research is about the Pakistan but due to time constraint it is not possible for us to review all the curriculum of all the provinces and take data from the student of all the provinces. So, in this study , I reviewed the books of FS and CS, as it is mentioned in the third chapter of Methodology, in the Pakistan, the students of Federal reads the books of Federal System, the Students of Punjab reads the books of Punjab textbook board, similarly the students of KPK, Baluchistan and Sindh reads the books of their respective boards. As I mentioned in the methodology section by assuming that Federal is the represented of all units. And the books of science for matric an intermediate are almost same as the books Federal but the curriculum of initial classes is somehow different. And I also surveyed from the students of students of CS and FS, so there is the possibility due the curriculum difference at earlier classes, their impact of environmental knowledge on environmental attitude and practices will be different.

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Appendices

Appendix (A): Criteria's for scaling of Priority areas of SD.

Appendix A (1) Table 6.1: Criteria for Water Scaling

Scales	Criteria for water scaling
Scale 0	Water is not discussed in the content of that particular book
Scale 1	Water is important for drinking. Uses of water Ways to reduce and minimize the use of water such to repair tabs and leakage in tank, use mug and bucket instead of tab.
Scale 2	Water cycle Various sources of water such as streams, river, tube wells, rain, snow, sea, canals etc. How water is important for transportation and marine life.
Scale 3	What is water pollution? How water pollution effects human and marine life Features of water, fresh water, and salty water, water use to make electricity states of water (solid, gas, liquid). Polluted water spread diseases in animals' humans and marine life Stress on drinking boiled and filtered water is part of content.
Scale 4	Acid rain is also responsible for water pollution? Which type of chemicals are responsible for acid rain? How domestic sewage and industrial chemical pollute water are part of content. How Food and Agriculture (animal manure and fertilizers) pollute water How industries and Food and Agriculture sector wastewater how Accidental leakages pollute water.
Scale 5	Water is scarce resource, due to pollution and wastage of water. Drop in water table Desertification (process of turning land into deserts) Drying up streams, lakes, and rivers increases water shortage. Discussion related water shortage in general and in terms of Pakistan and how it become problem for Food and Agriculture and industrial sector. Water sustainability, climate, and water scarcity How to manage water resources is the part of content like building water reserves. Role of national and international institution to manage water scarcity and water pollution.

Appendix A (2) Table 6.2: Criteria for Forest (deforestation/Afforestation) scaling

Scales	Criteria for Forest (deforestation) scaling
Scale 0	✓ Any topic related to the forest is not part reviewed books
Scale 1	✓ Just statement of deforestation and afforestation related advices are in the content like do not cut trees/ planting trees. ✓ Reasons of deforestation is part of content. ✓ Uses of tress like the use of wood for fire, furniture etc. are part of content.
Scale 2	✓ How forests are important for environment by cleaning air because of exhaling oxygen and inhaling CO2? ✓ Forests are also home to wild animals and birds, How? ✓ How biodiversity reduces by removing trees to grow crops and by keeping animals are discussed in detail in the content? ✓ How plants biodiversity is reduced due to the increase in population?
Scale 3	✓ Several types of forests are the part of content. ✓ How forests are important for raining and to avoid flood? ✓ How the burning and cutting of wood threat human health. ✓ How deforestation is cause of soil erosion? ✓ How the burning and cutting of wood threat human health.
Scale 4	✓ How Cutting of forests and burnings of wood are responsible for climate change and Global warming. ✓ Importance of several types of trees according to their characteristics. ✓ Location of different forests in Pakistan. ✓ Location according to special characteristics of forest such as Rainforest, Monson forests, coniferous forest, Mangroves, tropical forests etc which are responsible for raining, avoid flooding, prevent soil erosion, shelter for fishes etc.
Scale 5	✓ How to save plants biodiversity? ✓ Sustainable forestry is the part of content.

	✓ How international institution focus Afforestation. ✓ How it is important to save the products which are manufacture or formed with tress such as paper and furniture by using recycled products?

