Bangladeshi young people's ecoliteracy in postcolonial times

Ferdousi Khatun
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Bangladeshi Young People’s Ecoliteracy in Postcolonial Times

উত্তর-ঔপনিবেশিক যুগে বাংলাদেশী তরুণদের বাস্তুসংস্থান সাক্ষরতা

সাক্ষরতা

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A thesis submitted in fulfilment of the requirements for the degree of
Doctor of Philosophy

Southern Cross University
School of Education

March 2019
This research explores Bangladeshi young people’s ecoliteracy and how such literacy is socially and culturally influenced. At present, Bangladesh has no particular policy document on environmental education for school education. There is also a serious dearth of research focused on environmental education in Bangladesh (and other majority countries) and little research has focused on Bangladeshi young people’s ecoliteracy.

The theoretical foundations of this study are in the intersecting areas of socioecological theory and postcolonial theory. These theories help to explain the postcolonial socioecological context of Bangladeshi young people’s ecoliteracy. A child-framed ethnographic methodology was used as the overarching mode of enquiry. The study was conducted in two districts of Bangladesh—Dhaka and Jessore—involving 28 co-researchers and 84 participants aged between 14 and 15 from four different secondary public and private schools.

The applied child-framed research methodology required qualitative representation of data, rather than a traditional qualitative data presentation and analysis. Data representation and analysis are presented in four chapters—young people’s environmental perceptions and beliefs, young people’s environmental awareness and knowledge, young people’s environmental agency, and postcolonial and socioecological influences on young people’s ecoliteracy. The young people revealed a rich tapestry of ecoliteracy. While ecological knowledge was limited among some young people, environmental issues such as climate change were revealed as an omnipresent consciousness in Bangladeshi culture. The research revealed a deep level of systemic environmental inaction due to traditional and colonial concepts of the environment and education, which continue to dominate Bangladeshi culture.

This research further revealed significant gaps in environmental education research related to young people’s environmental perceptions, sensitivities, concerns and agencies in less advantaged majority contexts such Bangladesh. This study has the potential to considerably inform environmental education policy formulation and curriculum development in Bangladesh.
DECLARATION

I certify that the work presented in this thesis is, to the best of my knowledge and belief, original, except as acknowledged in the text, and that the material has not been submitted, either in whole or in part, for a degree at this or any other university.

I acknowledge that I have read and understood the University's rules, requirements, procedures and policy relating to my higher degree research award and to my thesis. I certify that I have complied with the rules, requirements, procedures and policy of the University (as they may be from time to time).

Signed: _____________________________
Ferdousi Ara Khatun

Date: 26 February 2019
This thesis is dedicated to my respectable parents who are my foremost environmental educators. Thank you mother and father for your priceless contribution in my life.

আমার শ্রদ্ধেয় পিতা -মাতা কে যারা আমার প্রথম পরিবেশ বিষয়ক শিক্ষার্থ।
ধন্যবাদ আম্মা এবং আব্বা আমার জীবনে আপনাদের মূল্যবান অবদানের জন্য।
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<td>Centre for Enquiry Based Learning</td>
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<tr>
<td>BBS</td>
<td>Bangladesh Bureau of Statistics</td>
</tr>
<tr>
<td>UNDESD</td>
<td>Decade of Education for Sustainable Development</td>
</tr>
<tr>
<td>ESD</td>
<td>Education for Sustainable Development</td>
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<tr>
<td>IEEP</td>
<td>International Environmental Education Program</td>
</tr>
<tr>
<td>IUCN</td>
<td>International Union for Conservation of Nature and Natural resources</td>
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<tr>
<td>WWF</td>
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Introduction

This thesis explores Bangladeshi young people’s ecoliteracy¹ and how such literacy is socially and culturally mediated. At present, Bangladesh has no particular policy document on environmental education for school education. There is also a serious dearth of research focused on environmental education in Bangladesh and little research focused on Bangladeshi young people’s ecoliteracy. This study seeks to address this gap in the research.

In this initial chapter I outline the background and thinking that guided this research. It is comprised of three parts. Part One outlines my personal orientation to the research. Part Two describes the rationale for the study in the context of the broader field of environmental education research, and Part Three details the significance of my research. I then outline my overarching research question and the subsidiary questions.

Part One: The Researchers Personal Journey

For me as the researcher, as for many researchers, the catalyst for pursuing research was personally motivated and arose from the sense of a knowledge gap within my community (see Figure 1.1). I was deeply inspired by my father and mother as a young child through gardening. I learnt the art of grafting, propagating, growing and

¹ The term ecoliteracy was defined by Orr (1992) as a way to understand and know the environment. Cutter-Mackenzie and Smith (2003, p. 502) stated that, ‘ecoliteracy is ideally about developing a rich knowledge base, multifaceted beliefs and/or philosophies about the environment’. The concept of ecoliteracy is discussed in detail in Chapter Two, the Literature Review.
harvesting food in a harsh climate. Thus, my passion for the environment was seeded at a young age.

Figure 1.1: The Researcher’s Home in Uttara, Dhaka, Bangladesh.

It is important to mention that Bangladesh is a riverine country and the rivers carry alluvial soil, that made the land rich, and this particular culture is land based. The main source of rural income in Bangladesh is agriculture, whereas land is regarded as a key resource (Hasan, Hossain, Bari & Islam, 2013). Bangladeshi people’s traditional knowledge, beliefs and spiritual practices are intensely imbedded in their culture, and they learn informally from nature, religion and every day life to achieve sustainability (Islam, 2006). Therefore, it is clear that Bangladeshi people's ecoliteracy is influenced deeply by the socio-cultural factors.

After the completion of my Bachelor and Masters of Botany from the University of Dhaka, I started working as a science teacher at a primary school in 1997 and taught general science and agricultural education at a high school from 2004 to 2008. I found the existing curriculum for environmental education was textbook oriented and topics related to the environment provided inadequate learning. After realising these practical shortcomings, I sought to place emphasis on experiential learning with students in the
environment. My students and I co-designed and built an expansive garden, which enabled me to teach and my students to learn environmental education through the school grounds.

While an experiential approach to environmental education was having some success, I sought to further understand environmental education. At Kathmandu University, I completed a Master’s by Research in environmental education with a specific focus on waste and education.

Following completion of my Masters (in 2010), I had the opportunity to work as a research assistant in a Green Club Project for three months (April to June 2011), funded by the Department of Environment and Forest under the government of Bangladesh for raising environmental awareness through school children. Afterwards, the Department of Environment and Forest continued to publish my essays in the annual publication Poribesh Shoronika on the environment and ecology of Bangladesh. Thereafter, I developed an environmental club (Green Club) in a school to raise environmental awareness of the community through school children and young people.

I completed three months training on ‘Disaster Management and Environmental Safety’ as an active member of the Dhaka University Environment Society in 2012. While teaching as a biology teacher in 2013, I found that environmental awareness was lacking in the school. Therefore, I proposed a plan for an eco-club, which was approved by the school authority and I was appointed as advisor to the club. We celebrated the World Environment Day for the first time on 5 June 2014, organised by the eco-club. We distributed plants among the students on the same day to raise their awareness of the environment. It was during this experience that I sought to understand young people’s environmental ontologies. At the same time, I observed significant environmental education curriculum and policy deficiencies in Bangladesh. These observations led me to Australia to explicitly focus on researching this phenomenon. It is my hope that it will be beneficial for the future development of the school environmental education curriculum in Bangladesh.
I now turn to the background of the study outlining a justification of the field and the significance of the research, before detailing the overarching question and subsidiary questions of this research.

Part Two: Justification for the Area of Environmental Education

In 2005, the Millennium Ecosystem Assessment Board declared that the state of the environment was worsening globally. Now, over a decade later, the planet is considered to be at a tipping point (Crutzen & Brauch, 2016). The scientific literature places particular emphasis on climate change, loss of biodiversity, decline of water resources, desertification and drought. Asia faces different types of environmental problems such as increasing temperature, extreme weather events, loss of biological diversity and water crisis (United Nations Environment Programme [UNEP], 2007). Bangladesh is vulnerable, with a multitude of environmental problems such as air and water pollution, water scarcity, land degradation, biodiversity and natural disaster (Ministry of Environment & Forest, 2001). According to the Asian Development Bank (2005), environmental sustainability is one of the most critical needs for the Asia-Pacific region.

Such global environmental plights have led to what researchers are calling the Anthropocene - a new geologic epoch (Steffen, Grienevald, Crutzen & McNeil, 2011). According to Crutzen (2006, p. 1), 'human activities are exerting increasing impacts on the environment on all scales, in many ways outcompeting natural processes'. The Anthropocene is estimated to have commenced two centuries ago with the intervention of the steam engine.

While there is little doubt that the Earth has entered an anthropogenic state, human concern for and behaviour towards the environment varies markedly from country to country. For many minority countries, there is a mounting level of concern for the environment, but it is certainly not universal and fluctuates from year to year (McCarthy, 2008). While concern is prevalent in majority countries, little research has

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2 In this thesis, the terms ‘minority’ and ‘majority’ world/nations are utilised to differentiate between Western (minority) cultures and what are commonly referred to as developing countries (majority). Majority countries represent 80% of the world’s population, yet Western countries are often portrayed as superior nations (Alam, 2008). Challenging such Western rhetoric is an important intent of this thesis.
actually captured majority world concerns (Alam, 2008). Rather, research and the media have tended to focus on industrial practices in majority countries. In the case of Bangladesh, environmental conservation and sustainability is not well understood in terms of cultural understandings and practices (Azad, 2014; Afroz, 2011; Islam, 1999 Rahman & Hassan, 2012).

The concept of environmental education appeared in the 1960s and 1970s (Gough, 2013; Gough, 2006; Palmer, 1998). The definition of environmental education was framed and accepted in 1970s by the IUCN (Gough, 2013; Palmer, 1998; Stapp, 1969). Since then the definition of environmental education was globally recognised and accepted by the UN Stockholm Conference in 1972 (Cutter-Mackenzie, 2003; Hopkins, 2012). Bangladesh participated in the Conference to contribute to the level of EE policy formulation and the curriculum development that focused on both young people and adults (Aminuzzaman, 2010; UN, 1972).

The notion of ‘sustainability’ gained acceptance at the international level with the publication of Our Common Futures (WCED) in 1987 (Cutter-Mackenzie & Hoepper, 2014, p. 392). The report defined the concept of sustainability as development that ‘meets the needs of the present without compromising the ability of future generations to meet their own needs’ (WCED, 1987, p.43). This report placed sustainability on agenda 21 that advocated Education for Sustainable Development, which was repositioned by UNESCO as central in place of environmental education programmes. According to the Brundtland report, sustainable practices with natural resources are important components of ecoliteracy (McBride et al., 2013). The philosophy of sustainable development became prominent in environmental education circles (Bonnett, 2002; McBride et al., 2013). However, despite the shift towards sustainable development being popular, it was controversial amongst some environmental education researchers (see Knapp, 2000) who believed this change was problematic for environmental education. The United Nations declared a Decade of Education for Sustainable Development (DESD) (UNESCO, 2005) to recognise the global commitment and skills to environmental education (Fien, 2006).
Part Three: Significance of the Study

In a recent times environmental education has drawn more attention as a result of ideas about the ‘environment and sustainability’ which are common issues in public dialogue, as Environmental Education includes’ nature study, outdoor and conservation education’ (Gough 2013, p.1). At present environmental related issues such as climate change have also been recognised extensively (Gough, 2013). Gough (2013, p.1) asserted that Environmental Education is an arena of importance, particularly areas relating to ‘policy, curriculum, and learning’. Changing people’s behaviour towards the environment is the central focus of research related to Environmental Education (Gough, 2013).

Although children and young people are one of the most intensely researched groups in society, very little research involves children as genuine researchers (Barratt Hacking, Cutter-Mackenzie and Barratt, 2013). Barratt Hacking et al. (2013, p. 454) also stated, how engaging children and young people as researchers provides them with a voice and the opportunity to explore problems relating to their environment that impact them and their future.

Research about young people’s ecoliteracy is infrequent in majority countries like Bangladesh. Although a little research focused on young people’s ecoliteracy in the majority world, young people showed a low level of ecoliteracy (Karyanto, Riyadi & Pryaitino, 2018; Meilinda et al, 2017). For a wider understanding of individual’s learning about the environment it is important for environmental education research to be carried out in majority countries as well as minority countries (Rickinson, Lundholm & Hopwood, 2009). The inclusion of Bangladeshi urban and rural young people ensured that the current study explored young people’s ecoliteracy in a majority world (non-Western) rather than a minority (Western) world.

Mamun, Nessa, Aktar, Hossain and Saifullah (2018) stated that at present environmental education and awareness is in a very young phase in Bangladesh. However, although there have been small amounts of quantitative research on young people’s environmental literacy carried out in Bangladesh, there is a lack of qualitative research in environmental education including young people’s perceptions about the
environment, in Bangladesh (Uddin, 2014). Therefore, for this study relating to Bangladeshi young people’s ecoliteracy is a worthwhile and significant area of research:

**Research Aim and Subsidiary Questions**

The overarching question of this study is:

What are Bangladeshi young people’s ecoliteracy, and how is such, socially and culturally mediated?

The subsidiary questions of this research are:

1. What are Bangladeshi young people’s ecoliteracy; their ecological perceptions, beliefs, knowledge and agency?
2. To what extent do social and cultural factors mediate young people’s ecoliteracy?

**Thesis Structure**

This thesis comprises nine chapters:

**Chapter One** presented the scope and importance of the study, identifying the research context, background to the study and its significance. I have also outlined the overarching research questions and subsidiary questions in this chapter.

**Chapter two** presented a review of relevant environmental education literature and research central to my overarching research problem. The purpose of this review is to identify and analyse the major concepts related to this study—environmental education policy and curriculum, ecoliteracy and young people’s ecoliteracy.

**Chapter Three** looks at post-colonial theory, sociocultural theory and socioecological theory that underpin my research.

**Chapter Four** describes and contextualises the child-framed methodology that this study applied to understand young people’s ecoliteracy. Twenty-eight young people carried out their own research with 84 participants aged between 14 and 15 years from four urban and rural secondary public and private schools from two districts of
Bangladesh. Initially I discuss the study’s research methodology, followed by a detailed account of the research design including the data collection and analysis methods employed. I also consider various data collection problems encountered including my own reflexivity.

This study’s child-framed research methodology required a qualitative representation of data.

Chapter Five is the first of four data representation chapters. Young people co-analysed the data with the researcher in the first instance through a curation process of selecting, categorising and describing photographs and drawings. In Chapter Five I discuss young people’s perceptions and beliefs of the environment, environmental perceptions in everyday life, environmental sensitivities and concerns and beliefs towards environmental issues with a particular focus on climate change.

Chapter Six focuses on knowledge. I present young people’s environmental awareness, environmental knowledge and source of environmental knowledge.

Chapter Seven explicitly focuses on agency. I discuss young people’s everyday local environmental agency and then I discuss young people’s global environmental agency.

Chapter Eight presents the sociocultural influences on young people’s ecoliteracy. I examine the social and cultural factors that influenced the young people’s ecological perceptions, knowledge and agency in postcolonial times.

Chapter Nine is the final chapter of this thesis. In this chapter I synthesise the research findings. I initially provide a summation of all chapters, followed by a rich synthesis of the data representation chapters. The overall research question and subsidiary questions guide the structure of this synthesis.
If literacy is driven by the search for knowledge, ecological literacy is driven by the sense of wonder, the sheer delight in being alive in a beautiful, mysterious, bountiful world. The darkness and disorder we have brought to that world give ecological literacy an urgency it lacked a century ago. (Orr, 1992, p. 8)

**Introduction**

In Chapter 1, I review environmental education literature and research central to my overarching research problem. The purpose of this review is to identify and analyse the major concepts related to this study. Figure 2.1 illustrates the conceptual framework of this literature review, showing the major concepts of this study.

**Figure 2.1:** Literature Review Conceptual Framework.
The chapter is presented in four sections:

1. The naming and framing of environmental education: International policy trends;
2. Environmental education in Bangladesh: From Policy to Curriculum;
3. From environmental literacy to ecological literacy and ecoliteracy; and
4. Young people’s Ecoliteracy in Minority and Majority countries.

I now turn to the literature relating to environmental education in the first section.

**Part One: Naming and Framing of Environmental Education: International Policy Trends**

With the focus of my research being young people’s ecoliteracy in Bangladesh in postcolonial times, it is important to review the history of environmental education and the significance of ecoliteracy in environmental education. In the 1990s, environmental education started as a nature study movement. In the mid-1990s the conservation movement then took hold (Palmer, 1998). The emphasis was on nature studies for encouraging learners to experience and study nature with the prospect so that they could develop values to conserve nature. Greenall Gough (1992, p. 18) stated, the origin of environmental education is both ‘environmentalism and education’, which is related and similar to ‘science and science education’. In the 1960s scientific ideas of environmental degradation increased, which was influenced largely by Rachel Carson’s (1962) seminal work, Silent Spring. Carson (1962, p. 30) argued, ‘the public must decide whether it wishes to continue on the present road, and it can do so only when in full possession of the facts’. Such early works, including Carson (1962), acted as the impetus for the United Nations Educational, and Scientific and Cultural Organisation (UNESCO) and UNEP to guide the development of formal environmental education (Cutter-Mackenzie, 2003; Sauvé, Berryman & Brunelle, 2007; Hopkins, 2012). In the 1970s, environmental education moved to school curriculum through a science conference on ‘Education and the environmental crisis’ (Gough, 1992, p.118). EE was initially considered with instruction about the ecosystem, the environment and the negative impacts of pollution on the environment (Tilbury, 2006). As shown in Table 2.1, over the past four decades environmental education has been formalised through various
and significant milestones. The policies and landmark initiatives by UNESCO and other international organisations are explored in the following section.
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Source: adapted from Cutter-Mackenzie (2003, p. 23).
International Policy Trends: From Tbilisi to 2014

The concept of environmental education evolved in the 1960s and 1970s, and the term was first used in the United Kingdom (UK) in 1965 (Gough, 2006; Palmer, 1998). In the 1970s, the definition of the term environmental education was formulated and adopted in a conference called by the International Union for Conservation of Nature and Natural Resources (IUCN):

Environmental education is the process of recognising values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among man, his culture, and his biophysical surroundings. Environmental education also entails practice in decision-making and self-formulation of a code of behaviour about issues concerning environmental quality. (IUCN, 1970, p.11)

The term environmental education was internationally recognised and accepted by the first Conference on Human Environment, which took place in Stockholm in 1972 (Cutter-Mackenzie, 2003; Hopkins, 2012). This conference was a landmark event signifying international commitment to environmental education (Linke, 1980). The conference prelude to the agreed upon environmental actions stated:

...education and training on environmental problems are vital to the long-term success of environmental policies because they are the only means of mobilising an enlightened and responsible population, and of securing the manpower needed for practical action programmes. (Linke, 1980, p. 25)

The Stockholm conference highlighted the importance of environmental education for younger generations and adults and triggered urgency about environment and developmental (majority world) issues. This resulted in the establishment of UNEP (United Nations Environment Program) (Palmer, 1998; Gough, 2006).
The UNESCO–UNEP’s IEEP (International Environmental Education Programme) was recognised in 1974 (Gough, 2006). However, the IEEP was launched during an Environmental Education UNESCO-UNEP workshop in 1975 and this shaped the first international statement of environmental education framed as the ‘Belgrade Charter - A Global Framework for Environmental Education’ (Palmer, 1998, p. 7; UNECO-UNEP, 1977). This charter constituted aims, key concepts and guiding principles relevant for all environmental education programmes, including both formal and non-formal education and was the first international statement to do this (Palmer, 1998). According to Belgrade Charter, the goal of environmental education is:

To develop a world population that is aware of and concerned about the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones. (UNESCO - UNEP, 1976, p. 2)

This goal incorporated attitudes, motivations and commitment, in addition knowledge and skills for conserving the environment. The objectives are:

- Awareness: to help individual and social groups acquire an awareness of and sensitivity to the total environment and its allied problems;
- Knowledge: to help individual and social groups acquire basic understanding of the environment, its associated problems and humanity’s critically responsible presence and role in it;
- Attitude: to help individual and social groups acquire social values, strong feeling of concern for the environment and the motivation for activity participating in its protection and improvement;
- Skills: to help individuals and social groups acquire the skills for solving the environmental problems;
- Evaluation ability: to help individual and social groups evaluate environmental measures and education programmes in terms of ecological, political, economic, social, aesthetic and educational factors; and
• Participation: to help individual and social groups develop a sense of responsibility and urgency regarding environmental problems to ensure appropriate action to solve those problems (UNESCO-UNEP, 1976, p. 2; also see Gough, 2006).

Guiding principles were established by UNESCO-UNEP in 1976 in order to implement environment education programmes in schools throughout the world (Gough, 1997). These guiding principles are:

• Environmental education should consider the environment in its totality – natural and man-made, ecological, political, economic, technological, social, legislative, cultural and aesthetic;
• Environmental education should be a continuous life long process, both in schools and out of schools;
• Environmental education should be interdisciplinary in its approach;
• Environmental education should emphasise active participation in preventing and solving environmental problems;
• Environmental education should examine major environmental issues from a world point of view, while paying due regard to regional conference;
• Environmental education should focus on current and future environmental situations;
• Environmental education should examine all development of growth from an environmental perspective; and
• Environmental education should promote the value and necessity of local, national, and international cooperation in the solution of environmental problems (UNESCO-UNEP, 1976, p. 2).

The Belgrade Charter's objectives and guiding principles identified political, economic, social and global issues, which served as an impetus to develop and formulate environmental education (Tilbury, 1994).
In the 1977, the Belgrade Charter on environmental education was advanced at the Tbilisi Intergovernmental Conference (McBride, Brewer, Berkowitz & Borrie, 2013). The main focus of the Conference was the major environmental problems in modern society; the role of education relating to increasing environmental problems; efforts that have been made to develop environmental education; strategies to present environmental education at national and global level; and local and global support to develop environmental education (UNESCO-UNEP, 1977, p.5).

Forty-one recommendations on environmental education were put forward at the Tbilisi Conference. The Conference also produced a declaration including the goals, objectives and guiding principles of environmental education. The goals of environmental education reiterated at Tbilisi are:

- To foster clear awareness of, and concern about, economic, social, political and ecological interdependence in urban and rural areas;
- To provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment; and
- To create new patterns of behaviour of individuals, groups and society as a whole towards the environment (UNESCO-UNEP, 1977, p. 26).

The Tbilisi developments included the connection between social, economic, political and ecological interdependence; the opportunities for everyone to learn environmental education; and the inclusion of individuals, groups and society to work collectively to improve the state of the environment (NAAEE, 1999). At the Tbilisi Conference a new definition for environmental education was developed from the goals, objectives and guiding principles formed. The definition is:

Environmental education, properly understood, should constitute a comprehensive lifelong education, one responsive to changes in a rapidly changing world. It should prepare the individual for life through an understanding of the major problems of the contemporary world, and the provision of skills and attributes needed to play a
productive role towards improving life and protecting the environment with due regard given to ethical values. (UNESCO - UNEP, 1977, p. 24)

The Stockholm-Belgrade-Tbilisi declaration pushed for work relating to environmental solutions in environmental education (Cutter-Mackenzie, 2003). Bangladesh was invited as one of the representative countries to participate in the Stockholm Conference, in accordance with General Assembly resolution 2850, (UN, 1972). Although these conferences focused on environmental education as a major contributor to all levels, little attention was directed towards environmental problems (Annette Gough, 1997).

A number of noteworthy conferences developed from the UNESCO-UNEP conference in Tbilisi including the Earth Summit and Agenda 21 (UNESCO - UNEP, 1992), the Thessaloniki Declaration in 1997 (UNESCO, 1997), and the UN Decades of Education for Sustainable Development 2005–2014 (UNESCO, 2005a). There was a global movement to incorporate the term ‘sustainable development’ in the definition of environmental education during this period (UNESCO, 2005a, p.3). This movement towards sustainable development was controversial in the field of environmental education and was widely debated (Cutter-Mackenzie, 2003). Nevertheless, in the 1980’s IUCN (1984), UNEP and the World Wildlife Fund introduced the term ‘sustainable development’ in world conservation strategies (Palmer, 1998, p.16).

The World Commission on Environment and Development (WCED), ‘Our Common Future’ report was published in 1987 (WCED, 1987). The report positioned the concept of sustainable development in international environmental policy, which extensively focussed on poverty and degradation of the environment. It also provided a pivotal definition of sustainable development that has been adopted widely, ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’ (WCED, 1987, p. 43):

Our Common Future repeated two strong messages: sustainability issues are all intimately connected and their effects tend to be greatest in the poorest and most populous countries in the world. And it
emphasised three themes – there had to be limits placed on some human activities, there had to be fairer sharing of the world resources and people in the more effluent countries must adopt lifestyles within the planets ecological means. (WCED, 1987, p. 44)

According to the Brundtland Report, ‘the world’s teachers have a crucial role’ to play in helping to bring about ‘the extensive social changes’ that is required in order to achieve sustainable development (WCED, 1987, p. xix; also see Gough, 2006). Agenda 21 from the United Nations (UN) Conference on Environment and Development Earth Summit, which took place in 1992 at Rio de Janeiro, emphasised promoting sustainable development in education. Sustainable development has penetrated the area of environmental education since 1980s but the underpinning values surrounding ecological sustainability have still remained dominant in the Environmental Education field (Cutter-Mackenzie, 2003). These values can be seen in the UNESCO and UNEP’s statement from the 1992 Earth Summit:

Education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues. It is also critical for achieving environmental and ethical awareness, values and attitudes, skills and behaviour consistent with sustainable development and for effective public participation in decision-making. (UN, 1992, para. 36:3).

The Thessaloniki Conference (1997) celebrated the twentieth anniversary of the Tbilisi Declaration and assessed, ‘education as a basis for the pillar of sustainability in the 21st Century’ (UNESCO cited in Knapp, 2000, p. 32). Knapp (2000, p. 32) stated, that ‘only two out of the twenty-nine statements outlined in the declaration was environmental education mentioned’. One of those statements advocated that ‘environmental education be referred to as education for sustainability in the 21st century’ (UNESCO, 1997, p. 20). It was also proposed that, ‘environmental education be referred to as education for environment and sustainability’ (Knapp, 2000, p. 32). Fien (2001) believed that education for sustainability goes across ecology, society, economy and the political arena. In contrast, Huckle (1996, p. 9) contended, ‘such sustainability
frameworks were weak due to their focus on techno-managerialism and economic growth’. Bonnett (2002, p. 14) stated, ‘the issue of sustainability is a frame of mind’ and it represents a ‘fundamental ethical, epistemological and metaphysical consideration’, that is concerned with humans’ perceptions, beliefs and practices. Gough (1997, p. 45) asserted, the historical issues reach into ‘the core of policy, trends and the important contextual problems of marginalisation’. Gough (1997, p.46) highlighted the issues of ‘marginalisation’ through placement of environmental education in ‘either the sciences or social sciences’. Furthermore, Ramsey and Hungerford (1989 cited in Gough 2013, p. 17) pointed out that the ultimate goal of environmental education is ‘responsible environmental behaviour’.

The UN World Summit on Sustainable Development (2002), in Johannesburg declared that ‘Education for Sustainable Development (ESD) is an emerging but dynamic concept that encompasses a new vision of education that seeks to empower people of all ages to assume responsibility for creating a sustainable future’ (UNESCO, 2002, p. 5). The Johannesburg World Summit on sustainable development recommended the progression of the implementation of ‘education for sustainable development at national and global levels’ (Tilbury, 2011, p. 12).

The United Nations Decade of Education for Sustainable Development (DESD) lead by UNESCO (2005) was established to recognise the global commitment and skills to environmental education (Fien, 2006). The main idea of DESD is to make a world where ‘everyone has the opportunity to benefit from education and learn the values, behaviour and lifestyles required for a sustainable future and for positive societal transformation’ (UNESCO, 2005b, p. 6). The key goals of DESD which was framed by UNESCO are:

1. Improve access to quality education to improve knowledge and skills for quality of life;
2. Reorient the education programme (from preschool to university) in order to enhance sustainability;
3. Enhance public understanding and awareness of sustainable development; and

The Millennium Ecosystem Assessment Report (UNESCO, 2005) was concerned with the present and future state of the Earth’s ecosystems. This report revealed that although humans are advanced in technology, they are still dependent on the Earth’s ecosystems for their fundamental needs (UNESCO, 2005). The report stated that:

...in attempting to assess the importance of nature to our lives, we should not lose sight of the value placed on the variety of life on Earth for its own sake: this is more difficult to put a price on, but nonetheless of deep concern to people of all cultures. (Millennium Ecosystem Assessment, 2005, p. 9)

This Millennium Ecosystem Assessment (UNESCO, 2005) steered environmental education in the development of policy for environmental education in schools indirectly.

Similar to the declarations of Thessaloniki and Johannesburg, the International Conference on Environmental Education in Ahmedabad (2007) declared:

Through education, human lifestyles can be achieved that support ecological integrity, economic and social justice, sustainable livelihoods and respect for all life. Through education we can learn to prevent and resolve conflicts, respect cultural diversity, create a caring society and live in peace. (UNESCO - UNEP, 2007, cited in Sarabhai, 2008, p. 87)

The 2009 Bonn Declaration exclusively focused on ESD in the twenty-first century. Its focus was one of a socioecological nature with consideration for the educational implications. Particular attention was paid to ‘a new direction of education and learning for all’ and to ‘address important issues such as water, energy, climate change, disaster and risk reduction, loss of biodiversity, food crisis, health risk, social vulnerability and insecurity’ (UNESCO, 2009, p. 250).
Gough (2013, p. 13) stated the Bonn Declaration (UNESCO, 2009) describes ‘education for sustainable development for ten paragraphs and specifies action in formal, non-formal, informal, vocational and teacher education’. Lotz-Sistika (2009) stated that the Bonn Declaration evolved from an official UNESCO conference which had the influential background and power to postulate a future guideline for UNESCO and the DESD. The argument surrounding the shift towards ESD and away from environmental education was illustrated by Lotz-Sistika (2009, p. 207), who stated the Bonn Declaration was firmly established in ‘the modernist and anthropocentric education agenda, with firm modernist beliefs centred on the infallibility of a global capital and associated economic paradigm’. This demonstrates how some environmental education researchers saw sustainable development as promoting humans at the centre where the health of the environment should be maintained for the benefit of humans, rather than for the benefit of the environment itself. Lotz-Sistika (2009), like many environmental education researchers, saw ESD as being politically driven.

Since then sustainable development has been emphasised at the United Nations Conference on Sustainable Development (2012) which was held in Rio de Janerio, Brazil, and the UNESCO’s World Conference on Education for Sustainable Development in Aichi-Nagoya, Japan in 2014. The Conference declared:

A commitment to environmental sustainability – promoting the integrated and sustainable resource and ecosystems but as part of a broad vision of sustainability, we also reaffirm the freedom, peace and security, respect for all human rights, including the right to development and the right to an adequate standard of living, including the right to food, the rule of law, gender equality, women’s empowerment and overall commitment to just democratic societies for development. (UN, 2012, pp. 1-3)

The conference called for immediate and robust sustainable actions by a broad alliance through the public, the government and the private sectors. However, like the Bonn Declaration, human needs are at the centre. The World Conference on ESD aimed to
focus on changing education systems in order to promote sustainable development (Warwick, Sterling & Wyness, 2015).

These milestone actions have been highly significant with respect to the development and practice of environmental education. However, there have been serious concerns raised around the language of sustainability itself. Prior to summarising this section I now turn to a critical discussion on sustainability or sustainable development in relation to environmental education (Fien, & Tilbury, 2002) and highlight the tensions and controversies further.

**Problematising Sustainable Development and Education**

The practice or teaching of environmental education or other associated areas including ESD, has been a vexed debate. The DESD recognised the crucial role of governments in education and possibilities to implement sustainable development in educational systems at a national level (UNESCO, 2005). Nonetheless, there were many arguments over implementing the terms ‘education for sustainability’, ‘education for sustainable development’, ‘education for the environment’, and ‘education for responsible societies’ because of numerous global interpretations and arguments. (Bonnett, 2002; Breiting, 2009; Cutter-Mackenzie, 2003; Jickling, 2001; Jickling & Spork, 1998; Sauvé, 2005; Sauve, 1999). These terms emphasised development more than sustainability. However, a strong case for ‘sustainable education’ has been put forward by Stephen Sterling (2001) who argues, “The root of the ‘world problematique’ lies in a crisis of perception; of the way we see the world” (Sterling, 2001, p.23). Therefore, it is essential to change our worldviews in order to make the world better.

The pressure ‘within EE/ESD reflects a number of ideological currents in the western society’ (Kopnina, 2014, p.125). Poeck and Vandenabeele (2012) highlighted how the concept of economic growth and its long-term feasibility being at the centre of sustainable development caused much concern and debate. Wals and Jickling (2002, p. 233) elucidated, ‘when comparing the sustaining ecological process with the sustaining of consumerism we immediately see inconsistencies and incompatibilities of values, yet many people, continued to think that sustainability is inherently good’. The term sustainable development is unclear because, on one hand, it supported the governments
by representing their concern through attempting to make ecosystems more sustainable, while on the other it is stimulating economic growth (Bonnett, 2007; Wals & Jickling, 2002). Jickling (1994) argued, there was lack of attention and analysis of the key concepts surrounding sustainability and this created a barrier in environmental education. Wilson (1969) also argued, the conceptual analysis is an art of revealing the truth and such analysis requires re-examination and clarification of the concepts. Therefore, it is essential to examine the definition of sustainability in the literature to establish the background of the debate surrounding ESD.

Smyth (2006) argued that policy trends were highly problematic for environmental education. Sustainable development itself is an unqualified and nebulous term that fails to find the common ground of common meaning among its proponents (Smyth, 2006). Cutter-Mackenzie (2003, p. 42) further exposed this issue arguing, ‘Sustainability is a catch-all phrase’ with extreme positioning. Building on Orr’s (1992) work, Cutter-Mackenzie (2003) broadly categorised sustainability into ecological sustainability and technological sustainability, placing them at opposite ends to one another.

Cutter-Mackenzie’s (2003) positioning mirrors popular environmental philosophy. She summarised the two perspectives of sustainability as ecocentric and technocentric. In ecocentric perspectives ‘nature has intrinsic value and has a right to exist and to flourish’ (Cutter-Mackenzie & Hoepper, 2014, p. 395). Therefore, for the 'highest level of ecological sustainability', people should make a 'harmonious relationship with nature' and should restrict their use of natural resources (p. 395). Conversely, in a technocentric perspective, ‘nature is a resource to be used’ to benefit humans (Cutter-Mackenzie & Hoepper, 2014, p. 395). Furthermore, in a technocentric view, ‘technology will provide solutions for any resulting environmental problems’ (p. 395) in contrast to an ecocentric view where people should take responsibility and apply limits to their utilisation of natural resources. This ecocentric versus technocentric view echoes the tensions between environmental education and ESD. The main focus of environmental education is with ‘actual connections to, and affinity with the natural environment’ (Cutter-Mackenzie & Hoepper, 2014, p. 398). Although many researchers agree to implement ‘education for sustainability’ or ‘education for sustainable development’ in
educational settings, there is still controversy surrounding these terms (Jickling, 2010; Jickling & Spork, 1998).

Sauvé (2005) highlighted 15 currents within environmental education, with ESD being one. By identifying the currents, Sauvé (2005, p. 32) believed that ‘it enables the identification of complementary aspects, in view of a comprehensive environmental education, one which encompasses - through a range of coherent, well-orchestrated interventions - all the many diverse dimensions of our relationship to the environment’. Russell (2006, p.410) argued:

The field of environmental education research has much to gain if, as researchers, we all become better at keeping conversations alive by being open, playful, respectful and generous. We need to move beyond working across difference to working with difference, that is, beyond more tolerance for methodological, epistemological and ontological diversity to actively working to creating spaces where such diversity can flourish.

**Part One Summary**

In Part One I discuss the international policy trends in environmental education, presenting established goals, objectives and guiding principles of environmental education. The initiatives and developments have been significantly guided and influenced by UNESCO and UNEP. The latter has seen the infiltration of the concept of sustainable development and sustainability is such that there is now a naming and framing debate within the field of environmental education. There has been much controversy among environmental education researchers relating to the interpretation of sustainability and this reflects the key issues at the centre of ‘education for sustainability’ and ‘education for sustainable development’. In the next section I focus on environmental education policy and curriculum trends in Bangladesh to contextualise the international policy trends within the confines of this study.
Part Two: Environmental Education in Bangladesh—From Policy to Curriculum

This section presents the history of environmental education, policy developments and environmental education curriculum trends in Bangladesh.

Bangladesh: The State of the Environment

Bangladesh is a majority country with low land, a large population and limited resources (Chowdhury, 2004). Bangladesh is considered to be amongst the most vulnerable countries to the impacts of climate change because of its geography and large population (Aminuzzaman, 2010; Brouwer, Akter, Brander & Haque, 2007; Mahmood, 2014). More recently the country has experienced intensified flooding, sea level rise, increased cyclones and storm surges (Brouwer et al., 2007; Rawalani & Sovacool, 2011). These impacts are leading to factors such as ‘erosion, drainage congestion, water logging, and saltwater intrusion of water supplies’ (Rawlani & Savacool, 2011, pp. 845-846). Recent research has revealed that in the Sundarbans area of Bangladesh ‘84% of dry land will be lost, and 77% of the whole Sundarbans areas will be inundated by more than 1m depth due to a 88cm sea level rise in 2100’ (Uddin, Shah, Khanom & Nesha, 2014, p. 154).

The 1972 the United Nations Conference on Human and Environment in Stockholm called for common ground in the global community in environmental education (UN, 1972). The Conference declared ‘to defend and improve the environment for present and future generations has become an imperative goal for mankind [Sic]’ (UNESCO - UNEP, 1978, p. 1). The government of Bangladesh, like many minority and majority countries, made an effort to participate at the policy and curriculum level to fulfil the Stockholm directive (Aminuzzaman, 2010). I now turn to environmental education policy in Bangladesh.

Policy for Environmental Education in Bangladesh

Salequzzaman and Davis (2003, p. 72) stated, ‘the government of Bangladesh has several policy statements advocating widespread environmental education but there has never been seen a specific government policy for environmental education or environmental professions’. However, the government of Bangladesh has taken up
various policies relating to the environment and development. According to WCED (1987, p. 37), the ‘environment and development are inexorably linked’. Bangladeshi landmark environmental and education plans and policies are shown in Table 2.2.

**Table 2.2: Environmental and Education Action Plans and Policies in Bangladesh**

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1977</td>
<td>Environmental Pollution Control Ordinance</td>
<td>Control, prevention and abetment of pollution to the entire environment in Bangladesh (Clemett, 2006).</td>
</tr>
<tr>
<td>1989</td>
<td>Formation of the Ministry of Environment and Forest (MoEF)</td>
<td>to address the emerging environment-related issues, and the government launched to endorse environmental laws in response to the national conservation strategy (Hossain, 2014).</td>
</tr>
<tr>
<td>1992</td>
<td>National Environmental Policy</td>
<td>to ensure the protection and improvement of the environment (MoEF, 1992 cited in Aminuzzaman, 2010, p. 2).</td>
</tr>
<tr>
<td>1995</td>
<td>National Environmental Management Action Plan</td>
<td>to reduce the rate of environmental degradation, improve the natural and human made environment, conserve habitats and biodiversity, promote sustainable development and improve the quality of human life (MoEF, 1995a, p. 16).</td>
</tr>
<tr>
<td>1995</td>
<td>The Bangladesh Environmental Conservation Act</td>
<td>to provide conservation of the environment, improve environmental standards and control and mitigate environmental pollution (MoEF, 1995b, p. 154).</td>
</tr>
<tr>
<td>1996</td>
<td>The Fourth Five Year Plan</td>
<td>to reduce poverty and increase economic growth (Salequzzaman &amp; Davis, 2003).</td>
</tr>
<tr>
<td>1997</td>
<td>The Bangladesh Environmental Conservation Rules</td>
<td>to provide the regulatory framework for environmental management in Bangladesh (Mastaller, Montgomery &amp; Weinstock, 2000, p. 35).</td>
</tr>
<tr>
<td>2000</td>
<td>The Environmental Court Act</td>
<td>to provide for the establishment of an environmental court and incidental matters (MoEF, 2000, p. 168).</td>
</tr>
<tr>
<td>Year</td>
<td>Event</td>
<td>Direction</td>
</tr>
<tr>
<td>------</td>
<td>----------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>2005</td>
<td>The National Adaptation Programme on Action</td>
<td>to reduce the adverse impacts of climate change (MoEF, 2005, p. xv).</td>
</tr>
<tr>
<td>2011</td>
<td>The Sixth Five Year Plan</td>
<td>Economic growth and poverty reduction (Ministry of Planning [MoP], 2011, p. 112).</td>
</tr>
<tr>
<td>2012</td>
<td>New National Curriculum</td>
<td>to teach students about environment and climate issue using integrated EE curriculum through different subjects (Hossain, 2015).</td>
</tr>
</tbody>
</table>

The formation of the Water Pollution Control Ordinance demonstrates the importance of environmental growth in Bangladesh in 1973. The 1977 Environmental Pollution Control Ordinance in Bangladesh extended the interpretation of pollution from water to ‘air, water or soil’ in Bangladesh (Clemett, 2006, p. 4).

The Ministry of Environment and Forest (MoEF) was formed in Bangladesh to address emerging environmental issues in 1989 (Hossain, 2014). The government commenced the necessary steps to enlist the National Conservation Strategy. The government also approved the National Environmental Policy 1992, and revised the old law by endorsing the Bangladesh Conservation Act 1995, which has also reframed policy of the Department of Environment (Hossain, 2014).

There was considerable progress in Bangladesh regarding the formulation of environmental management policies and strategies during the 1990s. Bangladesh
observed 1990 as the ‘Year of the Environment’ and the decade of 1991–1999 was declared as the ‘Decade of Environment’ (Chowdhury, 2004, p. 24). As Aminuzzaman (2010) asserted, the concept of environmental protection was first recognised by the government of Bangladesh when they developed the National Environmental Policy in 1992. This objectives of this policy are to:

- Maintain the ecological balance and overall development through protection and improvement of the environment;
- Identify and regulate polluting and environmentally degrading activities;
- Ensure environmentally sound development;
- Ensure sustainable and environmentally sound use of all natural resources; and
- Actively remain associated with all international environmental initiatives (Aminuzzaman, 2010, p. 2).

The National Environment Management Action Plan was developed in 1995 to address the present and future environmental problems, focusing on particular actions to reduce the environmental effects (MoEF, 1995a). The Environmental Conservation Act was passed in 1995 to provide guidelines ‘for conservation of the environment, improvement of environmental standard, and control and mitigation of environmental pollution’ (MoEF, 1995b, p.154). The Act was strengthened in 1997 by the Environmental Conservation Rules, which provided the regulatory framework for environmental management in Bangladesh (Mastaller, Montgomery & Weinstock, 2000, p. 35). The government established the Environmental Court Act in 2000 providing a regulatory framework in prosecuting environmental pollution (Clemett, 2006).

The Bangladeshi Government established different environmental action plans and strategies to enhance the status of the environment. In 1992, a National Environmental Policy was formulated which aimed to:

- Eliminate illiteracy and create extensive mass awareness regarding environmental conservation and utilization of all national resources in an environmentally friendly manner;
- Confirm incorporate and transmission of environmental knowledge and information in the formal and non-formal schemes of education and the media;
• Encourage unplanned and active participation of public in all environmental activities;
• Incorporate environmental issues in all training programs for public and private sector officials and employees including built-up and commercial workers;
• Encourage necessary research and evolve technology so as to ensure long term, sustainable and environmentally sound utilisation of all resources; and
• Ensure that environmental issues get due consideration in all research activities by research and development institutions (Salequzzaman & Davis, 2003, pp. 72–73).

In this policy, the government of Bangladesh outlined the guidelines of environmental education and public awareness (Salequzzaman & Davis, 2003). The government has also organised a number of training programmes for teachers, educators and educator’s administrators relating to income generation for sustainable development. The Ministry of Education (MoE) organised different programmes such as ‘World Teachers’ Day and Education Week’ (UN, 2002, p. 41) to increase public awareness.

The Fourth Five Year Plan of Bangladesh (1996) stated, ‘Environmental Education would be imparted to the teachers and students at all levels of education and specific measures must be undertaken to ensure participation of women at every level of education’ (Salequzzaman & Davis, 2003, p. 72). This plan emphasised the economic growth of the country by including environmental education in the education system of Bangladesh and empowering women by increasing opportunities for their education.

The Country Profile of Johannesburg Summit of Bangladesh (2002) stated some guidelines about environmental education in terms of sustainable development but did not demonstrate any specific direction about the inclusion of environmental education in schools (UN, 2002). This report reveals the focus on economic development of the country through different issues such as trade, industry, energy, transport and sustainable tourism.

The Education Policy (Ministry of Education, 2003, p. 13) stated that ‘there is no alternative to exploring the full utility of modern technology for quality improvement in
primary and secondary education’. This suggests that economic growth and developing human resources are key objectives of the education system. Furthermore the policy did not state any specific guidelines about environmental education for school education (MoE, 2003).

In 2004, National Report of Bangladesh on ‘Development of Education’ was published to improve education in Bangladesh from primary to tertiary level (MoE, 2004). The recommendations of this report were to:

- Provide value based education;
- Emphasise job oriented and need based education;
- Modernise the curriculum;
- Ensure efficient management at all levels; and
- Strengthen the information and communication technology (MoE, 2004, p. 9).

Environmental education has not been prioritised in this report and there were no specific guiding principles on environmental education in schools.

The National Adaptation Program of Action was developed in 2005 to address environmental issues and the impacts of climate change. This program incorporated a number of ‘adaptation measures’, including introducing issues relating to climate change in curricula for both secondary and tertiary education (MoEF, 2005, p. xv).

The Bangladesh Climate Change and Action Plan (2009) aimed ‘to create a suitable environment for the economic and social development of the country and to secure the well-being of the people, especially the poorest and most vulnerable groups, including women and children’ (MoEF, 2009, p. xvii). The Bangladeshi Government’s vision was to eliminate poverty establishing a culture of social and cultural wellbeing. This plan promotes a climate change management strategy that prioritises a low carbon society (MoEF, 2009).

According to the 2010 National Education Policy, the aims and objectives of secondary education are to:
• to develop learner’s latent intellect and comprehensive inner faculties;
• to develop a learner’s competencies so that she/he can compete in the job market, especially in the economic sector of the country;
• to impart quality education at this primary level to extend and consolidate the knowledge acquired during primary education to help the students to acquire a strong foundation of quality higher education;
• to make efforts to mitigate discriminations among various secondary educational institutions and among various socio-economic, ethnic and socially backward groups; special steps will be taken to support advancement of education in the backward regions as long as necessary;
• to design, continue and implement a uniform curriculum and syllabus for the selected subjects, irrespective of streams. (MoE, 2010, p. 13)

This policy mentioned secondary-level science, social science, business studies, information technology and computer science as being closely associated with the development of technology and economic activities (MoE, 2010). Although this policy focuses on economic development through secondary education, it did not emphasise environmental issues.