Appendix A (3): Table 6.3: Criteria for the Transportation scaling

Scales	Criteria for Transportation scaling
Scale 0	✓ The concept of Transportation is not present in the particular book
Scale 1	✓ Modes of transportation ✓ How these are useful? ✓ Walk for short distance instead of using cars ✓ Use bicycle.
Scale 2	✓ Which modes of transportation pollute the earth more and how? ✓ Which type of pollution caused by which mode of transportation? ✓ Smoke comes out from cars and buses causes air pollution. ✓ Oil leakages from ships cause water pollution.
Scale 3	✓ Which type of pollutants comes out from vehicles. ✓ How such type of pollutants pollute environment (air, noise, and water pollution) ✓ Effects on the life of humans, plants, and animals. ✓ Guide students to repair smoke producing vehicle.
Scale 4	✓ How these pollutants cause of climate change by producing greenhouse gases. ✓ And how these pollutants are cause off Acid rain. ✓ How GHG and acid rains effects on aquatic life and other living things. ✓ In more, detail the ways related to reduction of smoke is discussed such as oxides of nitrogen released from cars, it can be removed by using catalyst converters. ✓ Transports are required for the development of industry and Food and Agriculture sector.
Scale 5	✓ Sustainable Transportation ✓ How the use of hydrogen fuel, CNG gases instead of Patrol is more environmentally friendly? ✓ The role of institutions to promote environmentally friendly vehicles

Appendix A (4) Table 6.4: Criteria for Industry's scaling

Scales	Criteria for industry's scaling
Scale 0	✓ No concept about industry is present in the particular level
Scale 1	✓ Various kinds of industries ✓ We need clean air to breath. ✓ We should use recycled products.
Scale 2	✓ How Industries effects environment is part of content as it gives out smoke from their chimneys and pollute air. ✓ Industries are main cause of air pollution.
Scale 3	✓ How industries are the cause of water, land, and noise pollution? ✓ Different industries use different chemicals and pollute environment in diverse ways for example fertilizer industry release nitrogen oxides, textile industry lead, manganese, cadmium etc. ✓ Chemicals use in every industry and the Fossil fuel and Energy (coal, oil, gas) use in the industries pollute the environment industry. ✓ Industrial pollution affects the life of human beings and animals.
Scale 4	✓ Industrial pollution is also the cause of global warmings and acid rain ✓ Industry and ozone layer depletion. ✓ environmental condition of Pakistani industries.
Scale 5	✓ International restriction on Pakistani industries due to environmental concern. ✓ Sustainable development of industrial sector including conservation of environment. ✓ use of recycling product means to avoid industrial pollution. ✓ Role of government to control such type of industries. ✓ Ways to reduce, minimize and avoid industrial pollution

Appendix A (5): Table 6.5: Criteria for the Solid waste Scaling

Scales	Criteria for Solid waste Scaling
Scale 0	✓ Nothing about the solid waste is the part of particular curriculum book
Scale 1	✓ Just advices such as do not through garbage, litter, and plastic bags on the street to keep environment clean. ✓ Advices on Where to dump garbage by individuals. ✓ Use recycled products
Scale 2	✓ Garbage create land pollution by filling land sites. ✓ Other than land pollution, burning of solid waste cause air pollution, ✓ Throwing garbage into the water bodies cause water pollution
Scale 3	✓ How these effect on living things such as human health, animals, aquatic life. ✓ How poly bags and litters pollute the earth more than food and bio waste. ✓ Paper and cloth bag are good for environment as compared to plastic bags. ✓ Recycle material such as plastic things are good for environment because it reduces solid waste. ✓ Biodegradable and non-biodegradable products? Which are more environmentally friendly?
Scale 4	✓ Open air Burning of solid waste, produce gases which are cause of greenhouse gas emission and create global warming. ✓ How these gases are cause of Acid rain which effects the acidic of soil and water bodies
Scale 5	✓ Role of Institution is the placement of dumpsters and awareness to use dumbs. ✓ Avoid open air burning of solid waste. ✓ Incineration ✓ Solid waste dumbing