The Sixth Five Year Plan of Bangladesh (2011) stated, ‘Human resource development is at the core of Bangladesh’s development efforts and access to quality education is critical to poverty reduction and economic development’ (MoP, 2011, p. 112). Although this plan focuses on some environmental issues for sustainable development, its main target is economic growth and reduction of poverty.

The vision of the Seventh Five Year Plan of Bangladesh (MoP, 2016, p. 11) was to ‘create a society where men and women will have equal opportunities and will enjoy all fundamental rights on an equal basis’. The plan also supported the positive impacts of remittances on poverty reduction.
From the above, it is clear that although the Bangladeshi Government established different environmental plans and strategies for improving the environmental condition, the education sector has not been prioritised. This review of environmental policy reveals that although the government stated some directions about environmental education in its environmental policy of 1992, at present Bangladesh has no specific policy document on environmental education, in particular for school education.

**Environmental Education Curriculum Trends in Bangladesh**

There is a lack of research relating to environmental education in Bangladesh, necessitating investigation of trends in this area through Bangladeshi education policy and curriculum. In Bangladesh there are three education systems - general, madrasa and technical (Chowdhury, 2014). The education system comprises three major stages - primary, secondary and higher education. Students (aged 6 to 10) spend five years in primary school. Secondary education has three substages - Junior Secondary (grades 6 to 8), Secondary (grades 9 and 10), and Higher Secondary (grades 11 & 12). The majority of the students are in the general education system. Chowdhury (2004) stated, in Bangladesh 'EE (environmental education) is provided in formal and non-formal schools' (p.20). Therefore, it is important to describe the broader Bangladeshi curriculum framework.

In Bangladesh the curriculum for schools is rigorously centralised (MoE, 2004). Environmental education is incorporated into different subjects such as science (knowledge of environment), Bangladesh and global studies (environmental protection, development and climate), and religion and moral education (which has strong ethics of respect for the environment from an anthropocentric view). Textbooks have stereotypically guided the curriculum of primary and secondary levels.

Although there have been considerable advancements in secondary education in Bangladesh for increasing enrolments and academic success rates, this has been at the expense of the quality of education (Hossain, 2015). Hossain (2015) also stated, the primary and secondary curriculum, which was developed in 1995 (p.9), is 'overloaded, examination- oriented and teacher-centered'. The existing curriculum has failed to
prepare students to change modern society and to protect the environment. The formal education system of Bangladesh has been unsuccessful in providing environmental education and education for sustainability that promotes individual action in everyday life (Haque, 2013). Postcolonial, cultural, religious and economic factors have influenced the education system in Bangladesh. Haque (2013) highlighted, how indigenous knowledge is not assimilated in the formal education system of Bangladesh. Sohel (2006 cited in Haque, 2013, p.324) stated, ‘Bangladesh is facing numerous problems such as population growth, food and energy crisis, exploitation, forest clearing, pollution and women’s position’. Chowdhury (2014) recognised environmental issues such as biodiversity, energy, urbanisation, depletion and degradation of natural resources were poorly represented in the textbooks of 1997 and the issue of climate change was not included.

In 2012, a new curriculum was developed in Bangladesh at both the primary and secondary level and carried out in 2013 (Hossain, 2015). In this curriculum, some issues related to environment and sustainability such as climate change, energy and water conservation actions are addressed (Hossain, 2015). The new curriculum introduced environment-related issues such as climate change. Hossain (2015) stated, the curriculum is politically and economically motivated, therefore, it was not possible to offer any alternative approach outside the education system and the curriculum is highly centralised. As Haque (2013) mentioned, although the MoE and educators are keen to integrate environmental education programmes, it is difficult to introduce this in a highly centralised education system as it is knowledge based and teacher centred. Additionally, teachers are not sufficiently skilled to teach environmental education curriculum in the classroom as there is no working model for teachers that provides them with implementation of environmental education strategies.

**Part Two Summary**

This section reported the environmental and education plans and policies and environmental education curriculum trends in Bangladesh. Despite the Bangladeshi government and non-government organisations undertaking a number of initiatives in areas relating to environmental education, formal environmental education in the school education sector is seriously lacking. The Government of Bangladesh has not
developed any specific policy document for school-based environmental education. The current curriculum places emphasis on economic and technological development, rather than on sustainable or ecological development. Thus, by all accounts, environmental education in Bangladesh is in its infancy. I now turn to Part Three where I consider and critically discuss the concept of ecoliteracy, which is central to this study.

**Part Three: Environmental Literacy to Ecoliteracy**

This section presents the definitions of environmental literacy, ecological literacy and ecoliteracy, followed by a discussion of their respective histories. The term environmental literacy has been used to describe knowledge, attitude, skills and behaviour necessary for life in a sustainable society (UNESCO - UNEP, 1976). In some senses, it has become a goal of environmental education. There has been some argument surrounding the terms environmental literacy and ecological literacy as they have been seen to lack meaning (Disinger & Roth, 1992; Stables & Bishop, 2001). Payne unqualified the notion of environmental literacy or ecological literacy as it is confused because the focus of curriculum theory is oriented to students’ experiences about the existence of ecosphere, rather than ‘critical ecological ontology’ (2005;2006, cited in McBride, Brewer, Berkowitz & Borrie, 2013, p. 2).

The concept of environmental literacy was first used in an issue of the *Massachusetts Audubon* by Roth 43 years ago (1968 cited in Roth 1992, p.7; McBride et al., 2013), who enquired, ‘How shall we know the environmentally literate citizens?’. Since then the meaning of environmental literacy has emerged and has been comprehensively reviewed (McBride et al. 2013). According to Roth (1992, p.18), the major domains of environmental literacy are: ‘knowledge, skills, attitude and values, personal investment and responsibility, and active involvement’.

The term ecological literacy was first publicly used by Risser (1986) in a public address as the past president to the Ecological Society of America. Risser (1986) advised ecologists to consider, debate and arrive at the agreement of the basic components of ecological literacy, and to adopt a strong position and embrace their responsibilities to promote ecological literacy for students and the general public. Since then, the concept of ecological literacy has advanced significantly in the field of ecology (McBride et al.,
2013; Odum, 1992; Jordan, Singer, Vaughan & Berkowitz, 2009). Individuals’ basic ecological knowledge is achieved through ‘scientific analysis and systems thinking’ (McBride et al., 2013, p. 3).

Capra (1997) coined the term ecoliteracy after drawing heavily on Orr’s (1992) work (Cutter-Mackenzie & Smith, 2003). Capra founded the Centre for Ecoliteracy a non-profit organisation, committed to education for sustainable living (McBride et al., 2013). Capra and others advanced the term ecoliteracy focusing on creating sustainable human communities and societies (Capra, 1997; Cutter-Mackenzie & Smith, 2003; Wooltorton, 2006). Stables and Bishop (2001), and Payne (2005; 2006) criticised these definitions based on the numerous arguments because these approaches are descriptive, rather than hypothetical or theoretical. In the next section I explore the concepts of environmental literacy, ecological literacy and ecoliteracy and their respective histories in more detail.

**Environmental Literacy**

The term environmental literacy was conceptualised by Roth (1992), however, Rachel Carson’s (1962) *Silent Spring*, triggered public awareness about environmental problems, particularly those such as pollution, surrounding human impact on the environment (Rothman, 1998). As a result of this environmental awareness that occurred in the 1960’s and 1970’s the term environmental literacy became more popular, particularly in the field of environmental education (McBride et al, 2013).

The Belgrade Charter that was declared originally in 1975, was developed further in 1977, at the International Conference in Tbilisi (see Part One of this chapter). Three goals of environmental education were defined by this Charter (UNESCO - UNEP, 1978). Since the Tbilisi Declaration, the International Strategy for Action in the field of *Environmental Education and Training for the 1990s* was produced which focused environmental problems, principles and directives for environmental education (UNESCO - UNEP, 1988). The following year UNESCO-UNEP (1989, p.1) issued ‘Environmental Literacy for All, that is, a basic, a functional education for all people, which provides them with the elementary knowledge, skills and motives to cope with environmental needs and contributes to sustainable development’. This statement
positioned environmental literacy as the central goal of environmental education (Roth, 1992).

The National Project for Excellence in Environmental Education was initiated in 1993 to develop a high quality of environmental education across the US and environmental literacy was the central focus of that project (North American Association of Environmental Education, 2004). The project developed guidelines for environmental learning (McBride et al., 2013).

In 1995, Simmons recognised seven components of environmental literacy by supporting the aforementioned guidelines. The seven components of environmental literacy are: ‘affect, ecological knowledge, socio-political knowledge, knowledge of environmental issues, cognitive skills, environmental responsible behaviour, and additional determinants of environmental responsible behaviour’ (Hollweg et al., 2011, pp. 2–3)—shown in Table 2.3.

Table 2.3: Components of Environmental Literacy

<table>
<thead>
<tr>
<th>Components</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affect</td>
<td>Environmental sensitivity/ gratitude, in terms of responsible attitude to environmental problems including pollution, technology, economics and conservation; and environmental action and willing to recognise environmental problems and issues and inspiration to actively participate in environmental improvement and protection to know one’s values to judge environmental issues according to his/her sense of responsibility.</td>
</tr>
<tr>
<td>Ecological Knowledge</td>
<td>An ability to communicate and apply major ecological knowledge including population, community, ecosystem and biogeochemical cycles; and an understanding of energy production and transfer and how natural systems work.</td>
</tr>
<tr>
<td>Socio-Political Knowledge</td>
<td>A clear awareness of economic, social, political and ecological interdependence in urban and rural areas and an understanding of basic structure of societal systems and the relationship between beliefs, political structures, and environmental values of various culture; and local, regional and global topography and recognition of pattern of change</td>
</tr>
<tr>
<td>Components</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Knowledge of Environmental Issues</td>
<td>An understanding of numerous environmental problems and issues and how they are influenced by political, educational, economic and governmental institution; and understanding of the quality of air, water and soil; use and management of land for human health, wildlife habitat and wastes.</td>
</tr>
<tr>
<td>Cognitive Skills</td>
<td>Identification and definition of environmental problems and analysis, synthesis and evaluation of information about these issues. Ability to select appropriate action strategies and creating, evaluating and implementing action plans and to conduct scientific enquiry and risk analysis, system thinking, and plan.</td>
</tr>
<tr>
<td>Environmental Responsible Behaviour</td>
<td>Active participation to solve environmental problems and issues, and action through selected lifestyle activities such as green consumer purchasing, using methods of conserving resources and to encourage ecofriendly sound practices, supporting ecofriendly sound policies and governmental initiatives.</td>
</tr>
<tr>
<td>Additional Determinants of Environmental Responsible Behaviour</td>
<td>A locus of control and assumption of personal responsibility, and an individual’s perceptions to bring change because of his/her behaviour and internal locus of control believe that an individual’s actions are likely to advance change.</td>
</tr>
</tbody>
</table>

Source: adapted from McBride et al. (2013, p.7).

These seven components of environmental literacy explain an individual’s sensitivity towards the environment, an awareness and application of ecological concepts, cognizance of social, political, and ecological factors in relation to the environment and how these link up, knowledge and action relating to environmental issues, and taking individual responsibility towards change (Roth, 1992; Marcinkowski & Rehring, 1995).

**Ecological Literacy/Ecoliteracy**

In 1980s, following the common problems surrounding scientific literacy, research began to clarify students’ misunderstanding of basic ecological perceptions (Munson, 1994). In 1989, David Orr introduced the term ‘ecological literacy’ and developed
consequent writings which defined a path towards a more sustainable world by educational reform (Mitchell, 2009, p. 19). Orr (1992, pp.90-92) identified six components of ecological literacy—‘holistic learning; earth and eco centric learning; relationship with the natural and social world; participatory learning; experimental learning; and practical experience in education for environmental sustainability’. Orr (1992, p. 92) and Cutter-Mackenzie & Smith (2003, p. 502) asserted, ecological literacy includes ‘knowing, caring and practical competence’. Orr (1992) pointed out, ecological literacy covers an understanding of the relationship between people and societies and sustainability. Orr (1992) argued that humans are becoming destructive towards the environment and education can a play a significant role to address the world’s environmental problems. Both Orr (1992) and Cutter-Mackenzie (2003) advocated, pedagogical content knowledge for graduate students and both recommended a syllabus of ecological literacy in order to develop deep ecological knowledge.

Capra and others shaped the term ecoliteracy based on Orr’s (1992) work by focusing on the sustainability of human communities and societies (Capra, 1997; Cutter-Mackenzie & Smith, 2003; Wooltorton, 2006). The concept of sustainable development is key to Orr’s ecological literacy conception. In the mid-1980s World Commission on Environment and Development (WCED, 1983) helped to address increasing concern about the negative impact of humans on natural resources. The WCED, or Brundtland Commission report was the first widespread investigation into global environmental problems (WCED, 1987) (as discussed earlier in the chapter). The concept of sustainable development was defined in the report as ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’ (WCED, 1987, 2:1). The Brundtland Commission report positioned the underpinning work of Agenda 21 (Chapter 36), which suggested education towards sustainable development (UNESCO, 1992). Later the report was replaced by UNESCO in an international environmental education programme (UNESCO, 1992). Using natural resources in a sustainable manner indicates the future availability as essential elements of ecoliteracy (McBride et al., 2013). Consequently the philosophy of sustainable development entered into the area of environmental education (Bonnett, 2002).
ESD advocates putting emphasis on the concept of sustainability literacy (Parkin, Johnston, Buckland, Brookers & White, 2004, p. 9):

...a sustainability literate person will be equipped with a number of intellectual and practical tools that enable them to take decisions and act in a way that is likely to contribute positively to sustainable development. They will be able to make decisions on specific matters, such as advising on financial investments, buying food or writing new policy from prisons, by applying the ‘at the same time’ rule—that is, taking environmental, social and economic considerations into account simultaneously, not separately.

Orr (1992) believed that the term sustainability split ecoliteracy from environmental literacy. According to Orr (1992) this idea of literacy emphasised the establishment of sustainable human communities and called for essential reform of the entire educational system. This ideology that surrounded sustainable development which was central to Orr’s (1992) conceptualisation of ecological literacy became popular towards the middle of the 1990’s steadily penetrating environmental education practice and research. This in turn saw ecological literacy gain acceptance as a legitimate perspective in environmental education (Sauvé, 2005). Cutter-Mackenzie and Smith (2003, p. 502) stated that, ‘ecological literacy is ideally about developing a rich knowledge base multifaceted beliefs and or philosophies about the environment’. Cutter-Mackenzie (2003) substantially advanced Orr’s (1992) original work by conceptualising ecoliteracy in consideration of knowledge theory and environmental philosophy. Cutter-Mackenzie (2003) developed a corresponding framework for measuring ecoliteracy as shown in Table 2.4.
<table>
<thead>
<tr>
<th>Ecological literacy</th>
<th>Complex knowledge</th>
<th>Beliefs</th>
<th>Perspectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecological illiteracy</td>
<td>Little understanding and many misperceptions about environmental issues.</td>
<td>Believing the environment is a resource for human use; science and technology will solve any problems and support economic growth and disbelieving environmental education and social change are essential.</td>
<td>Technocentric/Anthropocentric perspective</td>
</tr>
<tr>
<td>Nominal ecological literacy</td>
<td>Recognition and some basic terms used in communicating about the environment and misconception of environmental systems and beginning to identify environmental problems and surrounding proposed solutions.</td>
<td>Developing awareness and sensitivity towards the natural systems and human impacts, belief in economic growth and resource exploitation; set up effective environmental management agencies at national and local levels, and raise environmental awareness and concern is important in society/education.</td>
<td>Accommodation perspective</td>
</tr>
<tr>
<td>Functional/Operational ecological literacy</td>
<td>Understanding of organisation and functioning of environmental systems and their interaction with human systems and knowledge and skills to act on local problems.</td>
<td>Personal commitment to environmental quality and belief in the intrinsic value of nature, rejection of materialism and disbelief in advanced technology and constant economic growth and personal commitment to environmental education and production of environmentally literate and dedicated community.</td>
<td>Communalist/ Eco-socialist perspective</td>
</tr>
<tr>
<td>Ecological literacy</td>
<td>Complex knowledge</td>
<td>Beliefs</td>
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<td>Highly evolved ecological literacy</td>
<td>In-depth understanding of how people and societies relate to each other and natural systems, and how they do sustainability, through understanding of the dynamics of environmental crisis; and understanding of models of sustainability, able to synthesise environmental information and act in ways that leads to environmental sustainability.</td>
<td>Belief in cooperative capabilities of societies to establish independent communities, and in the intrinsic value and preservation of nature, and in simple lifestyle; a passionate and committed belief in the production of an ecologically literate, committed and active community.</td>
<td>Gaia / Ecocentric perspective</td>
</tr>
</tbody>
</table>

Cutter-Mackenzie’s (2003) theory of ecoliteracy aspires to a complex understanding of various philosophies, rather than a particular view of the environment, leading to ecological sustainability. In this study I apply ecoliteracy as a theoretical approach for ecological sustainability.

**Part Three Summary**

In this section I outline the how the concept of ecoliteracy evolved. The review revealed the concepts of ecological literacy/ecoliteracy arose within the fields of environmental education, ecology and the broader humanities, and that ecoliteracy encompasses multifaceted pedagogical content knowledge focusing on ecological concepts and sustainability. I now turn to Section 4, which explores young people’s ecoliteracy in minority and majority countries.

**Part Four: Young People’s Ecoliteracy in Minority and Majority Countries**

This section is about presenting views on the concepts of young people’s ecoliteracy found in the literature.

The earth is now facing numerous environmental problems such as ‘climate change, ozone layer depletion and global warming, and so on’ (Sarkar, 2011, p. 106). Research shows, it is essential to connect young people to nature, as they are the ‘next generation’ of possible activists for environmental concern (Moore & Thielking, 2001, p.63). Yet there is a dearth of research about young people’s ecoliteracy in Bangladesh. This study attempts to reveal young peoples’ ecoliteracy in terms of their ecological perceptions, knowledge, beliefs and agency.

**Young People’s Ecoliteracy in Minority Countries**

Numerous studies have investigated young people’s environmental concepts. Here, I discuss young people’s ecoliteracy in terms of their environmental perceptions, knowledge and behaviour. The term ecoliteracy has been used to understand individual’s perceptions about ecological systems and their components which includes the interrelation of people, society and the environment; and application of this
knowledge to make a sustainable socioecological system (Capra, 1997; Cutter-Mackenzie & Smith, 2003; Orr, 2011).

Perceptions of the Environment and Nature

People’s feelings, thinking, views, values and relationship with the environment are called environmental perceptions (Fien, 1993; Disinger & Tomsen, 1995). Loughland, Reid and Petcoz (2002) conducted a large-scale survey of 2,249 primary and secondary students’ (aged nine to 17) views of the environment from 70 schools in New South Wales, Australia. They reported students’ conceptions of environment in six distinct categories: the environment: is simply a place; contains living things; does something for people; people are part of environment; people are responsible for it; and people and the environment have a mutually sustaining relationship’ (Loughland et al., 2002, p. 192). The first three categories were viewed by these researchers as reflecting an object view of the environment, whereas the last three categories were seen to reflect a relationship view (Loughland, et al., 2002). Although the fourth concept includes humans in the environment, it does not focus on the relationship between human and nature (Loughland et al., 2002). In their study, the majority of participants did not recognise the relationship of humans with the natural environment but an individual's environmental knowledge might also have developed from the relationship between the tangible and non-tangible world. Loughland et al. (2002, p. 191) found, both children and adolescents showed ‘limited and expansive’ (object and relations) conceptions of the environment.

Furthermore, Shepardson’s (2005) work with secondary students (grades 7 to 9) in Indiana, US explored young adolescence students’ environmental perceptions. He found students did not consider humans or built environment as components of the environment. Specifically, students generally appeared to describe ‘nature’ while mentioning the environment. Shepardson (2005, p. 57) remarked, although young people perceived the environment from a limited ecological point of view, they did not demonstrate scientific perceptions relating to the environment. For instance, ‘the cycling of matter and flow of energy in an environment, the interdependence and interrelationship of biotic and abiotic components, and the physical and earth process of an environment’. In line with Shephardson’s (2005) thinking, Salequzzaman and
Stockers (2001, p. 108) stated, ‘most people in the world do not think in scientific or environmental terms and have a different perception on the issues’. Such statements indicate that science might not change people’s environmental behaviour. Fitzgerald and Smith (2016) asserted, emotional engagement has been seen as an important component of learning in science. Therefore, when students are emotionally engaged in their learning in science they develop the values and attitudes towards nature and the environment (Fitzgerald & Smith, 2016). Chawla (1998) and Malone (2016) in their research both have found that outdoor learning influences children’s environmental practice.

In a research study with sixth grade students (aged 9 to 11) in Melbourne, Australia Payne (2014) explored students’ conceptions of nature and the environment. In his study, the majority of the children perceived nature as ‘living and non-living things’ remaining naturally in the ‘external’ environment; and ‘natural’ in a ‘pure’ and ‘romantic/ idealistic’ sense (Payne, 2014, p. 74). The meaning of nature and the environment were considered to be the same by the children. The children saw humans as separate to the environment providing invaluable insight for environmental educators in practice and research.

Rickinson (2001) investigated experiential studies focused on environment and nature in primary and secondary schools from 1993 to 1999 in minority countries including the US (Wals, 1994), the UK (Bonnett & Williams, 1998) and Australia (Barron, 1995; Keliher, 1997; Payne, 1998). In this review of the research Rickinson found the following categories relating to nature and the environment: Young people did not view humans as part of nature (Dunlap & Vanliere’s, 1978), rather they identified nature as relating to ‘recreation, danger and being under threat’ (Rickinson, 2001, p. 276); they perceived no difference between the meaning of nature and the environment (Payne, 1998; Bonnett & Williams, 1998); they included human-made things and the built environment when they expressed the meaning of the environment (Payne, 1998; Bonnett & Williams, 1998); the environment was a geographic place or a known geographic area that they experienced (Payne, 1998); and they demonstrated knowledge about the environment when they spoke about environmental problems or
expressed their concerns or spoke about how to manage something (Bonnett & Williams, 1998).

Bogner (1998) examined Irish and Bavarian adolescents’ (aged 10 to 16) environmental perceptions and Bogner and Wiseman (1999) studied Bavarian, German, Danish and Swiss adolescents’ (aged 10 to 11) environmental perceptions. Both studies placed adolescents’ environmental perceptions in terms of their environmental concerns and worldviews. They found individuals’ inner conceptions show they are concerned about both the natural and the physical environment, environmental problems and humans’ relationship with the environment. The environmental perception model of environmental problems and behaviours about the environment developed by Bogner and Wiseman (1999, p. 142) comprise an individual’s five types of intention and behaviour —’supportive intention, caring intention, intention to enjoy the natural world, dominating intention and altering intention’. These researchers summarised these intentions and behaviours into two main divisions: the ‘preservation’ and ‘utilisation’ domains (Bogner & Wiseman, 1999, p. 145). These two domains focus on people’s views and behaviour towards the environment. Bogner (1998) found, Irish adolescents did not show awareness of the limitation of natural resources, whereas Bavarian adolescents were more likely to conserve the natural environment. Bogner (1998) argued, Bavarian adolescents’ awareness towards environmental conservation might be developed from their understanding of severe degradation which they experienced from their region such as pollution problems. Bogner and Wiseman (1999) remarked adolescents’ trends of environmental utilisation influenced their attitude towards environmental conservation.

Bechtel, Corral-Verdugo, Asai and Riesle (2006) researched with 1358 undergraduate students (aged 17 to 22) from different private universities in the US, Japan, Mexico and Peru to examine their environmental beliefs. Bechtel et al. (2006) employed Dunlap and VanLiere’s (1978, p. 19) scales of the ‘New Environmental Paradigm’ to explore students’ environmental beliefs. Unpredictably, findings of this study demonstrated that students’ environmental beliefs were diversified in different nations and cultures. Bechtel et al. (2006, p. 150) found that students of Japan and Peru believe, ‘humans have
to balance their needs against the need of preservation of nature, the less one subscribes to the idea of a human separation from nature'. On the other hand, graduate students of Mexico believed that human needs should be measured and humans should regulate nature, whereas undergraduate students of America believed that humans need to maintain ecological balance and restrict economic growth to preserve nature (Bechtel, et al., 2006).

Wals (1994) conducted research with young adolescents in four middle schools of the underprivileged areas of Detroit City in Michigan to examine their perceptions of nature. They illustrated ‘nature is for entertaining; nature is a place for doing different activities, nature as an image of beautiful memories, nature is a place for learning, nature is a quiet place for thinking and echoes and nature is an interesting place’ (Wals, 1994, p. 15). The study uncovered that although young people included plants, animals and places in nature, they separated humans from nature and identified that nature is important for humans’ living. Wals (1994) advocated, it is essential for environmental educators to draw and build on urban students’ perceptions and experiences of nature in their everyday lives to avoid young people separating themselves from nature.

Loughland, Reid, Waker and Petcoz (2003) conducted a research project on 1,866 high school students in New South Wales, Australia to understand the influence of social and cultural factors on students’ environmental perceptions. The study revealed that young people learned about the environment from environmental science lessons and from environmental studies in school textbooks.

In 2001, Moore and Theilking carried out a research on 550 students (aged 7-10) in western area of Melbourne, Australia to examine their environmental knowledge, attitude and behaviour. The study revealed that young people demonstrated low level of environmental perceptions and behaviour and poorer level of environmental knowledge. In their study, students’ environmental outlook was more technology oriented. Moore and Theilkening (2001) stated, inadequate resources and less opportunities to participate in ecological activities might be the reason of students’ poor ecological behaviour.
When looking at nature and the environment it is essential to explore research relating to global warming and climate change. The following studies have investigated young people’s conceptions of climate change and climate systems.

Shepardson and Niyogi (2011) undertook research with 51 high school students from three schools in Midwest US, which investigated ‘students’ conceptions of greenhouse effect, global warming and climate change’ (Shepardson & Niyogi, 2011, p. 481). The study revealed students’ misconception about greenhouse effect. Although students believed that greenhouse gas causes global warming which impacts the environment, they did not believe that there is also ‘major impact of global warming and climate change on humans or society’ (Shepardson & Niyogi, 2011, p.495). Students thought, technological advancement will help humans to adapt with the impacts of global warming and climate change. Shepardson and Niyogi (2011) believe it is important to understand students’ environmental perceptions in order to develop a climate science curriculum.

Shepardson, Choudhury, Hirsch, Niyogi and Top (2014) carried out research with 42 students of grade seven (aged 12 and 13) in Midwest, US. The study explored the students’ perceptions about the climate system, the influence of a climate system on climate, and also the impact of ‘greenhouse gases and global warming’ on the climate systems (Shepardson et al., 2014, p.333). The study indicated that it was very important to educate students about climate so they gain a deeper understanding as their understanding was limited. Shepardson et al. (2014) remarked that ‘it is critical for science and climate educators to help teachers develop an understanding of the Earth’s climate system and the pedagogy to teach students about the Earth’s climate system and how it is changing’ (Shepardson et al., 2014, p. 347).

A study looking at young people’s concerns, values and pro-environmental behaviours towards solutions to climate change was carried out in Sweden with young people aged 12 years (Ojala, 2013). Although adolescents demonstrated lower levels of concern, values and pro-environmental behaviour, female adolescents’ pro-environmental behaviour was superior to that of the males. Ojala (2013) commented that parents and peers influenced students’ ideas of dealing with climate change impacts.
**Environmental Sensitivity**

Chawla (1998, p. 18) defined environmental sensitivity as ‘an empathetic perspective towards the environment’. Building on this idea, Sivek's (2002) studied high school students (aged 15 to 18) in Wisconsin, US to gauge their environmental sensitivity (using focus group interviews and questionnaires). The study found that young people had high levels of environmental sensitivity, adequate knowledge of environmental problems and believed that it is necessary to take action on environmental problems to maintain the quality of the environment. The study also revealed that teachers, parents, friends, advisor from environmental clubs and outdoor experiences significantly influenced students’ environmental sensitivity.

Chawla et al. (2014) carried out research with different levels of school students in Colorado, US regarding the benefit of participation in gardening. The study used ethnographic observations and interviews to explore how students’ wellbeing was promoted by working in the school grounds. As part of this study Chawla et al. (2014) engaged elementary school students (aged 6 to 12) in woodland for retreat while older elementary students (aged 9 to 13) were engaged in the natural environment for learning science and writing. The high school students (aged 14 to 18) who Chawla (2014) studied were engaged in gardening. The study revealed that when young people were out in their school grounds their interactions with natural environment increased their wellbeing and other skills relating to their environmental sensitivity.

Bustam, Young and Todd (2003) studied 84 students at the University of Northeast, US. The study aimed to examine the relationship between environmental sensitivity and outdoor restoration experiences and factors influencing students’ environmental sensitivity. The study revealed outdoor experiences as the most influential factors to raise students’ awareness towards environmental problems. The study also discovered the relationship between environmental sensitivity and outdoor experiences. Bustam et al. (2003) advocate further research to explore young people's level of environmental sensitivity influenced by outdoor experiences.
In investigating the influence of participation in a Green Council Program in Negev, Israel, Goldman, Assaraf and Shaharabani (2013) carried out research with 50 junior secondary students’ (grades 7 and 8) to explore their environmental literacy. The study revealed that although the programme did not develop students’ scientific understanding of the environment; and interrelationship and interconnection of environmental components, it strengthened students’ sensitivity to ‘human-environment interrelationships and advanced their ecological worldview’ and as a result students revealed a better perception of ‘human-environment interrelationship’ and a higher level of awareness about humans’ impact on the environment (p.515). Students’ environmental values reflected their value for non-human nature which shifted from an anthropocentric view to being more aligned with an ecocentric view (Goldman, et al., 2013).

In an Australian study with 2050 students (aged 15) from eight high schools in four states in Australia Martin and Liem (2015) uncovered how students’ environmental awareness, concern and pro-environmental attitude were influenced by their socio-economic position, sexual role, culture and parents’ education and personality. The study looked at the adaptability role of students’ environmental awareness, concerns and future prospect, and pro-environmental attitude to support policy formulation and taking action for environmental sustainability. Martin and Liem (2015) found that students who were more adaptable had better environmental awareness and concern and they retained pro-environmental attitudes to support the requisite of policy and action to improve the environment. Martin and Liem (2015) indicated students’ adaptability was associated with attitude, knowledge and intention to improve the environment and address climate change.

**Environmental Concern**

According to Dunlap, Van Liere, Martig and Jones (2000), environmental concern is a new way of thinking about the environment. Said, Yaha and Ahmadun (2007) conducted research on 306 students (aged 15 to 17) from four secondary schools in the state of Johor, Malaysia to examine their environmental perception, awareness and knowledge and their engagement in sustainability practices (Said et al., 2000). This study revealed that students were environmentally aware and relatively concerned about
environmental issues. Of significance most students were unfamiliar with the notion of sustainability or sustainable development. The research also identified students’ primary sources of information related to the environment, which was television and the Internet, with radio and newspapers being secondary sources.

Young people’s environmental attitudes, beliefs, awareness, concern, knowledge and behaviour were studied by Sykes, Yencken, Fien and Choo (2000) in nine different countries (Australia, New Zealand, Bali, India, Brunei, Thailand, China, Japan and Singapore). In their study, the levels of young people’s scientific perceptions of environment was good in terms of awareness and knowledge about global issues, the significance of rainforests and the impact of sea level rise. The students had acquired this knowledge through their science and social science education. The young people from urban areas (Melbourne and Brisbane) were more concerned about environmental problems that impacted on the city rather than overall problems that impacted rural and regional areas. In contrast young people from Thailand and Fiji demonstrated concern for more widespread environmental problems and issues. Young people showed both ecocentric and technocentric beliefs of the environment and, in particular girls’ appeared to reveal stronger environmental concern when compared with boys. Majority countries’ young people demonstrated their deep concern about environmental problems including air and water pollution, overpopulation, traffic congestion, political crisis, deforestation, modernisation, and sea level rise due to global warming (Sykes et al., 2000). Minority young people expressed their major concern about exploitation of natural resources and loss of biological diversity, ozone layer depletion, global warming and sea level rise (Sykes et al., 2000). Minority young people were also concerned about air and water pollution, deforestation and overpopulation. However when minority and majority environmental views were compared, the majority young people demonstrated a higher level of environmental awareness, concern and a strong desire to protect and improve the state of the environment compared with minority students (Sykes et al., 2000).

In a study in Victoria, Australia Hampel and Holdsworth (1996) worked with 661 state secondary school children (aged 10). The study investigated students’ environmental awareness (including knowledge, beliefs and behaviours) based on their social
structures and settings. The study revealed that female students’ environmental knowledge, beliefs and behaviour were richer than male students and urban students demonstrated a little more concern about environmental issues compared with their rural counterparts. In their study, students’ environmental concerns were influenced by parents’ level of education, with higher levels of education correlating with more concern about the environment.

*Environmental Awareness*

Eckersley (1992) identified that population, pollution, industrial hazards, traffic congestion and harmful wastes are major environmental problems in urban areas. In 1976, UNESCO and UNEP discussed the importance of environmental awareness gained by individuals and the public to be aware of the environment and its associated problems (Hungerford & Volk, 1990). Research has been carried out looking at young people’s awareness of environmental aspects and problems. One such study was carried out by Barraza et al. (1999) where they researched students from eight primary schools (aged seven to nine) in the UK and Mexico, both groups were from urban areas. The study explored students’ environmental awareness, beliefs and concerns through three drawings including where the young people imagined they were visiting planet Earth in their spaceship from another world. The study revealed strong similarities between UK and Mexico. The study revealed that the young people were responding to “social messages about the environment crises” (Barraza et al., 1999, p. 64) and almost 37% represented environmental problems in their drawings. Barraza et al. (1999) also pointed out that there was no indication that school environmental policies influenced children’s concern for the environment.

Stepien, Wadowski and Zurakowski (2013) studied 201 young people (aged 18 to 29) in Silesia, Malopolska, Mazovia, and Podlaskie provinces in Poland to explore their awareness about waste management practice and their attitude towards waste separation. The study revealed that although young people showed poor knowledge of waste management practice in their own region, they expressed strong desire to, and a positive attitude towards, environmental conservation (Stiepen et al., 2013).
Maravic, Cvjeticanin and Ivkonic (2014) conducted research with 198 primary and high schools and secondary agriculture vocational school students in Siberia, Russia. The study investigated primary and secondary students’ level of environmental awareness (including knowledge, attitude and behaviour). The study revealed that primary and secondary students demonstrated low levels of environmental awareness, knowledge, attitude and behaviour. In their study, high school students’ showed higher levels of environmental awareness, knowledge, attitude and behaviour compared with primary school students and secondary agriculture school students.

**Environmental Knowledge**

Environmental knowledge has been defined broadly. In fact Hollweg et al. (2011, pp. 3, 4) defined environmental knowledge as ‘knowledge of physical and ecological systems; social, political and cultural systems; environmental issues; multiple solutions to environmental issues; and knowledge about citizen participation and action strategies’. They argued knowledge of environmental issues comprises two types of knowledge: namely knowledge relating to environmental problems; and knowledge relating to environmental issues.

A survey in the West Coast of the US conducted with 848 secondary adolescents (aged 14 to 18) examined the relationship of adolescents’ environmental knowledge, value, attitude and behaviour (Meinhold & Malkus, 2005). The study revealed that adolescents’ level of pro-environmental attitudes influenced their pro-environmental behaviour. In addition, adolescents’ levels of pro-environmental attitude were moderated by their environmental knowledge which projected their pro-environmental behaviour. In their study, male students showed greater environmental knowledge compared to their female counterparts.

Makki, Abd-El-Khalick and Boujaoude (2003) conducted a research study in Lebanon with 660 (grade 10) students to measure their environmental knowledge and attitude. The study also explored the link between ‘students’ knowledge, attitude and commitment to environmentally friendly behaviour’ (Makki et al., 2003, p.21). The study revealed that students’ environmental knowledge was inadequate which was considerably related to their environmental attitude and their parents’ level of
education. Although students demonstrated a low level of knowledge, they showed a strong desire to conserve the environment.

A study was conducted by Aikenhead (2001) with Aboriginal science students (grade six to 11) in the ‘Rekindling Traditions’ project across northern Saskatchewan, Canada. In this project, the aboriginal way of knowing the community helped to develop the foundation for each unit, thus students gained community knowledge to value and show their respect to aboriginal heritage. The study found that the students’ aboriginal knowledge learnt from home was not highly valued as applicable knowledge for schools. O’Loughlin (1992) stated, aboriginal knowledge should be prioritised to give voice in the classroom through discussion and by involving both the speaker and the listener having respect for each other. This way, the core curriculum ‘validated the ways of knowing students bring to school by grounding the curriculum in their voices and lives’ (O’Loughlin, 1992, p. 814). Aikenhead (2001) commented that teachers can learn from the students and also from the community (dialectic voice).

A survey conducted with 5,688 students in Melbourne and Brisbane, Australia examined students’ environmental attitude, knowledge and behaviour (Connell & Fien, 2014). The study revealed that young people showed technocentric views of the environment and demonstrated poor knowledge about environmental issues. These young people also demonstrated little interest towards environmental conservation.

Khulemeier, Bergh and Lagerweij (1999) undertook research with 900 students (aged approximately 15) from 206 secondary schools. Their study revealed that although majority (57%) of the students’ showed positive environmental attitudes, their knowledge about environmental problems was not adequate and clear. Students demonstrated poor levels of environmental responsible behaviour which was strongly connected with the disposition to make sacrifices for the environment, rather than their environmental attitude (Khulemeier et al., 1999). These findings indicate that the link between students’ environmental knowledge, attitude and behaviour was not strong (Rickinson, Lundholm & Hopwood, 2009).
Sources of Environmental Knowledge

A number of aspects have been shown to influence environmental knowledge. Cini, Leone and Passafaro (2012) conducted a survey of 365 young student tourists (170 male and 188 female) in the Rome area, Italy. The study examined students’ personal and environmental beliefs and behaviour. The study revealed that ecotourism influenced young people’s personal wellbeing and their knowledge, innovations, exploration of other culture and interrelationship of humans with nature. Students showed good environmental knowledge and beliefs through visiting ancient and archaeological places and protected areas, prioritising energy conservation and recycling waste. In their study, students demonstrated beliefs in the intrinsic value of nature and appeared to believe that all organisms have equal rights to exist which indicates more ecocentric views.

Barton, Bragg, Pretty, Roberts and Wood (2016) undertook research with 130 adolescents’ (aged 11 to 18) in Rosenberg, UK. Their study examined students’ self-respect and connectedness to nature by engaging them in different activities such as camping, walking, swimming, hunting, watching nature, journaling and canoeing. The research revealed that frequent contact with natural environments improved individuals’ health and wellbeing. Barton et al. (2016) suggested every school must organise a short time every day for young people to spend time in the natural environment.

A research study relating to young people’s levels of ‘recovery and resilience’ was conducted by Peek et al. (2016) with young people (aged 13 to 22) in Canada and the US. The research involved an empirical and art-based workshop in a post-disaster background (p. 89). The research revealed that the art-based research workshop enhanced young people’s knowledge and ability towards addressing environmental problems in the community.

A study relating to walking was carried out by Horton, Christensen, Kraftl and Hadfield-Hill (2013) with 175 children and young people (aged nine to 16) in southeast England. The study examined the importance of children and young people’s walking practice each day, their experience, and their relationship through walking. The study revealed
that children’s and young people’s everyday pedestrian practices increased their knowledge, encouraged exploration and decreased stress (Horton et al., 2013). Horton et al. (2013) encouraged social and cultural geographers to look at the interrelationship of similar contexts in their research (Horton et al., 2013). As walking is a sustainable practice it is important to look at the research surrounding this area in this thesis.

**Environmental Attitude**

Environmental attitude includes young people’s knowledge, beliefs and behaviour towards the environment (Fien, Yencken & Sykes, 2002). Schultz, Shriver, Tabanico and Khazian (2004, p. 31) defined, environmental attitude as a ‘collection of beliefs, affect, and behavioural intentions a person holds regarding environmentally related activities or issues’. Bogner and Wiseman (2006) believed that attention to environmental attitude should be included in the area of environmental education.

There have been a number of research studies conducted looking at environmental attitudes, many of these studies have been quantitative research. A cross-cultural survey was carried out by Yencken, Fien and Syke (2000) on young people’s environmental attitudes and learning in the Asia-Pacific region (Australia, Bali, Brunei, South China, Hong Kong, Fiji, India, Korea, New Zealand, Singapore and Thailand). The study examined young people’s environmental attitudes including knowledge, beliefs and behaviour in the area. In their study, young people’s environmental views and beliefs were stronger when compared to elderly people. The study revealed that young people of the Asia-Pacific region showed positives attitudes towards the environment and they had a strong disposition for environmental well-being (Yencken, 2000). The study also discovered that indigenous culture and religion influenced young peoples’ environmental attitudes. Yencken et al. (2000) stated, the results of the study can help to develop environmental policy and education in the Asia-Pacific region.

In 2002, Fien carried out research in Asia-Pacific regions (Australia, Brunei, China, Hong Kong, Fiji, India, Japan, New Zealand, Singapore, Thailand, and the USA) to explore young people’s environmental attitude. In his study young people’s level of environmental concern and knowledge were sound at local, regional and global level. In this study, young people demonstrated strong environmental outlooks and beliefs. The
study revealed that majority countries (Indonesia, Malaysia and India), young people’s environmental knowledge, attitude and behaviours were influenced by their religion and indigenous culture and they believed in spiritual relationship with nature rather than human impacts on it, as it is emphasised in their religious books that humans should care for nature (Fien, 2002, p.151). Although young people expressed their positive feelings towards environmental actions, they showed lack of knowledge to actually take action for the environment. Television was identified as a primary source of young people's environmental information, whereas school was recognised as a reliable source but the students were not as interested in the information they learnt at school. Fien (2002) remarked that findings of the study can be used to formulate environmental education policy and develop environmental education curriculum.

In Ankara, Turkey a survey was conducted with 14, 97 students (grades six, seven, eight and 10) of public and private schools (Tuncer, Ertepinar, Tekkaya & Sagur, 2007). The study examined the contribution of both public and private schools and gender on school students’ attitude. The study revealed that girls’ and private school students’ environmental attitudes were more positive (Tuncer et al., 2013).

A study of secondary students (aged 14 to 15) in north Trinidad and Tobago examined young people’s perception of the importance of the integration of environmental education into the education system (Sharma, 2010). The study identified the gaps between the views on environmental conservation of environmentalist and scientists, and also secondary school students. The study revealed that despite young people revealing positive attitude towards environmental conservation (largely through planting trees) they were unwilling to raise environmental awareness among the public about issues relating to the environment (Sharma, 2010).

Arneson (2012) conducted research with 670 public middle school students in Lincoln, Nebraska, US. The study investigated students’ attitude through afterschool garden-based learning by engaging girls’ and boys’ clubs. Students demonstrated low levels of attitude towards learning the source of food and the process of food production due to low attendance. Although some students showed interest in outdoor education, a small
number of students' attitude was influenced by their peers or social behaviours while attending the club.

*Environmental Agency*

Society, culture, education, economy, awareness, knowledge, beliefs and attitude influence individuals' pro-environmental behaviour (Kollmuss & Agyman, 2002, p.257). Chawla in her study of significant life experiences since the 1980's, strongly supported by her review of similar studies in the environmental education literature, found that the most common reasons adults gave for pursuing interest in ‘environmental protection or environmental education’ were spending time in special places in the natural environment as children or significant people in their lives that influenced them, particularly family (Chawla, 2007, p. 145). Being involved in environmental clubs or organisations, was the next most common reason for pursuing environmental education, followed by seeing environmental degradation in a place that they value, learning about the environment in their employment and books about the environment that influenced them.

There have been a number of research studies have looked at environmental agency with children and young people.

In Sweden, Alerby (2000) researched 109 children and young people (aged seven to 16). Alerby (2000) utilised students’ drawing to understand children and young people’s thoughts about the environment. Four different themes emerged from the drawings, these were: ‘clean and unspoilt nature in different manifestation, the need for human beings to use nature for recreation and well-being, environmental destruction in different forms, and direct and indirect ways of taking care of the prevailing environmental situation’ (Alerby, 2000, p.205). Alerby highlighted four themes that emerged in the children and young people’s work, these were: —‘the good world, the bad world, the dialectic between the good and the bad world, and symbol and actions protecting the environment’ (Alerby, 2000, p. 205). Children and young people’s drawings demonstrated that they believed humans were part of nature but their attitudes were anthropocentric as they believed that nature must be a clean and better place for humans’ restoration and wellbeing (Alerby, 2000; Wikis & Rudner, 2013).
They also believed that humans impact the environment significantly, therefore, both direct and indirect care of the environment is essential. These children and young people’s views of the environment came from a very comprehensive curriculum which demonstrates concepts of place, connection and interdependence (Alerby, 2000). These children and young people perceived the environment with respect to the negative impact of humans. Alerby (2000) remarked that children and young people’s views about the environment came from a global worldview that they may have learnt in school during science or natural science subjects. Alerby (2000) contended, that it is difficult to change young people’s general perceptions that result from the scientific understanding which they developed in school.

Rideout (2014) conducted research on 779 college students (aged 17 to 22) in south-eastern Pennsylvania, US. The study investigated students’ concern, knowledge and pro-environmental behaviour about major environmental issues (Rideout, 2014). This study revealed that students’ level of knowledge was low on environmental issues including global issues because of their course work (Rideout, 2014). Although students’ environmental concern was weak, female students’ pro-environmental behaviour was better than male students. Rideout (2014) suggested carrying out further research to identify the best education that will enhance young people’s willingness to address future ecological problems.

Research was conducted in the US, Australia, England and Israel with secondary students’ (grades 9 and 10) looking at environmental knowledge and beliefs (Blum, 1987). The research revealed that students’ conceptual and factual knowledge of environment was poor, but their level of environmental beliefs was high. The study also found that mass media such as radio, television and newspapers influenced a greater extent of Australian, English and Israeli students’ environmental knowledge compared to school education. However, school education helped students to judge the magnitude of different environmental issues.

Boyes, Skamp and Stainistreet (2009) conducted a survey on 500 secondary students’ (aged seven to 10) in New South Wales, Australia. The study explored the link between students’ environmental beliefs and actions to reduce global warming and their
intention to take the actions (Boyes et al., 2009). The study revealed that students demonstrated strong beliefs of environmental actions to reduce global warming (Boyes et al., 2009). Students also believed that it is possible to reduce global warming through planting trees, recycling things, using public transport or small cars, using renewable energy and saving energy, using organic fertilisers and eating a small amount of meat (Boyes et al., 2009). Boyes et al. (2009) believed that although students mentioned different sustainability practices, students identified planting trees as one of the best ideas to reduce global warming. The next section continues this discussion of young people’s ecoliteracy in the context of majority countries.

Libman (2007) conducted research with 18 African-American adolescents (aged 10 to 14) at the Brooklyn Botanical Gardens to understand the benefits of gardening. The study revealed adolescents’ progressive social connection during gardening through sharing, harvesting, preparing and eating influenced their awareness of food and diet. Libman (2007) remarked that garden-based learning using a social contact influences adolescents’ awareness of food and nutrition. Although this is not essentially agency this type of experience encourages young people to carry out environmental practices where they are building on their environmental knowledge.

Young People’s Ecoliteracy in Majority Countries
Bangladesh and other majority countries are confronted with a multitude of environmental issues and problems (MoEF, 2001; Sarkar, 2011). As this research relates to Bangladeshi young people’s ecoliteracy it is necessary to first look at the environmental aspects surrounding young people in Bangladesh and other majority countries.

Environmental Perceptions
Environmental perceptions of majority young people are influenced by a range of factors.

Soto-Cruz, et al. (2014) carried out street interviews with high school students aged 14 to 21, attending school at Turuachi, in the rural community of Sierra Tarahumara in the state of Chihuahua in Northern Mexico. The study investigated high school students’
environmental awareness. The study revealed that students' experiences in the everyday world influenced their perceptions and the researchers contended that the students' knowledge relating to ecology was adequate (Soto-Cruz et al., 2014). Students identified waste pollution as a major environmental problem followed by deforestation and drought. Soto-Cruz et al. (2014) contended, female students' environmental perception was better compared with male students, and these female students expressed a strong desire to participate in communal environmental cleaning campaigns.

A study in Duzec Turkey in 2014 to 2015 was conducted with 62 sixth grade students (aged 11 and 12) in two different secondary schools (Genc, Genc, Ergenc & Erkuz, 2016). The study examined students' perceptions of environmental issues through their drawings and written text related to the environment. The study revealed students' perceptions of environmental problems included 'pollution such as air, water, land, visual, sound', and other factors such as 'biotic, energy, natural catastrophe, and loss of biological diversity' with air pollution thought to be one of most significant problems (G nec et al., 2016, p.18).

In Nigeria a survey of 400 secondary students was conducted to examine students’ perceptions of the importance of environmental education based on gender and family income (Obasoro, Oyinly & Illosanmi, 2013). Obasoro et al. (2013) found, gender and family income did not influence secondary students’ perceptions, but the older female students revealed more concern towards environmental problems compared with male students. The researchers believed that environmental education was prioritised across all levels of education in Nigeria.

Environmental Sensitivity
The following research relates to young peoples' environmental sensitivity in Turkey and the factors that influence this environmental sensitivity. The study took place from 2014 to 2015 and it involved 447 fourth grade students who attended 15 different public schools in Afyonkarahisar, Turkey (Fidan, 2016). The research investigated students' environmental sensitivity relating to the natural environment, wildlife, social problems and culture. The study determined that students’ gender influenced the
students’ level of environmental sensitivity and the parents’ education and occupation also significantly influenced the students’ perception of the natural environment and related problems.

Environmental Concern
A number of aspects lead to environmental concern in majority countries, including the impact of climate change (Mohammad, 2015). In a study in Bangladesh, Ullah, Hasan and Uddin (2013) studied 200 private university students in the Sylhet area to measure their environmental awareness and behaviour. The study revealed that these students believed that ‘global warming’ was seen to be a major problem in the world, ‘unplanned urbanisation’ seen as the greatest problem in Bangladesh and source of energy such as ‘petroleum’ was seen to be the main reason for environmental disaster (Ullah et al., 2013, p. 34). The majority of these Bangladeshi students believed that education is essential for raising environmental awareness (including ecological knowledge) to improve the conditions of the environment (Chhokar & Dua, 2012).

Neelima (2018) researched 500 young people (aged 18 to 25) from different schools and colleges in Bengaluru and Chennai, India. The study explored the ‘message and messengers’ which engaged young people about the impact of climate and its resolution. The study revealed that young people’s concerns were intensified towards the environment on a global scale and issues surrounding the changing climate. Students demonstrated a comprehensive knowledge about climate change issues which was influenced by social media rather than traditional media outlets. The findings revealed gender, parents’ level of education and economic status, deeply influenced students’ knowledge of climate change issues.

Environmental Awareness
Research was carried out looking at environmental awareness amongst majority young people in India. Shivakumar (2012) carried out a study with 1,440 secondary (grade 9) students from 36 secondary government and private schools of urban and rural areas in Davanagere district of Karnataka, India. The study examined high school students’ environmental awareness. Private school students’ level of environmental awareness was better compared to that of government school students because of better facilities.
Shivakumar mentioned that students’ environmental awareness was influenced by the media and the parents’ level of education.

**Environmental Knowledge**

In order to carry out adequate analysis of Bangladeshi young people’s environmental perceptions and knowledge it is important to look at research findings in Bangladesh and other majority countries surrounding these constructs. Muttaqi (1983) conducted a survey of students (aged nine and 10) in and around Dhaka city, Bangladesh. The study revealed that although most students demonstrated poor knowledge of the environment, urban students’ environmental knowledge was better compared with rural students’ knowledge. The majority of students revealed positive environmental attitudes, despite being weak, but the rural students’ environmental attitudes were better than that of urban students and girls demonstrated higher levels of environmental awareness compared with boys.

A study was undertaken in Puducherry, India by Ramadoss and Moli (2011), relating to an environmental education programme with 70 secondary students’ (aged 13 to 15). The study explored students’ understanding, knowledge, interest and skills about conservation and biological diversity. The study concluded that students had good knowledge, positive interests and significant skills relating to biodiversity and conservation. The findings of this study also revealed that the environmental education programme increased students’ confidence and knowledge about, interest towards, and skills to conserve, natural resources and biological diversity at the local level (Ramadoss & Moli, 2011).

Sarkar, Ara, Raihan and Ozaki (2008) conducted a study with rural and urban adolescents (aged nine and 10) in Natore and Manikganj area, Dhaka. The study explored adolescents’ environmental literacy in terms of knowledge, attitude, environmentally friendly practices and actions. Young people were found to have poor environmental knowledge, with girls in particular lacking factual knowledge compared with boys. Both girls and boys showed positive environmental attitudes, but girls’ environmental attitudes were stronger than boys and they carried out environmentally
friendly practices. Sarkar et al. (2008) argued rural schools’ environmentally friendly practices were lacking and were insufficient to lead to environmental literacy.

Sarkar and Ara (2007) undertook a comparative study on the environmental literacy of secondary urban and rural students’ (aged nine and 10) in Natore district of Bangladesh. The study investigated students’ environmental knowledge, environmental attitude and environmentally friendly practices and actions. Urban young people demonstrated sounder environmental knowledge compared with rural young people but the boys showed higher level environmental knowledge compared with girls. In terms of environmental attitude, girls revealed a more positive attitude than boys. The study demonstrated that environmentally friendly practices were good both in urban and rural areas. Sarkar and Ara (2007) argued that in rural schools, environmental practice is not adequate for the development of environmental literacy. The findings from these studies are important in relation to this study looking at Bangladeshi young people’s ecoliteracy.

As gardening is central to many young people’s lives in Bangladesh it is necessary to look at research surrounding young people and gardening in majority countries. A research study was conducted with secondary students (aged 10 to 15) in Nepal to examine their nutritional awareness, knowledge, perceptions and eating behaviour and nutritional position as a result of school gardening programs (Schreinemachers et al., 2017). Data were collected from 30 schools from 2014 to 2015. The study revealed that students showed greater knowledge about vegetables and fruits, nutrition and health, sustainable agriculture and preference of fruits and vegetables, after carrying out the gardening programs. Schreinemachers et al. (2017) recommended gardening in schools as an effective way to influence students’ knowledge and well being.

Meilinda, Prayitno and Karyanto (2017) undertook descriptive research using a survey of 117 school students in Surakarta, Indonesia to examine their environmental literacy in terms environmental knowledge, attitude and concerns. The research revealed that students showed positive attitude towards the environment and were concerned about environmental issues, but their knowledge of environmental issues was poor. Meilinda et al. (2017) stated that students’ concern and knowledge of environmental issues was
better with compared to their environmental attitude. Overall, students demonstrated a low level of environmental literacy.

Yanger (2016) conducted research with 360 students (aged 11 to 19) from five public secondary high schools in Tacloban city, the Philippines in 2010. The study explored secondary students' level of knowledge about global warming. The study revealed that although all students' knowledge of global warming was low, female students showed better knowledge of global warming compared to their male counterparts. The study also showed that age, gender and economic status influenced students' environmental knowledge of global warming significantly and that students were not involved in any environmental organisations.

Sources of Knowledge
It is important to be aware of the sources of knowledge relating to the environment that is evident in the research with majority young people as it relates to this study with Bangladeshi young people. Chapman and Sharma (2001) undertook research with primary and secondary school (government) students in India and the Philippines to investigate their environmental attitude and knowledge. The study revealed how despite the students being provided with high levels of theoretical environmental education in the schools, the level of the majority of students' environmental awareness and attitude was low. Almost all of the students perceived television to be an important source for environmental information. The study emphasises the importance of incorporating environmental concepts and associated activities into school environmental education programs that lead students to change their attitudes and motivation towards environmental issues and problems (Chapman & Sharma, 2001).

Rehman, Hunjra, Safwan and Ahmad (2014) studied 300 university students (aged 20 to 33) from a business and computer science background in Islamabad and Rawalpindi, Pakistan to explore students' source of knowledge of the environment. The majority of the students showed their interest in using the Internet for study, fun and research projects and that it was their major source knowledge, providing information than teachers. The study revealed that the Internet is important for developing the knowledge of Pakistani students and teachers.
Ahmad, Noor and Ismail (2015) carried out a survey with 895 high school students (aged 16) in Malaysia. The study investigated students’ environmental knowledge, attitude and environmental practices and sources of environmental information. The study revealed that the level of these secondary students’ environmental knowledge was high and they carried out practices that were environmentally sound (Ahmad et al., 2015). The study uncovered that although media (television and newspapers) and family influenced young people’s environmental knowledge and environmentally sound practices, the Internet was also a significant influence on their environmental knowledge.

Environmental Attitudes

Becoming aware of the research surrounding environmental attitude of Bangladeshi and other majority young people will be helpful when looking at Bangladeshi young people’s ecoliteracy. Sarkar (2011) conducted research with 400 urban and rural secondary students (aged 14 to 15) in Bangladesh to examine their environmental attitude. The study revealed students’ poor knowledge of the environment. Although all students demonstrated a favourable attitude towards the environment, girls showed a more positive environmental attitude than boys (Sarkar, 2011) and, specifically, rural girls’ environmental attitude was very positive compared with other students. These young people did not show their true feelings about the environment. Sarkar (2011) urged researchers to carry out more research with young people to find the link between their attitudes to, and their behaviour towards, the environment.

Boiyo (2014) conducted research with 320 secondary students in the Kasarani and Kibera divisions of Nairobi, Kenya. The study aimed to establish the relationship between attitude and level of participation in environmental activities in these two areas. The study examined students’ environmental awareness, attitude and behaviour. Although students demonstrated a low level of environmental awareness, their environmental attitude was positive and they demonstrated a strong desire to conserve the natural environment (Boiyo, 2014). The study uncovered a positive relationship between students’ attitude and ecological behaviour (Boiyo, 2014).
Yousuf and Bhutta (2012) studied 312 secondary school (grade 10) students’ attitudes towards environmental issues including air and water pollution, unwise use of natural resources and climate change in Karachi, Pakistan. There was a significant difference amongst government and private school students’ environmental attitudes. Students in private school students revealed higher positive attitudes towards environmental issues compared with students in government students. Yousuf and Bhutta (2012) suggested investigating the reason for the difference between government and private schools to develop school environmental education in Pakistan.

Chan (1996) researched 992 secondary students in Hong Kong to examine their environmental attitude and pro-environmental behaviour. Students were found to be highly concerned about the environment and expressed their strong desire to participate in different environmental activities (Chan, 1996). The study also revealed that television and school influenced students’ environmental knowledge to a great extent and female students demonstrated a more positive environmental attitude.

Wen and Lu (2013) conducted research on 750 primary school students in Taiwan, China. The study measured students’ knowledge, attitude and behaviour and their involvement in curricular activities to protect marine ecosystems. The results found that students’ level of knowledge, attitude and behaviour of environmental protection was average to high, but their curricular involvement was low. The study also found that field trips influenced their behaviour to protect the marine ecosystems.

Environmental Agency

A sense of agency is at the heart of environmental education where young people are motivated to take action towards the environment. Cassin et al. (2014, p. 19) defined human agency as ‘a quality of interventions that makes individuals to take necessary actions’. Active participation in the community empowers young people with a greater sense of agency to accomplish positive results for future sustainability (Henderson & Tudball, 2017). The following research relates to majority young people taking environmental action. Most of the research that is discussed in the following section relates to organised activities where young people are motivated to take action towards
environmental conservation, in contrast to the young people instigating their own environmental initiatives.

Breuer and Mavinga (2009) carried out a research study with 100 school children in northern Congo, central Africa to measure their environmental knowledge. The study revealed how the school environmental club increased children's environmental knowledge of biological diversity through using books and environmental activities such as tree planting. This knowledge of environmental issues and taking part in environmental activities influenced the young people's desire to take action for environmental conservation (Breuer & Mavinga, 2009).

A study in the Bungoma district of Kenya with 29,000 students (aged 16 to 18) from 111 secondary schools. The study examined secondary students' participation in different environmental activities in the context of environmental education curriculum (Toili, 2007). The research revealed adolescents' interest in conservation of natural resources, pollution and environmental health and safety in their school (Toili, 2007).

An initiative by Peace Corps in 2011 (April 15-17) involved young people as volunteers planting 12,000 mangrove trees in addition to coastal clean up activities in their local communities, 2011). This environmental programme encouraged youths to become more aware of their environment and take action towards it (Peace Corps Volunteers in the Philippines Plant 12,000 Mangroves, Organize Coastal Cleanup with Youth, 2011).

Fifty young people (aged 16 to 25) from 45 countries planted 4,000 trees including 47 native species in Kenya through the 'Plant for the Planet' campaign with the influence of peers and family in 2003. The purpose of the campaign was to shape the environment and reduce poverty around the world in an environmentally friendly manner. The campaign raised environmental awareness among young people (‘International Tree Planting Campaign Launched’, 2003).

In 2016, an environmental conservation programme was organised by the Vietnamese Government (Ministry of Natural Resources and Environment) involving a competition for young people to enter photographs and posters. The aim of the program was to raise
awareness among the public, particularly young people, for environmental protection and the sustainable use of natural resources, conveyed through the theme ‘3Rs - For a brighter future’ (referring to reduce, reuse and recycle) (‘Thailand: Young people joined environmental protection communication’, 2016).

In 2011, UNEP organised a billion tree programme campaign, and commissioned the Planet-for-the-Planet Foundation, a leading organisation staffed by young people in Germany, to organise the program. Under this program, 12 million trees have been planted by individuals from school children to presidents across 193 countries, particularly majority countries with a strong impetus for sustainability. This programme helped participating countries to improve the state of the environment (climate change) (‘UNEP Billion Tree Campaigns Hands Over to the Young People of the Plant-for-the-Planet Foundation’, 2014).

Haynes and Tanner (2015) conducted a participatory research study with a group of young people (aged 13 to 21) in three communities of Eastern Summer in the Philippines. The study measured young people’s awareness of the environment, their enduring environmental stewardship and decisions that they made relating to the environment (Haynes & Tanner, 2015). The project raised the environmental awareness and knowledge of young people by empowering them to solve community environmental problems (Hayness & Tanner, 2015).

**Factors Influencing Young People’s Ecoliteracy in Minority and Majority Countries**

*Minority Countries*

Ecoliteracy is influenced by multiple factors with family being a very significant influence. Payne (2010) carried out research with young people (aged eight to 16) and adults (aged 45 to 53) in thirteen green families (seven in inner city Melbourne and six in Bendigo, Australia). The research investigated the influence of green families on young people’s ecoliteracy and found that family is a place for environmental education and a central influence on an individual’s development, which is recognised by the socioecological theory. In an earlier study with young adults from seven families in Melbourne Australia Payne found that ‘green parents’ social ethics, politics and living
practices were significantly influenced by their own parents’ (Payne, 2005, p. 88). This study revealed that little environmental education was gained in school. These findings demonstrate the significance of intergenerational learning of environmental education but it also demonstrates the need to rethink how environmental education is incorporated in school curricula.

Another study looking at the influence of family was carried out by Stevenson, Peterson and Bondell (2016) with 426 school students from middle school in North Carolina, US. The study examined students’ concern towards and acceptance of global climate change relating to the frequency of discussion with family and friends. The study revealed that there was a great influence of peers and family on young people’s concern towards climate change (Stevenson et al., 2016).

Both Yencken, Fien and Sykes (2000) and Fien (2002) carried out research with young people aged 16-17 in the Asia-Pacific regions. Yencken et al. (2000) researched young people’s environmental knowledge and attitude in Australia, Brunei, Fiji, India, Indonesia, Japan, New Zealand, Papua New Guinea, the Philippines, Singapore, South China and Thailand. Fien's (2002) study involved 10,000 young people in India, China, Thailand, Japan, Singapore, Hong Kong, Brunei, Indonesia, Fiji, Australia, New Zealand and the West Coast of the US. These research studies revealed that young people’s environmental knowledge, attitude and behaviour were shaped by their political, cultural and educational background. More specifically indigenous culture and religion largely influenced young people’s environmental attitude (Yencken et al., 2000 & Fien, 2000).

Similarly, in a majority context Sykes et al. (2000, p.23) studied young people's environmental literacy (awareness, knowledge, concern, beliefs, behaviour) in the Asia-Pacific region. The study revealed that family, peers, news papers, media (television) and schools (particularly science and social science text books) influenced young people’s environmental awareness, knowledge, beliefs and behaviour in majority countries. However, the researchers revealed that there was a significant influence of environmental non-government organisations (NGOs) and schools on young people’s environmental knowledge in minority countries.
While there have been some quantitative studies undertaken in majority countries concerning adolescents' ecoliteracy, there is scant qualitative (i.e., in-depth) research. Effectively, there is lack of research on the social and cultural influences on students' ecoliteracy—a gap that this study seeks to fill.

**Part Four Summary**

This section demonstrated that young people's ecoliteracy is an under-researched area, particularly in majority countries. The studies examined in this section explained young people’s environmental knowledge and environmentally friendly practices, but very few detailed that society and culture could aid development of young people’s ecoliteracy. Additionally, there is a lack of research on developing young people's’ ecoliteracy based on their cultural aspects (Canosa, 2016) In Bangladesh, the development of environmental education can be described as exceptionally slow compared to that of minority nations. The present study explores in depth the role of cultural aspects in developing young people’s ecoliteracy in Bangladesh.

**Chapter Conclusion**

In this review of literature, I have discussed the numerous international policy developments and initiatives and also have uncovered the goals, objectives and principals of environmental education. In Bangladesh, although there is no specific environmental policy for school education, the 1992 environmental policy has the directives pertaining to environmental education. Notwithstanding, there has been much controversy among environmental education researchers relating to the interpretation of sustainability and this reflects the key issues at the centre of ‘education for sustainability’ and ‘education for sustainable development’. Such rhetoric though has not translated into relevant Bangladeshi policy.

Despite the Bangladeshi government and non-government organisations undertaking a number of initiatives in areas relating to environmental education, formal environmental education in the school education sector is seriously lacking. The Government of Bangladesh has not developed any specific policy document for school-based environmental education. The current curriculum places emphasis on economic
and technological development, rather than on sustainable or ecological development. Thus, by all accounts, environmental education in Bangladesh is in its infancy.

The review revealed the concepts of ecological literacy/ecoliteracy arose within the fields of environmental education, ecology and the broader humanities, and that ecoliteracy encompasses multifaceted pedagogical content knowledge focusing on ecological concepts and sustainability. Ecoliteracy is identified as a key component of environmental education in realising sustainability.

While the growing focus on young people's ecoliteracy, it is a significantly under-researched area, particularly in majority countries. Additionally, there is a lack of research on developing young people's ecoliteracy based on their cultural aspects. In Bangladesh, the development of environmental education can be described as exceptionally slow compared to that of minority nations. The present study explores in depth the role of cultural aspects in developing young people's ecoliteracy in Bangladesh. I now turn to the next chapter where I present the theoretical framework underpinning this research.
History, teaches us that, in certain circumstances, it is very easy for the foreigner to impose his domination on a people. But it also teaches us that, whatever may be the material aspects of this domination, it can be maintained only by the permanent, organized repression of the cultural life of the people concerned (Cabral, 2013, p.90).

Introduction

It will be recalled that the central focus of this study is young people’s ecoliteracy in terms of their perceptions, knowledge, and agency, which encompasses sociocultural and socioecological theories. This study's theoretical framework (see Figure 3.1) works to provide understanding of young people’s ecological knowledge, beliefs, behaviour and social and cultural factors that mediate ecoliteracy.

Figure 3.1: Theoretical Framework.

I present this chapter in five parts — 1) Postcolonialism 2) Bangladeshi Young People’s Socioecological and Sociocultural Context; 3) How Young People Develop and Learn 4) Influence of Postcolonial Sociocultural Theory on Human Development and Learning;
and 5) Socioecological Theory. I conclude this chapter with a brief discussion of how these theoretical perspectives support each other to provide a rich theoretical model for this study, which is utilised later in the thesis for data representation, analysis and synthesis. I now turn to Part One, where I discuss post-colonial theory and its appropriateness in the context of the present study.

**Part One: Postcolonialism**

In Part One I discuss the concept of colonialism, post-colonialism and post-colonial theory. I then discuss post-colonialism in the Bangladesh context.

This study is contextualised in Bangladesh; therefore, postcolonialism is an important theory that frames this study. Postcolonial theory takes into perspective the issues of colonial identities, cultural differences and indigenous outlooks. In Bangladesh, there is a gap in the research when it comes to empirical research on young people's ecoliteracy using postcolonial theory.

**Colonialism and Imperialism**

In order to examine postcolonial theory it is important to look at ‘colonialism’ and ‘imperialism’, terms that are sometimes used interchangeably (Loomba, 1998, p.30). However, it is important to distinguish between these terms. Loomba (1998) described imperialism as being central to ‘domination and control’. Williams and Chrisman (2013) highlighted how Marxist thinking most convincingly distinguished between colonialism and imperialism: where colonialism, which is:

...the conquest and direct control of other people's land, is a particular phase in the history of imperialism which is now best understood as the globalisation of the capitalist mode of production, its penetration of previously non-capitalist regions of the world, and destruction of pre- or non-capitalist forms of social organisation. (Williams & Chrisman, 2013)

Williams and Chrisman (2013, p.19) described this colonial phase as being where many countries were acquired by European nations, where they sought ‘captive markets’ and sourced resources in addition to denying these findings to ‘competitor nations’. Loomba (1998) described the process of colonialism as connecting indigenous peoples and new
settlers in the most complicated and troubling relationships in human history. In the early 19th Century approximately ‘85% of the’ Earth’s ‘land surface’ was controlled by ‘colonial powers’ (mostly European) (Huddart, 2006, p.1). During the colonial period, there was an enormous movement of people occurring and this included both ‘the colonised and the colonisers’ (Loomba, 1998, p. 34). Settlements were established by the colonisers, on land previously occupied by the colonised, where the colonisers performed practices such as: farming; political, military and religious leadership; and teaching, managing and trading (Loomba, 1998, p. 34). The colonised became labourers, household servants and staff for the colonisers (Loomba, 1998, p. 34).

Colonisers from Europe (mainly England, Spain, Portugal, France, Belgium, Germany and Italy) occupied lands and imposed their practices on the local people of other countries, failing to recognise the centuries of indigenous knowledge of the local lands (Kayira, 2015). Instead the local peoples were made to feel ‘inferior’ and the colonial practices of ‘law, government, agriculture, and education’ were imposed on them (Kayira, 2015, p. 106). In portraying colonisation Said (in 1978), an influential postcolonial critic, reflected on the notion of ‘Orientalism’ that symbolises the fraught relationship between Europe and its colonial ‘conquests, in particular, how the East was viewed by European colonialists and how the West sees the East as being distinctly ‘different’ and ‘inferior’ (Huddart, 2006, p.5). Said was influenced by the work of Michel Foucault in relation to power and domination. The terms ‘orient’ and ‘occident’ were used by Said in relation to the East and the West and the surrounding complex relationships. Said described the relationship between the ‘orient’ and the ‘occident’ as a ‘relationship of power, of domination, of varying degrees of a complex hegemony’ and could be described as the relationship of ‘dominance’ between ‘Asia’ and the West (Said, 2013, p.204).

Said (1978) in his book ‘Orientalism’, used the word ‘othering’ to describe the view of colonialists where indigenous peoples were regarded as subordinate and their local practices disregarded with terms such as 'barbaric' used by colonialists to describe the indigenous people’s culture, while these colonialists enforced their own practices for the so called ‘betterment’ of the country (Kayira, 2015, p. 108). In his writings, Fanon (1963, p. 94) portrayed, colonialism as being ‘separatist and regionalist’. Fanon highlighted how ‘the colonizers are civilized, rational, and intelligent’: the ‘Negro’ (sic)
remains ‘other’ to all these qualities against which colonizing peoples derive their sense of superiority and normality’ (Mondal, 2014, p. 2966). Colonisation resulted in the shaming of indigenous cultures where indigenous peoples became ashamed of their cultural practices under colonial rule (Kayira, 2015).

There is much debate into the theorizing of the issues surrounding colonisation, such as ‘cultural identity’, ‘colonial subjectivity’ and ‘political resistance’ (Williams & Chrisman, 2013, pp.46-47). Even amongst this debate there are questions relating to ‘gender’ and ‘colonial subjectification’, for example, surrounding the existence of ‘a’ colonised subject, and its binary opposite, ‘a’ coloniser subject, about whom theories can be produced, without regard for the socio-economic class of either party’ (Williams & Chrisman, 2013, p. 47). Theorists who deliberated over these matters include, Homi Bhabha, Gayatri Chayatri Spivak, Deniz Kandiyoti and Ngũgĩ wa Thiong’o (Williams & Chrisman, 2013, pp.46-47). In fact contributors such as, and Léopold Sédar Senghor, Frantz Fanon and Amilcar Cabral were members of what could be described as the ‘intellectual class’ of the ‘colonisers’ but took part in both political theorising and political activism relating to these injustices (Williams & Chrisman, 2013, p. 48).

Furthermore, when looking at histories and cultures it is important to look at ‘their configurations of power’ particularly in relation to colonialism (Said, 2013, p. 203).

Black oppression has long been associated with colonisation and highlights the deep psychological impacts surrounding ‘othering’ (Said, 1978). Theorising relating to black oppression dates from the 19th Century, such as the works of African-based Edward Wilmot Blyden (Williams & Chrisman, 2013, p.48) and was very prominent in the 1940’s, 1950’s and 1960’s. This theorising largely surrounded the colonising of African, Caribbean or America. Senghor (2013, p.51) who was a poet and an influential African philosopher of the 20th century and the first president of Senegal (1960 - 1980), used the term ‘negritude’ and some found this term offensive. Building on the black American title, ‘black personality’ Senghor (2013, pp. 52-53) stated:

...who would deny that Africans, too, have a certain way of conceiving life and of living it? A certain way of speaking, singing and dancing; of painting and sculpturing, and even of laughing and crying? Nobody, probably; for otherwise we would not have been talking about ‘Negro (sic) art’ for the last sixty years and
Africa would be the only continent today without its ethnologists and sociologists. What, then, is negritude? It is – as you can guess from what precedes – the sum of the cultural values of the black world; that is, a certain active presence in the world, or better, in the universe.

Senghor (2013, p. 530) described ‘Negritude’ as a way to ‘open out’ black Africans to the world to participate as valued individuals after years of colonisation and oppression. Fanon, who was a psychiatrist and political activist from the French Caribbean colony of Martinique, and Cabral, who was an agronomist and political activist from Guinea-Bissau in Africa, also theorized particularly about the oppression of black people but they had different ideas to Senghor. Fanon criticized ‘Negritude’ and accused this as ‘racialisation’, akin to colonialism itself (Williams & Chrisman, 2013, pp. 48). The differing views surrounding colonisation can be further illustrated in the conflicting interpretation of culture by Fanon and Cabral. For Fanon, culture tended to derive from the people, whereas Cabral saw culture more in the light of ‘popular culture’ (Williams & Chrisman, 2013, pp. 49, 50). Fanon believed colonialism extinguished culture from the colonised whereas Cabral saw culture as being within the colonized groups and something that could bring unity and harmony by bringing people together (Williams & Chrisman, 2013, pp. 49, 50). Being aware of the influence of colonialism on culture is important for research that involves a colonial historical context. In his book, ‘The Black Skin, White Mask’ Fanon (1967) affirmed that the European language surrounding colonialism psychologically affected black people and European language proficiency gave extraordinary power to white people (Mondal, 2014). Furthermore, local languages were often extinguished or even banned in colonial regions, such as the speaking of Australian Aboriginal languages was banned in Australian schools prior to 1970 (Australian Institute of Aboriginal and Torres Strait Islander Studies [AIATSIS], 2018). Language in Bangladesh history is very significant and discussed in section two.

Gender is also an issue surrounding colonialism. The Indian scholar, Spivak, who widely published in the area of colonialism, combined the intellectual theories behind ‘Marxism, Feminism and Deconstruction’ to address issues surrounding knowledge and power relating to South Asian women (Williams & Chrisman, 2013, p.51). Spivak focussed on the patriarchal control of women surrounding British colonialism and highlighted the neglect of gender in the colonial discourse (Williams & Chrisman, 2013,
Spivak refers to the South Asian woman in a postcolonial context as the ‘subaltern’ woman, a term that illustrates the subordination of indigenous women in colonial history:

In seeking to learn to speak to (rather than listen to or speak for) the historically muted subject of the subaltern woman, the postcolonial intellectual systematically ‘unlearns’ female privilege. This systematic unlearning involves learning to critique postcolonial discourse with the best tools it can provide and not simply substituting the lost figure of the colonized. (Spivak, 2013, pp.146-147)

In research surrounding post-colonialism including the study of young people in postcolonial times it is important to explore issues of gender impact surrounding colonialism and to explore how this historical context impacts young people in post colonial times.

**Postcolonial Times**

The period after independence is known as the post-colonial period (Sawant, 2012). For countries within the disintegrating ‘British Empire’ the term Commonwealth was coined to provide a sense of unity in the changing environment (Mishra & Hodge, 2013, pp. 406-407). Prior to the wide use of the term ‘post-colonial’, departments of English literature used the term ‘Commonwealth Literature’ in reference to the post-independence of colonial nations (Mishra & Hodge, 2013, pp. 406-407). Nonetheless, this term was problematic with political connotations and subsequently ‘post-colonial’ became a more widely utilised term and one which challenged the core problems surrounding colonialism, such as the ‘politics of opposition and struggle’ (Mishra & Hodge, 2013, pp. 406-407). However, ‘post-colonial is a complicated and contested construct as the term ‘post-colonial’ suggests the colonial period has ended as people may have gained independence or that the people who were colonised live in other parts of the world (Loomba, 1998, p. 37). Nevertheless, after independence, countries are far from being free of colonisation. Years of being colonised resulted in deep impacts on indigenous peoples, for example, independence occurred in Nigeria in 1960 and India in 1947, and the countries became autonomous and free from British rule, but their psychological, social, political and cultural aspects are still impacted by
colonialism, despite decades of independence (Sawant, 2012, p.2). In 1963, Fanon reflected on the problems surrounding colonisation: ‘the war goes on and we will have to bind up for years the many, sometimes ineffaceable, wounds that the colonialist onslaught has inflicted on our people’ (Fannon, 1963, p.249). Here Fanon is referring to post-colonial psychological impacts leading to mental illness surrounding the impact of colonialism.

**Post-colonial Theory**

Post-colonial theory reflects the discourse surrounding colonisation and associated relationships (Andreotti, 2006). Homi Bhabha an Indian Scholar, was a prominent ‘influential’ thinker in post-colonial theory (Huddart, 2006, p.1). According to Huddart (2006), Bhabha saw post-colonialism as a ‘reimagining’ of the west and a ‘reminder’ of its colonial past (p. 2) and it that colonialism is still ‘very much with us’ (p.4). Concepts of ‘hybridity, mimicry, difference and ambivalence’, surrounding resistance of the colonisers by the colonized, were put forward by Bhabha, and were at the heart of post-colonial theory (Huddart, 2006, p.1). Drawing on the post-structuralists’ discourse from theorists such as Foucault and Derrida, Bhabha highlighted the point of ‘difference’ in these discourses and extended this point of difference to the cultural differences within colonialism (Huddart, 2006, p. 4). This point of difference could be illustrated by the term ‘orientalism’ or ‘other’ highlighted by Said (1978 cited by Huddart, 2006, p. 5). Colonialism sought to accentuate the point of cultural difference (‘self and other’) to justify ‘colonial rule’ (Huddart, 2006, p. 5) but hybridization illustrates how these cultures are constantly in contact with each other and this contact results in a mixing together of cultures (Huddart, 2006, p. 7). Bhabha (1994 cited in Kapoor, 2008, p. 9) stated, ‘in the every practice of domination the language of the masters become hybrid’. Hybridity has the potential to reinterpret and redeploy ‘dominant discourse’ (Woon, 2015, p. 250). Bhabha identified ‘ambivalence’ as being the ground of postcolonial theory and ‘stereotypical discourse’ as being the core of ‘colonial discursive power’ (Huddart, 2006, pp. 36-37). Bhabha stated:

Racist stereotypical discourse, in its colonial moment, inscribes a form of governmentality that is informed by a productive splitting in its constitution of knowledge and exercise of power. Some of its practices recognize the difference
of race, culture and history as elaborated by stereotypical knowledge, racial theories, administrative colonial experiences, and that basis institutionalized a range of political and cultural ideologies that are prejudicial, discriminatory, vestigial, archaic, ‘mythical’, and, crucially, are recognised as being so. [...] However, there coexist within the same apparatus of colonial power, modern systems and sciences of government, progressive ‘Western’ forms of social and economic organisation which provide the manifest justification for the project of colonialism. (Bhabha, 1994 cited in Huddart, 2006, p. 37)

According to Bhabha (1994, p.85), mimicry appears as one of the most subtle and operative approaches of ‘colonial power and knowledge’. Mimicry is the form of ‘Mockery’ that Bhabha refers to as ‘sly civility’, a response to the grand ambitions behind, and the ‘solemn’ and ‘serious nature, of colonialism’ (Huddart, 2006, p. 58). Bhabha used the term mimicry to signpost the influence of West on the local culture (Sawant, 2012; Huddart, 2006). Bhabha (Huddart, 2006, p. 59) defined colonial mimicry as:

...the desire for a reformed, recognizable Other, as a subject of difference that is almost the same, but not quite. Which is to say, that the discourse of mimicry is constructed around an ambivalence; in order to be effective, mimicry must continually produce its slippage, its excess, its difference.

Huddart (2006, p.60) suggested, ‘ambivalence’ could mean two things: ‘it could mean that colonial discourse is accidentally ambivalent, or that colonial discourse incorporates ambivalence’. Huddart (2006) contended that for Bhabha it was the latter as this ‘ambivalence and mimicry’ destabilised the ‘colonial’s grand discourse of humanism’ (Huddart, 2006, p. 60). Bhabha believed that the concepts of ‘hybridity, mimicry, difference and ambivalence’ will live on from generation to generation despite decades of independence and he challenged the ‘west’ to ‘transform’ cultural understanding towards all nations and peoples (Huddart, 2006, p.1).

Postcolonial theorising challenges the ‘superiority of the dominant western perspective and provides a way to move towards repositioning and empowering the ‘marginalised and subordinated other’ (Parson & Harding, 2011, p.2). Instead of presenting a solid theory as such post-colonial theory brings to light a series of questions relating to how
knowledge evolves and how it impacts socially and politically (Andreotti, 2015). Andreotti highlighted the following ‘disciplines or movements’ as underpinning post-colonial theory, some of which have been discussed earlier:

- de-colonisation struggles and Southern responses and social movements challenging European domination (like those of Fanon, Freire and Gandhi);
- literary studies concerned with the representations of the ‘First’ and ‘Third’ worlds in literary and non-literary texts (like that of Edward Said); and
- recent debates in the fields of sociology, political theory, international relations and development and cultural studies triggered by new trends of discussion related to knowledge and power (e.g. Foucault, Derrida, Spivak and Bhabha). (Andreotti, 2006, p.7)

Mishra and Hodge (2013, p. 418) discussed how rather than there being one ‘post-colonialism’ there are many ‘postcolonialisms’. Here Mishra and Hodge (2013, p.418) deliberately drop the hyphen as they suggest that ‘postcolonialism’ can be seen ‘as an always present tendency in any literature of subjugation marked by a systematic process of cultural domination through the imposition of imperial structures of power’. These authors see this form of postcolonialism as not being ‘post’-something rather as being ‘already implicit in the discourses of colonialism themselves’ (Mishra & Hodge, 2013, p.413). Building on this idea of postcolonialism Mishra and Hodge distinguished two types of postcolonialisms. The first being ‘oppositional postcolonialism’ and is in line with the hyphenated ‘post-colonial’ and being found in ‘post-independent’ colonial period discourse (Mishra & Hodge, 2013, p.419). The second form of postcolonialism is ‘complicit postcolonialism’ which is more towards the ‘unhyphenated’ postcolonialism as being ‘an always present underside within colonization itself’ (Mishra & Hodge, 2013, p. 419).

It is evident to see from this brief introduction to colonialism and post-colonialism discourse that, as previously mentioned, this is a highly complex area and one that has stimulated much debate in the decades within and following colonial domination. The impact of colonialism on culture, religion, politics, economics, and the social structure in
post-colonial nations is profound therefore to carry out research in Bangladesh it is essential to look at aspects relating to post-colonialism in the Bangladeshi context.

**Post-colonialism in Bangladesh**

*Colonial History*

The colonial period in Bangladesh came to an end in 1947 when India and Pakistan were separated (Rahman, 2010). East Pakistan (now Bangladesh) was one of the provinces of Pakistan, an Islamic nation (Rahman, 2010). Bangladesh finally gained independence in 1971, however the period following independence in Bangladesh has seen tumultuous ‘social, political and economical’ problems (Rahman, 2010, p.116).

*Education in Colonial times*

The territory that later became Bangladesh was Islamic for 500 years up to 1757 (AD) when colonisation occurred and when the whole of the ‘Indian provinces of Bengal and Assam’ were under British rule’ (for almost ‘190 years’) (Rahman, 2010, p.116). Prior to colonization since ‘medieval’ times the education system was ‘Islamic’, however during British colonization an ‘imperialist’ education system was imposed (Rahman, 2010, p.116). The East India Company saw the significance of promoting Indigenous languages in addition to providing Western science knowledge and this was recognized ‘in the Charter Act of 1813’ (clause 43) (Rahman, 2010, p.116). In 1837 the English language was officially made the ‘language of administration’ (Rahman, 2010, p.116). With the East India Company entering the education field and the growth of the English language, English schools and colleges emerged with English instruction being the ‘medium of instruction’ as well as compulsory English language being introduced in secondary school (Rahman, 2010, p.110). In 1854 an inquiry into Education by the British House of Commons resulted in the ‘Woods Educational Despatch’ where Universities, schools, secondary schools, teacher training and enhancement of education for girls, were established and where both English and Indigenous local languages were encouraged (Rahman, 2010, p.116). However, Rahman (2010) notes where education for girls was established this was for the education of girls to become mothers rather than the preparation of girls to follow educational careers. The content of schools was controlled by the British Crown until 1930 when provincial school education
departments were set up and eventually in 1945 a central school education department was established (Rahman, 2010, p.117). In 1904 more schools were established to cater for the general population but ‘elite’ European schools excluded most indigenous peoples (Rahman, 2010). It has been widely documented that the education during this period perpetuated the ‘aristocratic tastes and manners of the upper class to create an exclusively dependent elite (Ilon, 2000; Mukerji, 1956; Seal, 1968; as cited in Rahman, 2010, p.117). This ‘new elite became alienated from’ the general population who did not have ‘access to the new education system, (Basu, 1952; Bhattachrya, 2005; Robb, 2002; as cited in Rahman, 2010, p.117). The British were criticized for not encouraging education of all, failing to provide opportunities for the poor to access education, and for not promoting indigenous education and cultural understanding (Nurullah & Naik, 1951; as cited in Rahman, 2010). At the end of British colonialisation 1947, Bangladesh became East Pakistan and Islamic values and culture were introduced into the education system (Rahman, 2010). Since independence there have been many reforms in the education system to meet the changing needs and challenges in post-colonial Bangladesh, but education for all citizens continues to be a priority of the Bangladeshi government. Education for girls is prioritised and Scouts and Girl Guides as students’ role models are also included in this education policy (MoE, 2010). The influence of Scouts and Girl Guides reflects the colonial influence of the British.

Language

After British colonial rule, East Pakistan (now Bangladesh) was a province of Pakistan but Urdu was the national language (Rahman, 2010). After the language movement of 1952, Bangla was established as the national language. However, in the 21st Century the English language is used in many sectors such as for trade, mediation, in higher education, and in computer work. English is the dominant language in universities in Bangladesh. In the Education Policy 2010 (final report), English is mandatory at degree level at all universities and colleges for all students (MoE, 2010). Therefore, although English (as a second language) and the technology support the country for economic growth, it is also impacting the young people’s cultural values and beliefs. However, recently in Bangladesh, English schools are emerging like ‘mushrooms’, because rich parents think about future job opportunities for their children and about their children becoming internationally competitive (Rahman, 2014, p.8). Rahman (2014, p.8) argued
that ‘English is undoubtedly important, but mother language is the principle mode to develop the moral culture’. Hence, native language is essential to develop local culture.

*Gender*

In her essay, The Romance of the New Woman, Chowdhury (2018, p.47) discussed, the self empowerment of the Bangladeshi women in a ‘neo-colonial’ context. She described, the conflict into the perception of Bangladeshi women in the 21st Century who on one hand are seen to be oppressed by a ‘patriarchal culture and religion’ and are unable to be independent or enact agency, conversely, there is the perception of the ‘emergent new women (in Bangladesh) who are autonomous consumers and modern citizens‘. Chowdhury (2018, p. 48) goes on to reflect on the ‘dichotomy’ of the ‘new’ women as there are complexities of the ‘gender relations and socio economic transformations as well as of women’s varied subjugation, social mobility, and engagement within labour, kin, and community groups’. In fact Chowdhury (2018, p. 50) believed the so called ‘new women’ in Bangladesh is in some sense an enigma, ‘she is both autonomous, self-reliant, and economically productive while simultaneously oppressed, menial, and third world (sic).’ Chowdhury (2018, p. 50) used the example of the ‘Rana Plaza Industrial disaster’ in the garment industry in Bangladesh and the photograph ‘The Death of Thousand Dreams’ (Akhter, Taslima, 2014), where a dead man and women are in an embrace in the ruins of the collapsed garment industry building. This image in the words of Chowdhury (2018, p.53) ‘draws our attention to the structural inequality of globalisation, colonial relations between supplier and buyer nations, corporate greed, corrupt state machinery, and disregard for poor workers, both, male and female, in each tier’. Chowdhury paints a picture of post-colonial Bangladesh where women are able to become autonomous in a sense where it is possible to earn an income in global industries such as the garment industry. However, akin to slavery in colonial times, they are exploited in what Chowdhury (2018, p. 53) refers to as ‘racial and gendered labour in the context of neoliberal capitalist globalisation of political economy’.

*Culture*

Rahman (2014, p. 3) stated, in the 21st Century in post-colonial Bangladesh that western culture is dominating Indigenous cultural practices and these practices are being eroded and are being replaced by a ‘cultural hybridization’ of both indigenous and
global practices. Rahman (2014, p.3) highlighted how ‘digital technology, electronic media, English language, international innovations and the Western lifestyle’ are largely impacting the culture in majority (developing) countries. Due to the influence of Western culture, people's lifestyle and eating patterns are changing, in particular young people, such as the preference to drink ‘Coca Cola’ or other soft drinks and junk foods instead of consuming local produce and healthy foods (Rahman, 2014, p.3).

As Rahman (2014, p. 4) stated, South Asian cultural heritage such as ‘folk song, theatre drama, gossip’ are important for people’s psychological development but at present these practices are becoming vulnerable. Recently television’s shows, social networks (face book) and cell phones are impacting young people's values and attitudes (Rahman, 2014).

**Part One Summary**

Part One has presented colonialism and the deep and lasting impact of this period in history on the local indigenous peoples. Subsequently post-colonialism and postcolonial theory was analysed followed by looking at post-colonialism in the Bangladeshi context.

**Part Two: Bangladeshi Young People’s Socioecological and Sociocultural Context**

In this section I discuss the socioecological and sociocultural context of Bangladeshi young people — the history of Bangladesh and young people’s education, social position, marriage and employment.

As Khan (cited in Mollah, 2015) indicated, the end of the colonial period is not a positive experience for Bangladeshi people because corruption became extensive and widespread through almost every domain of administration. The basic structure of bureaucracy in Bangladesh was inherited from the British. The British East India Company came to India for trade and eventually established government in the seventeenth century (Mollah, 2015). The end of colonialism indicates the political, economic and psychological change of colonised people (Mondal, 2014). British colonial rule in south Asia lasted until 1947, after which Bangladesh became governed only by constitutional law, as part of India and later Pakistan, including the principles of ‘secularism, socialism, democracy and nationalism’ (Miah, 2013, p. 49). The political
crisis of the 1950s and 1960s, wherein the Pakistani central government allocated comparatively few resources for East Pakistan, created a ‘political and economic’ dissimilarity and sense of removal in East Pakistan (Mustafa & Nawaz, 2014, p. 50). The subsequent break from Pakistan after the Bangladesh Liberation War in 1971 saw Bangladesh become a democratic country. Alavi (1973, p. 77) stated that Bengalis “challenged the domination of the ‘Punjabi bureaucracy’ in a secular idiom through the Bengali Language Movement” in 1952. The main focus of this movement was national language (Alavi, 1973). Akram (2007, p. 6) stated that the death of students complaining about the language policy became the impetus of that movement and the celebration of the day as ‘Ekushey February’ (Martyr’s Day, 21 February).

International Mother Language Day came about due to the Pakistani Government. The Government of East Pakistan attempted to bring cultural and language uniformity across Pakistan through declaring ‘Urdu’ was to be the national language (Choudhury, 1972, p. 247). This led to the East Pakistani people believing their culture and language (Bengali) was disappearing (Choudhury, 1972). International Mother Language Day is the anniversary of when, in 1952, students from Dacca University and (now the University of Dhaka) in East Pakistan (now Bangladesh) took action in the form of protests to attempt to protect their language and culture from the Pakistani Government, with police action leading to the death of some students (Choudhury, 1972). Bowers (1996, p. 7) stated that ‘the language of a culture plays a crucial role to develop epistemic and moral patterns’. Mother language is the overarching norm to develop ethical culture (Rahman, 2014). In Bangladesh, language is very important to the people and is at the heart of their cultural practices and beliefs. It is evident that the co-researchers see these student activists in 1952 as role models who lost their lives while attempting to protect the cultural independence of the Bangladeshi people. Bowers (1996) argued that language plays an important role in shaping an individual’s knowledge and beliefs.

Eaton (1993) stated that the Islamisation process started in Arabia first and later grew in Bengal in the nineteenth and early twentieth centuries. Subsequently, Bengali Muslims became increasingly aware of the beliefs and practices and tried to integrate those into their identity as Muslims (Eaton, 1993). Eaton (1993, p. 128) asserted, ‘the
rise of Islam in Arabia established the model for the subsequent movement in the Bengal as in the Muslim world at large'.