Appendix A (6) Table 6.6: Criteria for the scaling of Energy

Scales	Criteria for the scaling of Energy
Scale 0	✓ Nothing is discussed about the Energy in the particular book
Scale 1	✓ Turn off light, fun or other electronic devices when leaving the room or premises. ✓ Use solar devices ✓ Unplug your plug, when not in use. ✓ Fossil fuels (coal, oil, and gas) are the source of Fossil fuel and Energy. ✓ Electricity is also generated from fossil fuel burning.
Scale 2	✓ What are Renewable and Non- Renewable energy resources. ✓ Renewable resources are more environmentally friendly. ✓ Energy generated from fossil fuel more effects on environment
Scale 3	✓ Energy generated from fossil fuels produced different chemicals in the air such as carbon dioxide, carbon monoxide, Sulphur oxide, nitrogen oxide ✓ How the chemicals effect on the health of human beings.
Scale 4	✓ How the Energy production from the fossil fuel are serious threat for Global warming and climate change. ✓ Electricity generation from the fossil fuels are also cause of Acid Rain. ✓ Acid rain is also threat for marine life. ✓ Location of resources of coal, oil and natural gas is the part of content.
Scale 5	✓ Sustainable energy production. ✓ Process of capturing the flue gas before it escaped for the reduction of air pollution. ✓ Mismanagement of Energy (transmission losses) and sustainable development of power resources is the part of content. ✓ Role of Institutions to produce cleaner energy.

Appendix A (7) Table 6.7: Criteria for the Scaling of Food and Agriculture

Scales	Criteria for the Scaling of Food and Agriculture
Scale 0	✓ Nothing is discussed in the book related to food and agriculture
Scale 1	✓ Advices related to avoid hunger such as do not waste food. ✓ Major crops cultivated in Pakistan. Commercial and non-commercial crops. ✓ And animal farming is the part of content. ✓ How Urbanization cut fertile land.
Scale 2	✓ As the population increases their demand for food increases. To meet the demand of people, how farmers use modern and innovative technology, which are sometime not healthy for environment. ✓ Framer use fertilizers and pesticides, insecticides to save crops to meet the demand of public but it pollutes land because it increases the soil acidity.
Scale 3	✓ How livestock (animal wastage) and fertilizers pollute air, land, and water. ✓ Fertilizers makes in factories how pollute air and water. ✓ How the fertilizer uses on crops pollute soil and water are the part of content. ✓ And how these pollutants adversely affect at living organism such as animal, plants, and aquatic animals. ✓ Fertilizers which has components like nitrogen, potassium, sulfur, calcium, magnesium, carbon dioxide, methane, and ammonia etc.
Scale 4	✓ How these Agriculture components pollute environment, cause of GHG and global warming. ✓ How the fertilizer cause of Acid Rain. ✓ Due to overgrazing, how fertile land become desert.
Scale 5	✓ Need to cut the use of fertilizers. ✓ Organic food, how the world moving towards it. ✓ Adopt soil management techniques, reclamation of deserts. ✓ Afforestation to avoid soil erosion. ✓ Sustainable development of Food and Agriculture sector. ✓ Food wastage? how it is possible to manages hunger by preventing food wastage.

Appendix (B): Questionnaire

Education for Sustainable Development; Knowledge, Attitude & Practices

Disclaimer

I am Hina Kanwal, a candidate for MPhil Public Policy at Pakistan Institute of Development Economics. I am working on a thesis titled "Education for Sustainable Development in Pakistan: Knowledge, Attitudes, and Practices." Purpose of my project is to know about the knowledge, attitude, and practices of students about what they already have learned related to sustainable development in their previous classes. The interview will take 20 minutes. All identity information obtained through this survey will remain strictly confidential and your responses will never be revealed to anyone except extraordinary legal circumstances which are very less likely to occur. I request your answer according to the best of your knowledge, honesty, telling me about what you know, how you feel, the way you live. I encourage you not to make a wild guess. There is always a 'do not know' option which is also correct anyway. This will help me in judging how curriculum affects sustainability behaviours in Pakistani students.