The Bangladeshi bureaucracy is patrimonial in nature based on personal interest. In this independent Bangladesh, the politicians and bureaucrats are free to fulfil their purpose unethically. At the same time, the impact of militarism is still visible in the national government of Bangladesh (Miah, 2013), and the government’s use of power is demonstrably corrupt in the same vein as its predecessors, the British, Indian and Pakistani administrations. It is clear that the politics and administration of Bangladesh are affected by military rebellions and the country is thought to be one of the most corrupt countries in the world (Mollah, 2015; Miah, 2013).

Bangladesh is considered to be a majority (or ‘developing’) country (UN Children’s Fund [UNICEF], 2014). According to UNICEF (2014,p.66), the per capita gross national income of Bangladesh in 2012 was US$840 and the percentage of the population below the international poverty line (of US$1.25 per day) was 43% (2007 to 2011). In 2012, the population of Bangladesh was 154.69 million, with 21% of the population in the 10–19 year age range and the population is expected to increase 1% each year from 2012 to 2030 (UNICEF, 2014, p.60). UNICEF (2014) emphasised basic reading, writing and numeracy skills for individual’s wellbeing and societal development. In Bangladesh, from 2007 to 2012 the adult literacy rate was only 58%, but the youth literacy rate (aged 15 to 24) for boys was 77% and 80% for girls (UNICEF, 2014, p.54).

Contemporary society provides adolescence with increased educational opportunities (Amin, Diamond, Naved & Newby, 1998). The government of Bangladesh has increased the provision of schooling quite rapidly and the demand for education has grown in equal measure (Caldwell, Caldwell, Caldwell & Pieris, 1998). Between 2007 and 2011, The gross enrolment ratio\(^3\) in secondary school was 43% (male) and 51% (female) and

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\(^3\) Secondary school net enrolment ratio – Number of children enrolled in secondary school who are of official secondary school age, expressed as a percentage of the total number of children of official secondary school age. Secondary net enrolment ratio does not include secondary-school-aged children enrolled in tertiary education owing to challenges in age reporting and recording at that level' (UNICEF, 2014, p. 57).
the net attendance ratio\(^4\) at secondary school was 43% (male) and 47% (female) (UNICEF, 2014, p.54).

In Bangladesh, secondary female students receive a government stipend to complete secondary level that enhance ‘girls’ enrolment in secondary schools’ (Mahmud, 2004, p. 4; Ministry of Primary and Mass Education, 2015). In majority countries, many children work to help their families and this interferes with their education, childhood enjoyment and right to physical and mental development (UNICEF, 2014). In Bangladesh, from 2005 to 2012 13% of children were engaged in child labour (18% of males and 8% of females) (UNICEF, 2014, p. 78). Practices of physical punishment or psychological aggression by parents and caregivers to correct children’s misbehaviour violates human rights. Domestic violence is a great threat for adolescence girls (aged 13 to 18) that must be addressed (UNICEF, n.d.). In Bangladesh female sexuality is managed through early marriage or seclusion (purdah) which controls the nature of interactions between men and women (Amin et al., 1998). Models of media influence young people’s feelings through love letters (Franco, 2012). Thus, the traditional culture has shaped modern young people’s sexuality, reproduction and marriage (Caldwell et al., 1998).

The garments industry provided women with cash employment and this was the first time in Bangladesh where women were provided with paid work outside the home. This resulted in many rural young women moving to the city to work in factories to contribute to the households’ expenses (Amin et al., 1998). Kibria (1995) stated, women work in the garment factories for low wages to provide financial support to their family and improve their family’s situation and prospects. Amin et al. (1998, p. 186) commented, ‘the employment of women in labour factory production has developed from their weak economic and social position’. In Bangladesh, young women are involved in work (largely in factories) and this has resulted in women gaining more

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\(^4\) ‘Secondary school net attendance ratio – Number of children attending secondary or tertiary school who are of official secondary school age, expressed as a percentage of the total number of children of official secondary school age. Because of the inclusion of secondary-school-aged children attending tertiary school, this indicator can also be referred to as a secondary adjusted net attendance ratio’ (UNICEF, 2014, p. 57).
confidence in themselves and being exposed to a new social world and to new lifestyles (Amin et al., 1998) but as discussed in part 1 there is a paradox between this ‘independence’ and the exploitation of the workers by large international companies surrounding the garment industry (Chowdhury, 2018).

**Part Two Summary**

Part Two has provided some general statistics and information on Bangladesh, particularly Bangladeshi adolescents’ education, social position, marriage and employment in postcolonial times. Part Three presents young people’s identity, learning and development.

**Part Three: How Young People Develop and Learn**

The transition from childhood to adulthood occurs usually between the ages of 12 and 20, a period known as adolescence, when children bridge the gap to adulthood (Lefton, 1994). Heyes and Blackmore (2009, p.51) defined, ‘adolescence as the period of psychological and social transition between childhood and adulthood’. The development of adolescence is a significant stage with complex factors involved which influence how adolescents view themselves as young adults (Lovu, Hargas & Roth, 2018). Lefton (1994) described, adolescence as the period extending from the onset of puberty to early adulthood when the reproductive system matures while increasing the production of sex hormone, signalling the end of childhood. At this phase in a young person’s life, people, such as parents, siblings and peers, play a significant role in their development through this period (Toumbourou & Gregg, 2001). The present study will examine the factors that influence adolescents’ phases of growth such as bodily, societal, learning and moral. The phases are described below:

**Bodily Development**

As Lefton (1994, p.317) stated, although the term ‘adolescence’ and ‘puberty’ are interrelated, their meaning is different. When adolescents’ reproductive system become mature then it is called puberty, that starts with an increase of the production of sex hormones and occurs at the end of childhood. However, ‘adolescence is the period extending from the onset of puberty to early adulthood’ (Lefton, 1994, p.317).
Puberty is around approximately 13 years of age (can be earlier or later) but before puberty occurs young people experience a substantial ‘growth spurt’ (Lefton, 1994, p. 317). Furthermore, the hormonal impact provides changes that more obviously differentiate males from females whereas in childhood these differences are not so pronounced (Lefton, 1994).

During this time, boys’ body mass and facial hair increase, whereas girls’ body size including hips and breasts are enlarged (Lefton, 1994, p. 318). With the maturity of the reproductive system, ‘puberty’ is complete and during this period, boys start to produce ‘sperm’ and girls produce ‘ova’ and begin to ‘menstruate’ (Lefton, 1994, p.318). Lefton (1994) stated, boys who mature early often enjoy several advantages including increased ‘self-confidence’, higher level of athletic skill, greater sexual appeal and higher expectation of teachers’ and parents’ cooperation. Conversely, early maturing girls seem to be at a disadvantage because females sometimes find it difficult to accept the changes in their peers (Lefton, 1994, p. 318, 319). Thus, at what stage maturation occurs influences young people’s social development.

Development and Learning

Jean Piaget believed like many educators and psychologists that the basic development of all learning capabilities occurs during the first two years of life (Lefton, 1994). Piaget’s theory focused on ‘how people think (through process) instead of ‘what they think’ (content) and this involves people from ‘all societies and cultures’ (Lefton, 1999, p. 291). As Piaget stated, to deal with new ideas both children and adults use two processes, namely, ‘accommodation and assimilation’ (Lefton, 1994, pp. 291-292). In the assimilation process, an individual incorporates new philosophies and ‘experiences’ and re-interprets them to fit into their pre-existing ‘thought processes and behaviours’, and continues to use these re-interpreted assimilated processes in the future (Lefton, 1994, pp. 291, 292). In contrast, in the accommodation process, a person modifies their thought patterns and behaviours to accommodate new information (Lefton, 1994, p., 292).

Supporting Piaget’s theory, Lefton (1994) highlighted how parents, teachers and psychologists can influence children’s cognitive development, for example, for a child’s
development the love of a parent is important and also parent and child contact is essential.

Piaget's theory of intellectual development of a child is as follows:

1. Cognitive development is a process in which each stage builds on the previous one.
2. The egocentrism of infants and children is reduced over a period of several years through the process of decentration.
3. The exact age at which the stage of development appears differs from one child to another, but all children in all societies go through the same stages.
4. To psychologists, the actual content of children’s thoughts is less important than the nature of their thinking. By discovering how children think, psychologists can find ways to facilitate learning. (adapted from Lefton, 1994, p. 297)

The relationship between learning and development is unclear and there are many theories relating to learning and development (Vygotsky, 1978). Vygotsky highlighted, how theories of childhood learning fall into three major ‘theoretical positions’ (p.29) and although he rejects these three positions he believed it is important to analyse these positions to look at relationships between learning and development. The first assumes child developmental processes are ‘independent of learning’ (Vygotsky, 1978, p. 29) and if a child has not developed cognitively to the extent of being able to learn a particular concept then learning will not occur (Vygotsky, 1978) and this theory is ‘based on the premise that learning trails behind development and that development always outruns learning’ (Vygotsky, 1978, p. 29). Piaget’s theories on child development fall into this theoretical position. The second theoretical position is that ‘learning is development’ (Vygotsky, 1978, p. 29) and in contrast to the first theoretical position this group of theorists believe that both learning and development ‘occur simultaneously’ (Vygotsky, 1978, p. 29). The third theoretical position simply combines the first two positions, for example Koffka’s theory where ‘development is based on two inherently different but related processes, each of which influences the other’ (Vygotsky, 1978, p. 29), for example, a ‘child makes one step in learning’ but ‘two steps in development’ Vygotsky, 1978, p. 29).
In the Zone of Proximal Development approach to learning and development, Vygotsky believes that learning happens long before children start school and the fact that children bring with them to a school a complex history of learning is central to this theory. Using the example of studying arithmetic in school Vygotsky highlights how children have had experiences with learning about quantity, measuring, dividing things into portions, and assessment of size (Vygotsky, 1978, p. 32) in this way children have formed their own ideas about arithmetic before starting school. Vygotsky (1978) emphasizes the interrelationship of learning and development from the very beginning of life and this needs to be recognized. The ‘zone of proximal development is the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers’ (Vygotsky, 1978, p. 33). This zone of proximal development could be defined as being functions that have not yet matured, functions that are in the process of maturing. Vygotsky (1978, p.33) used the example of the process of maturing being like ‘buds’ that have not matured into ‘fruit’ (the fruit would be the actual development). This is very important in developmental research as it means that not only what is developmentally achieved is taken into account, but also that which is in the process of maturing. The zone of proximal development according to Vygotsky (1978, p.34) enables a ‘new formula’ to be put forward and that is: ‘good learning is that which is in advance of development’. Vygotsky (1978 p.35) highlights the social aspects of learning where ‘internal developmental processes are able to operate only when the child is interacting with people in his environment and in cooperation with his peers’. Vygotsky (1978, p. 35) identified the most ‘essential feature of’ his hypothesis as ‘the notion that developmental processes do not coincide with learning processes. Rather, the developmental process lags behind the learning process; this sequence then results in zones of proximal development’ (Vygotsky, 1978, p.35).

Moral Development

According to Lefton (1994, p. 391), ‘morality is the system of beliefs, values and judgements about the rightness or wrongness of human acts’. Piaget’s theory of moral development demonstrated how children respond to particular questions, and at what
age level they change, and apply different solutions (Lefton, 1994). Lefton (1994, p. 299) defined morality as ‘a system of learned attitudes about social practices, institutions, and individual behaviour that allows people to evaluate situations and behaviour as being right or wrong, good or bad’. Morality is where people assess different circumstances and take action as a result of their moral views (Lefton, 1994). Piaget observed, morality as being similar to cognitive development (Lefton, 1994). Young children’s thoughts about morality tend to be ‘inflexible and follow rules’ whereas older children’s morality is constructed through social encounters and changes according to their circumstances (Lefton, 1994, p. 299). The principal theme of Kohlberg’s theory of morality relates to justice, ‘where reasoning is aligned with social norms and directed by an individual’s own conduct’ (Lefton, 1994, p. 300, 301). Kohlberg’s theory, identifies three ‘levels’ of morality, these are: pre-conventional morality, conventional morality and post-conventional morality’ (Lefton, 1994, p. 301). Pre-conventional morality usually relates to children where they make moral decisions based on what they think the consequences will be, as the child has not fully developed their beliefs about what is right or wrong (they may be prevented from doing something if they believe there will be negative consequences from doing it) (Lefton, 1994, p.303). ‘Conventional morality’ relates more to adolescents and young adults and it is where they make moral decisions according to what they think others, such as family members or societies, outlooks are (Lefton, 1994, p.303). For instance, young people may not smoke if their family and peers disapprove of smoking. Finally, in 'post-conventional morality', people judge based on their own individual views. In the advance phase of this kind of morality, individuals emphasise their own ethical beliefs and values to judge any matter and this might mean, if they feel empowered to do so, making a stand against societal views (Lefton, 1994, p.303).

Social Development
During puberty, adolescents’ behaviour is affected by ‘environmental and biological’ factors (Lefton, 1994, p.318). Family and teachers play an important role in the development of adolescents (Lefton, 1994). Adolescents’ social growth and behaviour are influenced by environmental factors, and ‘parents and peers’ are the two most important influences on adolescents’ social behaviour (Lefton, 1994, p. 319). The impact of a peer group is important at this stage. As Bukowski et al. (1993 cited in Lefton,
1994) stated, young people during adolescence spend more time out of home rather than staying with their family or inside their homes (Lefton, 1994). Peer groups support information about social issues and there are enormous benefits of peers influencing young people’s social development (Lefton, 1994).

Development of Personality
The concern of adolescents is to determine that they effectively develop individuality (Lefton, 1994). According to Erikson an individuals’ identity shows ‘who they are, where they perceive themselves to be going, and their place in the world’ (Lefton, 1994, p.323). Erikson described how an individual’s personality develops from their own views and from other people’s insights (behaviour) as well (Lefton, 1994). Adolescents are influenced through their engagement in ‘political, religious or ideological groups’ (Lefton, 1994, p. 323) and peer pressure influences their behaviour such as becoming involved in ‘drug use or shoplifting’ (Lefton, 1994, p. 323). The process of adolescents’ psychological development fluctuates (Lefton, 1994).

Part Three Summary
Part Three has described young people’s bodily development, development and learning, social development, moral development, and development of personality. Part Four details the influence of postcolonial theory on human development and learning.

Part Four: Influence of Postcolonial Sociocultural Theory on Human Development and Learning
In this section I describe environmental ideologies, first, I then discuss the idea of culture in the global and national (Bangladeshi) context and describe the major cultural aspects. Thereafter, I present the influence of post-colonial sociocultural theory on human development and learning. Finally, I summarise the relationship between environmental ideologies to develop a theoretical model for the thesis.

Environmental Ideology
Individual's perception, thinking and the way of interpretation of the world are called ideologies. The ideology of a society explains the purpose of people's activities, their understanding and thinking. According to Olsen, Lodwick and Dunlap (1992), ideology
can originate from cultural worldviews. The present study has included the concept of culture in its theoretical framework. This environmental ideology is a more ecocentric perspective to explore the ecoliteracy of Bangladeshi young people.

Pepper (1994) classified environmental ideology into two categories—anthropocentric and ecocentric. The anthropocentric perspective is also known as the technocentric perspective and is based on the belief that 'nature is a resource to be used for humans' (Cutter-Mackenzie & Hoepper, 2014, p. 395). O'Riordan (cited in Cutter-Mackenzie, 2003) stated that the technocentric perspective is the main environmental philosophy in Western capitalist culture. The anthropocentric perspective is concerned for the wellbeing of the human and non-human environment. O'Riordan (1990, p. 143) argued:

Environmentalism is the clash of two world views. The simplest distinction lies between who believe that the earth is capable of being improved or manipulated for the benefit of both human kind as well as for life on earth itself, and those who believe that human beings should at best be only equal with other forms of life on the planet and that societies must learn to adjust their economics and aspirations so as to cohabit with the imperatives of earth and life process that are essential for the survivability, or sustainability of earth.

In describing the nature of technocentric, O'Riordan (1976, p. 11) stated,

The technocentric mode is identified rationality, the 'objective' appraisal of means to achieve given goals, by managerial efficiency, the application of organisational and productive techniques that produce the most for the least effort, and by a sense of optimism and faith in the ability of man to understand and control physical, biological and social process for the benefit of present and future generations.

As Kortenkamp and Moore (2001, p. 261) stated, ‘in anthropocentric ethics nature deserves moral thought because how nature is treated moves humans’. In contrast, ‘in an ecocentric ethics nature deserves ethical consideration because nature has intrinsic
value’ (Kortenkamp & Moore, 2001, p. 261). Hays (cited in O’Riordan, 1981, p. 1) asserted, the technocentric perspective is “the application of rational and value free managerial techniques by a professional elite, who regraded the natural environment as ‘neutral stuff’ from which man could profitably shape his destiny”. The technocentric perspective is made up of two perspectives—the ‘accommodation perspective’ and the ‘cornucopian perspective’. The Cornucopian perspective believes that progress is the result of science, technology and politics and everything can be resolved through these (O’Riordan, 1981, pp. 376–377). Accommodation perspective refers to ‘some consciousness must be made towards redistribution and environmental protection but who do so by accommodating to the demands of the ecocentrist rather than responding with radical reforms’ (O’Riordan, 1981, p. 377)—that is, accommodation is sensitive to social and environmental concerns (O’Riordan, 1989, p. 93). Current trends in environmentalism are shown in Table 3.1.

**Table 3.1: Current Trends of Environmentalism: European Perspectives on Environmental Politics and Resource Management**

<table>
<thead>
<tr>
<th></th>
<th>Ecocentrism</th>
<th>Technocentrism</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gaianism</strong></td>
<td>Faith is the rights of nature and of the essential need for co-evaluation of human and nature.</td>
<td>Faith in the application of science, market, forces and managerial ingenuity.</td>
</tr>
<tr>
<td><strong>Communalism</strong></td>
<td>Faith in the cooperative capabilities of societies to establish self-reliant communities based on renewable resource use and appropriate technologies.</td>
<td></td>
</tr>
<tr>
<td><strong>Accommodation</strong></td>
<td>Faith in the adaptability of institution and approaches to assessment and evaluation to accommodate to environmental demand.</td>
<td></td>
</tr>
<tr>
<td><strong>Intervention</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Green supporters, radical philosophers</td>
<td>Radical sociologists, committed youth, radical-liberal politicians, intellectual environmentalists</td>
<td>Middle-ranking executives, environmental scientists, white-collar trade unions, liberal socialist politicians</td>
</tr>
<tr>
<td>0.1–3% of various</td>
<td>5–10% of various</td>
<td>55–70% of various</td>
</tr>
<tr>
<td></td>
<td>10–35% of various</td>
<td>10–35% of various</td>
</tr>
</tbody>
</table>
opinion surveys

Demand for redistribution of power towards a decentralised, federate economy with more emphasis of informal economic and social transactions and the participatory justice.

Belief in the relation of the status quo in the existing structure of political power, but a demand for more responsiveness and accountability in political, regulatory, planning and educational institutions.

Source: O'Riordan (1989, p. 90).

According to Eckersely (1992), an ecocentric perspective sees the environment as being valuable in itself. The ecocentric ideology considers that 'no habitable future is possible without a fundamental change of attitude away from a sense of technological hubris towards a much more humble and humane association with the earth' (O'Riordan, 1981, p. 377). O'Riordan (1976, p. 1) argued that 'ecocentrism preaches the virtues of reverence, humility, responsibility, and care; it argues for low impact technology; it decries bigness and impersonality in all forms; and demands a code of behaviour that seeks performance and stability based upon ecological principles of diversity and homeostasis'. The ecocentric ideology consists of two perspectives—'Gaianism' and 'communalism' (O'Riordan, 1989, p.90).

Gaianism is grounded in deep ecological beliefs and it is inspirational to human beings (O'Riordan, 1989). Lovelock (1979, p. vii) proposed, 'the Earth's living matter, air, oceans, and land surface from a complex system which can be seen as a single organism and which has the capacity to keep our planet a fit place for life'. Lovelock imagined 'human kind as collectively adaptable organism with an immense capacity for learning' (O'Riordan, 1989, p. 98). Gaianism maintains that as a part of society, people should show respect towards it and the actual Gainist observes the contribution of people to the intrinsic processes of homeostasis (O'Riordan, 1989). Essentially, Gaianism supports the relationship of human kind and the environment. Naess (1973, p. 95) remarked the deep ecological concern for not only pollution and resource depletion but 'diversity, complexity, autonomy, decentralisation, symbiosis, egalitarianism and classness'.

The communalism perspective is also known as human welfare ecology (Eckersley, 1992). O'Riordan (1989, pp. 95–96) stated that in the communalist mode:
...economic relationships are intimately connected with social relationships and feelings of belonging, sharing, caring and surviving...communalism feeds on idealism, in faith in the inherent co-operative character of human kind, and the ability of co-operative people to realise that they can achieve their ends more safely and expeditiously through co-operation rather than conflict.

Therefore, communalism suggests establishing pleasant relationships between society, people and nature.

The environmental ideology developed by O’Riordan (1976; 1981; 1989) has been considered as an important framework for environmental education research. Gough, Scott and Stables (2000, p. 45) commented that the framework developed by O’Riordan is flawed because of the chronological order of intervention, accommodation, communalism and Gaianism. Gough et al. (2000, p. 45) criticised equating communalism with ecocentrism and accommodation with technocentrism, stating communalism does not ask about the importance of technology and accommodation relates more to ecocentrism because it values ‘life’ above all. In this, Gough et al. (2000) recognised the different positions of accommodation and communalism, shown in Table 3.2.

**Table 3.2: An Alternative to the O’Riordan Model**

<table>
<thead>
<tr>
<th>Gaianism</th>
<th>Anthropocentric/Technocentric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trust ‘Gaia’</td>
<td>Accommodation</td>
</tr>
<tr>
<td>Value ‘life’</td>
<td>Value ‘fairness’</td>
</tr>
<tr>
<td>above all</td>
<td>above all</td>
</tr>
</tbody>
</table>

Source: Gough et al. (2000, p. 45).

Cutter-Mackenzie and Hoepper (2014) identified, ecocentric and technocentric perspectives and values in a different way, as shown in Table 3.3.
Table 3.3: Environmental Perspectives

<table>
<thead>
<tr>
<th>Most Ecocentric Perspective</th>
<th>Most Technocentric Perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Deep Communalism</strong></td>
<td><strong>Accommodation</strong></td>
</tr>
<tr>
<td><strong>Environmentalism</strong></td>
<td><strong>Intervention</strong></td>
</tr>
<tr>
<td>Ecological sustainability</td>
<td>Value fairness above all</td>
</tr>
<tr>
<td>Value life above all</td>
<td>Value progress above all</td>
</tr>
<tr>
<td></td>
<td>technological sustainability</td>
</tr>
</tbody>
</table>


In Cutter-Mackenzie and Hoepper’s (2014) model, communalism stressed the importance of ecology and accommodation relates more to technocentrism. Environmental ideologies are described from different perspectives, each stressing different elements of importance. The present study used Cutter-Mackenzie and Hoepper’s (2014) environmental ideology on the grounds of it being a widely accepted and utilised model for describing and analysing environmental education.

**Culture**

According to Jenks (2005), culture is represented by objects and products of human society that helps human beings to demonstrate their patterns of behaviour in daily life. Cultural things are language, specific knowledge about the society and the customs and rituals of the social community (Jenks, 2005). Jenks (2005) argued that culture is an equally shared idea of personal, mental and social things where both symbolic and abstract meaning work together.

Matsumoto and Juang (2008, p. 12) defined human culture as ‘an unique meaning and information system, shared by a group and transmitted across generations, that allows the group to meet basic needs of survival, peruse happiness and well-being, and derive meaning from life’. The cultural group may be a small or large ethnic group or social community and they hold a ‘shared history’ (Jackson & Medows, 1991). The ethnic group have particular norms, attitudes, values, beliefs and lifestyle. People from modern societies develop their cultural identity from their nationality and social cultural life.
Jupp (1997) stated national education systems have a prominent role in developing general concepts of national identity in a country. Jupp (1997) commented that education systems help to develop united values, customs and civic responsibility between individuals and communities which forms the concept of nationality and represents national culture. Nationality expresses a common set of belief systems and values which are being developed through interaction with aspects of culture that exist within a state or country (Jupp, 1997). Jupp (1997) stated a country is characterised by the dynamic amalgamation and collaboration of a range of cultural identities.

A country’s society demonstrates common views about themselves and about the world — cultural worldviews (Ibrahim, 1991). The concept of worldview explains how people behave or interact with each other in that society and the relationship between people and events (Jackson & Medows, 1991). Worldviews guide individuals’ activities and the activities of groups in a specific society. Gerrig et al. (2011, p. 662) stated, ‘culture gives meaning to experiences and behaviour that are linked to ethnicity’.

Bangladeshi young people have developed their cultural worldviews based on their shared history, language, religion, ethnicity, settlement and education. Therefore, the present study uses cultural aspects as a lens when investigating adolescents’ ecological literacy in the context of Bangladesh.

**Bangladeshi Culture**

As Hossain and Khan (2006) asserted, the culture of Bangladesh has developed from the fertile nature of land. People from different cultural backgrounds live in Bangladesh—90% are Muslims and 10% are of mixed religions (MoE, 2004). Hossain and Khan (2006) mentioned that while Islam is the state religion of Bangladesh, the cultural setting has included all the religions that represent the common beliefs of the country. According to Islam (2006, p. 67), Bangladeshi people believe in ‘nature as blessing’ and family, and focus particularly on human kind. Although religious faith is one of the basic characteristics of Bangladeshi people, language is an important factor that recognises their cultural identity (Hossain & Khan, 2006).
In Bangladesh, the shared history of religion, ethnic knowledge and beliefs encourage some sustainable practices and appreciation of the natural environment and all religions (Islam, Hinduism, Christianity and Buddhism) encourage care for the environment (Islam, 2006). The religious tradition suggests people consume less in daily life and follow a simple lifestyle to take care of the natural and social environment and are kind to all things, both living and non-living (Islam, 2006). In addition, Christians and Muslims believe that humans must look after the creations of God (Hope & Jones, 2014). However, people believe that nature is more powerful and is a blessing for human society.

In Western culture people over-consume, which is dissimilar to Bangladeshi culture. In Bangladesh, people consume less because of religious practices and beliefs (Islam, 2006). Environmental conservation is recommended in the Quran as ‘God (Allah) created the garden, date palm and olive trees to eat the fruits and distribute among other people but not to waste. Allah does not like unbalanced’ (Al-An’am, 6:142). There is an unlimited bounty of God for good deeds of humans. The history of human evolution is stated in the Quran as ‘Allah created humans in the best make; then if he works inequity, I reject him as the lowest of the low, except those who believe and do good works; so for them is an unending reward’ (Al-Teen, 95:4-6). In support of the statement of the Quran, Qaradaw (2001 as cited in Dien, 2013) stated that all environmental resources and components of Earth belong to humans and non-humans, rather than an individual or a particular group of people. Islam (2006) commented that humankind is prioritised in Bangladeshi culture.

At present in Bangladesh, there is no policy for environmental education, particularly for school education. There is also a lack of empirical research about young people’s ecoliteracy in postcolonial times in a cultural context. Hence, the use of postcolonial theory as one of the frames of the present study.

In 1971 since independence in Bangladesh, ‘a total of seven national education commissions were formed by emphasising planning, pedagogy and learning of English’ (Chowdhury & Kabir, 2014, p. 1). Chowdhury and Kabir (2014) stated that ‘although the first education commission (in 1974) aimed to decolonise the education system and
effectively banish English from the country, English has remained always a top priority in school curriculum, which was ‘inherited from the British education system’ (Chowdhury & Kabir, 2014. p. 1).

Hudson (2003) stated, the education system inherited from the time of European colonialism is currently facing postcolonial contests. The theory of postcolonialism provides a lens as to why the curricula of many majority countries are still a long way from ‘reaching sociocultural equity’ (Hudson, 2003 p. 381). Hudson (2003 p. 382) described how using a postcolonial lens demonstrates the domination of European and North America ‘through colonialism and imperialism on learning and education’. Postcolonialising encourages people to develop ‘identities and strategies that help to leave narrowing neocolonial ideas and practices behind (Hudson, 2003, p.382). The discourses of neocolonialisms are massively embedded and difficult to change’ (Hudson, 2003, p.382). Hudson (2003, p.381) stressed that ‘multicultural education and postcolonial rethinking’ might guide educators and students to change the traditional school environment and curriculum.

The 1952 language movement was a prominent event in the history of Bangladesh and promoted a connection between ‘heritage and modernity’ (Chowdhury & Kabir, 2014, p. 1). In the 1987 Mofizuddin Commission, religious education was made ‘compulsory to create religious sentiment and moral values’ in young generations (Chowdhury & Kabir, p. 6). The National Education Policy 2010 emphasised English to build up a society which is ‘knowledge-based and information’ – technology focused (Chowdhury & Kabir, 2014, p.11) with ‘technical and vocational education’ to transforming young people into a skilled human resources (MoE, 2010, p.16). The policy emphasised English as a ‘medium of instruction’, and encouraged the use of translation books for international students (Chowdhury & Kabir, 2014, p.11). The importance of television and radio were recognised as sources of learning English in the education policy 2010 (Chowdhury & Kabir, 2014).

Bangladeshi people adopted their traditional knowledge from their ethnic background. In Bangladesh, people do not depend on technology for crop production, for instance, the fertility of land and crop production are generated through using organic fertiliser
(Islam, 2006). As Islam (2006) stated, people use traditional knowledge and skills to control pests, do not rely on genetically modified crops and believe, nature is a good teacher for human life. These practices represent the environmental values that the people hold. Salequzzaman and Davis (2003) remarked, the historical religious, social and educational background of a community help them to develop common ethical and aesthetic values and beliefs.

**Sociocultural Theory**

As Rogoff (cited in Wals & Dillon, 2013) stated, sociocultural theory recognises that learning and development are influenced by culture. Vygotsky’s sociocultural theory of human development and learning describes that learning as a process and beginning of humans’ intelligence in society or culture (Centre for Excellence in Enquiry -Based Learning, n. d). The key theme of Vygotsky’s theoretical framework indicates that social interactions play a fundamental role in the development of cognition (CEEBL, n.d.). In Vygotsky's view, social interaction leads not only to increase levels of knowledge but actual changes in thoughts.

As Vygotsky (1978, p. 86) stated, the zone of proximal development is ‘the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers’.

The Zone of Proximal Development is the existing level of development of learning that a child can do alone in a certain period of time (CEEBL, n.d.). The next level works through the possible apparatuses and is accomplished through the support of adults or peers (CEEBL, n.d.) (see Figure 3.2).
**Part Four Summary**

Part Four has presented environmental ideology, described the concept of culture and cultural aspects in a global and national context, and portrayed how postcolonial sociocultural theory influences human development and learning.

**Part Five: Socioecological Theory**

Historically, postcolonial studies are central to our understanding of the land, in broad terms, the Earth. To engage a historical model of ecology and an epistemology of space and time, Harries (cited in DeLoughery & Handley, 2011, p. 4) suggested, we must enter a ‘profound dialogue with the landscape’. Emphasising the historical dialogue, DeLoughrey and Handley (2011, p.4) stated, the combination of nature and history has helped to confound colonial ‘histories of forced migration, suffering and human violence’. Postcolonial ecology reflects a complex epistemology' that improves both nature and history. The knowledge that comes from a Eurocentric position in environmental education and how we speak about environmental conservation have been influenced by the colonial ‘exploitation of nature and the assimilation of natural epistemologies’ worldwide (DeLoughery & Handley, 2011 p. 12).
The ‘Green Revolution’ in South Asia resolved the basic problems of increasing the agricultural excess needed to sustain industrialisation, urbanisation and domestic market for manufacturing goods (Alavi, 1973). In the 1960s, the Bangladesh Academy for Rural Development at Comilla promoted a substantial increase in agricultural production where small farmers benefitted (Blair, 1978). Blair (1978) stated, the program came to be dominated by the elite farmers because of class structure at the macro and micro level, but bureaucratic factors would have biased the rural development programme towards these rural elites.

**Socioecological Theory**

Social theory is the scientific ways of thinking about social life including social behaviour, social structure, class structure, gender, ethnicity, power, social development and numerous social problems (Harrington, 2005). Socioecological theory is concerned with continuity and change in contrast to minority (Western) theories of socialisation and cultural transmission (Grusec & Hastings, 2007). This theory emphasises the meaning of behaviour, developmental process, children’s role in their socialisation and the nested settings in which behaviour is embedded (Grusec & Hastings, 2007). Stokols (1996, p. 283) defined, socioecological theory as ‘as an overarching framework or set of theoretical principals which assist with understanding interrelationships among diverse personal and environmental factors in human health and illness’. Therefore, socioecological theory has been used in the area of human health.

In order to gain understanding of human development, we need to look closely at the factors that influence the growth and development of the individual. Socioecological theory considers the influence of interactions and experiences on adolescents’ development (Bronfenbrenner, 1994).

**Bronfenbrenner’s Socio-ecological Theory Framework**

Uri Bofenbrenner first introduced his ‘ecological paradigm’ in the 1970s (Bronfenbrenner, 1994, p. 37). The development of this paradigm was in response to what Bronfenbrenner saw as the ‘restricted scope’ of developmental psychology research (Bronfenbrenner, 1994, p. 38). He saw the ‘contemporary development
psychology’ as being ‘the science of the strange behaviour of children in strange situations with strange adults for the briefest possible periods of time’ (Bronfenbrenner, 1977, p. 513). Bronfenbrenner saw the need to go beyond observation of human behaviour and bring in a social focus, one that takes in ‘multi-person systems’ that is not restricted to a ‘single setting’ but looks at the ‘environment beyond the immediate situation containing the subject’ (Bronfenbrenner, 1977, p. 513). Bronfenbrenner (1977) referred to his perspective as ‘the ecology of human development’ and defined it as follows:

The scientific study of the progressive, mutual accommodation, throughout the life span, between a growing human organism, and the changing immediate environment, in which it lives, as this process is affected by relations obtaining within and between these immediate settings, as well as the larger social contexts, both formal and informal, in which the settings are embedded. (Bronfenbrenner, 1977, p. 514)

Bronfenbrenner represented the ecological environment in his ‘general ecological model’ (Bronfenbrenner, 1994, p. 38) as five subsystems which are represented ‘as a set of nested structures, each inside the other like a set of Russian dolls’ (Bronfenbrenner, 1994, p. 39). The subsystems are: ‘microsystem, mesosystems, chronosystem and exosystem’ (Bronfenbrenner, 1977, pp. 514-515; Bronfenbrenner, 1994, pp. 39-40). The microsystem consists of the ‘complex of relations between the developing person’ and their immediate environment (‘home, school, workplace’) in which the person engages in ‘particular activities in particular roles’ (daughter, parent, teacher employee) (Bronfenbrenner, 1970, p. 514) and interpersonal relations (Bronfenbrenner, 1994, p.39).

The mesosystem portrays the ‘linkages and processes’ that occur between ‘two or more settings containing the developing person’ (Bronfenbrenner, 1994, p. 40) such as the ‘interaction’ between family and school; and school and the place of work (Bronfenbrenner, 1994, p. 40). You could say the mesosystem is a ‘system of microsystems’ (Bronfenbrenner, 1977, p. 515).

The exosystem could be seen as an ‘extension of the mesosystem’ (Bronfenbrenner, 1977, p. 515). It is a system which ‘embraces’ other ‘formal and informal’ social
practices and associations that take place but do not include the ‘developing person’ (Bronfenbrenner, 1977, p. 515; Bronfenbrenner, 1994). For example, the relationship among the family and the parent’s (‘in lieu of a child’) and the relationship amongst the school and the local ‘peers’ (Bronfenbrenner, 1994, p. 40). This could also include ‘parents’ workplace’, neighbourhood organisations, ‘family social networks’ (Bronfenbrenner, 1994, p. 40), government, communication, transportation; in other words structures that are central to the community (Bronfenbrenner, 1977, p. 515).

A macrosystem is the system that includes the ‘culture or subculture’ of the ‘overarching patterns of the micro, meso and exosystems’ with a focus on aspects such as: ‘belief systems’, knowledge, resources and life styles that occur within the systems (Bronfenbrenner, 1994, p. 515). Bronfenbrenner (1994) highlighted, how the macrosystem also transcends ‘class and culture’ to look at the ‘social and psychological features’ that influence ‘processes’ which occur in the microsystem (Bronfenbrenner, 1994, p. 40).

A chronosystem incorporates variation and ‘consistency over time’ including an individual’s own identity and their environment that surrounds the person (Bronfenbrenner, 1994, p.40). The chronosystem includes consistency or changes in the ‘family structure’, the family income, family occupations and location of home (Bronfenbrenner, 1994). For example, this could take in changes surrounding divorce in the family which could impact family structure, socio-economic status, home and so on.
Figure 3.3: Socioecological Systems Theory of Human Development.
Source: Bronfenbrenner (1977; 1994).

Figure 3.3 demonstrates that adolescents' knowledge and growth are concurrently influenced by the numerous factors throughout the different systems, which provided me the background to understand young people's ecological beliefs.

Family and peers are the major factors of the microsystem, whereas the exosystem interacts through the influence of school and community. The microsystem and the exosystem are impacted by the macrosystem such as culture or the chronosystem such as change and consistency. In Bronfenbrenner's (1994, p.39) theory, the built environment such as ‘classroom and school’ are emphasised as background of young people’s development and learning area. To comprehend individuals’ socioecological aspects Bronfenbrenner’s socioecological model of human development is an applicable framework for this study.
In 2008 Johnson and Puplampu suggested the ecological techno-subsystem related to the influence of the environment on a child’s growth (see Figure 3.4). The techno-subsystem comprise a child’s contact through both living and non-living components such as ‘peers and hardware’ in lieu of interaction, data and renovation technologies in an uninterrupted environment (Johnson & Puplampu, 2008, p.1). In this way, the contemporary technology impacts a child’s emotional growth. In the current study, young people’s ecological knowledge was influenced through interaction of technology.

Brown, Jeans and Cutter-Mackenzie (2014, p.24) stated that in history, socio-ecological models have been advanced from the schools of ‘psychology and public health’. Bronfenbrenner’s socioecological model of human development suggest that an individual’s behaviour is influenced by the existing numerous systems (Brown et al, 2014). Brown et al. (2014, p. 25) advocated, academics and scholars must consider the
mutual relationship amongst ‘social and natural environment’ and they ought to take
subsequent measures about melting the dichotomy from the past, which separate
‘culture, ecology, society and nature’. Nevertheless, ‘four introductory socioecological
education notions were recognised by Brown et al. (2014). The four educational
concepts are: ‘place, experiential pedagogies, agencies, participation and lived
experience (see Figure 3.5). Wattchow, Jeans, Alfrey, Brown, Cutter-Mackenzie, &
O’Connor (2014, p. v) stated that application of these four ideologies from socio-ecology
to education suggests that it must embrace extensive and various factors that influence
an individual’s ‘identity, family, policies and environment’. As a different approach- ‘a
socio-ecological philosophy and practice to education’ imitates how a person’s learning
experience is formed by various aspects such as the individual, societal, communal,
ecological, and governmental (Wattchow et al., 2014, p.v).

Figure 3.5: Foundational Socioecological Education Concepts within an Ecoliteracy
System Source: adapted from Brown et al. (2014, p. 27).

Figure 3.5 demonstrates the integration of four foundational concepts that represent
the ongoing development of experiential pedagogies within an ecoliteracy framework.
This theoretical framework guided me to analyse and interpret the young people's
understandings in the wider context of young people's ecoliteracy and socio-ecological education.

**Part Five Summary**

Part Five has discussed postcolonial ecology and socioecological theory to understand the mechanism of humans' learning and development. Bronfenbrenner's socioecological system theory and adaptations to this theory have been used to identify the factors that influence Bangladeshi young people's development.

**Chapter Conclusion**

In Chapter Three, I presented five main parts: 1) Postcolonialism 2) Bangladeshi Young People’s Socioecological and Sociocultural Context; 3) How Young People Develop and Learn 4) Influence of Postcolonial Sociocultural Theory on Human Development and Learning; and 5) Socioecological Theory.

In Part One concepts of colonialism, post-colonialism and post-colonial theory were analysed. In particular the exploitation of colonial powers over indigenous peoples was highlighted and the deep lasting impacts that this colonialisaiton had and continues to have on the peoples of many nations, in particular Bangladesh.

Part Two detailed Bangladeshi young people’s education socioecological and sociocultural context.

Part Three portrayed how young people develop and learn with an emphasis on bodily development, development and learning, social development, and development of personality.

Part Four described the influence of Post-colonial Sociocultural Theory on human development and learning.

Part Five discussed the influence of postcolonial socioecological theory on the development and learning of a person looking at Bronfenbrenner's Socio-ecological Theory.
This chapter looks at the postcolonial and socioecological theoretical underpinnings of this study in a Bangladeshi context.

The overarching research aim guiding the present study is:

To understand Bangladeshi young people’s ecoliteracy, their perceptions, knowledge, beliefs and behaviour and how such ecoliteracy is socially and culturally influenced.

Given the theoretical framing presented in this chapter, in theoretical terms the rephrased overarching research aim is:

To understand the postcolonial socioecological context of Bangladeshi young people’s ecoliteracy.

I now turn to the next chapter, to discuss the ‘child-framed’ research methodology (Barratt Hacking, Cutter-Mackenzie & Barratt, 2014).
Youth participation is important, because when young people participate, it draws upon their expertise, enables them to exercise their rights as citizens, and contributes to a more democratic society. It also promotes their personal development, and provides them with substantive knowledge and practical skills. (Checkoway, 2011, p. 340)

Introduction
This chapter discusses and describes the overarching methodology used to investigate young people’s ecoliteracy. This research is framed by postcolonial socioecological theory and postcolonial cultural theory, as discussed in Chapter Three. Within this framework, a child-framed ethnographic methodology was used as the overarching mode of enquiry for this study. In the field of Environmental education children are most commonly participants in research, rather than being involved in the research as researchers in their own right, despite two decades of literature produced on child participation (Barratt Hacking, Cutter-Mackenzie & Barratt, 2013, p.439). Recently, policy and research revealed that children have the right to participate in the research and to participate in the decision-making process (Barratt-Hacking, Cutter-Mackenzie & Barratt, 2013). The Chapter is presented in parts—Part One critically discusses the child-framed ethnographic methodology within a qualitative research paradigm and Part Two outlines the research design including data collection and data analysis techniques.

Part One: Child-Framed Ethnographic Methodology

Child-Framed Methodology
The level of research methods utilised by children varies from participatory to non-participatory (Barratt-Hacking et al., 2013). Hart (1997) recognised, children and young people must have choice, ability, trust and democracy to participate in research. In
terms of Hart's (1997) 'ladder of participation' and Tresedar's participatory child-framed research model (cited in Barratt-Hacking et al., 2013, p.41), (see Table 4.1), child participation in research comprises five layers.

**Figure 4.1: Ladder of Participation.**

Source: adapted from Hart (1997 p. 41).
Table 4.1: Child-Framed Participatory Research Model

<table>
<thead>
<tr>
<th>Children as Active Researchers</th>
<th>Young people-initiated, shared decisions with adults</th>
<th>This happens when projects or programs are initiated by young people and decision making is shared between young people and adults. These projects empower young people while at the same time enabling them to access and learn from the life experience and expertise of adults.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young people-initiated and directed</td>
<td>This step is when young people initiate and direct a project or program. Adults are involved only in a supportive role.</td>
<td></td>
</tr>
<tr>
<td>Adult-initiated, shared decisions with young people</td>
<td>Occurs when projects or programs are initiated by adults but the decision-making is shared with the young people.</td>
<td></td>
</tr>
<tr>
<td>Consulted and informed</td>
<td>Happens when young people give advice on projects or programs designed and run by adults. The young people are informed about how their input will be used and the outcomes of the decisions made by adults.</td>
<td></td>
</tr>
<tr>
<td>Children as Assigned Researchers</td>
<td>Assigned but informed</td>
<td>This is where young people are assigned a specific role and informed about how and why they are being involved.</td>
</tr>
</tbody>
</table>

Source: adapted from Barratt-Hacking et al. (2013, p. 442).

Figure 4.1 shows the level of child participation in research, ranging from simply informed to being genuine researchers initiating ideas and sharing decisions with adult researchers. Barratt-Hacking et al. (2013, p. 454) stated that involving children and young people as active researchers is an ‘ideal’ process for planning research. Children and young people can be ‘experts, actors, and stakeholders in their own and other environments’ (Barratt Hacking et al., 2013, 438). Barratt-Hacking et al. (2013) asserted that although it is most common for children and young people to be researched, very little research involves children as actual researchers. Rickinson (2001, p. 224) identified ‘the voice of the learner is a severely neglected one in environmental education research and curriculum development’. Barratt-Hacking et al. (2013, p. 438) mentioned ‘children have a significant role to play in their own presentation and research’. Willow et al. (2004, p. 7) suggested children should be viewed as ‘young citizens who are entitled to respect and participation’. Theories of child development and the relationship between children and the environment suggest that ‘the opportunity to engage children in environmental research would have genuine relevance for children’ (Barratt-Hacking et al., 2013, p. 444). These theoretical perspectives also suggest that children should have opportunities to work towards
environmental and community improvement through research, particularly projects impacting their own local environment (Barratt-Hacking et al., 2013). This methodology identifies that ‘children are experts in their everyday experience, have a particular knowledge set in relation to the (local) environment and acts as agents within it’ (Barratt Hacking et al., 2013, p. 454). Barratt Hacking et al. (2013, p. 456) also discussed how ‘children can use and develop innovative child friendly research methodology’. Barratt-Hacking et al. (2013) challenged researchers in environmental education to discuss and critically analyse children and young people’s role in research. There has been little attention to young people–framed research methodologies, particularly in majority countries (Quinton & Khatun, 2018). Therefore, providing the experience for Bangladeshi young people to be co-researchers in this project is significant.

**Qualitative Paradigm**

The methodological paradigm of this study is qualitative. There is a serious dearth of empirical research in Bangladesh relating to young people's ecoliteracy, particularly in terms of qualitative research. This study adopts Denzin and Lincoln’s (2011, p. 3) definition of qualitative research. The definition is:

…a situated activity that locates the observer in the world. Qualitative research consists of a set of interpretive, material practices that make the world visible. These practices transform the world. They turn the world in a series of representations, including field notes, interviews, conversations, photographs, recording and memos to the self. Qualitative researchers study things in their natural settings, and try to interpret phenomena in terms of the meaning that people bring to them.

The research in this study endeavoured to understand Bangladeshi young people’s ecological knowledge, beliefs and behaviour (their ecoliteracy) within a qualitative paradigm. As Bogdan and Biklen (2007) asserted, qualitative study can be described as naturalistic as the data is descriptive and adds a rich understanding of people’s lives. A naturalistic approach was adopted in the study to understand young people’s ecological knowledge, beliefs and behaviour.
The qualitative process can be defined by three activities, which are interconnected. They are ontology, epistemology and methodology. The ‘personal biography of the researcher speaks from a specific class, gender, racial, cultural and ethnic perspective’ (Denzin & Lincoln, 2011, p. 11), and ‘approaches the world as a set of ideas, a framework (theory and ontology) that specifies a question (epistemology), which are then examined (methodology and analysis) in specific ways’ (Denzin & Lincoln, 2011, p.11). Denzin and Lincoln (2011, p. 11) mentioned these generic activities consist of five phases: ‘the researcher and the researched as multicolour subjects; major paradigms and interpretive perspectives; research strategies; methods of collecting and analysing empirical materials; and the art of interpretation’. These phases are the framework for the researcher who enters the research process from inside a community and approaches the research from a distinctive point of view (Denzin & Lincoln, 2011). Denzin and Lincoln (2011) stated that the researcher’s point of view determines the perspectives that the researcher takes and the politics and ethics surrounding the research need to be considered at all times in every phase of the research process.

**Ethnographic Method**

Application of ethnographic method in social research provides in-depth information and detailed description of everyday life. The ethnographic approach can be both ‘qualitative research process and method and product whose aim is cultural interpretation’ (Hoey, 2014, p. 1).

Creswell (2008, p. 273) stated that ‘ethnographic designs are qualitative research procedures for describing, analysing and interpreting a culture-sharing group’s shared patterns of behaviour, beliefs and language that develop over time’. According to Bogdan and Biklen (2007, pp. 30, 31), ethnography is a ‘thick description’ that ‘attempts to describe culture or aspects of culture’. The exploratory features of ethnographic research explore the settings, strategy and application of strategy, interviewee and the circumstances (Bogdan & Biklen, 2007). Ethnographic research attempts to draw on both the individual and social meaning that individuals understand (Cutter-Mackenzie, 2003). According to Hammersley and Atkinson (1983), ethnography has four core features—it is inductive; open to interpretation; rigorous and intensive; and, if analysed
clearly, attempts to expose deep interpretation of meanings within a cultural framework. Ethnography focuses on the traditions of naturalistic-phenomenological philosophy in multiple realities in every situation (McMillan & Schumacher, 1989). Humans’ actions are influenced by social and cultural reality.

Cutter-Mackenzie (2003, p. 141) stated, ‘the world is subjective and the ethnographer makes “stories” about the cultural worlds of informants based on their language’. Therefore, it is important for an ethnographer to speak in their native language. In the current study, the researcher suggested young people use their native language (Bengali, or Bangla).

**Part One Summary**

This section set out the rationale for the methods selected for the empirical work of this study—a qualitative ethnographic approach employing a child and young people–framed methodology. The application of ethnography provided understanding of young people’s environmental perceptions, knowledge and agency (Rickinson, 2001).

**Part Two: Data Collection and Data Analysis**

**Cultural Background**

The study was conducted in two districts of Bangladesh—Dhaka (Uttara and Dhanmondi areas) and Jessore (Monirampur and Jhikargachha areas). The Dhaka district is 1,463.65 km² with a total population of 12,043,877 and literacy rate (reading, writing, numeracy, communication and comprehensive) of 62.3% (Bangladesh Bureau of Statistics, 2013a). Dhaka has a good history and rich cultural tradition. Dhaka is famous for mosques and muslin (saree). Jessore is a small town rich in agricultural products. The Jessore district is 43,522 km² with 169,164 households, a total population of 742,898 (population density of 1,707 per square kilometre) and literacy rate of 63.8% (Bangladesh Bureau of Statistics, 2013b). All public and private schools in both Dhaka and Jessore districts including sub-districts follow the national curriculum. The study investigated Bangladeshi young people’s ecological perceptions, knowledge and

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5 Refer to Appendix 1-8 for all research instruments and ethics approval.
beliefs that were influenced by culture. The culture of Bangladesh includes historical, religious, social and educational nuances.

**Entry into the Field**

The environmental education research aimed to collect data about young people’s ecoliteracy. As a qualitative study helps to gather rich data, rather than traditional data collection, this research involved a sample of young people in Dhaka and Jessore districts to uncover representative trends about young people's ecoliteracy.

Initially I communicated with school principals for permission to carry out the research by providing a letter, including the SCU ethics approval document and participants’ consent forms and information sheets. Each individual school authority agreed on a specific date and time for me to meet with the students, and to carry out the research. Students volunteers were invited to participate based on their research interest through my discussion about the nature of research. Principals provided the forms to the respective class teachers to distribute among the students. Teachers reminded students to bring back the forms on a particular date with parents’ signature. I collected the forms from students and informed them to attend the research training in schools on the specific dates.

**Participants**

Twenty-eight student co-researchers’ aged between 14 and 15 (12 girls and 16 boys) from four secondary government and private schools were involved in this study. Fourteen students (eight boys and six girls) from urban and 14 students (eight boys and six girls) from rural schools had been selected for this study. Four groups of young people were formed. The reason for selecting private and government schools is that both follow the national curriculum. In Bangladesh, environmental education is incorporated into different subjects such as general science, biology, chemistry and physics. Time was allocated during these lessons for them to carry out and engage with the research. Bangladeshi young people expressed their feelings towards their local environment.
Research Context

This section introduces the four research contexts. Four schools were selected for research enquiry—two traditional schools in urban areas and two schools from different cultural backgrounds located in rural areas of Bangladesh.

Rural Girls’ School

The Rural Girl’s School is located in the rural area of Bangladesh, 20 kilometres away from the main town, and consists of 12 classroom buildings with a small grounds area (see Figure 4.2). Modes of transportation are buses, vans and bicycles. Students enjoy walking in the community. The cultural group of this area are Muslim and Hindu faiths. Most people are either in the fishing industry or rice and vegetable farmers. Community contact with the outside world is largely through personal communication or mobile phone. People watch television and read newspapers, however, communication facilities are poor due to being in a rural area.

Figure 4.2: Rural Girls’ School

The school was established in 1965 and approximately 327 students currently study at the school. The spoken and written language is Bengali. There is a computer lab and a
A data projector in the school to make the students efficient in information and technology based on the curriculum.

*Rural Boys’ School*

This Rural Boy’s school is located in the countryside of Bangladesh, 10 kilometres from the town. Buses, vans and bicycles are the primary modes of transportation. The cultural group are Muslims and Hindus. Most villagers depend on agriculture for their livelihood, with families producing rice and vegetables in fields. The school was established in 1988 and is a three-storey building with 20 classrooms (see Figure 4.3). The school is an independent (non-government) school. A total of 1,098 students currently study at this school and 27 teachers are engaged in teaching. Some students are involved in extracurricular activities. There is a computer lab for students. There is a bicycle parking and a language memorial in the corner of the school compound to show respect to the martyrs of the language movement. The school has a big playground surrounded by different types of fruit trees. The majority of the students are from farming backgrounds.

*Figure 4.3:* *Rural Boys’ School*
Urban Boys’ School
The Urban Boy's School is independent and is a conventional school, located in a new town within the city. The school was established in 1985 and is a multi-storey building with 45 classrooms and large grounds surrounded by rain trees. There is a small flower garden in front of the building and a language memorial in the school compound (see Figure 4.4). About 9,000 students currently study at the primary and secondary level (ranging from grade 4 to grade 12) and approximately 200 teachers are engaged in teaching. About 1,100 students study at the secondary level.

Figure 4.4: Urban Boys’ School
**Urban Girls’ School**

The Urban Girl’s school is located in the centre of the city. It is a two-storey building with 20 classrooms and small garden with large trees (see Figure 4.5). The school was established in 1965. There are two flower gardens in front of the school building and a big playground behind it. It is a green school surrounded by different types of trees. The school has a big computer lab and a projector for teaching and learning. This school is committed to Earth safe, healthy and beautiful. Approximately 1,000 students currently study in this school. Many students participate in extracurricular activities. In 2016, the school celebrated World Environment Day on 5 June by planting trees, creating art and participating in cultural programmes on campus.

![Urban Girls’ School](image)

**Figure 4.5: Urban Girls’ School.**

**Research Preparation**

A half-day research training workshop was organised in the four schools where children learned about qualitative methodology and ethnography. With regards to ethnography, the focus was on interviewing and participant observation. The workshops focused on practical skills associated with interviewing, interviewer–participant relationships, consent, using a research journal and personal journal and operating disposable cameras for photography and question time. I requested permission from the students and their parents to video record their preliminary photo/drawing data analysis and focus group discussions.
**Research Method**

Ethnographic method was used to investigate young people’s ecological knowledge, beliefs and behaviour. The basic ethnographic approach involves observation, organisation and interpretation of data. Data were collected from the field through photography, observation, discussion and interview (conversation) (see Figure 4.6).

![Research Process Diagram](image)

**Figure 4.6: Research Process.**

*Note. Steps 2 and 4 were conducted by the co-researchers. Steps 3 and 5 were conducted by the principal researcher.*

Implementing a child-participatory framework for the methodology and engaging young people as a co-researcher unpacks a wide variety of techniques including photography, participants’ interviews, observation, video for reporting and promulgating research findings (Barratt-Hacking et al., 2013). The researcher intended to engage young people as co-researchers in the research following research methods and directions. This was consistent with Barratt-Hacking et al. (2013). The following sections describe the research methods which framed the study. Following the child and young people–framed research model (Barratt-Hacking et al., 2013), these co-researchers made decisions about who they would interview, questions they would ask during the interview, what they would photograph or draw in their local environment and what aspects they would reflect on in their researcher journals. The co-researchers chose the photographs to display in their school exhibition. The co-researchers also collaboratively displayed the photographs with the principal researcher.
**Photography**

As Powell (2010, p. 47) stated, ‘photography can be used as a tool for documenting an event, place and people that, in the final presentation of the work, render contextual complexities that are difficult or illusive to depict through narrative text’. The co-researchers were trained during the researcher workshops in photographic techniques and were encouraged to take photos of their local environment. Young people used these photos for explanation and interpretation in group discussions that were recorded and transcribed. Barratt-Hacking et al. (2013, 441) argued that if ‘children are given the opportunity to take, explain and interpret their photographs the risk of the image being used to speak for the children may, to some extent, be obviated’. Co-researchers used disposable cameras, digital cameras and mobile phones for photography of the local environment. The researcher also took part in young people’s photographic techniques to observe their ability and unique creativity and assisted children to arrange a photography exhibition at their schools with the permission of the school authority. Teachers were given the opportunity to assist children in the photo exhibition.

**Interviewing**

The semi-structured interviews in this study were conducted by the co-researchers. According to Burns (2000, p. 424), semi-structured interviews permit ‘greater flexibility and gives a more valid response from the informant’s perception of reality’. The rational for selecting semi-structured interview is ‘the only person who understands the social reality in which they live is the person themselves’ (Burns, 2000, p. 425). Interview questions were conducted in participants’ native language. In the interview session, open-ended questions helped participants to expand on their knowledge rather than the interviewees simply answering questions. Lofland et al. (2006, p. 105) recommended that interviewees ‘speak freely in their own terms about a set of concerns’ that the interviewer brings ‘to the interaction, plus whatever else they might introduce’. In interviews, student co-researchers asked questions of interviewees. The interview guide was followed for taking field notes and important sentences (research findings). All co-researchers had learned these skills during the researcher training session. Digital voice recorders were used during the interview for recording conversation. Each
co-researcher conducted three interview sessions. The interviews were mostly conducted at school with their peers.

**Focus Groups**

For qualitative researchers, focus group are group interviews designed to foster talk among participants about particular issues (Bogdan & Biklen, 2007). As Morgan (cited in Bogdan & Biklen, 2007) stated, in group interviews people are encouraged to discuss subjects that are of interest to them from different perspectives providing the researcher with a range of views. Thus, the focus group interviews stimulated the group participants to talk from multiple perspectives (Bogdan & Biklen, 2007). In group interviews, group participants can encourage each other to express their views and young people often feel comfortable in a group situation. The co-researchers participated in the focus group interviews facilitated by the lead researcher. Eight groups were formed with three to four co-researchers in each focus group interview. Twenty-six student co-researchers from four secondary schools participated in four focus group discussions. During these photographs the co-researchers selected photos and drawings and conducted the initial analysis of these data.

**Observation**

As Lofland et al. (2006, p. 17) identified, ‘Participants observation refers to the process in which an investigator establishes and sustains a many sided and situationally appropriate relationship with a human association in its natural setting for the purpose of developing a social scientific understanding of that association’. Participant observation is a common research practice used by ethnographers (Burns, 2000). Burns (2000) discussed how participant observation provides the researcher with deeper understanding of how people interpret their surroundings and realities. With participant observation the researcher can observe people’s behaviour, expressions, body language, and gain insight into their values and beliefs (Burns, 2000). During participant observation, the main elements of focus were who, setting, purpose, social behaviour, frequency and duration (Burns, 2000). As Denzin and Lincoln (2011) discussed, naturalistic observation can be understood in light of the results of particular shared negotiation in specific contexts. The lead researcher incorporated field notes
from observations of students' non-verbal communication during workshops, and focus group sessions with the co-researchers.

**Research Journal**
The researcher maintained a reflection journal during data collection for deep thinking. The co-researchers were invited to keep a journal throughout the data collection period to express their feelings, thoughts and reflections about the research process. The lead researcher carried out journal entries from her observations, in her reflective journal from the beginning of the data collection phase and throughout the data collection period.

**Research Exhibition**
Co-researchers organised research exhibitions in the classrooms of the four participant secondary schools through displaying their photos, drawings and key notes (see Figure 4.7). School principals, science and social science teachers and peers visited and commented on students' or peers' research works.

**Figure 4.7: Research Exhibitions (clockwise from top left: urban girls’ school, rural girls’ school, urban boys’ school and urban girls’ school).**
**Data Triangulation**

Four different approaches of triangulation were suggested by Denzin 'the use of multiple and different sources, methods, investigation and theories' (cited in Lincoln & Guba, 1985, p. 305). Data was triangulated from multiple perspectives (in the interest of trustworthiness). The data triangulation process is shown in Figure 4.8.

![Data Triangulation Diagram](image)

**Figure 4.8: Data Triangulation**

**Ethical Considerations**

Every researcher should adopt strict ethical considerations when conducting research. According to Sieber (1993, p. 14) 'ethics can be defined as a set of moral principles and rules of conduct’. In research, ethics can be seen as ‘the application of a system of moral principles to harming or wronging others, to promote the good, to be respectful and to be fair’ (Sieber, 1993, p. 14). When researching children with a socioecological framework special attention is required particularly with reference to the cultural context surrounding how ‘childhood is constructed’ (Morrow, 2008, p. 51). Individual details of informants were not disclosed and all co-researchers were treated equally. Pseudonyms were used for co-researchers and participants. Meetings with co-researchers were conducted in a friendly manner and prior consent gained. Richards (2009, p. 124) stated that researchers ‘need to be as loyal as possible’ and respect the privacy of their participants and these aspects were discussed with the co-researchers during their training workshops. Ethical issues associated with child-centred research include being aware of positions of power between the researcher and her co-
researchers and the fact that these young people may seek to please the lead researcher (Jorgenson & Sullivan cited in Johnson, Pfister & Vindrola-Padros, 2012, p. 165). The researcher was aware of this power imbalance during her interactions with the co-researchers and kept in mind during the analysis of data. A warm and friendly environment was created for young people so they would feel relaxed (Leitch, 2008). Ethics approval was gained from the Southern Cross University Human Research Ethics Committee (HREC).

**Informed Consent**

Research requires informed consent of participants. The research objective, research method and data collection process must be explained clearly to participants (Jones & Stanley, 2008). All co-researchers and participants were given the right to discuss any concerns before they undertook the research. All young people were informed about their rights regarding confidentiality and the right to withdraw during any stage of the research process. Both young people and their parents/caregivers were asked to provide consent as is stipulated by human research ethics committees. It is important to keep in mind that this very act of young people being required to gain parental/caregiver permission deprives the young people of making their own decisions (Jones & Stanley, 2008, p. 33). However, as the research in this study was not sensitive in nature most parents were willing for their children to take part. The young people were informed how their creative activities would contribute to the study and were also provided with the opportunity to share their ideas about the research method. As Bell expressed it is important for young people ‘to express their view about the research process itself’ (Bell, 2008, p. 10).

**Data Trustworthiness**

Guba (1981, p. 80) put forward four trustworthy criteria in order to measure the ‘trustworthiness of qualitative research’—‘credibility, transferability, dependability and confirmability’. Data triangulation from multiple sources was used to provide the reliability, dependability and validity of the data. These multiple modes of data were used to gain understanding of young people’s perceptions, beliefs, knowledge and agency surrounding their ecoliteracy in post-colonial times. These data sources included: young people as researchers themselves carrying out interviews with peers,
young people’s reflective journals, young people’s photographs and illustrations; focus group sessions conducted by the lead researcher with the co-researchers; and observations, thoughts and ideas being recorded in the lead researcher’s reflective journal. Methodological detailing was extensive to increase transferability. Data analysis techniques are discussed in the following section.

Data Analysis

Data were analysed in two stages.

The first phase of data analysis involved the co-researchers categorising and analysing photo data and drawing data. For compositional interpretation, the content, colour and spatial construct of the image (Rose, 2001) was focused on by the co-researchers and the lead researcher to analyse the photographs in combination with the interviews themselves. Clark (2010) stated that children’s photos and drawings demonstrate their importance, concern and views of the existing environment. The discussion relating to the photographs and the communication between the co-researchers, each other and the lead researcher, provided a foundation for this analysis and provided a collective research voice in order to make ‘meaning’ from the data (Clandinin & Connelly, 2000). The lead researcher also further analysed co-researchers’ photo data and drawing data and categorised these data using NVivo version 11.

In stage 2, qualitative thematic analysis techniques were followed for interview data and focus group data analysis. The lead researcher analysed co-researchers’ interview data and the principal researchers’ focus group interviews data using NVivo version 11. Qualitative field analysis essentially begins with the activities of ‘coding’ and ‘memoing’ (Lofland et al., 2006, p. 200). Interview data were organised and categorised into various themes established based on the literature review and theoretical framework. As part of the coding process, the lead researcher recorded her ideas relating to the categories that were formed and the connections between the categories. The purpose of memoing was to clarify the codes and make the analysis comprehensive.
**Methodological Limitations**

The study was limited to four secondary public and private schools in two districts (urban and rural) of Bangladesh. Although the findings of this study may not provide a comprehensive picture of Bangladesh, this study explored rich data within a qualitative paradigm. As an ethnographer, the researcher's understanding is influenced by her culture.

**Part Two Summary**

This section discussed the methods of data collection and data analysis techniques. Photography, illustrations, research journals, observation, focus group discussion and interviews were utilised as modes of data collection. Data were sorted, categorised and coded for analysis and triangulated for reliability and validity.

**Chapter Conclusion**

Chapter three presented the methodology and methods of this research. The research was undertaken using a qualitative paradigm to gather rich data from multiple sources. This research employed a child-framed ethnographic methodology to empower young people in the Dhaka (urban) and Jessore (rural) districts in Bangladesh, with young people becoming researchers in their own right. Child-framed methodology provided students with a voice and the opportunity to co-construct the research. The young people collected data and co-analysed photo and drawing data with the principal researcher. Co-researchers photographed aspects in their local community and expressed their thoughts and feelings of the future environment and their world through drawings. They interviewed other students using semi-structured interviews and participated in focus group discussions with the principal researcher. NVivo version 11 was used for thematic qualitative data analysis.

The next chapter is the first of four data representation chapters and discusses adolescents’ perceptions and beliefs of the environment, environmental perceptions in everyday life, environmental sensitivities and concerns and beliefs towards environmental issues with a particular focus on climate change.
In Bangladesh, population is increasing rapidly but the number of trees are becoming less. People are cutting down a lot of trees across the globe. Trees give us oxygen, but if we cut down trees we will not get enough oxygen. As a result, this will impact human health because of insufficient oxygen. Temperature is increasing day by day and green areas are reducing. So we should alert people to plant trees to make the environment green. (Rose-Moumita, Principal Researcher’s Group Discussion, 2016)

**Introduction**

The overarching research aim of this study is to understand young people’s ecoliteracy and this understanding is informed by a postcolonial socioecological theoretical framework. The study’s child-framed research methodology requires a representation of data, rather than a traditional quantitative data presentation and analysis. As detailed in Chapter Four, 28 young people carried out their own research with 84 participants (aged 14 to 15 years) from four urban and rural secondary public and private schools from two districts of Bangladesh. The young people themselves co-analysed the data in the first instance through a curation process of selecting, categorising and describing photographs and drawings. In representing young people’s research, the data are organised into themes which the young people identified:

1) তরুণদের পররদ্ধবশ রবষয়ে ধারণা এবং বিশ্বাস [Young people’s environmental perceptions and beliefs]
2) তরুণদের পররদ্ধবশ রবষয়ে জ্ঞান [Young people’s environmental knowledge]
3) তরুণদের পররদ্ধবশ রবষয়ে স্বেীয়তা [Young people’s environmental agency]
4) তরুণদের বাস্তুসংস্থানসংক্রান্ত সাক্ষরতার উপর সমাজ এবং সংস্কৃতির প্রভাব [Sociocultural influence on young people’s ecoliteracy].
These four themes are explored in Chapters Five, Six, Seven and Eight respectively. The data representation draws on a large array of co-researcher photographs (300), drawings (90) and interviews. The photos and drawings aided in understanding the ecological concepts and activities of young people from a socioecological perspective. The interview transcripts were derived from co-researchers’ own interviews with their participants and the one-hour focus group discussions that involved co-researchers and the researcher as the principal researcher. Field notes are also incorporated to encapsulate the researcher’s insights on the research process including non-verbal communication and background.

Before turning to initial data representation, a brief overview of my co-researchers’ data is undertaken, specifically of their photos and drawings. As shown in Table 5.1, climate change is identified as the second highest category (either photographed or drawn). As discussed earlier Bangladesh is one of the most climate change affected countries in the world (Aminuzzaman, 2010; Brouwer et al., 2007; Mahmood, 2014). Trees are recognised as the highest category, which came across mostly in the responses of rural young people.

Table 5.1: Importance of Environment to the Young Researchers in Bangladesh

<table>
<thead>
<tr>
<th>Types</th>
<th>Interviews</th>
<th>Count</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Agriculture</strong></td>
<td>Garden</td>
<td>0207</td>
<td>6.09%</td>
</tr>
<tr>
<td></td>
<td>Farm</td>
<td>0096</td>
<td>2.82%</td>
</tr>
<tr>
<td></td>
<td>Farming</td>
<td>0093</td>
<td>2.73%</td>
</tr>
<tr>
<td></td>
<td>Trees</td>
<td>1023</td>
<td>30.12%</td>
</tr>
<tr>
<td><strong>Environmental Issues</strong></td>
<td>Pollution</td>
<td>0140</td>
<td>4.12%</td>
</tr>
<tr>
<td></td>
<td>Wastes</td>
<td>0135</td>
<td>3.96%</td>
</tr>
<tr>
<td><strong>Environmental Impacts</strong></td>
<td>Climate</td>
<td>0696</td>
<td>20.49%</td>
</tr>
<tr>
<td></td>
<td>Air</td>
<td>0431</td>
<td>12.69%</td>
</tr>
<tr>
<td><strong>Nature</strong></td>
<td>Natural</td>
<td>0138</td>
<td>4.06%</td>
</tr>
<tr>
<td>Types</td>
<td>Interviews</td>
<td>Count</td>
<td>%</td>
</tr>
<tr>
<td>-----------------------</td>
<td>------------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>Organisms</td>
<td>0008</td>
<td></td>
<td>0.23%</td>
</tr>
<tr>
<td>Forest</td>
<td>0018</td>
<td></td>
<td>0.53%</td>
</tr>
<tr>
<td><strong>Sustainability Practice</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planted</td>
<td>0159</td>
<td></td>
<td>4.68%</td>
</tr>
<tr>
<td>Rain</td>
<td>0124</td>
<td></td>
<td>3.65%</td>
</tr>
<tr>
<td>Energy</td>
<td>0127</td>
<td></td>
<td>3.73%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,396</strong></td>
<td></td>
<td><strong>99.90%</strong></td>
</tr>
</tbody>
</table>

Notes. * 1,000 most frequent words with minimum length of three from NVivo quotes.

The photo data illustrated young people’s visualisations of environment. Figure 5.1 presents a word cloud of co-researchers’ descriptions of their photos. The word most commonly identified was ‘tree’ (55 instances), followed by flower (34) and garden (17). Co-researchers’ descriptions tended to focus on ecology, for example, the word sustainability (ধারণক্ষমতা) was not identified by co-researchers possibly signalling that it is not a particularly useful or valued ‘environmental’ concept among young people in majority cultures such as Bangladesh. This echoes Jickling and Wals (2008) argument that sustainability is a culturally nebulous term.
Figure 5.1: Word Frequency Cloud from Co-researchers’ Photo Data.
Photo data represented co-researchers’ environmental concerns and connectedness. Conversely, Figure 5.2 represents co-researchers’ descriptions of their drawings. The word most commonly identified was ‘trees’ (34 instances) followed by water (17), plant (10), bird (9) and river (8), all being natural elements of the environment. Interestingly, co-researchers rarely utilised the word ‘nature’ (2) which is not a particularly common concept in majority contexts (Gough, 2013a). In that sense, co-researchers’ descriptions tended to focus on ecology.

Other words that featured were those that co-researchers saw as problematic and detrimental to health such as ‘smokes’ (cigarettes, 10) and polluting the environment such as ‘factory’ (8). The word ‘house’ (8) and ‘man’ (6) were used, demonstrating the significance of humans as separate to nature and the use of ‘man’ being more common than ‘women’ (4) highlights the patriarchal society of Bangladesh. Further, the word ‘reuse’ (পুনঃবযবহার) followed by ‘waste’ (8) was not readily identified by co-researchers. It may be a culturally unusual term in majority contexts like Bangladesh as it is a minority world construct.
Figure 5.2: Word Frequency Cloud from Co-researchers’ Drawing Data.

Having presented a general overview of the data, the rest of this chapter is devoted to the first data theme, Bangladeshi’s young people’s environmental perceptions.
Environmental Perceptions: Introduction to the Data Representation

In examining Bangladeshi young people's ecoliteracy, it is necessary to understand their underlying environmental perceptions and beliefs. In Loughland et al. (2002), minority students' conceptions of environment were considered as their views of environment. As detailed in Chapter One, environmental perceptions include people's feelings, thinking, views and values of the environment and their connection with it (Fien, 1993). Disinger and Tomsen (1995) asserted environmental perception is an approach for describing young people's concepts, beliefs and values towards the environment and mankind's relation to it. Therefore, in the present study environmental perceptions include conceptions of the environment and beliefs towards it.

As detailed in Chapter Two, Loughland et al. (2002) indicated that the dominant view of environment among many minority adolescents is 'object' focused, where the environment is seen as external. According to Loughland et al. (2002, p. 192), when conceptions are limited and related to an idea that 'the environment is some sort of object' then it is considered an object view. Conversely, conceptions centred on the relationship between 'people and the environment' is considered a relational view (Loughland et al., 2002, p. 192). In the present study, both object and relational perceptions of the environment were reflected in many of the responses from co-researchers and their participants in both the rural and urban schools.

This chapter discusses adolescents' perceptions and beliefs of the environment (Part One), environmental perceptions in everyday life (Part Two), environmental sensitivities (Part Three) and concerns and beliefs towards environmental issues with a particular focus on climate change (Part Four). The reason for the focus on climate change is because the co-researchers themselves identified it as a significant issue (shown in Table 5.1).

Part One: Environmental Perceptions

In Part One I discuss the co-researchers’ and participants’ perceptions of environment, drawing on the researcher's interviews with co-researchers and the co-researchers' interviews of participants respectively.
Co-Researchers’ Environmental Perceptions

The majority of co-researchers appeared to hold an object view of the environment, for example:

   Everything around us is called environment. There are two types of environment: natural environment such as rivers, plants and man-made [sic] environment such as house, chair, etc. (Rose-Awabin,6 Principal Researcher’s Group Discussion, 2016)

One co-researcher stated there are two types of environment, ‘natural and social’, that she perceived from the Bangladesh and global studies textbook (Nasrin, Malek, Chakravarty & Akhter, 2012):

   Everything around us is called environment. Living beings such as humans, animals and non-living things such as table, chair are the components of environment. There are two types of environment, natural and social. Plants, rivers are included in the natural environment and our school, hospital are included in the social environment. (Rose-Zinat, Principal Researcher’s Group Discussion, 2016)

Although object views were prevalent, some co-researchers considered humans as part of the environment:

   I think everything around us such as humans, plants and animals are included in the environment. (Rose-Tushar, Principal Researcher’s Group Discussion, 2016)

   Living beings and non-living things are the components of environment. Plants, humans, animals, birds and houses are included in

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6 Zinat is a co-researcher and Rose is the researcher. All co-researchers have been assigned pseudonyms.
the environment. (Rose-Rancho, Principal Researcher's Group Discussion, 2016)

Interestingly, one co-researcher separated components of the environment such as ‘plants, animals and fish’ and ‘houses, chair and table’ that they had learned from their biology textbook (Haider, Naser, Ahmed & Howladar, 2012) but did not recognise that the environment functions through the interrelation of its components and that there is a relationship between humans and the environment:

Everything around us is called an environment. Living beings and non-living things are the two components of environment. Living beings such as plants, animals and fish. Non-living things such as houses, chair and table are included in the environment. (Rose-Rashed, Principal Researcher's Group Discussion, 2016)

Rashed did not identify the relationship among different elements of the environment ‘and the relationship between humans and the environment’, echoing Loughland et al.’s (2002, p. 192) conclusion of ‘an object view of the environment’ (2002, p.192). In the present study and consistent with Loughland et al. (2002) and Shepardson (2005), an object view of the environment was omnipresent among the Bangladeshi co-researchers. This mirrors Payne’s (2014) findings where young people separate humans and the natural environment which is in contrast to posthumanist theory where children can be considered as nature (Malone, 2008). No co-researchers appeared to hold posthumanist views of the environment.

**Participants’ Environmental Perceptions**

The majority of the participants (interviewed by co-researchers) appeared to hold an object view of the environment, for example:

Everything around us is made up of an environment. There are two types of environment such as natural environment and man-made [sic] environment. Man-made [sic] environment includes houses, schools.
Natural environment includes plants, rivers, hills, mountains, etc.
(Sujana-Ruhi, Co-researcher’s Interview, 2016)

Interestingly, some urban participants mentioned two types of environment, ‘natural and social’, that they perceived from the Bangladesh and global studies textbook (Nasrin et al., 2012):

Everything around us is called environment. Living beings and non-living things are the two components of environment. Living beings such as plants, rivers and non-living things such as vehicles, houses, etc. There are two types of environment: natural environment and social environment. Schools and houses are included in the social environment. Plants, rivers and lakes are included in the natural environment. (Niha-Sonu, Co-researcher’s Interview, 2016)

Trees, animals, birds, flowers, hills and mountains are included in the environment. Soil, water and air are also the parts of environment. These elements of environment are influenced by climate change. (Rose-Sumi, Principal Researcher’s Group Discussion, 2016)

In these descriptions though, neither Sonu nor Sumi appeared to include humans as part of the environment and, as such, held object views of the environment where humans and the environment are separate and such findings are consistent with Loughland et al. (2002).

While object views were omnipresent, some participants also considered themselves as part of the environment. It could be considered a sliding scale with extremes at either end. For example, the following two excerpts demonstrate that two participants see themselves as part of the environment but also compartmentalised this into the major structures of society:

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7 Ruhi is a participant and Sujana is a co-researcher. All co-researchers and their participants have been assigned pseudonyms.
Everything around us is called environment. I am also a part of the environment. Plants, rivers, ponds are also included in the environment. There are two types of environment: natural environment and social environment. Natural environment includes plants, rivers, mountains and hills, whereas social environment includes family, schools, etc. (Zinat-Bornali, Co-researcher’s Interview, 2016)

Everything around us is called environment. There are two types of environment: natural environment and social environment. School, madrasa and temples are included in the social environment. Natural environment includes plants, rivers, canals, etc. (Niha-Aura, Co-researcher’s Interview, 2016)

Bornali stated she ‘is part of the environment’, but what does she really mean by this? She considered human and human activity are social and everything else is natural. Aura also compartmentalised environment in a similar way with ‘school, madrasa and temples’ being the social environment and ‘plants, rivers and canals’ being the natural environment. Again, this is a clear separation.

Such findings are consistent with Shepardson (2005) and Payne (2014), which found that young people tend to separate the natural world and humans. Again, this is in direct contrast to contemporary posthumanist theory (Malone, 2016). The centrality of human beings in young people’s perceptions was ubiquitous. This is depicted in Hasan’s drawing (see Figure 5.3) about Royal Bengal Tiger, stating that they are ‘vulnerable’ but he still ‘others’ the tiger.
Figure 5.3: ‘Royal Bengal Tiger and its Skin’ (Hasan’s Drawing) shows it is ‘vulnerable’ due to human impact.

Translation of text: Proud of Bengal: the bones of tigers are used for making liquid medicine (tiger henimenians) that gives us tiger’s energy. Tigers are being killed for making different household decorative things by using their striped skins.

Some participants demonstrated different perspectives incorporating religious views, exemplified in the following comment:
There are two types of environment, natural environment and social environment. Natural environment is created by God and human created the social environment. We human beings pollute the environment and suffer from many problems. (Shamim-Shahidul, Co-researcher’s Interview, 2016)

The central premise of this view is religious where ‘God’ created the environment including human beings. Children in Payne’s (2014) study mentioned that nature is something that is probably made by God. In the present study, a small group of young people said natural environment is created by God. One co-researcher’s participant (Joba) discussed this perspective further:

God created the natural environment. Schools, colleges, factories, hospitals and mosques are included in the social environment. (Nipu-Joba, Co-researcher’s Interview, 2016)

Although a small number of participants included humans in the environment and separated humans from the natural world, findings were largely consistent with Loughland et al. (2002). This is significant in so much as there are limited studies focused on majority countries such as Bangladesh. The findings signal a disconnection between theory, policy and practice where a relational view is heavily advocated but is not yet translated into young people’s environmental perceptions.

**Part One Summary**

The majority of the co-researchers and their participants demonstrated an object view of the environment, where human and human activities are social but other aspects of the environment are natural. No co-researchers or participants identified with posthumanist environmental perspectives. Only a small number of participants demonstrated religious views where they believed that the environment was created by God. The latter findings are significant because environmental education policy and theory strongly advocates a relational view, yet in reality young people possess object views with humans at the centre. This signals a serious disconnect between policy, theory and practice.
Part Two: Environmental Perceptions in Everyday Life

To further understand the co-researchers’ and their participants’ environmental perceptions, in analysis of the co-researchers’ data the co-researchers and the principal researcher sought to further understand young people’s environmental perceptions in their everyday lives. This section primarily discusses co-researchers’ and participants’ everyday environmental perceptions. In discussing co-researchers’ everyday environmental perceptions, this section draws on their photographs and interpretations, while for participants’ this section draws on the interviews conducted by co-researchers.

Co-researchers’ Environmental Perceptions in Everyday Life

Many co-researchers elected to capture their environmental perceptions through photography. As shown in Figure 5.4, the photomontage represents several patterns across co-researchers’ photos including working/using the land, the environment in distress, ecological aesthetics, animals and plants (as food). This is significant because past research (Shepardson, 2005) has represented young people as having objectified environmental perceptions, which is indeed revealed in this study, but an affinity with nature is also represented among young co-researchers through their photos.
The photos in Figures 5.5 and 5.6 represent the concept of self-sufficiency. For example, many co-researchers took photos of ducks. Co-researcher Rupkotha said she photographed ducks and the ducklings because ‘ducks give us eggs but people kill them for food’ and ‘ducklings are a beautiful animal’. This is somewhat similar to Islam (2016) indication that duck rearing is particularly effective in empowering women and young people in rural areas of Bangladesh as it provides a source of income and food. At
the same though, many co-researchers saw beyond the income and food value of ducks, pointing out their beauty, signalling an affinity with the more than human world (Weston, 1996).

**Figure 5.5:** Rupkotha’s Photo of ‘Ducks and Plates’. Rupkotha said she loves ducks because ducks give eggs but people kill them for food. In Rupkotha’s community, duck eggs and meat are used for food and income.

**Figure 5.6:** Sujana’s Photo of ‘Ducklings’. Sujana said ducklings are beautiful but people kill ducks. In Sujana’s community, ducks are a source of food (eggs and meat).
Similar to co-researchers’ focus on ducks as sources of income and food, Shihab took photos (shown in Figure 5.7) of goats because ‘goats give us milk and meat’. This again echoes the work of Islam (2006, p. 66) on account of the emphasis of the importance of humans and farm animals living together as a means of survival.

Figure 5.7: Shihab’s Photo of ‘Two Goats and Straws’. Shihab said he loves goats because ‘goats give us milk and meat’. This animal originated from Asia, thus it is a more local animal. In Shihab’s community, goats are a source of food (milk and meat).

Further, as shown in Figure 5.8, Shamim took the photo of hilsa fish because the hilsa fish is the national fish of Bangladesh. The hilsa fish was discovered in Bangladesh, signifying its local significance. Shamim also said that ‘Hilsa fish is good in taste’, therein conveying the fish as an object of food, rather than a living being in its own right. He did, however, acknowledge the need for ecological regulation so that hilsa fish could mature.
Figure 5.8: Shamim’s Photo of ‘Hilsa Fish (National Fish)’ from the market. The hilsa (Ilish) fish was originally found in Bangladesh and is a local fish. Shamim said hilsa fish taste good. He said in Bangladesh people catch small hilsa which is forbidden by environmental law. He also said Bangladeshi exports of hilsa fish a significant source of revenue. In Shamim’s community, hilsa fish are used as source of food and income.

The photos also readily depicted the concept of self-sufficiency. For example, many of co-researchers captured the food grown to support their communities. As shown in Figure 5.9, Sujuna took a photo of a rice field because ‘rice is the main food in Bangladesh’. This reflects Islam’s (2006, p. 66) claim that ‘rice is the principal crop and Bangladesh has reached self-sufficient in rice production within the last few years’.
Figure 5.9: Sujana’s Photo of ‘A Rice Field’. Sujana said rice is the main food in Bangladesh. Rice originates in Asia, showing it is a local plant. In Sujana’s community, rice is used as a source of food and income.

As shown in Figure 5.10, Tushar captured the rice field because ‘rice is our main food and there is plenty of rice in Bangladesh’. There is a proverb in Bangla, ‘গোলা ভোরা ধান’, which translates as ‘when the grain store is full of rice when the harvest is good, there is no scarcity of food’ (Wooltorton & Marinova as cited in Islam, 2006, p. 66). Islam (2006, p. 66) stated Bangladeshi people are known as ‘Bangladeshi with rice and fish’.
Islam (2006) stated the culture of a country impacts the sustainability of the environment in that country. Further, the culture of a country can also be represented in people’s identity and can in part help to explain their environmental perspectives. Bangladeshi culture has developed from fertile land.

Pollution was identified as an everyday concern for many co-researchers. As shown in Figure 5.11, Monika took a photo of solid wastes because ‘waste disposal is a major problem in Bangladesh’. Such photos were frequently taken by co-researchers. Islam
(2017) found municipal solid waste to be central to the causes of the emission of greenhouse gases in urban areas of Bangladesh and these impact on global emissions and contribute to global climate change.

Figure 5.11: Monika’s Photo of ‘ Dumped Waste in Front of a Building where Rickshaw Pullers Pull their Rickshaws’. Monika said haphazard disposal of solid wastes spread bad smell, pollute land and contribute to climate change.

As shown in Figure 5.12, Shihab captured the dumped rubbish in the river because of ‘water pollution’. This is consistent with Sykes et al. (2000) who indicated that water pollution is an important problem in Asia.
Figure 5.12: Shihab’s Photo of ‘Rubbish Dumped in the River (Turag)’. Shihab said river water is used for irrigation but people pollute the water by dumping their household rubbish in the river.

Sykes et al. (2000) and Yencken (2000) revealed how secondary school students of Asia-Pacific regions were concerned with both local and global environmental problems. Adolescents of the current study are also concerned about local and global environmental issues.

Further, gardening played a central role in young people’s everyday lives. As shown in Figure 5.13, Awabin took the photo of a vegetable garden because she loves ‘gardening egg plant because it gives us vitamin’. This echoes Cutter-Mackenzie’s (2009) research on multicultural gardens revealing that gardens and gardening are everyday sites of ecological learning in direct and indirect ways. Such gardening practices were evident across co-researchers.
Figure 5.13: Awabin’s Photo of ‘Small Plants and Big Plants’ from her community garden. Awabin said that in this garden, mehagony (big plants) provide shade to the egg plants (small plants). She professed to love gardening egg plants because egg plant a source of vitamins. The egg plant originates in Asia and the vegetable gardening practice originates in Greece, showing the local and colonial origins of the plant.

The photos also readily depicted the concept of food self-sufficiency. For example, many co-researchers captured the food grown to support their communities. As shown in Figure 5.14, Rupkotha took the photo of white gourds because ‘white gourd is a good summer vegetable that we grow in our garden to get fresh food and saving money’. As shown in Figure 5.15, Dia captured the photo of green coconuts because ‘green coconut is good for health in summer and we use coconut for making different types of cakes in winter and coconut trees give us fresh air’.
Figure 5.14: Rupkotha’s Photo of ‘White Gourds’. Rupkotha said white gourd is a good summer vegetable grown get fresh food and saving money. The white gourd originates in Asia. Rupkotha’s community uses white gourd as a source of food and income.

Figure 5.15: Dia’s Photo of ‘A Coconut Palm Tree with Some Green Coconuts’.

Islam (2006) stated Bangladeshi people like to produce vegetables and children help parents with gardening outside of school hours. Islam (2006, p. 67) stated that
Bangladeshi people believe that ‘nature is blessings for them as gives them food and shelter’. This perspective is somewhat anthropocentric as nature is portrayed as a resource for humans. The researcher recorded his observations of the environment of the school in a field note:

I visited the urban girls’ school today at 12:00pm. It is a two-storey building surrounded by some big and small trees. I knew from the photo display and staff that students made the flower garden in the school ground. They look after the garden and keep the school compound clean through their environmental conservation group called Leads. Some students are working through Girl Guides and Scouts which originated in England. Such regulated practices deeply reflect colonisation with regards to humans–nature interaction. (Field note, 4 January 2016, Urban Girls School – Reflection on School Visit).

While a regulated approach to relating to nature was observable, co-researchers’ photos illustrated young people’s affinity to/with the environment. For example, many co-researchers captured environmental aesthetics to support their community. As shown in Figure 5.16, Sumi took a photo of rose flower because the ‘rose is a beautiful flower which enhances the beauty of the garden’. As shown in Figure 5.17, Monika captured the Nayan Tara flower because ‘Nayan Tara is a beautiful flower’. Similar examples of flowers were noted across the majority of co-researchers’ photos. While such a focus on the beautification of the environment lacked depth with regards to the origins of these flowers, the young people’s fascination with ecological aesthetics revealed some level of ‘biophilia – a natural affinity with nature’ (Kahn, 1997, p. 1).
Young people’s photographs of their everyday environmental encounters continued to represent anthropocentric views of environment where humans remained at the centre.
This supports earlier findings that young Bangladeshi people largely hold anthropocentric views. The next section explores participants’ environmental perceptions in their everyday lives.

Co-researchers’ Participants’ Environmental Perceptions in Everyday Life

One participant included humans in the environment:

Humans, plants, animals and birds are part of the environment, and the environment must be clean for human’s living. (Moumita-Rijia, Co-Researcher’s Interview, 2016)

Although Rijia clearly described humans as part of the environment in general, human bodies though include non-living or living components. For example, hair and nails are non-living beyond the cell at the base, whereas many bacteria (up to 70% of the human body) utilise the human body as their environment in its entirety (Sender et al., 2016).

Rijia’s view is similar to Alerby’s (2000) findings that children and young people included humans within the environment. In this sense, Riji leans towards a relational view of the environment, but this view was the exception. The majority of participants placed humans at the centre. Other participants tended to classify the environment into two categories based on their global studies textbook (Nasrin et al., 2012):

Everything around us is made up of an environment. There are two types of environment: natural environment and social environment. Natural environment includes plants, birds, animals, humans and social environment includes houses. (Tushar-Arian, Co-researcher’s Interview, 2016)

Arian separated the environment into ‘natural’ and ‘social’ but, interestingly, included ‘humans’ in the natural environment, while perceiving the social environment as comprising human-made structures such as ‘houses’.
Part Two Summary
Consistent with co-researchers’ views, the majority of participants revealed anthropocentric practices in their everyday lives. However, some practices were relational particularly through gardening and ecological aesthetics. The latter aspects of ecoliteracy have been significantly under-researched in environmental education in majority world contexts, making it an important finding of this study.

Part Three: Environmental Sensitivity
To further understand co-researchers’ and participants’ environmental perceptions, the co-researchers and the principal researcher sought to understand young people’s sensitivity towards nature through analysing the co-researcher's photographs and drawings. In determining Bangladeshi young people’s ecoliteracy, it is essential to understand their feelings towards the environment because environmental sensitivity and experience of life are significantly interrelated and develop individual behaviour (Hollweg et al., 2011).

Chawla (1998, p. 18) defined environmental sensitivity as ‘an empathetic perspective toward the environment’. Chawla (1998, p. 19) stated that environmental literacy is ‘a predisposition to take an interest in learning about the environment, feeling concern for it, and acting to conserve it, on the basis of formative experiences’.

This line of investigation is important because existing studies have not revealed adolescents’ feelings towards the environment. For example, in Sarkar’s (2011) study secondary students believed that human activities did not have a great impact on the environment. As discussed in Chapter Two, Goldman et al.’s (2013, p. 1) study found that minority adolescents’ ‘value for non-human nature moved from an anthropocentric to more ecocentric orientation’.

Pepper (1994) classified environmental ideology into two categories, anthropocentric and ecocentric (see Figure 5.17). Similarly, Eckersley (1992) identified the anthropocentric and ecocentric perspectives, with anthropocentric being where humans are at the centre and ecocentric being where humans and nature are inseparable.
Anthropocentrism and ecocentrism are useful to understand ethical considerations of nature focusing on human behaviour towards nature and the inherent value of nature (Kortenkamp & Moore, 2001). In the literature, anthropocentric perspective is also known as technocentric perspective. A technocentric position is where the environment is viewed as a resource for human use (Cutter-Mackenzie & Hoepper, 2014). Orr (1992) stated that in technological sustainability, economic growth is important and every problem has a technological solution, whereas ecological sustainability conserves ‘traditional knowledge of the land and its functions’ (p. 32). Orr (1992) also argued that technology dominates nature and controls population. O'Riordan (1981 as cited in Cutter-Mackenzie, 2003) argued that in Western capitalist cultures (minority countries) a technocentric perspective is the dominant environmental philosophy.

The data from each school was analysed and demonstrated both technocentric and ecocentric viewpoints. The concern of environmental awareness was reflected in many of the comments from both co-researchers and participants.

**Co-researchers’ Environmental Sensitivity**

The photomontage (in Figure 5.19) represents several patterns across co-researchers’ photos, particularly environmental deterioration including pollution, deforestation and drought.

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**Figure 5.18: Environmental Perspectives.**

Source: adapted from O'Riordan (1989) and Cutter-Mackenzie and Hoepper (2014).
Figure 5.19: Photomontage of Young People’s Environmental Sensitivity.