I will acknowledge your effort with your college name in my project.

Instructions:

Before you start this survey, please answer the following questions to check if you qualify to participate in this survey? If you have opted 'No' in response to any question, please inform, otherwise, you are good to go with the survey.

Do you agree to participate in this survey?

1. Yes ☐ ← *Tick only one option*
2 No ☐

Do you have 20 minutes to complete this survey?

1. Yes ☐ ← *Tick only one option*
2 No ☐

Had you studied in Federal or Cambridge schooling systems?

1. Yes ☐ ← *Tick only one option*
2 No ☐

Knowledge

This set of questions gauge your knowledge about sustainable development. Please select an answer for which you are extremely confident. In case if you are not, please tick option 5 "I do not know" which in that case is the correct answer. (Note: tick mark one option per question)

I want to remind you that mentioning your name is optional, and there will be no personal value judgement about your knowledge no matter what option you select in response to any question

Q1. What among the following is the most important reason why people do not drink seawater?

☐ 1. Its sour in taste

☐ 2. Its salty in taste

☐ 3. Its acidic in nature

☐ 4. Its alkaline in nature

☐ 5. I do not know

Q2. Which of the following gas is inhaled by plants in the night?

☐ 1. Oxygen

☐ 2. Carbon dioxide

☐ 3. Carbon monoxide

☐ 4. Helium

☐ 5. I do not know

Q3. How increase in the number of vehicles impact Carbon mono oxide concentration in the air?

☐ 1. Carbon mono-oxide concentration in the air decreases

☐ 2. Carbon mono-oxide concentration in the air increases

☐ 3. Carbon mono-oxide concentration in the air remains unchanged

☐ 4. Vehicle release no carbon mono-oxide in the air

☐ 5. I do not know

Q4. For hydroelectric power generation, what is necessary for the production of power throughout the year?

☐ 1. Nuclear power

☐ 2. High intense sunlight

☐ 3. Continuous waterflow over turbines

☐ 4. Continious high speed air flow

☐ 5. I do not know

Q5. Skin Cancer is associated with _____

☐ 1. Ozone accumulation

☐ 2. Ozone depletion

☐ 3. Acid rain

☐ 4. All the above

☐ 5. I do not know

Q6. Term that refers to intake of inadequate nutrients is called_____

☐ 1. Nutrient discharge

☐ 2. Micro-nutrients prefoliation

☐ 3. Malnutrition

☐ 4. Food allergy

☐ 5. I do not know

Q7. Municipal Solid Waste (MSW) is a term generally used to describe _____

☐ 1. Wastes from industrial processes, construction, and demolition debris

☐ 2. Wastes from Private homes, commercial establishments, and institutions

☐ 3. Mining residuals

☐ 4. Agriculture residuals

☐ 5. I do not know

ATTITUDE

Please select the answer which best depicts your reaction if exposed to a situation given in the following set of questions. (tick only one option per question, until advised otherwise follow the instruction in Grey Highlight)

I want to remind you once again that mentioning your name is optional, and there will be no personal value judgement about you based on the option you may select in response to any question

Q8. Suppose while passing through a street, your friend finds clean water being wasted due to a pipeline leakage, what you would suggest him/her in such a situation?

1. S/He should do nothing and pass by.
2. S/He should wrap something around to stop the leakage and leave hoping that soon someone would fix it
3. S/He should wrap something around to stop the leakage and should held someone in neighbourhood responsible that the leakage would be fixed
4. S/He should wrap something around to stop the leakage and report the incidence to the municipal authorities for fixing the leakage
5. S/He should do all above mentioned actions (2,3&4) and keep pursuing until the leak is reasonably fixed

Q9. Suppose a person lives in an area where there is unavailability of gas, LPG for cooking and temperature maintenance purpose and the only available option is burning wood. What should be a minimum acceptable option from the following list in such a situation?