A small number of co-researchers stated that the role of the government is to improve the environment for the existence of living organisms, given that:

A healthy environment is needed for human and other living organisms. For that sufficient trees must be there. Our government has taken some initiatives to save the environment. (Rose-Rancho, Principal Researcher’s Group Discussion, 2016)

Rancho believed that the policies of the government would result in an improved environment by countering human destruction of the environment (see Figure 5.20).
Figure 5.20: ‘Two Men Cut Down Trees’ (Rancho’s Drawing) indicates deforestation due to human’s need.

Moumita stated the infinite needs of humans and the conflict and limitation of the environment:

In Bangladesh, population is increasing rapidly but the number of trees are becoming less. People are cutting down a lot of trees across the globe. Trees give us oxygen, but if we cut down trees we will not get enough oxygen. As a result, this will impact human health because of insufficient oxygen. Temperature is increasing day by day and green areas are reducing. So we should alert people to plant trees to make the environment green. (Rose-Moumita, Principal researcher's Group Discussion, 2016)

Moumita’s comment placed humans as central to the benefits of environmental conservation, which leans towards a technocentric perspective (see also Figure 5.21).
A small number of participants demonstrated ecocentric perspectives of the environment in being concerned about the environment and the impact humans were having, for example:

I am concerned about the environment. Nowadays, people are cutting down a lot of trees. Bangladesh is an overpopulated country. Because of population growth they cut down trees for making houses, furniture and paper. So to make our environment healthy, if we cut down one tree, we should plant two to three trees. (Rose-Liya, Principal Researcher's Group Discussion, 2016)

I think the world will be at the risk in future. Many people cut down trees for making houses and polluting the environment by disposing wastes. As a result, temperature is increasing and ultraviolet rays of sun come to the Earth and affecting us through ozone layer depletion. On the other hand, if we plant trees and make the public aware towards environment then we may have a beautiful world. (Rose-Durjoy, Principal Researcher's Group Discussion, 2016)
Liya and Durjoy’s ideas were partially ecocentric through a focus on transforming human behaviour through awareness or education (Cutter-Mackenzie & Hoepper, 2014).

**Participants’ Environmental Sensitivity**

Some participants stated the environment is a place for human living, for example:

> As a part of environment my feeling is not good. Environmental elements such as soil, air and water are polluted. Environment is a place for human living. (Liya-Sanjana, Co-researcher’s Interview, 2016)

> I think trees are the most important part of the environment. If we plant trees then we can improve the environment and we can be benefitted from the environment. So we have to plant more trees. (Rupkotha-Himi, Co-researcher’s Interview, 2016)

Sanjana and Himi’s ideas gesture towards a technocentric (accommodation) perception of the environment (Cutter-Mackenzie & Hoepper, 2014) in believing the environment is important for human wellbeing, where they see the environment as needing to be cared for to benefit humans. The following statement further demonstrated the importance of conserving the environment and the difficulties when the environment is used as a resource for the benefit of humans:

> I feel our environment is worsening day by day. So it is our duty to conserve the components of environment. All elements of the environment are our asset. So we should plant more trees instead of cutting them down and save the birds. If we conserve the elements of environment then we may have a healthy and happy life. (Tushar-Arian, Co-researcher’s Interview, 2016)

Although Arian’s perception reveals ecocentric tendencies, he still saw the environment as an asset to humans and the importance of conserving the environment for the benefit of humans. Two participants stated the environment is contributing to human wellbeing and existence:
I live in the environment and benefitted from the environment in many ways. For example, trees give us oxygen and food. Trees also reduce carbon dioxide from the air. We must be aware and should work collectively to protect the environment (Hasan-Rabbi, Co-researcher’s Interview, 2016)

I think our environment is worsening day by day. Humans are impacting the environment consciously and unconsciously. But we need a healthy environment to survive (Rancho-Auvro, Co-researcher’s Interview, 2016)

Rabbi and Auvro believed that the environment is a resource for human wellbeing and human existence. These ideas indicate technocentric (accommodation) views of the environment (Cutter-Mackenzie & Hoepper, 2014) where humans are central to environmental conservation.

Interestingly, one participant identified the role of the government in environmental management:

I have planted trees on ‘Tree Plantation Week’ in our community. Our government organised this week every year on the 5th of June. Our Prime Minister also planted trees in this week that encourage the public to plant trees. I feel happy by planting trees. (Monika-Abisa, Co-researcher’s Interview, 2016)

One participant stated that population growth is the main reason for increasing human needs which impact the environment:

I do not feel good about the environment. Our environment is worsening day by day because of pollution. Our lifestyle is changing. Overpopulation and industrialisation are the causes of environmental pollution. (Nojim-Rajon, Co-researcher’s Interview, 2016)
Rajon’s response signals an ecocentric (communalism) perspective (Cutter-Mackenzie & Hoepper, 2014) of the environment in positioning humans as responsible for environmental destruction.

Nojim (a co-researcher) revealed his drawing (see Figure 5.22) depicts urban growth, placing it as responsible for environmental pollution. Ullah et al. (2013, p. 34) stated ‘global warming is the most important problem in the world and unplanned urbanization is one of the most important problem in Bangladesh’.

**Figure 5.22:** ‘A Brick Factory’ (Nojim’s Drawing) indicates air pollution in his community.

Shihab’s drawing (see Figure 5.23) is of a girl planting trees because ‘trees can save the environment’. Shihab demonstrated environmental sensitivity as he was concerned about the health of the environment and used his knowledge about the importance of trees in the environment to encourage people to take action to plant trees as he believed that planting trees would ‘save the environment’.
Translation of text: environmental protection—if we want to save our environment from degradation, we must be aware. Everyone must be united about planting trees. Tree planting is the key of environmental conservation. Only trees can save our environment.

In interviews with Shihab and Sakib (see Figure 5.24), they indicated that planting trees (rather than cutting them down) is significant in addressing environmental problems in Bangladesh.
Further, one participant identified that the infinite needs of humans conflicts with the limitation of the environment:

I think the number of trees are not sufficient in our environment. There is a possibility of negative impact of deforestation on the environment. So we should focus on planting trees and stop cutting down trees.
(Moumita-Mithila, Co-researcher’s Interview, 2016)

Mithila’s response prioritised the environment for the sake of Earth. In this sense, she demonstrated an ecocentric perspective of the environment, revealing that environmental philosophies are never fixed but fluid dependent on the situation or issue before any one person. This was demonstrated by participants (see Figure 5.25):

I think human are impacting the environment. Trees are important for us but people are clearing forests for their needs and hunting animals and birds. Beside these, they pollute air, water and soil. Our
The environment is not healthy for our living and it is at the risk. (Durjoy-Una, Co-Researcher’s Interview, 2016)

Figure 5.25: ‘A Man Cut Down Two Trees’ (Durjoy’s Drawing) representing deforestation.

Translation of text: a man is destroying the forest by cutting down trees. As a result the amount of oxygen is decreasing day by day. Cutting down trees imbalances the environment and contributes to greenhouse gases so flood, drought and heavy rainfall occur in the country. Here, the man is interrupting the beauty of nature by cutting down trees.

A small number of participants stated the limitation of the environment and belief that the use of various technologies and resources was having a negative impact on the environment. They saw the importance of conserving and reusing resources, for example:
The condition of our environment is not good. People do not dispose their wastes in the right place. They use refrigerator and air conditioner that produce chlorofluorocarbon. Recycling wastes may help to reduce soil and air pollution. Planting trees is a good way to reduce global warming. (Rian-Suvro, Co-Researcher's Interview, 2016)

Some participants expressed strong beliefs about overpopulation, labelling it as the chief reason for ecological problems in Bangladesh (see also Figure 5.26):

Our environment is becoming polluted because of overpopulation. Black smoke from vehicles and factories pollute the environment. If this condition continues there might be a great impact of climate change on the environment. (Nipu-Joba, Co-Researcher’s Interview, 2016)

Figure 5.26: Safi’s Photo of ‘A Polluted Pond’ from his community shows the pond is ‘disappearing’.
Although some young people held beliefs that were technocentric, the majority demonstrated ecocentric perspectives in wanting to conserve the environment by planting trees and practicing other sound environmental practices. These findings are consistent with those of Bogner (1998) and Bogner and Wiseman (1999).

**Part Three Summary**

The majority of co-researchers and participants revealed ecocentric sensitivities towards the environment. The analysis in Part Three has revealed a clear difference between young people's perceptions and their environmental sensitivities. Their perceptions (as shown in Parts One and Two) were anthropocentric in many respects, yet environmental sensitivities revealed strong ecocentric tendencies. This finding is significant in that young people’s environmental disposition is shown to be not fixed but fluid, depending on the issue or problem. Co-researchers and participants viewed the issue of trees and overpopulation as being of particular significance, revealing their strongest or most prominent ecocentric views.

**Part Four: Concerns about Environmental Issues**

To further understand co-researchers and participants’ environmental perceptions, co-researchers and I sought to understand young people’s concern towards the environment through analysis of co-researchers’ interviews, photos and drawings.

In investigating Bangladeshi young people's ecoliteracy, it is necessary to understand their beliefs towards environmental issues. While co-researchers had intended to focus on environmental issues broadly, participants focused on climate change. This is because climate change is already being experienced in Bangladesh, and it is considered to be one of the countries that is most impacted by climate change as a result its geography particularly large areas of low land (Brouwer et al., 2007). Concern about the impacts of climate change was reflected in many comments from co-researchers and participants.

**Co-researchers’ Concern towards Environmental Issues**

A small number of co-researchers expressed concern about sea level rise and its impacts on people’s homes and crops, for example:
Climate is the average weather in a place over 20–30 years. Human activities are the main reason of climate change. The impact of climate change is very serious. Environmental disaster occurs, and we get heavy rain in the rainy season. As a result, coastal areas are flooded, which hampers homes and crops of coastal people. In Bangladesh, we have six seasons but because of climate change now we have only three seasons, (Rose-Sakib, Principal Researcher's Group Discussion, 2016)

One co-researcher stated her concern about the effect of climate change on the environment that she perceived from a science textbook (Tapan, Rahman, Rahman & Khaleque, 2012):

Bangladesh is a delta. This country is affected with the consequences of climate change. In the Polar Regions, ice melt and sea level rise are occurring because of climate change. Coastal areas are flooded as a result, people are moving from rural to urban areas and polluting the environment. There is an impact of greenhouse gases on the environment. Drought, insufficient rain, heavy rain and environmental disasters are occurring nowadays. (Rose-Zinat, Principal Researcher’s Group Discussion, 2016)

Zinat further described people moving from rural to urban areas as an environmental crisis which causes environmental pollution.

As shown in Figure 5.27, Rupkotha’s drawing describes the reason for migration of coastal people during flood due to sea level rise, a climate change–induced impact.
Figure 5.27: ‘A Woman on Banana Tree logs’ (Rupkotha’s Drawing) during ‘flood’s effect’.

Translation of text: The problems of climate change—climate change is a major global problem. Environmental disaster (flood, cyclone and tsunami), extreme temperature and sea level rise are the adverse effects of climate change. If this condition keeps continuing the Earth’s low land areas including Bangladesh will go under the sea. Coastal areas are mostly affected by climate change. Flood and drought occur in the northern part of Bangladesh. Climate change make the environment unfavourable for living animals and plants. If this situation keeps going one day biological diversity will be lost from Earth.

A minority of co-researchers indicated the causes and impacts of extreme temperature on biological diversity, for example:

Climate is the average weather in a place over 20–30 years. Some animals disappeared because of climate change such as dinosaurs. Temperature is increasing due to deforestation. In the Polar Regions
ice is melting and sea level rise, loss of biological diversity occur. Coastal people are affected a lot with the impact of climate change. I am thinking of making the public aware planting trees to improve the environment. In Islam, if we produce fruits and public eat that fruits without any cost then we will be rewarded. Extreme temperature, insufficient rain and the loss of biological diversity are the impacts of climate change. (Rose-Rashed, Principal Researcher’s Group Discussion, 2016)

Rashed described the adverse impacts of climate change on the environment. His observations align with Huq, Ali and Rahman (1995), who believe that biological diversity in the Sundarbans ecosystem will be affected by sea level rise (regions may experience a 1 metre rise in sea level resulting in many plant and animal species including the Royal Bengal Tiger being lost).

One urban co-researcher articulated his concern about seasonal change, which he saw as an impact of climate change:

Climate change is an environmental issue. Average weather of a place over 30–40 years is called climate. We have six seasons in Bangladesh but nowadays we are missing three seasons. We are having summer, winter and rainy seasons. Long summer and short winter are the impacts of climate change. (Rose-Shihab, Principal Researcher’s Group Discussion, 2016)

One co-researcher (Ashraful) indicated his concern about the impact of climate change on sea level in a drawing (see Figure 5.28). He believed that melting ice and sea level rise is one of the major impacts of climate change.
Participants’ Concern Towards Environmental Issues

One participant expressed her concern about the impact of climate change in the following comment:

I think climate is changing. Insufficient rain, extreme temperature, storm and sea level rise are the impacts of climate change. Coastal areas are sinking due to sea level rise, crop production hampers and people become homeless with the result of climate change. (Fagun-Kritika, Co-Researcher’s Interview, 2016)
Kritika expressed her beliefs relating to climate change and described the effect of climate change, which she indicated was influenced by her science textbook (Tapan et al., 2012). One participant expressed his belief that extreme temperature and sea level rise might affect the environment in future:

I think climate is changing. Previously the summer was not very hot, nowadays the weather is extremely hot so it is very hard for us to live here. Winter comes late, not even in January. Insufficient rain also indicates that climate is changing in Bangladesh. Global warming influences the weather and the climate. A riverine country like Bangladesh will be impacted a lot by the sea level rise and flooding. Fresh water crisis may occur due to salinity intrusion. Many plants, animals and fish will be extinct.

Trees are important to control the weather and temperature of a country. Trees keep the weather cool and produce a lot of rain. Trees play an important role in climate change. Deforestation increase carbon dioxide gas in air but green plants absorb carbon dioxide from air and reduce climate change. If we plant many trees, excessive carbon dioxide will be absorbed and temperature will be reduced. As a result, we will have a normal temperature. Trees take in carbon dioxide gas for making foods and release oxygen that we take in and live. Planting trees will make our environment healthy and our country green. According to the scientists, a country needs 25% forest area of the total land but it is only 13% in Bangladesh. The number of trees are not sufficient for absorbing carbon dioxide. So we should take individual and collective initiatives for planting trees that will make our country green. (Ashraful-Robin, Co-Researcher’s Interview, 2016)

Robin recognised that extreme temperature is one of the effects of global warming and climate change that adversely impact the environment. However, it is clear that Robin’s view was heavily influenced by his textbook and he did demonstrate deep
understanding of how humans impact climate change. A lack of critical thinking was observable across co-researchers and participants.

Sony focused on the importance of planting trees to reduce the impacts of climate change:

We can reduce carbon dioxide gas in the air by planting trees and by raising environmental awareness of the public. We should follow the slogan: ‘Plant trees, save the environment’. People are clearing the forests but a country needs 25% of forest area where in Bangladesh it is only 16% forest area of total land. The area of the Sundarbans is becoming reduced because of industrialisation. Government people are planning to make a coal-fired power plant near the Sundarbans for producing electricity. This activity might impact the biological diversity of the Sundarbans. Earlier, Bangladesh was a green country but nowadays it is becoming more urbanised. Trees are important for human because trees give us oxygen and reduce temperature by absorbing carbon dioxide gas from the air, so we should plant more trees. (Shihab-Sony, Co-researcher’s Interview, 2016)

Soni identified the importance of public awareness through planting trees. Interestingly, he stated the Sundarbans mangrove forest is important for Bangladesh but the government plans to build a coal-fired power plant near the Sundarbans. These concerns are reflected in the literature. Neogi et al. (2016, p. 488) found that the Sundarbans mangrove forest plays an important role in ‘carbon sequestration, sediment trapping and nutrient recycling’. Aziz and Paul (2015) stated, the Sundarbans had a greater influence on the local fresh water ecosystem but the government is planning to build a coal-fired power plant at Rampal. A coal fired power plant at Rampal will be a major threat to the Sundarbans (Aziz & Paul, 2015).

The findings mirror those of Shepardson and Nyogi (2011)—minority young people believed that greenhouse gases are causing global warming, but this cause is not because of climate change human activity or society. Similarly, Eroglu (2016) found,
majority (Turkey) young people were informed that global warming is the outcome of greenhouse gases but showed inadequate knowledge of greenhouse gases or the reasons for greenhouse gases.

Further, a small number of participants referred to a mounting food crisis because of drought and salinity intrusion, for example:

Environmental disasters including drought, cyclone, sea level rise, land inundation, food crisis and safe drinking water crisis due to salinity intrusion are the impacts of climate change. (Niha-Sonu, Co-researcher’s Interview, 2016)

Sonu described drought and increased salinity are the reasons for Bangladesh’s food crisis. A small number of participants identified a crisis in the shortage of safe drinking water because of increased salinity in water. One rural participant stated the crisis of drinking water was a consequence of climate change and sea level rise:

I think climate is changing. Cyclone, drought, insufficient rain, sea level rise and flood are the outcomes of climate change. Drinking water crisis happens because of salinity intrusion. (Liya-Tasnuva, Co-Researcher’s Interview, 2016)

Tasnuva’s response indicated people suffer without safe drinking water because of salt contamination in freshwater. This finding is in agreement with Hoque, Saika, Sarder and Biswas (2013) and MoEF (2009).

One co-researcher identified drought as the ultimate consequence of climate change (see Figure 5.29).
The observations of young people in this study are consistent with Miyan (2015), which found that South and Southeast Asian countries like Bangladesh, Nepal, Bhutan and Cambodia are suffering from drought because of the changing distribution and pattern of rain and the alarming situation of food security, human health, biological diversity, regular spring and water resources.

A minority of participants stated that cyclones and loss of biological diversity were consequences of climate change:

I think the climate is changing. Environmental disasters such as cyclone and loss of biological diversity are the impacts of climate change.
(Adronida-Najura, Co-Researcher’s Interview, 2016)
Najura’s thinking is supported by the findings of Kabir et al. (2016), who believed cyclones including Sidr in 2007, and Aila in 2009 are a more frequent due to climate change.

Although some participants identified the impact of climate change on agriculture being linked to the economy, only a very small number of participants mentioned the term ‘economy’ relating to climate change, for example:

I think climate is changing. Ice melting, sea level rise and cyclone are the impacts of climate change. Our economy is affected by the impacts of climate change. (Shamim-Abdul, Co-Researcher’s Interview, 2016)

However, a number of participants stated that the impact of climate change on agriculture is directly linked to the economy, for example:

I think climate is changing. Our livelihood and seasonal crop production is hampered. Winter is short so we are not getting enough potatoes. In the rainy season, our farmers harvest rice but they cannot do that because of insufficient crops. (Ashraful-James, Co-Researcher’s Interview, 2016)

By way of comparison, the majority of participants identified loss of biological diversity as a result of climate change:

Climate is changing due to excessive carbon dioxide in the air. Global warming, ozone layer depletion, the effect of ultraviolet rays and loss of biological diversity are the impacts of climate change. For example, dinosaurs disappeared from the Earth because of the same reason. (Monika-Anika, Co-Researcher’s Interview, 2016)

Climate is the average weather of a place over 30–40 years. I think climate is changing. Environmental disasters such as deforestation, river bank erosion and loss of biological diversity such as Royal Bengal
Tigers are disappearing due to climate change. (Monika-Abisa, Co-Researcher’s Interview, 2016)

Anika and Abisa described loss of flora and fauna as one of the major consequences of climate change. This supports Hoque et al. (2013), who found the salinity of water and soil was increasing, which reduced the production of crops and growth of plants, hampering ecosystems and biological diversity, deteriorating the natural environment and negatively impacting the socio-economic conditions of coastal people. Hoque et al. (2013) also found, the timber-producing tree Sundori and the Royal Bengal Tiger will gradually disappear from the Sundarbans as a result of the impacts of climate change, such as sea level rise. The majority of participants showed concern about seasonal change. One participant expressed his concern about seasonal change, which he saw as an impact of climate change, illustrated in the following comment:

Seasonal variation is the unique feature of Bangladeshi environment. There are six seasons in Bangladesh. Only three seasons appear in other countries. In Bangladesh, each season appears with their own unique features. In summer we feel hot, in winter we feel cold and we get sufficient rain in the rainy season and in spring we can see new flowers, fruits and leaves, and we can listen sweet songs of cuckoos. Spring is my favourite season. I feel amazing in the morning when I walk in the park. But nowadays this situation is changing because of climate change. (Shihab-Sony, Co-Researcher’s Interview, 2016)

Sony expressed his feelings about the irregular seasonal change, which is consistent with Islam, Moinum and Kotani’s (2016) findings that although the Bangla calendar consists of six seasons, it appears to be changing to four seasons.

A small number of participants stated the impacts of climate change on human health:

There is also a big impact on human health and mind. These are shown on television. Different types of waterborne diseases we get because of climate change. (Asraful-James, Co-researcher’s Interview, 2016)
Greenhouse gases are increasing temperature and depleting the ozone layer. The ozone layer has already been depleted by the chlorofluorocarbon and other harmful gases. Ultraviolet rays will come to the Earth easily that may cause skin cancer, eyes cataract and plants photosynthesis process and food cycle will be hampered. It will be very hard to live for humans and other living organisms in this Earth. Due to extreme temperature, people will use more air conditioning, fans and refrigerators. (Ashraful-Robin, Co-researchers’ Interview, 2016)

The severe effects of climate change on human health identified by James and Robin are similar to those reported by the MoEF (2009), who stated climate change–related events impact directly and indirectly on human health through vector and waterborne diseases such as diarrhoea, dysentery, skin diseases, malaria, dengue, malnutrition and mental illness. Similarly, Anwar, Choudhury, Nazeer, Zaman and Azam (2016, p. 129) found the main effects of ultraviolet rays are ‘permanent or temporary blindness, skin cancer and immunity suppression’.

**Part Four Summary**

Part Four has revealed climate change as a significant concern for young people in Bangladesh. However, data also revealed a lack of critical thinking about climate change and the reasons for it. Textbooks were identified as primary sources of knowledge, signalling an issue with such curriculum resources. Young people are perceiving climate change as a natural phenomenon, revealing a significant disconnect between climate change knowledge and climate change agency, which will be discussed later in this thesis.

**Chapter Conclusion**

This chapter has presented the data in four parts—young people’s environmental perceptions, young people’s environmental perceptions in everyday life, young people’s environmental sensitivity and young people’s environmental concerns. The data revealed significant anthropocentric views among co-researchers and participants. However, data also revealed that young people’s environmental perceptions shift
depending on the environmental problem or issue, showing that perceptions are not fixed. For example, some environmental practices (by co-researchers and participants) were relational, particularly through gardening and ecological aesthetics. The latter aspects of ecoliteracy are significantly under-researched in environmental education in majority world contexts, making this an important finding of this research.

Further, the majority of co-researchers and participants revealed ecocentric sensitivities towards the environment. Part Three revealed a clear difference between young people’s perceptions and their environmental sensitivities. The issues of trees and overpopulation were of particular importance, revealing their strongest or most prominent ecocentric perceptions held by young people.

This chapter also revealed climate change concerns among co-researchers and participants and their lack of critical thinking about climate change and the reasons for it. This signifies a gap in their knowledge about climate change. The issue of knowledge is further explored in the next chapter.
I am concerned about the environment. Our environment is becoming polluted because public are not conscious towards the environment. Bangladesh is a riverine country but our rivers are becoming dry. People dispose their wastes in the river, they also use chemical fertilisers that pollute the river water. Buriganga and Turag rivers are such examples of river water pollution. (Rose-Safi, Principal Researcher's Group Discussion, 2016)

Introduction
In researching Bangladeshi young people’s ecoliteracy, it is necessary to understand their environmental awareness and knowledge. In this chapter I represent young people’s environmental awareness (Part One), environmental knowledge (Part Two) and sources of environmental knowledge (Part Three).

Part One: Environmental Awareness
Ham and Horvat (2016, p. 160) defined environmental awareness as ‘attitude[s] regarding environmental consequences of human behaviour’. UNESCO - UNEP (1976, p. 2) defined environmental awareness as a ‘sensitivity of the total environment and its allied problems’. This study used UNESCO - UNEP’s definition.

In this section I discuss the co-researchers and participants’ environmental awareness. Discussion of the former draws on the researcher’s interviews with co-researchers, their photos and drawings, while discussion of the latter draws on co-researchers’ interviews with participants.
Co-researchers’ Environmental Awareness

The majority of co-researchers revealed their environmental awareness through their photographs and drawings. The photomontage shown in Figure 6.1 represent co-researchers’ general environmental awareness towards numerous environmental issues including pollution, reforestation, environmental cleaning, and traffic congestion. Previous research has not always been successful in capturing environmental awareness (e.g., Sarkar, 2011).

![Photomontage Demonstrating Young People’s Environmental Awareness](image)

**Figure 6.1:** Photomontage Demonstrating Young People’s Environmental Awareness.  

Pollution

Many co-researchers captured photos of pollution in their community. However, Ashraful captured solid waste management practices (shown in Figure 6.2) because ‘people dispose household wastes beside of the street which spread bad smell’. This finding is somewhat consistent with Hasan (1998), who found unplanned infrastructure...
development and lack of government policy and control are the central reasons of waste management problems in two main cities (Dhaka and Chittagong) of Bangladesh.

Figure 6.2: Ashraful’s Photo of Solid Waste Management Practices. Ashraful said in Uttara area, people dispose household wastes on the street.

This is significant because earlier research on young people showed anthropocentric views of environment. In Bangladesh, many people dump their household waste on the street because there is no other option (i.e., no active waste management programs).

Rashed demonstrated his environmental awareness as he had a strong desire to improve the conditions of the environment. He thought about raising the public’s environmental awareness to improve the state of the environment:

In my community, many people are not environmentally aware. They dispose wastes in a disorganised way. Even Municipality do not manage wastes regularly. Animals eat that wastes and spread it everywhere. This condition creates air pollution. (Rose-Rashed, Principal Researcher’s Group Discussion, 2016)
Rashed described a lack of public awareness as the primary cause of environmental problems his community. The mirrors Bhuiyan’s (2010) finding that lack of government control and public awareness are the main reasons of urban solid waste management practices in Bangladesh.

Liya took a photo of a brick factory because ‘the brick factory produces black smokes that pollutes air’ (see Figure 6.3). This finding is consistent with Hossain and Abdullah (2012), which revealed that the archaic brick making system in Bangladesh is destroying the forests of the country and threatening the country’s livestock through air pollution.

![Figure 6.3: Liya’s Photo of ‘A Brick Factory’ from her area. Liya said the brick factory produces black smokes that pollutes air.](image)

Rupkotha described population growth as a cause of air pollution:
We live in the environment and use its different components. Our environments is becoming worse because of population growth and lack of consciousness of public. They use plastic bags and chemical fertilisers and take baths in the river. In urban areas, people use plastic bags and they produce a lot of carbon dioxide from motor vehicles. Thus, soil, air and water are polluted. I am thinking to improve this conditions of the environment. (Rose-Rupkotha, Principal Researcher’s Group Discussion, 2016)

Rupkotha described plastic bags and motor vehicles as sources of air pollution in her community. Similarly, one co-researcher stated:

I am concerned about the environment. Our environment is becoming polluted because public are not conscious towards the environment. Bangladesh is a riverine country but our rivers are becoming dry. People dispose their wastes in the river, they also use chemical fertilisers that pollute the river water. Buriganga and Turag rivers are such examples of river water pollution. (Rose-Safi, Principal Researcher’s Group Discussion, 2016)

Reforestation
Ashraful took a photo of palm trees and a guava tree in the big containers because ‘trees protect the environment’ (see Figure 6.4). This support Haq’s (2011) finding that urban trees reduce chemicals from air and keep the environment healthy. The tree planting campaign ‘Plant for the Planet’ of 2003 raised environmental awareness among young people in Kenya to improve the ecosphere by planting 4,000 trees including 47 native species (‘International Tree Planting Campaign Launched’, 2003).
In Ashraful’s community, coconut trees are planted to provide clean air and shade. Such tree planting is inspired by the government’s slogan, ‘Plant Trees, Save the Environment’ (see the text on the containers in Figure 6.4, ‘গাছ লাগান, পরিবেশ বাঁচান’).

Moumita drew gardening because ‘gardening helps us with fresh food and economy and keeps us healthy’ (see Figure 6.5). This is consistent with Schreinemachers et al.’s
(2017) finding that gardening influenced majority (Nepal) students’ knowledge of food, nutrition, health and agricultural sustainability.

Figure 6.5: Moumita’s Drawing of Gardening where a girl and a boy are watering plants.
Translation of text: I love gardening. I enjoy spending my leisure time with plants. At present, in our country foods are not very safe so general public are becoming sick. We can overcome this problem by making gardens in our living area. Gardening helps us with fresh food and economy, and keeps us healthy. Beside these, we can keep our body and mind healthy by spending time with plants. This is our duty to advise other people to do this type of works.
In this community, some people like to produce their own foods such as fruits and vegetables because produce from the markets contain a lot of preservatives (formalin).

**Environmental Cleaning**

Niha drew environmental cleaning by young people because ‘a polluted environment is not good for health’ (see Figure 6.6). This is consistent with Soto-Cruz et al. (2014) who revealed that majority (Mexican) young people participated in a community environmental cleaning campaign to improve the quality of the environment. Young people’s awareness of environmental problems were influenced by their everyday life experiences rather than school (Soto-Cruz et al., 2014). This finding is also consistent with Robottom et al. (2000) who found that environmental education (in Australia) was gradually shifting from schools to communities.

![Figure 6.6: Niha’s Drawing of Community Environment in cleaning by the young people.](image)

**Overpopulation**

One co-researcher described the impact of humans on the environment:
Bangladesh is an overpopulated country. About 160 million people live in this country. The carrying capacity of our land is limited for many people so they are impacting the environment. People are clearing the forests to fulfil their needs such as houses and clothes. They use natural gas which contains methane and carbon dioxide gas. As a result, extreme temperature leads sea level rise which is human impacts. (Rose-Adronida, Principal Researcher’s Group Discussion, 2016)

Adronida described the impact of overpopulation on the environment. Interestingly, this overpopulation was not extended to climate change as discussed in Chapter Five. This finding is consistent with Chakravarty et al. (2012) which revealed that increased population has led to cities and towns being extended by clearing forests. Haque et al. (2007) argued, population growth can be controlled through family planning, empowering women, providing education, raising environmental awareness and ensuring the availability of resources among poor people.

Overconsumption
Co-researcher Adronida described the impact of overconsumption on the environment:

We use a lot of oil for cooking and vehicles which is harmful for the environment. Excessive cooking oil creates problem for health and drains. Vehicles oil produce black smokes that pollutes air. We also use wood for making houses and furniture that comes by clearing the forests. We use a lot of water that creates water crisis. People do not switch off lights and fans before living their rooms that causes electricity crisis in the community. (Rose-Adronida, Principal Researcher’s Group Discussion, 2016)

Adronida described overconsumption of people degrading the natural environment. No other co-researchers discussed overconsumption or its impact on the environment.

Traffic Congestion
Durjoy captured traffic congestion in the city because ‘traffic congestion takes our time, pollutes air with black smokes and makes a lot of noise in his area’ (see Figure 6.7). This
mirrors Chakraborty’s (2016) findings that traffic congestion is causing economic loss in Bangladesh by consuming travel time and impacting the environment via air and noise pollution. Similarly, Shamsher and Abdullah (2012, p. 13) see traffic congestion as the most ‘challenging and complicated issue’ in Bangladesh in recent decades because of an inappropriate traffic management system and insufficient application of proper traffic rules. However, young people thought traffic congestion impacts the environment, rather than the economic growth of the country. This indicates their sensitivity towards this important environmental issue.

Figure 6.7: Durjoy’s Photo of Traffic Congestion from Dhaka city. Durjoy said traffic congestion takes time, pollutes air by producing black smokes and noise pollution.

In Dhaka city, many people rely on vehicles but, due to narrow roads and an inappropriate traffic management system, traffic congestion consumes travel time and pollutes the environment by generating black smoke and noise.
Co-researchers’ Participants’ Environmental Awareness

The majority of participants appeared to retain anthropocentric views of the environment, while a minority held ecocentric views. The following interview excerpts are representative of the anthropocentric views.

Pollution
One participant described the impact of humans on nature:

Bangladesh is an agricultural country. Many people depend on agriculture for their livelihood in this country. Farmers use chemical fertilisers for producing more crops but these fertilisers are mixing with soil and going to the river, and pollute river water. Many animals die during environmental disasters such as cyclone Sidr and Ila and their dead bodies pollute air and mix with rainwater and pollute river water. Some people dump wastes here and there that pollute the environment. (Rancho-Riaj, Co-researcher’s Interview, 2016)

Riaj described water pollution through pesticides and other waste materials. This is similar to Vivekanandhan and Duraisami’s (2012) research indicating pesticides and the dead bodies of living organisms contaminate soil and water. Similarly, Elahi and Khan (2015, p. 119) stated that in Bangladesh ‘cyclone Sidr (in 2007) killed 3,500 people, and displaced two million people and wiped out many paddy fields’ and these events were most likely the impact of climatic change.

One participant described the impact of humans on the environment as:

Our environment is worsening day by day because of human activities. If this condition keeps continuing, one day all living organisms in this Earth will be extinct. An ecosystem is the most important issue to me. In an ecosystem, producers and consumers live in a relationship and they interact with each other for food. (Rashed-Lucky, Co-researcher’s Interview, 2016)
Waste Disposal

Although Lucky thought about the impact of humans on the environment, he showed his true feelings towards nature by emphasising the importance of environmental equilibrium. One participant described the importance of public awareness for sustainable waste management practices:

Public awareness is important to improve the environment. Humans can play an important role to keep the environment healthy. We should increase public awareness to dispose wastes in the right place then the City Corporation can help us. We can protect the environment by doing environmentally friendly practices. (Tasib-Arjun, Co-researcher’s Interview, 2016)

Arjun was aware of sustainable waste disposal in the city. This finding supports Bhuiyan (2010) who revealed sustainable waste management initiatives such as door-to-door waste collection across Bangladesh have raised public environmental awareness.

Deforestation

One participant described humans’ impact on the forest and its importance:

I am concerned about deforestation. Many people are cutting down trees and filling up the rivers for making houses. That is impacting our environment and health. I aware that my neighbours planting trees may improve the environment by absorbing carbon dioxide gas. Deforestation is the most important issue because carbon dioxide gas is increasing in the air. A country needs 25% forest area of its total land but Bangladesh has only 16% which is not sufficient for us. (Ashraful-Tanjim, Co-researcher’s Interview, 2016)

Tanjim thought overpopulation was the main reason of deforestation. This finding mirrors that of Chakravarty, Ghosh, Suresh, Dey and Shukla (2012). However, Tanjim made no link between deforestation and climate change (as discussed in Chapter Five).
Some participants described the importance of planting trees to improve the state of the environment. Interestingly, one participant stated her concern about planting trees by following the government’s slogan:

I am concerned about environmental pollution. We are facing a lot of problems such as insufficient rain, heavy rain and irregular rain. To solve these problems we should aware public about the importance of tree plantation. Organising seminars and rallies and making festivals might be helpful in this regard. Deforestation is seen everywhere in the world. Tree planting is the most important issue to me. Green plants release oxygen and use carbon dioxide for producing food. We take in oxygen from air. The amount of carbon dioxide gas is increasing in air because of deforestation and black smokes from factories and motor vehicles. As a result, gradually we will disappear from the Earth. Planting trees may help us to save the environment by reducing air pollution. (Liya-Santo, Co-researcher’s Interview, 2016)

Although Santo described deforestation, motor vehicles and factories as sources of black smoke, she believed this situation can be improved by planting trees. From a scientific perspective, this is similar to Badami’s (2005) finding that motor vehicles and industrialisation are the two main reasons of urban air pollution in majority countries. Another participant noted:

I am concerned about the environment. Trees are the most important environmental issue to me because they do not only enhance the beauty of the environment but supply fresh air with oxygen for us and other living organisms to survive. Trees keep up the right amount of oxygen and carbon dioxide in the air. Thus, environmental balance is maintained by trees. Big trees reduce soil erosion and makes soil fertile. For example, banyan trees keep the soil tight with its roots and reduce soil erosion. Trees also give us medicine and economic support. (Durjoy-Moon, Co-researcher’s interview, 2016)
While trees and tree planting was clearly evident in the minds of the participants, no connection was made between oceans and oxygen production. Rather, these young people connected oxygen production only with land-dwelling plants. Further, one participant described her concern of environmental problems and to improve its conditions by following the government’s slogans:

I am concerned about climate change, seasonal change, and drought and river bank erosion. Planting trees is the most important issue to me. So we should plant more trees following the slogan, ‘Plant Trees to Save the Environment’. (Nipu-Sujana, Co-researcher's Interview, 2016)

Although Sujana was concerned about environmental disasters, she was cognisant of planting trees through government slogans. To raise public awareness, numerous programmes are being implemented under the MoE including World Teachers Day and Education Week (UN, 2002, p. 41).

**Part One Summary**

Many co-researchers and participants recognised air pollution, water pollution, deforestation, waste disposal and reforestation as significant environmental issues in Bangladesh. While a broad awareness was demonstrated, there was a disconnection between significant global issues like climate change and human behaviour. Rather, co-researchers and participants tended to localise environmental issues and did not make connections to worldly issues. For example, the impact of the government tree program was considered significant by co-researchers and participants, such that they tended to identify planting trees as the most significant environmental solution for Bangladesh.

**Part Two: Knowledge of Environmental Issues**

Hollweg et al. (2011) purported that knowledge of environmental issues encompasses two types of knowledge including:

1. knowledge of numerous environmental problems which arise from biophysical impacts and the causes and effects of those impacts on the natural environment; and
knowledge of environmental issues that impact humans, comprising the causes and effects humans encounter. I now discuss the co-researchers’ environmental knowledge by drawing on interviews, photographs and drawings. I also discuss the participants’ environmental knowledge by drawing on co-researchers’ interviews with them.

**Co-researchers’ Environmental Knowledge**

In exploring the data of co-researchers’ environmental knowledge, several co-researchers captured their views and articulated their opinions through photos and drawings. Quotations, photos and drawings represent co-researchers’ environmental knowledge. The current study is significant because in previous research young people did not demonstrate their greater environmental knowledge in the wider community through photographs and drawings.

Blum’s (1987, p. 7) research indicated minority (US, Australia, England and Israel) adolescents had ‘little factual and conceptual knowledge’ of environmental issues. Sykes et al.’s (2000) research with young people in the Asia-Pacific region showed their awareness and concern about global environmental issues including, deforestation, ozone layer depletion, overpopulation, greenhouse effect, traffic congestion, waste disposal, soil erosion, land degradation, and air and water pollution. Meilinda et al. (2017) and Sarkar et al. (2008) demonstrated young people had poor knowledge about the environment. In the present study, environmental knowledge is mirrored in the following comments from many of the co-researchers and their participants in both urban and rural schools.

**Global Warming**

The drawing in Figure 6.8 demonstrates knowledge of global warming. Many co-researchers drew global warming. Co-researcher Ashraful drew global warming and said ‘the world is getting polluted indiscriminately and if we do not take necessary steps one day our world will be destroyed’. This is consistent with Khan and Alom (2015). Yet Hossain (2014) argued, Bangladesh plays a minor role in greenhouse gas emissions compared to technologically advanced countries.
Figure 6.8: Ashraful’s Drawing of Global Warming.

In Bangladesh, motor vehicles, brick kilns, aerosol sprays, air conditioners and meat industries are sources of greenhouse gases.

Many co-researchers demonstrated their knowledge about the effects of climate change. During a focus group discussion, two co-researchers described the negative impacts of climate change on the entire environment:

Climate change is a global issue. Temperature is increasing day by day because of greenhouse gases. Ultraviolet rays come from the sun which is harmful for plants and humans. Ice melting, sea level rise and environmental disasters are occurring because of climate change. (Rose-Liya, Principal Researchers’ Group Discussion, 2016)

I am concerned about climate change. Extremely hot weather in summer, sometimes the temperature is increasing above 40 degrees Celsius, little rain or heavy rain and flood in the rainy season, short
winter and little rain in winter. These are happening due to climate change. Therefore, there is an adverse impact of climate change on the environment. (Rose-Rian, Principal Researcher's Group Discussion, 2016)

Liya and Rian described their concern about climate change and recognised that extreme temperature, sea level rise, seasonal change and changes in precipitation are impacts of climate change. This finding mirrors Elahi and Khan (2015).

*Environmental Disaster: Drought, Heavy Rainfall and Riverbank Erosion*

Sujana took the photo (in Figure 6.9) of a dry river because ‘drought is the negative impact of climate change’. The finding is somewhat consistent with Miyan (2015) who found that South and Southeast Asian countries like Bangladesh, Nepal, Bhutan and Cambodia are suffering from drought because of delay and change in the distribution pattern of rain.

![Sujana's Photo of a Dry River from her area indicates drought. Sujana said drought is the negative impact of climate change.](image-url)
In Bangladesh, temperature is extreme in summer (April to July) and climate change exacerbates this.

Similar co-researchers’ focus on drought as the impact of climate change, Zinat drew environmental disaster because ‘environmental disaster influence usual life of humans’ (see Figure 6.10). This finding is similar to Haynes and Tanner’s (2015, p. 369) findings that young people in the Philippines identified climate change as a major environmental problem because of ‘heavy rainfall’ leading to ‘greater floods’.

**Figure 6.10: Zinat’s Drawing of Environmental Disaster (drought, heavy rainfall, and riverbank erosion).**

*Translation of text: climate is changing because of environmental pollution. The animal kingdom is vulnerable with the impact of climate change. Bangladesh has a tropical monsoon climate. The climate varies in different seasons so sometimes we feel hot or cold. The effects of climate change on the environment*
are heavy rain, inadequate rain, flood, storm surges and river bank erosion influence humans’ usual life through loss of economy and different types of diseases. We should take necessary steps to reduce the impact of climate change.

In this particular community there is lack of public awareness of human actions contributing to the pollution problem and, in turn, climate change.

**Participants’ Environmental Knowledge**

Generally, participants demonstrated poor conceptions of environmental issues, though their ideas of the ultimate impacts (e.g., disruption to human life) were generally sound.

**Ozone Layer Depletion**

The majority of participants described the effect of increased carbon dioxide gas. For example:

> If the concentration of carbon dioxide gas increases in air, temperature will be increased and the ultraviolet rays of sun will come to Earth directly through ozone layer depletion which will harm us. (Zinat-Bornali, Co-researcher’s Interview, 2016)

Bornali described increased carbon dioxide gas as a cause of ozone layer depletion and increased harm from ultraviolet rays, consistent with Islam (2018).

**Acid Rain**

Sonu described the impact of acid rain:

> Factories and vehicles produce black smokes. If the concentration of carbon dioxide gas increases in air, acid rain and cyclone may occur. The amount of oxygen will be reduced in air and living organisms will be affected and Bangladesh might be a desert area in future. (Niha-Sonu, Co-researcher’s Interview, 2016)

This mirrors Tapan et al. (2012), who stated acid rain affects delicate aquatic plants and animals and humans’ heart and lungs. Tapan et al. (2012) also identified coal-fired
power plant, brick kilns, domestic ovens and vehicles as sources of pollution leading to acid rain. Sonu described the negative impacts of concentrated carbon dioxide harmful for all living organisms including humans, a perception she gained from her science textbook (Tapan et al., 2012).

**Sea Level Rise**

One participant gave a particularly lucid account of the process of greenhouse gas contributing to global warming, climate change, subsequent sea level rise and the negative impacts of climate change on the environment:

Scientists projected in the next century the world will be at risk because of global warming. Scientists observed the temperature of Earth is increasing gradually. The weather is extremely hot and drought is seen in many places, indicating increased temperature. The measurement system of temperature has been upgraded and scientists predicted the future impacts of temperature on the environment. Previously climate change occurred through natural impacts, but nowadays it is human induced. As a result, the environment is losing its balance. In short, increasing temperature of the world is called global warming. On the other hand, combination of some particles and polluted gases mix with air, capture the sun’s heat and warm air, land and the sea level—that is called global warming. Carbon dioxide, methane, nitrous oxide, ozone and chlorofluorocarbon are the greenhouse gases that capture temperature and warm the globe.

If the concentration of carbon dioxide gas increases in air, temperature will be increased. Trees give us oxygen, but nowadays the small number of trees cannot absorb carbon dioxide. Temperature is increasing because of excessive carbon dioxide in air. As a result, ice is melting in the Polar Regions, sea levels are rising and coastal areas are sinking. Many people are becoming homeless and they are moving to the city so the population is increasing there. Many people are cutting down trees for making their houses and increasing the amount of
Carbon dioxide gas in air. Carbon dioxide is one of the harmful gases that mostly warm up the atmosphere.

After the industrial revolution, the usage of fossil fuel, coal and wood are causing environmental pollution. Beside this, because of overpopulation the number of vehicles are increasing and producing harmful gases. Third World countries are using non-registered vehicles which pollute air. Methane is a natural gas that is also produced in the rice fields. Nitrous oxide is a harmful gas that is produced by burning wood, fossil fuels, interaction of micro-organisms, farming and rotted part of crops. Chlorofluorocarbon is also a harmful gas which is produced from spray, air conditioners, refrigerators and manufacturing industries. Ozone is a greenhouse gas which is harmful for our health. Smog also mixes with air particles which absorb temperature and increases temperature. These harmful gases are increasing and warming air that make scientists more anxious. They examined and analysed the causes of increasing temperature and have declared the destruction of Earth by computer modelling. (Ashraful-Robin, Co-researcher's Interview, 2016)

Robin’s account mirrors the findings of Elahi and Khan (2015).

One participant stated the effect of concentrated carbon dioxide gas on the environment as:

Our environment is becoming worse. Humans pollute the environment rather than taking care of it. The amount of carbon dioxide gas is increasing in air because of overpopulation and deforestation. If this condition increases, ultraviolet rays may deplete the atmospheric ozone layer and we might have extreme temperature. Gradually, Bangladesh will be a desert area and there is a possibility to sink this low land area due to sea level rise. (Rupkotha-Himi, Co-researcher’s Interview, 2016)
Himi described anthropogenic activities as the main reason of increased atmospheric carbon dioxide gas, which she learned from her science textbook (Tapan et al., 2012). This book stated that rapid growth of population has led to forests being destroyed, with less carbon dioxide absorbed by trees meaning the amount of atmospheric carbon dioxide gas is increasing (Tapan et al., 2012).

*Loss of Biological Diversity*

One participant described the impact of concentrated carbon dioxide on the biological diversity as follows:

> If the concentration of carbon dioxide increases in air, greenhouse gases may affect the environment and as a result ice may melt in the Polar Regions and possibility sink low land because of sea level rise. Excessive carbon dioxide gas in air may causes our respiratory problems and loss of biological diversity such as disappearing of Royal Bengal Tiger, birds and plants. Therefore, carbon dioxide is a harmful gas for us in many ways. (Rashed-Tasnim, Co-researcher’s Interview, 2016)

Tasnim described many animals disappearing, due to the effect of an increase in carbon dioxide gas. The finding is consistent with Huq et al. (1995), who indicated, in Bangladesh the biological diversity of the Sundarbans will be affected by the sea level rise due to the low-lying geography.