1. Nothing but continue burning wood at the same pace, as it is the only available source of energy
2. Do nothing except trying to use wood for cooking / heating, as low as possible
3. Use wood for cooking / heating and cultivate more trees to refill the shortage of wood created due to burning
4. Besides doing what mentioned in point 3, s/he can motivate others to realize the problem and do the same
5. Besides doing what mentioned in point 4, s/he should manage alternate cooking fuels no matter what level of effort it takes

Q10. A person who is healthy, have access to a car, motorbike, bicycle, and public transport to accomplish the following tasks. What should be his/her preferred mode of transportation in each of the following cases S/He must:

1. _____ to buy grocery from the shop located at 3 km from his residence.
2. _____ to visit grand mom every week living 5 km away from his residence.
3. _____ to receive a parcel weighing 3 KG from the courier located at 1.5 k
4. _____ to go to the gym every week that is located at 10 km
5. _____ to commute for work covering 22 km on a single side

☐

Fill each of the above blanks with one from the following option codes

1. Walk
2. paddle the bicycle
3. Use public transport
4. Ride Motorbike
5. Ride on the personal car

Q11. A person can afford to buy a car that comes in two variants: Hybrid and Normal Gasoline. There is no other difference between the two except that the price of hybrid energy car is 30% higher than the normal car due to its relatively lower emissions. In your opinion which car that person should purchase:

☐ 1. Buy the cheaper gasoline car regardless of its emission rating.

☐ 2. Buy cheaper gasoline car thinking about one car does not create much impact to environment.

☐ 3. Buy the expensive Hybrid car only if it pays off in terms of fuel cost saving

☐ 4. Should buy expensive Hybrid car because of its lower environment impact

☐ 5. Shouldn't buy a car as every car has some impact on the environment

Q12. Suppose a conference distribute among participants cloth bags having the following message printed on it: "Use and re-use me for everyday shopping. I am much environment friendlier than a plastic bag." What impact you expect on those receiving these bags?

☐ 1. No one pays attention to such calls as using cloth made shopping bags is impractical

☐ 2. People would perceive such calls as mere show-off and wouldn't reduce plastic use

☐ 3. Not necessarily everyone but few people may start reducing plastic by using that bag

☐ 4. It is a great idea, and everyone must pay attention and start using the bag

☐ 5. Until the Government puts a ban on plastic bags, people should use plastic bags

Q13. An area that characterizes small piles of garbage near living areas and obsolete and under-used dumpsters at discrete locations may best reflect as:

☐ 1. Inhabitants lacking awareness of waste management

☐ 2. Inhabitants are not demanding waste disposal and management system

☐ 3. Inhabitants not valuing municipal waste disposal system

☐ 4. Completely absent municipal waste management system

☐ 5. Inefficient waste management and disposal system

Q14. Hearing that following government projects are underway for energy security in Pakistan makes you feel: ***(Mark one option per part of the question)***

Project	 Very unhappy	 Unhappy	 un-decided	 Happy	 Very Happy
1. A 1000 MW wind power plant	☐	☐	☐	☐	☐
2. A 1000 MW hydro-power plant	☐	☐	☐	☐	☐
3. A 1000 MW solar power	☐	☐	☐	☐	☐
4. A 1000 MW coal power plant	☐	☐	☐	☐	☐
5. A 1000 MW thermal power plant	☐	☐	☐	☐	☐

Q15. How you feel when you listen following terms related to:

(Mark one option per part of the question)

Agricultural terms	 Very unhappy	 Unhappy	 un-decided	 Happy	 Very Happy
1. Pesticide	☐	☐	☐	☐	☐
2. Chemical fertilizers	☐	☐	☐	☐	☐
3. Compost	☐	☐	☐	☐	☐
4. Organic agriculture	☐	☐	☐	☐	☐
5. Salinity	☐	☐	☐	☐	☐

Practices:

Kindly be honest. Follow the instructions in Grey highlight.

I *want to remind you once again that the mentioning your name is optional, and there will be no personal value judgement about your practices no matter what option you select in response to any question.*

Q16. I take a short shower (less than 5 minutes long): ***(Tick mark only one option)***

☐ 1. Only when in a hurry

☐ 2. Only when I already had a long shower earlier that day or I would take a long shower.