*Drought*

Two participants stated the effects of excessive amounts of carbon dioxide gas on the ecosystem:

> Ultraviolet rays may deplete the ozone layer because of excessive amounts of carbon dioxide gas in air. Ultraviolet rays may harm humans’ health and drought may affect crop production due to irregular rain. (Durjoy-Sony, Co-researcher’s Interview, 2016)
If the concentration of carbon dioxide gas increases in air there is a possibility of greenhouse effect on Earth. Ultraviolet rays may cause skin cancer and extreme temperature may cause river drought. Fish species will disappear. Ice will melt in the Polar Regions. (Sarwar-Pipul, Co-researcher's Interview, 2016)

Sony and Pipul recognised concentrated carbon dioxide causes drought, impacting humans, animals and agriculture. The participants acquired this knowledge from the school science textbook which states some north-western districts of Bangladesh are vulnerable to drought (Tapan et al., 2012). Tapan et al. (2012) also mentioned that a drought occurred in Bangladesh between 1978 and 1979 that caused more damage than the infamous 1974 flood.

Interestingly, one participant described the impact of massive amounts of carbon dioxide on regular seasonal change as:

If the concentration of carbon dioxide increases in air, the temperature will be extreme and seasonal variation will be hampered. As a result, our life will be harder. (Awabin-Nishi, Co-researcher's Interview, 2016)

Nishi suggested that the changes in regular seasons affect humans’ daily lives. This finding is somewhat consistent with Dana, Roy and Hoque's (2015) finding that environmental change is causing serious health problems in Bangladesh during summer.

Part Two Summary
The majority of co-researchers and participants demonstrated understanding relating to environmental issues such as ozone layer depletion, global warming, sea level rise, acid rain, drought and reduction in biological diversity. A minority of co-researchers expressed deep understanding about the causes of global warming as directly related to human impact. However, some young people were holding misconceptions relating to environmental problems, for example: many of the co-researchers and their participants assumed massive amounts of carbon dioxide cause extreme temperature
and have a direct effect on ozone layer depletion, this demonstrates their misconception about ozone layer depletion and global warming. It is most important for young people to have proficient environmental knowledge, particularly how humans impact on the environment, as environmental knowledge along with positive attitudes towards the environment can influence environmental behaviour (Meinhold & Malkus, 2005).

**Part Three: Source of Knowledge**

I now represent the co-researchers’ knowledge by drawing on interviews, photographs and drawings. Participants’ environmental knowledge is also discussed by drawing on co-researchers’ interviews with them.

**Co-researchers’ Sources of Knowledge**

In determining co-researchers’ source of environmental knowledge, several co-researchers captured their views and conveyed their opinions through photos. This study is significant because in earlier research young people did not demonstrate their source of knowledge through photographs of the natural and built environment. Television was the main source of information on environment for young people in India and the Philippines (Chapman & Sharma, 2001). In the present study, sources of environmental knowledge were reflected through urban and rural co-researchers’ photos and comments.

**Ecotourism and Personal Experience**

The photo in Figure 6.11 portrays the sources of environmental knowledge. Many co-researchers captured photos of the beach. Co-researcher Liya said she photographed the Cox’s Bazar beach because ‘she loves to walk at the beautiful beach for recreation’. This finding is consistent with Sykes et al. (2000), wherein the countryside and natural environment influenced Japanese young people’s environmental knowledge.
Liya’s Photo of Cox’s Bazar Beach. Liya said she loves to walk at the beach for recreation and spent her school holidays in Cox’s Bazar.

In Liya’s community, people visit Cox’s Bazar beach to relax.

During a focus group discussion, Liya also expressed her feelings about Cox’s Bazar beach as she observed the beauty of nature. She thought natural environment can play an important role in improving an individual’s feelings for the environment.

Recently, I have visited the Cox’s Bazar beach. I have enjoyed the sunset and big waves in the sea, and saw many aquatic animals. (Rose-Liya, Principal Researcher’s Group Discussion, 2016)

Liya stated visiting the beach improved her environment. Chawla (2015, p. 433) stated ‘trees and natural areas’ significantly contribute to children’s wellbeing.
Sorwar and Liya demonstrate their views of natural environment because they observed and enjoyed the components of nature. They thought visiting natural areas improve people's environmental feelings and knowledge:

I visited the Sundarbans mangrove forest with my family. I found many trees in the forest such as sundari, goran and gewa. (Rose-Sarwar, Principal Researcher's Group Discussion, 2016)

We had a family tour in the Bandarban hilly area this year. I saw many trees in that area. We enjoyed boating in the Shangu River and climbing up the hill. (Rose-Rancho, Principal Researcher's Group Discussion, 2016)

Sarwar and Rancho described their positive feelings about the natural environment. This mirrors Cini et al.'s (2012) findings that ecotourism improves young people's feelings and perceptions of the natural environment.

Liya took the photo of the Bandrban hill (shown in Figure 6.12) because 'she enjoys climbing up the hill'. This supports Barton et al. (2016)'s assertion that regular contact with the natural environment improves female adolescents' confidence and wellbeing.
Rupkotha expressed her feelings of a natural disaster recently experienced in her community as, ‘Recently a big storm uprooted many trees in our community’ (Rose-Rupkotha, Principal Researcher’s Group Discussion, 2016). Rupkotha thought young people’s environmental awareness might contribute to solve this problem. In Peek et al. (2016), an art-based research workshop (in the US and Canada) increased disaster-affected young people’s environmental awareness and knowledge to make the community stronger through actions. This is consistent with Rickinson’s (2001) work.

Culture
One co-researcher stated culture as his source of environmental knowledge: ‘Many young people learn farming from elderly people. So I think culture influence young people’s ecoliteracy’ (Rose-Sakib, Principal Researcher’s Group Discussion, 2016). Sakib described learning farming from older people. Though his description indicated culture influencing his environmental knowledge, rather than being a source of it. Similarly,
Yencken et al. (2000) found culture influenced minority young people's ecological knowledge.

**School**

Tasib captured the photo of his school and the playground because 'he knows about environment from his friends and teachers' (see Figure 6.13). This finding is similar to Sykes et al. (2000) who found school to be the main source of environmental education for young people in India and Fiji.

![Figure 6.13: Tasib's Photo of His School Building and Playground. Tasib said he learns about the environment from his friends and teachers](image)

**Mosque**

Rancho captured the photo of the mosque because 'he learns about environmental issues from the mosque' (see Figure 6.14). This is consistent with Laugu's (2007) finding that a mosque is a centre for teaching and learning about anthropogenic environmental disasters from the Quran and other books.
Figure 6.14: Rancho’s Photo of the Mosque in his area. Rancho said every Friday he visits the mosque and learns about environmental issues

Participants’ Sources of Knowledge
The majority participants identified television as their primary source of information on environmental issues, while a minority recognised newspaper, the Internet, school, parents and culture are secondary sources.

Television
Pipul demonstrated television as his source of environmental knowledge, having learned about deforestation and reforestation:
I know about environment and environmental issues from books, teachers and television. ‘Hridoye Mati o Manush’, a program shown on television, teaches us about the importance of tree plantation and the negative impact of deforestation. (Sarwar-Pipul, Co-researcher’s Interview, 2016)

This finding is consistent with Chapman and Sharma (2001) and Sykes et al. (2000).

Newspapers
Sony described newspapers as his source of environmental knowledge:

I know about environment and environmental issues from mass media such as television, newspaper and magazines. These sources present slogans: ‘plant trees, save the environment’ and ‘you have to plant three trees if you cut down a tree’. These sources are reliable to me because knowledgeable persons organise environmental reports and programmes. (Shihab-Sony, Co-researcher’s Interview, 2016)

The Internet
Bornali expressed the Internet is her source of environmental knowledge. Bornali assumed that the Internet is a reliable source as it provides information globally:

I know about environment and environmental issues from the Internet. The Internet provides information related to the environment to all people in the world. So I rely on the Internet. (Zinat-Bornali, Co-researcher’s Interview, 2016)

Community Garden
Fascinatingly one participant stated that community gardens have been her source of environmental knowledge. Rijia thought a garden gives not provides fresh food and economic support to the community but knowledge about fruits, flowers and vegetables:
I know about environment and environmental issues from community members. They have planted trees in the community. They also produce different types of flowers, fruits and vegetables in their garden that motivated me for gardening. They do not buy vegetables from the market that contained preservatives. Gardens give them support for economy and fresh food. (Moumita-Rijia, Co-researcher’s Interview, 2016)

Mosque
One participant stated the mosque is his source of environmental knowledge:

Mass media is important for raising environmental awareness of public. Every Friday, the Muslim community visit the mosque to pray together. The head of the mosque (Imam) raises public awareness about tree planting by discussion. (Tasib-Romeo, Co-researcher’s Interview, 2016)

Textbook and School
In the following comments two participants discussed their source of knowledge about environment and environmental issues are textbooks and school.

I know about the environment and environmental issues from the textbook and school. We get a lot of information about the environment from the textbook. I also know from parents that trees are our best friend so I always think about the wellbeing of the environment. I rely on these sources. (Monika-Abisa, Co-researcher’s Interview, 2016)

I know about the environment and environmental issues from parents and school. I learnt about planting trees from my parents. I learnt about disposing wastes in the right place from school. These sources are reliable to me. (Sujana-Ruhi, Co-researcher’s Interview, 2016)
Parents
Some participants stated that they learned about environment and environmental issues from their parents:

I know about environment and environmental issues from my parents. They said me to plant more trees and to encourage other people for planting trees. I rely on this source. (Hasan-Anik, Co-researcher’s Interview, 2016)

Non-Government Organisations
One participant stated a non-government organisation as her source of environmental knowledge:

I know about the environment and environmental issues from an environmental organisation. This source is reliable to me. (Awabin-Nishi, Co-researcher’s Interview, 2016)

Ecotourism and Personal Experience
Aura described experiences while travelling as her source of environmental knowledge. Aura presumed travelling is important to increase individuals’ environmental knowledge:

I know about the environment and environmental issues by travelling. I know about the Royal Bengal Tiger by visiting the Sundarbans mangrove forest. I rely on this source. (Niha-Aura, Co-researcher’s Interview, 2016)

Mushi described personal experiences as her source of environmental knowledge. Mushi thought the local environment and its allied problems are a direct source of environmental knowledge: ‘I know about environment and environmental issue by observing surroundings’ (Awabin-Mushi, Co-researcher’s Interview, 2016). This is consistent with Sykes et al. (2000).
Part Three Summary

The majority of co-researchers stated personal experience, family members, ecotourism and environmental problems as sources of environmental knowledge, while a minority stated culture, school and mosque. Some participants stated television was their primary source of environmental knowledge. Parents and personal experience, ecotourism, newspapers, organisations/clubs, the Internet, mosque, school and textbooks, were also identified by the co-researchers' participants as sources of environmental knowledge. These findings that show the sources that have influenced the young people's environmental knowledge are similar aspects identified by adults that were key influences that motivated them to pursue environmental preservation or environmental education as adults. Louise Chawla (2007, p.145) in her extensive research with adults over decades, into significant life experiences, revealed that spending time in nature as children, along with the influence of family members or other significant people were the most common influences that affected the adults' decisions to pursue environmental education or environmental preservation. Being involved in environmental organisations, books relating to the environment, or being aware of environmental degradation happening somewhere that was special to them, were also very important influences that lead to the adults pursuing environmental paths (Chawla, 2007, p.145). This demonstrates the significance of these important influences that were identified by the co-researchers and their participants both for building environmental knowledge but perhaps also influencing their environmental behaviours and pursuits in the future.

Chapter Conclusion

This chapter has presented data in three parts — young people's environmental awareness, environmental knowledge and sources of environmental knowledge. The co-researchers and their participants demonstrated knowledge of problems surrounding the environment particularly local issues, however, although some young people demonstrated understanding of human impact on the environment, there was a disconnect between significant global issues and human behaviour. Misconceptions relating to significant environmental problems were apparent in some of the co-researchers and their participants' responses, such as the difference between global warming and ozone layer depletion. The sources of environmental problems included,
personal experiences of being in natural environments, environmental problems, family, television, school, community, mosque, newspapers, traveling within Bangladesh, and non government organisations. Some of these sources of knowledge are similar to the influences identified by adults in significant life experience literature (See Chawla, 2007) that inspired adults to pursue environmental preservation or environmental education careers.

In the next chapter I represents data on young people's environmental agency.
I am working with an environmental conservation group called Shaytta Shangha. We discuss with people about the importance of planting trees. We walk for environmental discussions from door to door and make posters and display in the community for raising environmental awareness of public. (Rupkotha-Ruhanika, Co-researcher’s Interview, 2016)

Introduction

Chapters Five and Six presented the co-researchers and participants’ environmental perceptions and knowledge. This chapter presents their ecological agency. In investigating Bangladeshi young people’s ecoliteracy, it is essential to understand their ecological practices and agency in everyday life. In the case of these young people, this includes ecological and social problems in their local environment. The chapter comprises two parts. Part One discusses young people's everyday local environmental agency and Part Two discusses their global environmental agency. For the purpose of this study, human agency could be described as interventions that cause individuals to take necessary actions to provide solutions to social and ecological problems (Cassin et al., 2014; Parsell, Eggins & Marton, 2017). The terms agency and practice are used interchangeably.

When exhibiting pro-environmental behaviour, an individual intentionally minimises the negative impact of their actions on the Earth’s dynamic ecosystem (Kollmuss & Agyman, 2002). Kollmuss and Agyman (2002) asserted individuals’ pro-environmental behaviour is influenced by their society, culture, education, economy, awareness, knowledge, beliefs and attitude. An Australian study (minority students) revealed that secondary students’ personal responsibility for the environment influenced their pro-environmental behaviour and this was influenced by their knowledge (Moore &
Thielking, 2001). Similarly, in Meinhold and Malkus's (2005) US (minority) study, adolescents’ pro-environmental attitude predicted their pro-environmental behaviour and both of these were influenced by their pro-environmental knowledge. Kollmuss and Agyman (2002) stated there is a greater influence exercised by direct experiences on individuals’ behaviour than by indirect experiences. An example of direct experiences is students learning about environmental problems from personal observation of environmental damage within their own community, and an example of indirect experience is when students learn in school about environmental damage to the oceans or rivers. For this study, ecological agency includes young people’s direct and indirect pro-environmental behaviours at a local and global level. Both direct and indirect environmental practices were mirrored in the responses from co-researchers and participants in rural and urban schools.

**Part One: Everyday Local Environmental Agency**

In Part One I represent co-researchers’ local environmental agency by drawing on interviews, photographs and drawings. Participants’ local environmental agency is also discussed by drawing on co-researchers’ interviews with them. As shown below, co-researchers and participants did not refer to global ecological practices or agency, rather they focused on local ecology and agency.

**Co-researchers’ Direct and Indirect Agency**

The photomontage (shown in Figure 7.1) represents co-researchers’ everyday direct and indirect ecological practices. This is important as other studies in Bangladesh (Sarkar, 2011; Sarkar et al., 2008; Sarkar & Ara, 2007) did not include students’ photos and drawings in revealing their ecological practices.
Walking and Cycling as Everyday Environmental Practices

In this section I outline the indirect actions from which students gain knowledge about the environmental benefits of walking and cycling from school or general education about the environment.

Sujana’s photo (Figure 7.2) represents the practice of walking as an everyday ecological practice. Many co-researchers took photos of walking. Suajna said she took the photo of walking girls because ‘walking is good for the environment and human health’.
**Figure 7.2:** Sujana’s Photo of Walking School Girls. Sujana said walking is good for the environment and human health.

In Bangladesh, many young people walk to school and co-researchers saw the ecological benefits of walking.

The photo taken by Nojim shows a boy riding a bike to school (see Figure 7.3).

**Figure 7.3:** Nojim’s Photo of a Boy Riding His Bicycle to School. Nojim said the bicycle is a green vehicle.

Nojim discussed the ecological benefits of riding a bicycle in contrast to driving a car fuelled by fossil fuels. He stated that a ‘bicycle is a green vehicle’. Horton (2006) illustrated bicycles are beneficial socially and ecologically as they address problems such as climate change, urban crowding, growing pollution and unpleasant health. Horton (2006, p. 54) also stated, ‘the bicycle is the green lifestyle of environmental activists’.

During a focus group interview, Zinat (a co-researcher) discussed cycling and its positive impact on the environment:
Sustainability means the ability to exist in the environment for a long time. So, to exist in the environment we can make our environment favourable. For making a sustainable environment we can use a bicycle instead of a private car that may reduce air pollution. (Rose-Zinat, Principal Researcher's Group Discussion, 2016)

The majority of the young people in this study indicated that they walked to school. However, in Nojim and Zinat's community, many young people ride bicycles to school and these co-researchers believed that this practice, like walking, has less impact on the environment compared with vehicles that rely on fossil fuels. Riding is also economically beneficial as some students travel with rickshaw drivers on motor bikes to school for a fee. A small number of students travel to school in private vehicles.

Use of Renewable Energy

The co-researchers discussed indirect actions such as clean energy sources. The co-researchers learned about the benefits of alternative energy sources from their schooling or sources outside school. Co-researchers included photos and drawings of solar energy. Rashed drew the rooftop solar panel (shown in Figure 7.4) because solar energy plays an important role to fill our requirement as an efficient energy'. Deb, Bhuiyan and Nasir (2013) found that solar energy could solve the gas and energy crisis in Bangladesh and improve the quality of the environment.
The use of solar energy is increasing in our country day by day. The government has largely emphasised the use of solar energy. We have an inadequate electricity supply for our needs, therefore, solar energy plays an important role to fill our requirement as an efficient energy.

In Rashed's community, solar energy is used for both environmental and economic purposes.

The majority of co-researchers showed their direct and indirect environmental practices in everyday life. The following comments are representative of these practices. Two co-researchers described the use of solar energy:

Renewable energy comes from the natural sources which is unlimited. We can move fans and create light by using solar energy that is produced from sunlight. Renewable energy is cost effective and
maintains environmental balance. (Rose-Moumita, Principal Researcher's Group Discussion, 2016)

Kibria (2015) (Principal Researcher's Group Discussion, 2016) revealed that solar energy reduces emissions of greenhouse gases and is sustainable and renewable. Nojim described the benefit of using both solar energy and biogas as a renewable energy source:

In our community, we use solar energy for lights and fans which is cheap. We also use biogas as a fuel which is environmentally friendly. (Rose-Nojim, Principal Researcher’s Group Discussion, 2016)

Dia described the use of river water and biogas as renewable energy sources:

We use solar energy and biogas in our community. In Bangladesh, electricity is produced from river water. These are the sources of renewable energy. (Rose-Dia, Principal Researcher's Group Discussion, 2016)

This mirrors Wazed and Shahadat’s (2008) finding that micro hydro energy is a renewable energy which is economically achievable in remote hilly areas in Bangladesh where people face an electricity shortage due to infrastructure development.

Gardening, Organic Farming, Greywater Reuse and Rainwater Collection
The following practices are indirect actions as students learn of the benefits of organic farming, water collection and reuse from their schooling, their families or other sources. One co-researcher discussed the use of kitchen waste water:

The capacity to sustain in the environment is called sustainability. We can reuse our used things. For example, after washing vegetables we can use water for watering plants to keep them healthy. We can also make composts by using fruits and vegetables peels for applying to the
plants. Thus, we can improve our environment. (Rose-Adronida, Principal Researcher's Group Discussion, 2016)

Adronida described how the use of kitchen waste water keeps plants healthy and also is a water saving sustainable practice. Greywater use is an alternative to using fresh water and is a cost-effective practice used in many other countries such as in rural India (Sameer & Younus, 2015).

In Figure 7.5, Sakib represents rainwater collection, stating that the ‘use of rainwater conserves fresh water’. Rahman et al.’s (2014) research in Bangladesh revealed that rainwater collection is a sustainable practice which could be used for consumption and non-consumption purposes.

![Figure 7.5: Sakib's Drawing of Rainwater Collection.](image)

In Sakib’s community, many people collect rainwater during the rainy season for non-consumption purposes such as watering plants, washing cars and cleaning grounds. One participant described the importance of collecting rainwater as follows:

> Sustainability is the capacity to sustain in the environment. For example, we can reuse our things and if we use rainwater for non-consumption purposes that will reduce pressure on fresh water. (Rose-Moumita, Principal Researcher’s Group Discussion, 2016)
Educational Model for Sustainability

Durjoy described the use of an education model to bring present and future sustainability through raising environmental awareness of the public:

Sustainability is the ability to sustain. We can develop an educational model that may help us to sustain in Earth at present and in future. In so doing we can aware public towards environment and organise seminars in different places. (Rose-Durjoy, Principal Researcher’s Group Discussion, 2016)

Here, Durjoy is wanting to increase public awareness of the importance of sustainability even ‘organising seminars’ which is demonstrating agency. However, sustainability has many interpretations. Cutter-Mackenzie’s (2003) summarised two perspectives of sustainability as ecocentric and technocentric (as discussed in chapter 2), where with ecocentric perspectives ‘nature has intrinsic value and has a right to exist and to flourish’ (Cutter-Mackenzie & Hoepper, 2014, p. 395). The technocentric perspective sees nature as ‘a resource to be used’ to benefit humans (Cutter-Mackenzie & Hoepper, 2014, p. 395). It is difficult to see where Durjoy’s interpretation of sustainability would fit on the continuum, wether it would lean towards sustaining the Earth as a resource for future humans, ‘a technocentric position’; or where he would lean towards seeing nature (incorporating humans) as having ‘its own right to exist and flourish’, an ‘ecocentric position’ (Cutter-Mackenzie & Hoepper, 2014, p. 395). Certainly from analysis of data there is a leaning by these young people generally towards the technocentric or anthropocentric position.

Participants’ Direct and Indirect Agency

The majority of participants appeared to hold direct and indirect environmental practices in everyday life. The following interview comments are representative of such practices.

Environmentally Friendly Bags, Cycling and Environmental Cleaning

Sanjana described how she uses jute bags instead of plastics bags: ‘I use jute products instead of plastic bags for shopping. I dispose wastes in the bins in school and at home
too’ (Liya-Sanjana, Co-researcher’s Interview, 2016). Jute bags are made of biodegradable materials which are environmentally friendly (Jalil, Mian & Rahman, 2013).

Two participants described how they ride bicycles to school:

I use my bicycle every day for going to school to save money and the environment. (Nojim-Rajon, Co-researcher’s Interview, 2016)

I use bicycle for going to school because a bicycle is environmentally friendly. (Rian-Ovi, Co-researcher’s Interview, 2016)

This is consistent with Love (2013) which discussed how people can reduce their carbon foot print by riding bicycles, rather than travelling in fossil fuelled vehicles. The following practices are a combination of direct and indirect action where students learn indirectly about the benefits from their schooling or other sources. These benefits include planting trees and plants, recycling, energy conserving and sustainable water practices and adequately disposing of wastes. The students also see the aesthetic benefits of planting trees and gardens in their school or the impact of the dumping of rubbish in their waterways or local communities.

Rajon and Ovi stated that they carried out environmental practice in their schools:

I plant trees in the school compound and switch off lights and fan before leaving the classroom. I put wastes in the bins and encourage my friends to do the same. I write important information related to the environment on the notice board at school with the help of our teachers. I have asked the school authority to check the drinking water of the tube well. (Nojim-Rajon, Co-researcher’s Interview, 2016)

I have planted many trees in our home garden. In school, I planted trees in Tree Planation Week and enjoyed that work. (Rian-Ovi, Co-researcher’s Interview, 2016)
Rajon and Ovi described how they planted trees in the school grounds and in gardens. They disposed of wastes in the right bins, were aware of the importance of conserving energy and cleaned the classroom and school compound. In these examples, the participants described how they take individual action to reduce their impact on the environment by carrying out environmentally sound practices.

In Figure 7.6, Adronida captured waste management because ‘in her community people dump household waste beside of the street because they do not know have any idea about the right way of disposing wastes’. This finding mirrors that of Stepien et al. (2013).

**Figure 7.6:** Adronida’s Photo of Dumped Rubbish Beside the Pathway. Adronida described people in her community dump household rubbish beside the street because they do not have any idea about the right way of disposing wastes.

**Organic Farming, Gardening, Reuse of Kitchen Waste Water (Greywater) and Rainwater Collection**

Two participants describe organic farming practices as follows:
We have a backyard garden where we produce vegetables and spinach. We use organic fertiliser in the garden. We produce this fertiliser from organic wastes. (Zinat-Tania, Co-researcher’s Interview, 2016)

We produce vegetables such as spinach, cabbage, cauliflower and different types of fruits in our home garden. We use cow dung as organic fertiliser in the garden. (Manik-Emon, Co-researcher’s Interview, 2016)

One participant discussed the benefit of making a rooftop vegetable garden:

I live in the city so we do not have sufficient land for planting trees. I have planted flowering plants such as tube rose, marigold and rose in the balcony. There is a small vegetable garden on the rooftop. We produce tomato, bitter gourd, spinach and green chilli in the garden. (Moumita-Prerona, Co-researcher’s Interview, 2016)

Zinia and Mcshane (2018) found that rooftop gardens in Dhaka city support the economy by supplementing the food of the local people with home-grown produce.

Nafis described the reuse of kitchen waste water in the garden:

I produce vegetables and fruits in our home garden for food and economy. I use organic fertiliser and kitchen waste water in the garden to save fresh water. (Sakib-Nafis, Co-researcher’s Interview, 2016)

This reuse of kitchen water for farming practice is also widely practiced in other majority countries such as Nepal (Rutkowski et al., 2007).

One participant discussed the use of rainwater as an alternative source of water:

We produce flowers such as rose, hibiscus and spinach in our home garden. I clean the weeds and water to plants regularly. I collect rainwater in the rainy season for watering plants. Rainwater
harvesting is a good way to solve the water crisis in our country.
(Sarwar-Hillol, Co-researcher's Interview, 2016)

According to Abdullah and Rahman (2015), the use of rainwater is an important environmental practice that can improve Bangladesh’s economy and reduce poverty.

Co-researchers’ Intentional Environmental Agency
The following examples reveal co-researcher's direct and indirect actions towards environmentally sound practices.

Gardening and Tree Planting
In one community, urban people make rooftop gardens to promote clean air, for food and general green space. Urban people enjoy rooftop gardening as there is inadequate space in the city for gardens at the street level. These young people demonstrated their intentional environmental agency by showing acts of caring for plants. These are both direct and indirect actions, as students see the benefits of the plants and trees, as habitat, food source and as green space while also having learned about the photosynthetic properties of plants to reduce carbon from schooling or other sources.
As shown in Figure 7.7, Sakib took the photo of a boy watering plants in the flower garden because ‘caring for plants encourages young people towards the environment’. Chawla (2009) found caring for the environment develops children’s understanding for other living organisms.
In this study, many young people appeared to enjoy helping parents in gardening activities outside of school hours.

In Figure 7.8, Ashraful captured the rooftop garden because ‘the roof garden provides fresh air, fruits and green space to us’. Ansari’s (2008) showed that rooftop gardens can give social and economic support to the city inhabitants by providing fruits, vegetables and clean air.
In Figure 7.9, Sakib took the photo of a boy is planting a tree because he believed that ‘trees save the environment’. This is similar to Peace Corp volunteers’ tree planting and coastal clean-up programme (‘Peace Corps volunteers in the Philippines plant 12,000 Mangroves’, 2011).
Two co-researchers described how the practice of planting trees is helpful for reducing the impact of climate change as the trees absorb carbon dioxide:

Temperature is increasing and environmental disasters such as tornadoes and cyclones are happening. Low land might sink because of coastal flooding. There are six seasons in Bangladesh but we are missing three seasons because of climate change. Average weather in a place of some years is called climate. Climate is changing. Cyclone, heavy, rain, river bank erosion, ice melting and sea level rise may occur due to climate change. We can solve climate change by planting trees. Trees keep air cool by controlling temperature. (Rose-Shamim, Principal Researcher’s Group Discussion, 2016)

Climate change is influencing our daily life so we should think about it. Average weather of a place of some years is called climate. Temperature and rain are increasing. So we should plant more trees for reducing temperature and dispose wastes in the right place. Chlorofluorocarbon and methane are harmful gases that affect the environment so we should plant trees and inspire other people to take individual initiatives for planting trees to reduce climate change. (Rose-Adronida, Principal Researcher’s Group Discussion, 2016)

Boyes et al. (2009) indicated that tree planting is a popular idea of minority (Australian) students in a global warming context.

Making Posters, Drawings and Environmental Clubs for Raising Public Awareness

Co-researchers described how environmental posters and drawings could raise public awareness towards environmental matters:

In our community, we could raise awareness about planting trees and making posters to show people the bad impacts of pollution. (Rose-Rancho, Principal Researcher’s Group Discussion, 2016)
I can improve the community environment by disposing wastes in the bins and by keeping the pond clean and to keep tube well water free from pollution. We can raise awareness in environmentally illiterate people by drawing pictures related to the environment. (Rose-Shamim, Principal Researcher’s Group Discussion, 2016)

Hansmann and Steiner (2015), in their research on 147 men and women (aged 15 to 86) in Bern and Zurich, Switzerland, revealed that innovative posters designed to educate people about the environment are effective in changing people’s behaviour.

Sujana, Adronida and Rancho discussed how environmental clubs are effective for raising public awareness:

\[\text{We can make an environmental club in the community for raising awareness of people. (Rose-Rancho, Principal Researcher’s Group Discussion, 2016)}\]

I am concerned about the environment because our environment is worsening day by day. We can make the public aware by making an environmental club in the community and discussion the importance of planting trees for making the environment healthy. (Rose-Sujana, Principal Researcher’s Group Discussion, 2016)

I think public awareness is important for improving the community environment. We can make an environmental club for raising awareness. In this club we will work for conserving water, planting trees, saving energy, disposing wastes properly and stopping air and water pollution. Thus, we can improve the community environment. (Rose-Adronida, Principal Researcher’s Group Discussion, 2016)
These three co-researchers were keen to be involved in environmental clubs and they believed these clubs would help promote environmental awareness. Studies in other majority countries such as the Congo have revealed that environment clubs increase school children’s knowledge about environmental issues and promote their responsiveness for environmental conservation through active participation in activities (Breuer & Mavinga, 2009). However, it is not known if these young people actually undertook the action to set up an environmental club in their school or community (perhaps they were looking for an adult to set up the club). For instance, in Bangladesh, the Dhaka University Environment Society raises environmental awareness among other students on campus through different environmental activities such as cleaning the campus, showing documentaries, organising workshops/training on disaster risk management, environmental quizzes, cultural programmes, displaying environment-related photos and presenting plants every year, particularly on World Environment Day.

**Participants’ Intentional Environmental Agency**

**Tree Planting**

Like the co-researchers, many participants discussed the importance of planting trees to improve the state of the environment, for example:

Climate change can be solved by planting trees. Trees absorb carbon dioxide from air and keep the environment cool. Trees supply enough oxygen for us to survive. So tree planting is very important to reduce environmental disasters. (Zinat-Tania, Co-researcher’s Interview, 2016)

Planting trees can reduce climate change. Trees maintain the right proportion of oxygen and carbon dioxide in air, trees help us to get sufficient rain and protect the biological diversity by maintaining environmental balance. (Safi-Raqeeb, Co-researcher’s Interview, 2016)
I think tree planting is the best way to solve climate change. Trees are the friends of the natural environment. Planting trees make the environment healthy, green and reduce temperature by absorbing carbon dioxide. As a result, ice melting will not occur and sea level will not rise any more. Beside these, a country needs 25% forest area of its total land but that is limited in our country. So we should increase the forest areas by planting trees. (Rancho-Morsan, Co-researcher’s Interview, 2016)

We can solve climate change by planting trees. So we should focus on planting trees to conserve the environment. Trees are our best friends. Trees supply us enough oxygen to live and absorb carbon dioxide gas from air. Flood, cyclone and river bank erosion can be reduced by planting trees. Nowadays, people are cutting down a lot of trees for making their houses. As a result, our environmental balance is hampered. By planting trees we can improve the environment and our health. (Ashraful-James, Co-researcher’s Interview, 2016)

Tania, Raqueeb, Morsan and James all thought that planting trees could reduce the impact of climate change, because trees absorb carbon dioxide from air. Planting trees as a way of solving environmental problems is common in research relating to young people, such as Toili’s (2007) research in Kenya. Nowak et al. (2006) discussed how trees remove atmospheric chemicals, increase the amount of oxygen in air and absorb excessive amounts of carbon dioxide from air through the process of photosynthesis. However, these participants were talking generally about planting trees and not actually taking action to do this themselves. Conversely, the co-researchers included photos and drawings where they discussed how they took part in the planting of trees and other plants.

*Environmental Groups: Tree Planting, Waste Disposal, Environmental Cleaning, Bicycling and Making Posters for Raising Public Awareness*

Participants described the practices of the environmental groups they were involved in. All participants discussed planting trees as part of the practices of their environmental
group that they see as significant. Other activities enjoyed in these groups were also put forward:

I am involved in an environmental conservation group called Green Group. I have planted trees in the school ground and in the community to make the environment green through this group. (Ashraful-Tanjim, Co-researchers’ Interview, 2016)

I am involved in an environmental conservation group named Shaytta Shangha. We distribute plants and discuss the importance of planting trees and the causes and negative impact of pollution with the public. We work for raising environmental awareness and also take individual initiative for planting trees. (Liya-Sanjana, Co-researcher’s Interview, 2016)

I work in an environmental conservation group called Lead. We work for environmental conservation. This group work for reusing waste materials and fixing bins for disposing wastes and planting trees in the school compound. (Sumi-Poly, Co-researcher’s Interview, 2016)

I am working with an environmental conservation group named Jubo Krishi Club. We have planted trees and have cleaned the community environment by disposing wastes properly. This club encourage the community to plant trees and clean the environment. (Rashed-Himu, Co-researcher's Interview, 2016)

Chan (1996), in her research in Hong Kong, found secondary students had a strong interest in recycling and reducing their use of plastic bags and tissues. Taking part in the cleaning of the community environment was also an aspect that Himu and Poly highlighted:
I am involved in a club named Jubo Krishi Club. This club encourage us to use bicycles and plant fruit and medicinal plants in the community. (Rashed-Lucky, Co-researcher’s Interview, 2016)

Lucky discussed aspects such as the promotion of bike riding in her environmental group in addition to growing foods and natural medicines:

I am working with an environmental conservation group called Shaytta Shangha. We discuss with people the importance of planting trees. We walk for environmental discussions from door to door and make posters for display in the community for raising environmental awareness. (Rupkotha-Ruhanika, Co-researcher’s Interview, 2016)

Young people, particularly in majority countries, are keen to raise awareness about environmental problems. Young people in Vietnam took part in an international photo and poster competition on environmental protection organised by the UN (‘Thailand: Young people joined environmental protection communication’, 2016). It appeared that the participants were keen to be involved in their environmental groups and enjoyed the activities that promoted sound environmental practices.

**Part One Summary**

The environmental actions discussed involved action where the co-researchers and participants and/or their families carried out environmentally sound practices in their local community, such as such as walking, cycling, using alternative energy sources, recycling organic wastes, reusing waste water, organic gardening, using rainwater and planting trees. However, some of the practices discussed were those that the co-researchers or participants would like to see occurring, such as the initiation of environmental clubs or the further planting of trees. These practices were both indirect, resulting from knowledge that had been gleaned in school or from other sources, or from direct experience of seeing the results of a polluted environment or the benefits of the greening or cleaning of communities.
Part Two: Global Environmental Agency

I now discuss the co-researchers’ global environmental agency by drawing on interviews, photographs and drawings. Participants’ global environmental agency is also discussed by drawing on co-researchers’ interviews with them.

Co-researchers’ Direct and Indirect Environmental Agency

Many co-researchers elected to draw global environmental practices through drawings. The drawings represent co-researchers’ thoughts about the future environment and the world. Co-researcher Rancho drew the green Earth and the future deadly Earth because he believed ‘the environment of Earth is getting worse’ (see Figure 7.10).

Figure 7.10: Rancho’s Drawing on the Green Earth and the Future Deadly Earth.
Translation of text: the ocean is called the mother of Earth but it is misused nowadays. People are dumping wastes in the oceans, rivers, canals and ponds. As a result, animals are disappearing.

Tushar was illustrating indirect experiences from learning about the environment, in this case the pollution of the oceans and its impact on marine life. Sumi represented her belief that improving the world starts with individual action (see Figure 7.12).
Figure 7.12: Sumi’s Drawing of a Girl Caring for a Flowering Plant.

Sumi’s concern is consistent with other studies. Barraza (1999) and Alerby (2000) revealed children’s deep concern of environmental issues through their drawings.

Two participants described their thoughts about the environment as follows:

There is a great impact of climate change on the environment. Temperature is increasing and depleting the ozone layer. As a result, ultraviolet rays are affecting living kingdom. If this condition continues our future environment will be worst. We can make the environment healthy and make the Earth a better place by taking care of it. For that we have to be environmentally aware and literate. (Rose-Rupkotha, Principal Researcher’s Group Discussions, 2016)

We may have the worst or the best environment and world in future. At present, our environment is becoming polluted because of deforestation and ozone layer depletion. If this condition continues the
Earth will be destroyed. On the other hand, we can maintain the environmental balance by planting trees and by raising the public's environmental awareness. We may have a beautiful environment by doing these activities. (Rose-Rancho, Principal Researcher’s Group Discussion, 2016)

Rupkotha and Rancho believed that despite environmental problems such as pollution and deforestation, by raising public awareness they could improve the state of the environment. These participants’ experiences were indirect, that is, the knowledge of environmental damage had increased their awareness to take action and educate the public. However, despite their passion it is unclear if these students actually carried out these activities.

As shown in Figure 7.13, Rupkotha represented environmental conservation as she believed ‘the environment of the entire world is at risk’. Asia-Pacific students have previously been found to have positive attitudes towards, and a strong desire to protect, the environment (Yencken, 2000).
Translation of text: the environment is made up of everything around us. At present, the environment of the entire world is at risk. Air pollution, climate change and environmental disasters made the environment unfavourable for our living. Hence, we should improve the environment through conservation. To conserve the environment, we should follow the steps below:

1. Tree planting
2. Use of solar energy as an alternative source of energy
3. Use organic fertilisers for farming instead of inorganic fertilisers
4. Use jute products rather than plastic bags
5. Use the right bins for waste disposal
6. Collective work with public awareness.

Rupkotha described the environmental state of the ‘whole world’. She then discussed how people in her local community fail to carry out environmentally friendly practices—they did not dispose of their wastes adequately, they used artificial chemical fertilisers for farming, plastic bags for shopping and did not attempt to conserve energy. Nevertheless, she encouraged people to carry out practices such as planting trees, use...
jute for clothing and bags, dispose recycling materials and waste in the right bins both at home and in school and become more aware of environmentally sound practices. These co-researchers looked at both the positive and negative aspects of the state of the Earth. Rancho depicted a green Earth and a future polluted Earth (see Figure 7.10). Sumi, taking a positive position, included a girl caring for a flowering plant because ‘A beautiful world starts with one person’ (see Figure 7.12). Tushar highlighted the plight of marine animals as a result of human impact to the oceans (see Figure 7.11). Rupkotha’s drawing (see Figure 7.13) also depicted a conflict showing conservation practices and human impact leading to environmental disasters. This is consideration of positive and negative aspects which supports Alerby’s (2000) discussion, highlighting, ‘the good world, the bad world, the dialectic between the good and the bad world, and symbol and actions protecting the environment’ (Alerby, 2000, p. 205). The co-researchers’ drawings and discussion relating to the state of the Earth revealed a conflict between the positive and negative aspects surrounding the state of the environment. However, all of these young people looked at the importance of educating the public about environmental problems and their causes and actions that can be taken to avoid these problems. Again, these students were eager for these environmental actions to be carried out but it is unclear if they actually carried out the practices that they highlighted.

Part Two Summary
Part Two has explored the co-researchers global environmental agency and discussed ways that they as individuals or as communities thought they could address environmental problems such as pollution of the air, water and marine environment; waste disposal; and carbon emissions.

Chapter Conclusion
This chapter has presented data for young peoples’ everyday local environmental practices and global environmental practices. These practices were initiated indirectly, as a result of knowledge the young people had gleaned from school or other sources, or directly, as a result of witnessing firsthand problems associated with pollution or the benefits of positive actions to reduce pollution.
Both the co-researchers and participants discussed practices that they thought as important for individuals or the community to carry out. These young people demonstrated a strong desire to carry out practices that reduced their impact on their local environment such as gardening, organic farming, tree planting, recycling wastes, reuse of greywater, rainwater collection, use of renewable energy (solar, biogas and hydro), using jute bags instead of plastics, growing natural medicinal plants and conserving electrical energy. These could be considered soft forms of environmental agency.

Further, the young people believed that it was important to raise the public’s environmental awareness through educational models, environmental clubs or posters and drawings. The latter demonstrates a higher order of agency. However, it is evident that practices such as walking to school or, to a lesser extent, riding a bike are carried out by these young people and appreciated as having a low impact on the environment compared with vehicles with high carbon emissions such as cars and buses. The use of solar power, biogas and hydro power are evident in their local communities and, in some cases, these young people were keen to carry out recycling practices and other broader sustainability practices. Despite the co-participants being passionate about carrying out certain practices such as making posters to promote environmentally sound practices, planting trees or starting environmental clubs, these were largely ideals, rather than actions actually carried out. However, some participants discussed how they were involved in environmental groups where they planted trees, made posters, carried out the clean ups in the community and went door to door to educate people in their local community about environmental practices.

With respect to higher order agency, it was not evident that these young people initiated environmental action such as writing letters to government to request measures to reduce pollution or starting campaigns to reduce the use of plastics. Where action was carried out they were part of environmental group programs initiated and led by adults associated with agricultural organisations.

The next chapter focuses on the influence of postcolonialism on Bangladeshi’s young people’s ecoliteracy.
Rich and poor people live in our society. Rich people do not have feeling for the environment. Rich people pollute the environment by using air condition and disposing their wastes in a haphazard manner and they live in abroad during environmental crisis. On the other hand, poor people make new things with these wastes such as plastic bottles, peels of fruits, etc. Poor people who live in the slum areas might have more environmentally friendly practices with economic support. (Rian-Ovi, Participant’s Interview, 2016)

Introduction
The previous chapters have sketched the co-researchers’ research findings from rural and urban Bangladesh through their photos, drawings and interview data. Co-researchers’ research findings have been represented under three themes—young people’s environmental perceptions, environmental knowledge and environmental agency. This chapter highlights the sociocultural factors that might influence these young people’s ecological literacy.

First, it is important to revisit the definitions of ecoliteracy. This chapter uses Capra and Luisi’s (2014, p.353) definition which was largely built on the work of Orr (1992): ‘Being ecoliterate means understanding the basic principles of ecology, or principles of sustainability, and living accordingly’.

In examining young people’s ecoliteracy, it is essential to know the social and cultural factors that influenced their ecological perceptions, knowledge and agency in postcolonial times. As recalled in Chapter Two, Fien (2002, p. 151) found the ecoliteracy of young people in the Asia-Pacific region to be influenced by ‘indigenous cultural and
religious’ factors. In this chapter, the sociocultural factors that influenced the ecoliteracy of the co-researchers and participants of this study are examined. The data are organised into four themes highlighted by the young people:

1) সামাজিক বিষয়াবলী [Social aspects]
2) রাজনৈতিক বিষয়াবলী [Political aspects]
3) পরিবেশগত বিষয়াবলী একটি সাংস্কৃতিক দৃষ্টিভঙ্গি থেকে [Environmental aspects from a cultural perspective]
4) সাংস্কৃতিক বিষয়াবলী [Cultural aspects].

Part One: Social Aspects
Matsumoto and Juang (2008, p. 12) defined society as ‘a system of interrelationship among people’. Social factors include: the impact of population, socioeconomic factors, governmental influence, technological innovation, media influences, history of culture, religious aspects, and institutional structure (Matsumoto & Juang, 2008). The influence of social aspects such as these are reflected in the data from young people in both rural and urban schools, with this chapter exploring how the social factors of a particular community impacted on these young people’s ecoliteracy.

Co-researchers’ ecoliteracy is discussed by drawing on interviews, photographs and drawings. Participants’ ecoliteracy is discussed by drawing on co-researchers’ interviews with them.

Influences of Social Aspects on Co-Researchers’ Ecoliteracy
Many co-researchers elected to capture their understanding about social, environmental, political and cultural aspects through their photography. As shown in Figure 8.1, the photomontage represents different types of photos including farmland, architecture, sources of water, gardens, flowers and fruits, urbanisation, industry, environmental degradation, the language memorial and indigenous way of learning. Earlier research (such as Fien, 2002) also represented young people’s ecoliteracy influenced by the cultural factors.
Farming, Tourism and Industry in Bangladesh

Farming is very much respected in Bangladesh. Many of the co-researchers and participants make reference to farming practices and other industries in their interviews and focus groups discussing the Bangladeshi environment, for example:
Bangladesh is a riverine country. River water is used for irrigation. Bangladeshi farmers produce a lot of crops in the land. So we import very little agricultural products from other countries. (Sakib-Nafis, Participant’s Interview, 2016)

Bangladeshi land is fertile. Rice, wheat and jute are produced in this land. So our land is different from other countries. Bangladesh is a riverine country. (Durjoy-Una, Participant’s Interview, 2016)

Nafis stated with pride that Bangladesh produces many of its own crops with the use of river water and imports few agricultural products from other countries. Una also discussed the fertile soils of Bangladesh and describes these as unique. Ruhanika described the significance of Bangladeshi rivers:

Bangladesh is a riverine country. We can find 700 rivers in the map of Bangladesh. Bangladeshi rivers and climate are different to me. Rivers help us in our agriculture with water and fertile soil. So our farmers can produce sufficient crops that give us economic support. (Rupkotha-Ruhanika, Participant’s Interview, 2016)

Shihab captured a photo of a rice field (see Figure 8.2) and emphasised the importance of rice to the people of Bangladesh.
James also discussed rice: ‘My father produces crops such as rice, mastered in his farmland that give us food and economic support’ (Ashraful-James, Participant’s Interview, 2016). James stated producing rice provides food and economic support to his family. In his community, many people grow rice in fields as rice is their staple food and supports the local economy. This finding is consistent with Islam’s (2006) findings of rural Bengali families being self-sufficient in rice production.

During a focus group discussion, Manik expressed his concern about the impact of climate change on the environment, particularly as to how this impacts farming:

Average weather of an area over 20–30 years is called climate, and changing the climate is called climate change. Due to climate change temperature is increasing and environmental disaster occurs. There is an impact of climate change on lives and livelihood of many people. Irregular rain and extreme temperature affect our crops a lot. To solve climate change we can recycle and reuse our used things. We should show a friendly attitude towards the environment. (Rose-Manik, Principal’s Researcher’s Group Discussion, 2016)
Manik described climate change in relation to the livelihood of people. Chowdhury (2015) stated that the main food of Bangladeshi people is rice (85%), however, global warming resulting in climate change is causing a food crisis by reducing the production of rice in the country.

Farming is a prominent aspect in the lives of rural young people in Bangladesh and these young people frequently refer to framing practices when discussing environmental knowledge as farming appears to be foremost in their minds. Islam (2006) discussed how Bangladeshi people produce their own food through agriculture and how they value the environment because they depend on the natural world for their livelihood. These young people witness how the climate is changing and are concerned about the degradation of the environment and how it directly impacts their farming practices.