☐ 3. When there is less water available

☐ 4. I always take a short shower

☐ 5. I always NEVER take a short shower

Q17. A. How many trees you have planted so far? _____ (No. of the tree. Must put '0' if never planted a tree)

B. How many of those trees have survived? _____ (No. of the tree. Must put '0' if never planted a tree)

Q18. Which mode of transportation is used by you in each of the following cases:

☐ 1. _____ to buy grocery from a shop located at 3 km from your residence.

_____

2. _____ visit to your relatives living at 5 km away from your residence.

3. _____ to visit your place of worship like a Mosque, Temple, Church etc. 2 km away from your residence.

4. _____ Monthly visit to a market 20 or more than 20 km away from your residence.

5. _____ daily Visit to your collage 15 km away from your residence.

Fill each of the above blanks with one from the following option codes

1. Walk
2. paddle the bicycle
3. Use public transport
4. Ride Motorbike
5. Ride on the personal car
6. Use a taxi or private service cars like Cream or Uber

Q19 How often you do the following activities: ***(Mark one option per part of the question)***

Industrial product management activity	Never	Rarely	Some times	Most of the times	Always
1. New year new shoe					
2. New year new bag					
3. New year, New notebook					
4. Get cell phones repaired					
5. buy a shirt without a need					

Q20. How often you do the following activities:

(Mark one option per part of the question)

Activity	Never	Rarely	Some times	Most of the times	Always
1. Sort out the waste as per type					

2. Take waste to the dumpster
3. Throw wrappers or canes anywhere
4. Remain watchful on street dumps

Q21. How often you do the following activities. (*Mark one option per part of the question)*

Energy

	Never	Rarely	Some times	Most of the times	Always
1. Close lights when leaving a premises/rooms					
2. Buy energy efficient appliances					
3. Watchful on the electricity bill					
4. Buy solar appliances					

Q22. How often you do the following activities (*Mark one option per part of the question)*

Food and Agriculture

	Never	Rarely	Some times	Most of the times	Always
1. Order excess food					
2. Preserve leftover food for later use					
3. Prefer meat over vegetables					

General information

This set of questions gauges your Knowledge, interest, and view about sustainable development. in this set of Questions, all the questions are different. Before marking the answer carefully reads the instructions besides the question that is Grey Highlighted.

I *want to remind you once again that mentioning your name is optional, and there will be no personal value judgement about your attitude no matter what response you give in response to any question*

Q23. Self-declared interest on environmental issues (*Tick mark only one option)*

☐ 1. Very high
☐ 2. High
☐ 3. Moderate
☐ 4. Low
☐ 5. Very Low

Q24. Given the level of environmental knowledge, you have possessed so far, what percentage of it you would attribute to the following sources. *(Write zero if any source does not apply and give the answer in percentage like 10%, 20% etc. The total must add up 100)*

1. _____ School curriculum
2. _____ Teachers
3. _____ Parents and Siblings
4. _____Friends and relatives
5. _____ Self-study/Internet Search'
6. _____ TV Programs
7. _____ Radio
8. _____ Newspaper
9. _____ Any Other Source *(Please specify)*

=100%

Q25. If you are asked to give a message on Sustainable Development to your age-group across Pakistan, what one message you would like to give? You may quote someone else who you think best reflects your own thinking/ideas.

_____
_____
_____

RESPONDENT'S PROFILE

Name: _____ *Optional, so you may skip it. It will be used only if the researcher wants to contact you in the future.*

Gender: Female [1] Male [2] Other [3] ← *Tick one box*

Year of birth: _____ *e.g., 1978, 1980 etc.,*

Family Income (PKR) _____ *Family means all sharing a kitchen*

Years of Schooling _____ *Completed years. e.g., 10 for matriculate*

Educational System *Tick one box per row* ➔

A.	Federal	[1]	Cambridge	[2]			
B.	Public	[1]	Private	[2]			
C.	Pre-Med	[1]	Pre Eng.	[2]	Other	[3]	*Specify* ↑