Una described fish as one of the economic sources of Bangladesh: ‘Cox’s Bazar is the largest sea beach. Hilsa is our national fish. We earn foreign currency by exporting this fish’ (Durjoy-Una, Participant’s Interview, 2016). Una described how hilsa fish support the country’s economy through export. The fishing industry in Bangladesh promotes the economy as it provides employment, but sustainability is vulnerable due to poor practice such as fisheries overfishing small hilsa fish (Islam et al., 2016).

Pipul described the contribution of jute products to the economic sector of Bangladesh: ‘Jute is known as “The Golden Fibre of Bangladesh”. We export jute products and earn foreign currency. So jute is different to me’ (Sarwar-Pipul, Participant’s Interview, 2016). Pipul described the fertile nature of land and jute as the cash crops of Bangladesh. Jute bags are made of biodegradable materials which are sustainable and renewable (Jalil et al., 2013).

In each of these examples, the environment is portrayed as an important resource to support the economy. These discussions relating to the environment are anthropocentric as agriculture is central for these young people when discussing their
perception of the Bangladeshi environment. For the families of most of these young people, agriculture is their livelihood.

The Sundarbans mangrove forest is very special to the Bangladeshi people as this is the habitat of the Royal Bengal Tiger and there are significant plants such as medicinal plants that grow in the mangroves:

The Sundarbans mangrove forest is rich and famous. Royal Bengal Tigers are seen in the Sundarbans. (Durjoy-Unia, Participant’s Interview, 2016)

We have a mangrove forest which is very rich in plants such as sundari, geoa and goran. The Royal Bengal Tiger is found in the Sundarbans that is our national animal. (Sarwar-Pipul, Participant’s Interview, 2016)

The Sundarbans mangrove forest is an important resource of Bangladesh. Sundari, goran, geoa are important trees and the Royal Bengal Tiger is our national animal. The inhabitants of the Sundarbans influence our economy by collecting and selling honey from the forest. (Sarwar-Hillol, Participant’s Interview, 2016)

One participant discussed the biological diversity of the Sundarbans and how medicinal plants are gathered by people in this forest:

The Bangladeshi environment is unique. It is seen as biologically diverse. The spring season and the forests made the country different from other countries. The Sundarbans mangrove forest is famous. Golpata and sundari grow in the acidic soil. Bangladeshi soil is very fertile. So plants grow easily in this land. Arjun, horitoki and bashok are useful medicinal plants that grow in our country. (Monika-Anika, Participant’s Interview, 2016)
Unu, Pipul, Hillol and Anika all mentioned the Royal Bengal Tiger when describing the Sundarbans mangrove forest. Anika described the Sundarbans mangrove forest as a natural resource for the local people. In rural areas of Bangladesh, more than 60% of people depend on the biodiversity in the forests for their food and natural medicinal plants (Islam, 2006). Although highlighting the habitat value of the Sundarbans in terms of their important national animal, Pipul, Hillol and Anika alluded to the forest as the source of economy or a natural resource in Bangladesh, suggesting that they see this environment as an important economical resource for humans, rather than a significant ecological community. Conversely, Israt and Mithilia made reference to the mangroves and other beautiful places in Bangladesh but emphasised the unique beauty of these areas, rather than these being an economical resource for humans:

> The Sundarbans mangrove forest, the Jaflang tea garden, the Bandarban hill and the Rangamati hill are very beautiful places. These are the diverse characteristics of Bangladeshi environment. (Niha-Israt, Participant’s Interview, 2016)

> The Cox’s Bazar beach, the St. Martin Island and the Sundarbans Royal Bengal Tigers are the unique features of Bangladeshi environment. (Moumita-Mithila, Participant’s Interview, 2016)

These participants demonstrated their passion for their country and its natural beauty. Afroz and Hasanuzzaman (2012) discussed how tourism is a developing sector in Bangladesh and that the Bandarban district has been recognised for its divine beauty. If Israt and Mithilia were making reference to these places as economically significant tourist destinations, then they would be looking at this environment as a resource for the benefit of humans. However, it is unclear if they were referring to tourism or referring to the natural beauty of Bangladesh and their pride in their connection to the Bangladeshi environment.

Tasnuva made reference to the economic value of the ready-made garments of Bangladesh in addition to the agriculture and tourism:
Bangladesh is a riverine country. River water makes the soil fertile. We produce a lot of crops in our land. Bangladesh is an agricultural country. This country is developing with agriculture. There are many beautiful places in Bangladesh which attract many foreigners. Bangladesh earns foreign currency by exporting prawns and jute products. We also export beautiful ready-made garments that give us economic support. (Liya-Tasnuva, Participant’s Interview, 2016)

Tasnuva talked with pride about the significance of agriculture in the Bangladeshi environment with its rich soils of the riverine country. Like other participants, Tasnuva was very focused on the environment in terms of a human resource. He also discussed some of the economic industries of Bangladesh including the ready-made garment sector as the main source of income in Bangladesh. This supports Reza, Islam and Shimu (2017), which showed that the ready-made garment industry is one of the largest business and trade sectors in Bangladesh (with 4.4 million people and 80% of women working in the sector). Farhana, Syduzzaman and Munir (2015) emphasised, although ready-made garments form a major industry in Bangladesh, they provide little income to employers. The industry is a big part of Bangladeshi colonial history. Tasnuva did not mention the exploitation of workers in the Bangladeshi garment industry. He may not be aware of the low wages and poor conditions associated with such industries.

Foreign investors do not increase the unit price, therefore owners fail to provide proper wages to the employees (Personal communication with Shahin – garment industry employee). Chowdhury (2018, p. 50) allude to the ‘paradox’ of the working women in Bangladesh ‘who is both autonomous, self-reliant, and economically productive while simultaneously oppressed, menial, and ‘third world’.

Shihab was concerned about the issue of pollution resulting from garment factories. He photographed a polluted canal that was directly behind a ready-made garment factory (see Figure 8.3). Environmental degradation is a big issue in Bangladesh, particularly through the disposing of solid and liquid wastes from garments industries into water bodies (Reza et al., 2017). Reza et al. (2017) also mentioned that garment industry equipment also generates greenhouse gases and chemical elements that degrade air quality.
School Education

Many of the co-researchers and participants’ responses were influenced by information from school textbooks. Haque (2013) argued, the formal education system of Bangladesh has failed to provide environmental education that promotes everyday life applications. Chowdhury (2014) identified, the poor representation of issues such as ‘natural resources degradation and depletion, biodiversity, energy, (and) urbanization’, in the original textbooks and noted that climate change was not mentioned at any level despite there being ‘ample’ opportunity for the inclusion of this important issue.

The following examples illustrate the influence of the textbook on these young peoples’ knowledge and understanding of the environment:

Everything around us is called environment. Living beings such as humans, animals and non-living things such as table and chair are the components of environment. There are two types of environment, natural and social. Plants and rivers are part of the natural environment and school and hospital are part of the social environment. (Rose-Zinat, Principal Researcher's Group Discussion, 2016)

Figure 8.3: Shihab’s Photo of a Polluted River, the Turag.
Everything around us is called environment. Living beings and non-living things are the two components of environment. Living beings such as plants, rivers and non-living things such as vehicles, houses, etc. There are two types of environment, natural environment and social environment. Schools and houses are included in the social environment. Plants, rivers and lakes are included in the natural environment. (Niha-Sonu, Co-researcher’s Interview, 2016)

Everything around us is made up an environment. There are two types of environment such as natural environment and man-made [sic] environment. Man-made [sic] environment includes houses and schools. Natural environment includes plants, rivers, hills, mountains, etc. (Sujana-Ruhi, Co-researcher’s Interview, 2016)

Here, Zinat, Sonu and Ruhi, as with many of the young people in this research (see Chapter Five), used information from their textbooks that separates the environment into two components, the natural and social (or man-made) environment. This view of the environment promotes an anthropocentric view where humans are separated from what is perceived to be the ‘natural’ environment’ (as discussed in Chapter Five).

Sumi used her textbook knowledge to demonstrate the significance of maintaining environmental balance:

‘Eco’ means environment and ‘logy’ means knowledge. Ecology means knowledge about the environment and its elements. We should conserve the elements of the environment to maintain its balance. Ecosystem is the relationship and interaction between the environment and living organisms including humans. For example, in a pond small fish eat algae and big fish eat small fish. Thus, they balance the pond ecosystem by helping each other. In a forest, grasshoppers eat grass, snakes eat grasshoppers, deer eat snakes and tigers eat deer. So the
number of deer or tigers are not increasing. Thus, they maintain the environmental balance by depending and interacting each other. (Rose-Sumi, Principal Researcher’s Group Discussion, 2016)

Here, Sumi highlighted the relationship between living organisms including humans and the environment. She drew information from wild ecosystems to emphasise the importance of conservation and avoiding overuse of environmental elements. In this sense, Sumi, in contrast to Zinat, Sonu and Ruhi, moved away from an anthropocentric position as she demonstrated the importance of maintaining environmental balance with all living things and environmental elements, rather than privileging humans.

Family
Many of these young people learn to carry out environmental practices in their own homes. This is reflected in comments relating to environmental practices that have emerged in the data and illustrated by comments from co-researchers Sujana and Zinat:

I have learnt from my parents about using kitchen waste water in the garden. (Rose-Sujana, Principal Researcher’s Group Discussion, 2016)

My mother uses peels of vegetables and fruits for making compost. This compost is used in our vegetable garden. (Rose-Zinat, Principal Researcher's Group Discussion, 2016)

Payne (2010) highlights how young people in Australia also gain education relating to environmentally sound practices from their families.

Influence of Social Aspects on Participants’ Ecoliteracy

Class
One participant made reference to the class systems in Bangladesh when discussing the environmental behaviour of rich and poor people:
Rich and poor people live in our society. Rich people do not have feeling for the environment. Rich people pollute the environment by using air condition and disposing their wastes in a haphazard manner and they live in abroad during environmental crisis. On the other hand, poor people make new things with these wastes such as plastic bottles, peels of fruits, etc. Poor people living in the slum areas might have more environmentally friendly practices with economic support. (Rian-Ovi, Participant’s Interview, 2016)

Ovi described poor people as being more environmentally aware than rich people. Shiva (2000, p. 13) discussed in her research how sometimes poor people use environmental resources wisely as they believe that ‘wasting resources creates hunger’.

Gender

Himi discussed the activities of her environmental conservation group:

I am involved in an environmental conservation group. This group distribute plants among people and tell them how to take care of them. We are also aware of how illiterate women are. (Rupkotha-Himi, Participant’s Interview, 2016)

Himi related how, as part of their environmental group activities, she provided information to help educate illiterate Bangladeshi women about the environment. In 2016, in Bangladesh over 31% of women over 15 and 74.99% of women over 65 were illiterate compared with 24.34% and 47.56% males in the same respective age groups (UNESCO, 2016, np). Jahan (2008) stated that Bangladeshi women are concerned about and value the environment, but may be more susceptible to becoming distressed about the state of the environment. Females in 14 countries (in the late twentieth century) were found to be more ecocentric than males and female youth demonstrated more concern towards improving the environment than men (Zelazny, Chua & Aldrich, 2000). In a study comparing data from 2000 and 2010 in the US, women in both decades were found to exhibit more pro-environmental behaviour and demonstrate more concern towards the environment than men (Xiao & McCright, 2015).
Technologies

One participant believed that Bangladesh needs to improve its technology relating to recycling:

> Environmental pollution is a global problem. People are using air condition that produces chlorofluorocarbon. Developed countries recycle their waste products and reuse. In Bangladesh, recycle and reuse should be more focused. (Hasan-Rocky, Participant's Interview, 2016)

Rocky described the negative impact of technology on the environment and the importance of reuse, but believed that recycling technology could help solve environmental problems. The Bangladeshi curriculum emphasises how science and technology have the capacity to solve any problems (Haque et al., 2007). However, humans exploit nature with the use of science and technology to fulfil their needs, rather than reducing consumption, and this exploitation creates ecological imbalance (Gada, 2014).

Part One Summary

This section outlined co-researchers and participants' discussion relating to a number of social and cultural aspects including farming and industry, the garment industry, school education, family, class, gender and technologies. These have been analysed in terms of portraying how co-researchers and participants perceive these social aspects in relation to the environment and how these aspects influence their environmental knowledge, values and attitudes. It is evident that many of these young people have a deep love for their land and its natural features, but in many instances their perception of the environment is one of a resource for the benefit of humans and how the health of the environment directly relates to human health.

Part Two: Political Aspects

Human activities lack of understanding of environmental values, scarcity and inadequate alternative resources are the main reason for environmental problems that
occur in Bangladesh (MoEF cited in Islam, 2005). The concern of political aspects are reflected in many of the notes from the students. Discussion of co-researchers’ perceptions draws on interviews with them, while discussion of participants’ perspectives draws on co-researchers’ interviews with them.

**Co-researchers’ Ecoliteracy**

Many of the co-researchers selected to capture their environmental ecoliteracy through photographs. The photos and drawings represents the role of local government in the community.

**Water Pollution**

As shown in Figure 8.3, Shihab took a photo of a polluted river the Turag because people dump household rubbish, industrial wastes and logs of trees into the water. Islam, Tushar, Mustafa and Mahmud (2012) stated, the water of Turag (downstream) is polluted and not suitable for drinking or for fish farming. Kibria et al. (2015) found that humans pollute river water through industrial wastes which affects the environment. Tapan et al. (2012) stated, there is no alternative to raising public awareness to reduce pollution.

In Bangladesh, some people live near the river and most industries are located near the river. As a result, rivers are polluted through domestic and industrial solid and liquid wastes. Sony described the causes of his community’s environmental pollution:

I am concerned about environmental pollution. The public are not environmentally aware. They generate urine in the open places but it is written there please do not generate urine in the open places, if you do that you have to pay Tk.50 for one time. This is happening because of a lack of education and administration of the country. People dispose their wastes in a haphazard manner and cutting down trees for making their houses. Unplanned factories discharge chemical wastes in the rivers that pollute water. Most of the factories are built at the bank of the rivers. People use old vehicles and produce a lot of black smokes. Brick factories are also polluting air. As a result, carbon dioxide is
impacting the environment. (Shihab-Sony, Participant's Interview, 2016)

Rahman (2011) strongly emphasised that the government of Bangladesh needs to develop a strong policy to reduce industrial and community wastes. According to the Asian Development Bank (1997 cited in Fien et al., 2002, p. 2), ‘Asia is the world’s most polluted and environmentally degraded region...The range of environmental problem is huge—from the degradation of rural land to the pollution and congestion of the region's mega cities’.

_Urbanisation_

Ashraful stated his local ‘environment is becoming worse due to urbanisation’. He photographed a large building which was under construction to illustrate how the environment was changing (see Figure 8.4).

_Figure 8.4: Ashraful's Photo of a Large Building under Construction in his area._

Ashraful said the environment is becoming worse due to urbanisation:
In our community the number of buildings are increasing and the number of trees are decreasing. As a result, air and water are becoming polluted in our community. (Rose-Ashraful, Principal Researcher’s Group Discussion, 2016)

Ahsraful was very concerned over how Dhaka city is becoming heavily urbanised due to the large numbers of people who live in the city. Bangladeshi rural people move to the city for better income opportunities, and this population growth creates complex situations (Ahmed, 2014). However, young people thought overcrowding impacts the environment in terms of pollution which indicates their environmental sensitivity, rather than their concern about economic growth. Islam (2005, p. 671) discussed how ‘poorly designed development activities, misguided policies, flawed development models and inadequate access of resources’ is also adding to the problems surrounding overpopulation in Bangladesh. Like Bangladesh, rapid urbanisation in India is degrading the environment with increasing population leading to pollution impacting the air, land, and water the disposal of wastes from the increasing population is also of concern (Uttara, Bhuvandas & Aggarwal, 2018). Ahsraful did not directly mention the government in terms of policy or regulation, but was concerned over how urbanisation is impacting the environment. These young people are witnessing the direct impact of urbanisation, associated poor planning and policy and the impact on their local environment.

Community Water Supply

As shown in Figure 8.5, Nipu took a photo of a rooftop tank.
Nipu discussed how the tank would help conserve the Dhaka Water Supply. Nipu’s photograph of this rainwater tank perhaps demonstrates that she sees water sustainability as an important issue, particularly as the drinking water of Dhaka is contaminated with pathogenic bacteria (Sabrina, Hasan, Omor & Subhagata, 2013). In Figure 8.6, Zinat drew a girl washing hands with tube well water because ‘the tube well water is safe for drinking’.

Figure 8.5: Nipu’s Photo of a Rooftop Water Tank.
Sakib described how tube well water is safe in his community: ‘Tube well is the source of water in my community. This water is free from arsenic’. (Rose-Sakib, Principal Researcher’s Group Discussion, 2016).

In this community, many rural people use tube well water for all purposes including drinking. The well water is free from arsenic because most of the tube well water in rural areas has been tested by the government and marked with a green colour, which indicates the tube well water is safe for drinking (Das, Roy & Mostafa, 2015). Although the government of Bangladesh have organised safe drinking water for their citizens they still suffer from arsenic toxicity due to polluted water supply in some areas (Yunus, Khan, Chowdhury, Milton, Hussain & Rahman, 2016). Hoque et al. (2006) stated that technologies to remove arsenic from the water in addition to exploring innovative methods to collect water are widely promoted in rural areas of Bangladesh.

Sumi described the water supply in her (urban) community: ‘In our local community WASA [Water and Sewerage Authority] supply water to us that is underground water’ (Rose-Sumi, Principal Researcher’s Group Discussion, 2016).
Sumi described the underground source of water in her community as being supplied by the Water and Sewerage Authority. Conti, Velis, Anloriou and Nijsten (2016, p. 3) found ‘sustainable and equitable ground water plays a critical role in “ensuring no one is left behind”’ in terms of their water provision. Conti et al. (2016) stated ground water is an important resource in Bangladesh to support the health of the environment and its inhabitants.

*Wild Life Conservation*

As shown in Figure 8.7, Hasan drew two birds in a cage and stated, ‘keeping birds in the cage is illegal’. Ramadoss and Moli (2011) showed that biodiversity conservation education programs increase students’ knowledge, concern and skills to protect local natural resources and biodiversity. Animal care policies state that unkindness to animals is a crime (Farhana, 2016). Similarly, the Quran states that ‘all animals and birds in the world those move around and fly with two wings have similar right to live as humans’ (Al-An’am, 6:38) As the majority of the population in Bangladesh are Muslim, this statement is influential.

*Figure 8.7: Hasan’s Drawing on Two Birds in a Cage.*

Hasan is aware of the policy in his community, where it is unlawful to keep birds in cages at home unless a person is registered with a licence.
Regulations

Robin described human impacts on the environment and the government's environmental guidelines to promote environmental conservation:

I am concerned about environmental pollution. Bangladesh is a developing country. Many people are not environmentally illiterate. They do not have ideas about the negative impacts of environmental pollution. They pollute the environmental elements consciously and unconsciously and lack humanity. They bring the unexpected change in the environment by polluting soil, air and water and clearing forests as a result the amount of carbon dioxide gas is increasing in the air. Scientists revealed that 25% forest area is needed for a country but it is limited in our country. Every day we can see that people are polluting the environment. It is our responsibility to reduce environmental pollution.

Environmental conservation is the most important issue to me. We should keep the environment clean because it is very important for us. It is a global issue now and whole nations are conscious about reducing environmental pollution. Bangladesh is one of them. Environment is polluted by environmentally illiterate people. A polluted environment may impact our health through different types of diseases such as measles, pneumonia, skin disease, etc.

We should follow the environmental law produced by the government: to stop using plastic bags and stop riding two stroke motor vehicles. Two stroke motor vehicles produce a lot of smoke that contains carbon dioxide, methane and carbon monoxide gases harmful for the environment.

We can reduce environmental pollution by taking some steps such as using CNG drives vehicles, stop using expired vehicles, expanding
afforestation programme, organising environmental court and an international conference on climate change.

Earlier people believed that human must care the environment but that perception is changing nowadays. They have realised that human activities are the main reasons of environmental impacts. So human want to make a friendly relationship with the environment and a healthy life by maintaining the environmental balance. I think collective initiatives is important to make a healthy world. (Ashraful-Robin, Participant’s Interview, 2016)

Robin described human impacts on the environment and believed that people should follow the government’s guidelines to promote environmental conservation. He believed that it is the responsibility of all people to reduce their impact on the environment. Robin’s interview demonstrated ecoliteracy—in fact, he referred to people being ‘environmentally illiterate’ when they pollute the environment both consciously and unconsciously. He thinks that people need to show more concern and follow government policy and that it is not about humans caring for the environment but people making ‘a friendly relationship with the environment’ in a collective approach to make a difference. Aminuzzaman (2010) argued the guidelines of the National Environmental Policy 1992 emphasised using natural resources sustainably so to reduce any detrimental impact on the environment.

Abisa and Romeo described initiatives for tree planting:

I have planted trees on a ‘Tree Plantation Week’ with my friends in the community. Our government organise this week every year on the 5th of June, the World Environment Day. Our Prime Minister also planted trees in this week that encourage the public about planting trees. I feel happy by planting trees and many students study in agriculture at the Agricultural University in Bangladesh. (Monika-Abisa, Participant’s Interview, 2016)
In 2007, I participated in a tree plantation programme organised by the government. We distributed many plants to the community and I got a jarul plant. We made a rally with plants. The slogan was ‘Plant Trees, Save the Environment’. Through this programme we have planted many trees in our community and conveyed the message to others that trees give us oxygen to live so plant trees. (Tasib-Romeo, Participant’s Interview, 2016)

Abisa and Romeo describe how the government of Bangladesh has taken some initiatives for environmental conservation through the organisation of tree plantings. The 1992 National Environmental Policy’s objective was ‘to maintain ecological balance and overall development through protection and improvement of the environment’ (Aminuzzaman, 2010, p. 2).

**Part Two Summary**

When discussing environmental matters, the co-researchers and participants made reference to government infrastructure, urbanisation, pollution, policies and laws. Areas covered included local government water supply, overdevelopment (urbanisation), pollution and public policies and laws in relation to environmental matters and sustainable practices. There was no reference by these young people to political structures or aspects of democracy.

**Part Three: Gardens and Food as Culture**

Matsumoto and Juang (2008) discussed how climate change, topography and the availability of resources are ecological factors which affect culture. Discussion of co-researchers’ ecoliteracy draws on interviews, photos and drawings, while discussion of participants’ ecoliteracy draws on co-researchers’ interviews with them.

**Gardens**

The following photos demonstrate how co-researchers and participants build on their knowledge of sustainable practices by gardening with their families or in their schools.
Rashed captured the photo of a custard apple tree with fruits in his garden (see Figure 8.8). Rashed said he loves custard apples and share the fruits with neighbours.

![Image of a custard apple tree](image)

**Figure 8.8: Rashed’s Photo of a Custard Apple Tree with fruits from their home garden.**

In this community, many people plant different types of fruit trees and share the fruits with their neighbours. Rashed described his enjoyment of eating the fruit that his family had grown. He also discussed how his family share the fruit with the neighbours. Islam (2006) stated people think they should not cut down fruit-bearing trees and if they give the first fruits of their trees to neighbours then it might bring more fruits in future. Islam (2006) described how Bangladeshi people believe that nature is a blessing as it gives them food and shelter.

Rupkotha captured a photo of a boy working in a vegetable garden, stating the ‘the garden gives us food and economic support and joy’ (see Figure 8.9). Rupkotha believes that growing vegetables is more cost effective than purchasing vegetables in the market. He describes the joy that the vegetable garden brings families.
Chawla (2015, p. 433) stated that ‘trees and natural areas are essential elements of healthy communities for children’ and Jones et al. (2005) argued small vegetable gardens encourage people to build on their knowledge and promote nutritional practices.

**Roof Gardens**

Shamim captured a photo of a white gourd plant in her family roof garden (see Figure 8.10).
Shamim understood the benefits of roof gardens to provide fresh produce and help insulate homes from the heat. This sustainable practice of roof gardening helps improve air quality, supplies fresh food and absorbs atmospheric carbon dioxide (Safayet et al. 2017). Vazhacharickal (2014) described how people in majority countries gained social, economic and environmental benefits from rooftop and balcony gardens. Himu described his family rooftop garden and fruit gardens:

In our rooftop garden I have planted flowering plants such as rose, marigold and patharkuchi. We have planted fruit trees such as mango, blackberry, custard apple and litchi in our home garden. (Rashed-Himu, Participant’s Interview, 2016)

Jafari et al. (2015) believed that rooftop gardens provide urban dwellers with sustainable environmental, social and economic support.
**Balconies**

Durjoy’s took a photograph of marigold flowers from his balcony garden (see Figure 8.11). Durjoy said the small balcony garden is low cost and manageable:

![Durjoy’s Photo of Marigold Flowers in his balcony garden.](image)

**Figure 8.11: Durjoy’s Photo of Marigold Flowers in his balcony garden.**

In this particular community, urban people make flower or vegetable gardens in the small space of their balconies. Prerona described his gardens on the roof and balcony:

I live in the city so we do not have sufficient land for gardening. I have planted flowering plants such as tube rose, marigold and rose in the balcony. On the rooftop there is a small vegetable garden. I have produced vegetables such as tomato, bitter gourd, spinach and green chilli in the garden. (Moumita-Prerona, Participant’s Interview, 2016)
Prerona stated she made a flower garden in the balcony because of the scarcity of spaces in the city.

*School Gardens and Plantings*

Sumi took a picture of her school garden where she enjoyed working (see Figure 8.12).

![Sumi's Photo of the School Flower (Marigold) Garden.](image)

**Figure 8.12: Sumi’s Photo of the School Flower (Marigold) Garden.**

Sumi said she enjoyed working in the school flower garden. Arneson (2012) found that school gardens positively influenced middle school students’ attitudes in Nebraska through forming clubs.

Poly discussed planting trees in the school grounds:

> Every year our school organise the Tree Plantation Week. In this week, students plant trees in the school compound. They also dispose wastes in the right place. (Sumi-Poly, Participant’s Interview, 2016)
**Part Three Summary**

It is evident that the co-researchers and participants gained pleasure and enjoyment from gardening with their families in home gardens, rooftops and balconies and also planting in their school grounds. These practices provide these young people with the opportunity to build on their knowledge and skills relating to ecologically sustainable practices.

**Part Four: Cultural Aspects**

Matsumoto and Juang (2008, p. 12) defined human culture as ‘a unique meaning and information system, shared by a group and transmitted across generations, that allows the group to meet basic needs of survival, peruse happiness and well-being, and derive meaning from life’. Cultural aspects are reflected in many of the comments from students in both rural and urban schools.

**Traditional/Indigenous/Religious Knowledge**

Sujana photographed a man ploughing the land with two cows (see Figure 8.13). He said, ‘ploughing the land with cows is environmentally friendly’. Somerville (2007) found that indigenous people have friendly and visual connection with the land. Nakata (2002) stated that although indigenous knowledge was disrupted and suppresses by colonisation and modernisation, more recently it has gained attention in global formal education systems. However, Haque (2013) argued, the education system of Bangladesh has failed to provide indigenous knowledge to students.
In Bangladesh, rural people prefer ploughing the land with cows over using tractors because they believe it is a more sustainable practice. Sakib referred to the traditional way of learning about land: ‘Many young people learn farming from elderly people. So I think culture influence young people’s ecoliteracy’ (Rose-Sakib, Principal’s Researcher’s Group Discussion, 2016). This demonstrated the influence of culture on young people’s ecological knowledge. Orr (1992) stated, ecological sustainability focuses on the effort of preserving traditional knowledge of land and its roles.

As shown in Figure 8.14, Durjoy captured a photo of two boats in the river because he believed ‘boats are an environmentally friendly transport’. In his community, rural people use boats, a sustainable form of transport, for business purposes.
Two participants commented on the religious significance of planting trees:

I am an ecoliterate person. I love trees and planting trees and enjoy my leisure time by looking after them. I also think about the environment. Trees maintain the balance of the environment. My religion is Islam that tells us to plant trees and look after them. (Rose-Sumi, Principal Researchers’ Group Discussion, 2016)

If we plant trees and other people eat fruits, in Islam that is good for us.
(Rose-Awabin, Principal Researchers’ Group Discussion, 2016)

Sumi described how trees help us by providing fruits and keeping the environment healthy. Ashtankar (2016) highlighted how it is important to protect the environment in Islamic philosophy as humans are accountable to look after the environment. Social beliefs and values make individuals understand that their interactions with the natural
environment are central to their life so they should respect and care for the environment (Islam, 2006).

Dipa described the importance of ‘neem trees’ as organic pesticides:

Climate change can be solved partially by planting trees. For example, neem plants keep the environment healthy and works as pesticides. (Sujana-Dipa, Participant’s Interview, 2016)

Salequzzaman and Stocker (2001) stated neem leaves are utilised as a natural insecticide for use in food grains in many parts of Bangladesh. Akhtar (1996) stated Islamic lessons encourage people to make a harmonious relationship with nature. The perception of humans caring for the environment does suggest that humans are separate from, or have dominion over other, animals and elements of the Earth.

Shihab drew a native flower, datura, and described it as a medicinal plant (see Figure 8.15). Datura is used as a medicine for the treatment of various diseases and it is used as an insecticide and for medicinal purposes which is consistent to Parveen, Vijula, Avinash, Rabishankar, and Leeladhar (2016). Plants are an important part of Bangladeshi culture and flowers symbolise different cultural occasions and festivals such as martyr's day and marriage.
Sujon described indigenous aspects of Bangladesh:

Bangladesh is seen biologically diverse. Bangladeshi flowers such as kadam and sheuli are very attractive and sweet scented. Fruits such as mangoes, jackfruits, litchis and bananas are very sweet. The jackfruit is our national fruit. Animals such as lions, tigers, deer, giraffe. We have different types of birds such as magpie, dove, king fisher, pigeon and parrot. Magpie is our national bird which looks pretty. (Nahid-Sujon, Participant’s Interview, 2016)

In considering the local environment of Bangladesh, Sujon described indigenous flowering plants, fruits of Bangladesh and other animals indigenous to her land. Here, she demonstrated her fondness for the Bangladeshi environment, but her perception of the environment is from an anthropocentric position where humans are not included as part of the biodiversity.

Native Language

Niha, Raion and Rashed made reference to International Mother Language Day. Niha drew the event (see Figure 8.16) and Raion captured a photo of the language memorial in Bangladesh (see Figure 8.17).
Figure 8.16: ‘International Mother Language Day/21st February’ (Niha’s Drawing) with students’ slogan- ‘Bengali will be our national language’ displayed in front of the Martyr’s Memorial at the campus of the University of Dhaka.

Translation of text: International Mother Language Day is the day when many Bengali people sacrificed their life for their mother language. The 21st February is our consciousness that we celebrate every year which is related to many people's life of the year 1952. This day reminds us about the way of new life, the Martyr’s monument, and songs of love and reminds us to make people aware about these students’ sacrifice.
International Mother Language Day came about due the Pakistani Government, then the Government of East Pakistan attempting to bring cultural and language uniformity across Pakistan, declaring that 'Urdu' was to be the national language (Choudhury, 1972, p. 247). This led to the East Pakistan people believing their culture and language (Bengali) was disappearing (Choudhury, 1972). International Mother Language Day is the anniversary of when, in 1952, students from Dacca University (now the University of Dhaka) in East Pakistan (now Bangladesh) took action in the form of protests to attempt to protect their language and culture from the Pakistani Government, with police action leading to the death of three students (Choudhury, 1972). Bowers (1996, p. 7) stated that the 'language of a culture plays a crucial role to develop epistemic and moral patterns'. In Bangladesh, language is very important to the people and central to their cultural practices and what they believe. It is evident the co-researchers see these student activists in 1952 as role models who lost their lives while attempting to protect the cultural independence of the Bangladeshi people. Bowers (1996) argued that language helps shape an individual’s knowledge and beliefs.
Rashed also made reference to International Mother Language Day:

We are benefitted from the environment in many ways. I think trees are the main part of the environment. For example, we get flowers from the trees that we use on International Mother Language Day, marriage day and birthday. I think flowers are the best things which are used for special occasions. (Rashed-Lucky, Participant's Interview, 2016)

Rumi discussed the unity of Bangladeshi people: ‘Bangladeshi people can walk and talk easily. They have unity and they love each other’ (Sumi-Rumi, Participant’s Interview, 2016). Bhuiyan (2016) and Akhtar (1996) found that unity is a great strength of Bangladeshi people and derived from their native language and unique culture. The fact that Bangladeshi people preserved their language has been very significant for their unity and independence.

Muna described the religious practice of ‘cleaning the environment’: ‘I am concerned about environmental cleanliness. A clean environment gives us a healthy life to live’ (Adronida-Muna, Participant’s Interview, 2016).

Muna described how environmental cleanliness is important for a healthy life. Many of the co-researchers and participants were worried about the dumping of wastes or other activities that lead to pollution impacting the health of the environment. Kamali (2012) stated that cleanliness is a vital part of beauty both in and out of the Islamic religious faith. Islam (2006) stated that Islamic religious beliefs and values encourage respect towards the environment. This view of the state of the environment is related to human health and is anthropocentric, rather than the health of the environment in relation to the Earth’s as a dynamic ecosystem.

**Seasonal Diversity**

Zinat and Tasnim embraced the seasons of Bangladesh. Zinat drew rice harvesting in late autumn (see Figure 8.18).
Translation of text: Bangladesh has unlimited beauty. We can see the greenery around us and the blue sky top of our head. The rivers flow like silver ribbons. The sun rises in the morning and days smile with gentle light. The sun is very hot during the day and it becomes golden in the afternoon. The sky looks dark at night, sometimes it is golden and sometimes it looks bright with the moon. There are six seasons in Bangladesh. Summer is the first season of all. Days are very hot, that effect lakes and canals. Sometimes we see drought and sometimes storm come. Rainy season comes after that and covers the sky with black clouds so we get sudden rain. Lakes and canals overflow with water. Frogs make noise and we get the sweet smell of kadom and keya flowers. New baby rice plants move heads in autumn. The sky looks dark blue in autumn. Kash flowers bloom at the bank of the river and we get the sweet smell of sheuli flowers. Rice ripens during the late autumn and people celebrate the new rice festival called Nobanno. Little dews are seen in this time and then winter comes with fogs. People make different types of cakes in winter. We get the sweet smell of new date palm juice in air. Nature is adorned with new leaves and flowers in spring and birds sing. The seasonal diversity beautifies the country.

Tasnim also described the seasonal diversity of the country:
Seasonal variation of Bangladesh is unique to me. Summer is hot, rainy season is peaceful when keya and kadam flowers bloom, autumn looks beautiful with sheuli and Kash flowers and we celebrate the new rice festival in late autumn, the winter is good for date palm’s juice and cakes, the spring is green and lovely with new leaves, flowers and sweet songs of birds. (Rashed-Tasnim, Participant’s Interview, 2016)

Zinat and Tasnim celebrated the six Bangladeshi seasons and described the different environmental features and beauty that signify the different seasons, consistent with Biswas (2016) and Azad, Hassan and Kamaluddin (2016). These young people demonstrated their ‘sense of wonder’ and delight towards their environment (Orr, 1992, p. 8). However, Both Zinat and Tasnim demonstrated strong interrelationships between the elements of the Earth’s dynamic ecosystem and their lives, but in an anthropocentric way in that humans were central to these deliberations—for example, Zinat’s drawing is of the autumn rice festival.

**Colonial Influence**

Rakib and Najura explained how they planted trees in Scout and Girl Guide groups respectively:

I am a Scout member of my school. Every year we plant trees in the school complex on the Tree Plantation Week. (Sakib-Rakib, Participant’s Interview, 2016)

I have participated in an environmental cleaning programme and a tree plantation programme through our school Girls’ Guide. (Adronida-Najura, Participant’s Interview, 2016)

Jennifer (2012) found, the minority (British) Girl Scouts plant gardens at homes, schools and other places to increase green space and wildlife habitats to reduce overflow of storm water and improve the quality of water. The Scout and Girl Guide movements in Bangladesh are very popular with young people and dates back to British colonial times.
It is evident that these young people relate to the sustainable practices promoted by the organisations.

**Part Four Summary**

The majority of the co-researchers and their participants discussed the ecological sustainability of Bangladesh. A small number of co-researchers discussed ecological sustainability through indigenous or traditional ways of learning of land.

**Chapter Conclusion**

This chapter has presented data under four themes—social aspects, political aspects, environmental aspects (from a cultural perspective) and cultural aspects. Part One included aspects of farming, tourism, industry education, family, class, gender and the influence of technologies. Part Two presented government regulations and policies related to infrastructure, urbanisation and pollution. Part Three covered environmental cultural aspects such as the influence of gardens on environmental values, attitudes and knowledge. Part Four presented indigenous/traditional ways of learning, including language, seasonal diversity and colonial influence.

The findings demonstrated the following key points:

1) The co-researchers and their participants are concerned about the state of the environment, particularly in relation to agriculture and what impacts them as humans. They are passionate about the environment and its beauty and have a deep love and respect for their land, but the state of human health and wellbeing is central to their environmental perception;

2) They understand that community self-sufficiency, changing human’s behaviour and women’s empowerment are essential to make the country environmentally sustainable, although some believed that technological advancement can bring ecological sustainability in the country;

3) They experienced environmental problems in their everyday life and alluded to the gap between policy and practice in environmental education in Bangladesh;

4) They believed that the public must follow environmental policy, law and regulations to bring ecological sustainability to the country; and
5) Their ecoliteracy was influenced by their native language, family, school education, religion, indigenous practices and colonisation.

It is evident that social and cultural factors influence Bangladeshi young people's ecoliteracy in postcolonial times.

The final chapter synthesises the results and concludes the thesis.
The value of education has increased and continues to increase, yet so do pollution, exestuation of resources, and the danger of ecological catastrophe. If still more education to save us, it would have to be education of a somewhat different kind: an education that takes us into the depth of things and does not spend itself in an ever-extending battle with symptoms. (Schumacher, 1997, p.28)

Introduction
Chapter 9 synthesises the findings of the research, discusses the implications of the research and draws conclusions. A summation of the chapters is presented, followed by a rich synthesis of the data. The synthesis is structured in accordance with the subsidiary research questions. The synthesis is then discussed in the context of the theoretical framing.

Summation of Chapters
Chapter One introduced and oriented the study including the position of the research in the field. This chapter also discussed the research problems, objectives, justification and the significance of the study. It was shown that, at present, Bangladesh is in a serious state of environmental crisis and there is a lack of empirical and theoretical research practices in the field of environmental education. Theoretical and empirical gaps were identified in this chapter, reinforcing the significance and justification of this study.

Chapter Two comprised a literature review. An overview of numerous international environmental policy developments and initiatives was presented and the established principles, goals and objectives of environmental education laid out. It was made clear that, at present, there are no particular policies for environmental education for school education in Bangladesh and that little research had focused on young people's ecological literacy (Salequzzaman & Stocker, 2001). It was shown that in Bangladesh, the environmental education curriculum was incorporated into different subjects and there is no working model for teachers. The curriculum is highly centralised and there are deep postcolonial and other cultural, religious and economic influences in
Bangladesh that appear to impact how environmental education is approached. As a result of these influences, it has not been possible to adapt to the changing priorities of the twenty-first century or to offer any alternative approach outside the education system described by Hossain (2015) as being highly centralised and non-participatory with little transparency.

Chapter Three portrayed the theoretical framework of the research problem and the thesis. The overarching theory of the study was stated as postcolonial sociocultural theory (an intersection of socioecological theory) to understand Bangladeshi young people’s ecoliteracy in postcolonial times. Postcolonial theory provides a lens to look at the impacts of colonisation on the knowledge, culture and general lives of Bangladeshi young people. In Bangladesh, there is a lack of empirical research on young people’s ecological literacy using postcolonial theory. Postcolonialism is the dominant theory which frames this study and takes into account the issues of colonial identities, cultural differences and indigenous outlook.

Sociocultural theory explains the influence of society and culture on young people’s ecological learning and development. Sociocultural theory recognises cultural impacts on ‘learning and development’ (Rogoff cited in Wals & Dillon, 2013, p. 255) and the results of cognitive, physical, social, emotional and personal impacts on young people (Malone, 2008). Young people’s connections with the environment were identified as learning, development and wellbeing. Learning and development were noted as interlinked; one notifies the other in relationships of practice and products. The theoretical framework established a link between young people’s environmental beliefs, knowledge and behaviour. A model to measure young people’s ecoliteracy that followed theoretical concepts of ecological literacy was established. The concepts of ecological literacy from Orr were established condensed.

Chapter Four presents the methods and methodology that frame the study. The study employed ethnography based on a child-framed methodology where young people collected and analysed the data. Barratt-Hacking et al. (2013, pp. 438–454) stated involving children as active researchers is an ‘ideal’ process for planning research and children can bring as ‘experts, actors, and stakeholders in their own and other
environment’. The methodological paradigm of this study is qualitative. There is little empirical research that has been undertaken in Bangladesh that applies a qualitative approach particularly relating to the ecoliteracy of young people. The data collection techniques included co-researchers’ semi-structured interviews, photographs, drawings, and the principal researcher’s group interviews with the participants and co-researchers’ preliminary photo/drawing data analysis.

Data was presented and analysed over four chapters—young people’s ecological perceptions and beliefs (Chapter Five), young people’s ecological knowledge (Chapter Six), young people’s ecological agency (Chapter Seven) and sociocultural influence on young people’s ecoliteracy (Chapter Eight).

In Chapter Five, the data were presented in four parts—young people’s environmental perceptions, environmental practice in everyday life, environmental sensitivities and environmental concern. Young people’s environmental awareness and concern of local environmental problems (pollution) were positive. However, the major two findings of this chapter were ‘object views’, where the environment was seen as external, and ‘relational views’, where there was a relationship that existed between the environment and people (Shepardson, 2005). Environmental education policy and theory strongly advocates a relational view, yet in reality young people possess object views with humans are at the centre. Although many young people showed anthropocentric perceptions of the environment (Lovelock, 1979) through photos (using/working in the land, plants and animals as food and the environment in distress), they also showed their affinity with the environment (Weston, 1996). The majority of young people identified climate change as a major environmental issue (through photos, drawings and interviews) due to pollution and identified it as human induced. This supports Sykes et al. (2000). Research revealed that Bangladesh is a country that will be (and is already being) severely impacted by climate change (Aminuzzaman, 2010; Brouwer et al., 2007; Mahmood, 2014; Rawalani & Sovacool, 2011) and the young people are aware of the impacts of climate change in Bangladesh.

Chapter Six presents the knowledge of young people towards the environment. Data were presented in three parts—young people’s environmental awareness,
environmental knowledge and sources of knowledge on environmental issues. The major finding of this chapter was young people’s poor knowledge of acid rain, global warming, climate change and sea level rise and their misconception about the relationship of ozone layer depletion and global warming. These findings mirror Blum (1987), in which minority (Western) young people demonstrated 'little factual and conceptual knowledge' of environmental issues. The integrated revised curriculum of environmental education in this study revealed that the secondary school science textbook has failed to provide adequate information about the causes and effects of global warming, climate change and sea level rise for the entire environment. Parents influenced young people’s ecological knowledge, which supports Payne (2010). Young people’s ecological knowledge was also influenced by technologies, which is a part of an individual’s socioecological development (Johnson, 2010).

Chapter Seven presented young people’s environmental agency in two parts — young people’s everyday local environmental agency and everyday global environmental agency. Many young people demonstrated their environmental agency through ecocentric views such as walking, cycling and reuse of kitchen waste water, use of rainwater, use of renewable energy (solar, hydro and biogas), gardening, organic farming and planting trees. Young people’s appreciation of natural systems and identifying the components of the system indicated their cultural practices and beliefs, termed ecoliteracy (Orr, 2011). The major research finding was identified as widespread appreciation and support for tree planting. This supports Boyes et al. (2009), which found that tree planting is a popular idea among minority (Western) students. Bangladeshi young people showed a strong desire to protect the natural environment through photos and drawing data.

Chapter Eight presented the sociocultural influences on young people’s ecoliteracy in postcolonial times. Postcolonialism is at the forefront with respect to young people’s perspectives on the environment, economy, society and culture. Data were presented and analysed in four sections—social, political, environmental and cultural aspects. The major research finding was that technologies, economy, society and culture influenced young people’s ecoliteracy. The majority of the young people learned about environmental issues indirectly from school through textbooks. Some young people
talked about the business of manufacturing clothes and the exploitation of the environment, which is the worst capitalisation in majority countries for the benefit of minority countries. Although ready-made garments businesses have been recognised as a major economic contributor in Bangladesh, they pollute the environment and provide little money to workers. The values of colonial Christianity also have infiltrated the education systems and culture of Bangladesh. Such examples are planting trees and flower gardening in the school grounds by Scouts and Girl Guides organisations, traditional disciplines and a co-educational system. Learning from natural environment includes real-life experiences and cognitive, social, personal and emotional development (Brody, 2005; Malone, 2008). Although a small number of Christians live in Bangladesh (0.3% of the population), there is a provision to celebrate Christmas Day as a public holiday, which indicates the colonisation of Christians in Bangladesh.

Synthesis: Theorising the Data
The data have been developed through the substantial contribution of young people from four different rural and urban secondary (public and private) schools of two districts in Bangladesh. Young people's environmental beliefs, knowledge and behaviour/agency help to frame and organise this synthesis. In so doing, the focus is on young people's ecoliteracy and, later, the factors that influence young people's ecoliteracy in terms of their ecological perceptions, beliefs, knowledge and behaviour/agency.

Bangladeshi Young People's Ecoliteracy: Ecological Perceptions, Beliefs, Knowledge and Behaviour/Agency
The overarching research question asked is: What are Bangladeshi young people's ecoliteracy, and how is such, socially and culturally mediated? Bangladeshi young people developed their perceptions relating to the environment from their immediate environment based on culture (Wals, 1994). The majority of the young people showed anthropocentric perceptions of the environment aligned with technocentric cornucopian (anthropocentric) perspectives. The anthropocentric perspective does not believe that it is important to change education and society, whereas the technocentric accommodation (moderate technocentric) perspective supports raising ecological awareness and concerns to change education and society. This view indicates
participants’ low level of ecoliteracy, which supports Cutter-Mackenzie (2003), Fien (1993) and Huckle (2014).

Conversely, many young people demonstrated socioecological perspectives of the environment which aligned with ecocentric beliefs, supporting Cutter-Mackenzie and Hoepper (2014) and Wattchow et al. (2014). A few young people showed mixed perceptions (both ecocentric and anthropocentric), which is consistent with Sykes et al. (2000), where they believed nature should exist for its own sake, and Yencken (2000), where they believed that nature is something for humans’ use. In Bangladeshi culture, environmental values are reflected through respect towards nature. Although some young people showed appreciation of nature and affinity with the environment, the majority of them adopted anthropocentric views of the environment (Weston, 1996). Young people demonstrated limited understanding of issues relating to the environment and it was found that some were holding misconceptions of environmental issues indicating a low level of ecoliteracy, which supports Cutter-Mackenzie and Smith (2003) and David Orr’s (1992) theory of ecological literacy. The researcher’s theoretical approach of ecological literacy/ecoliteracy is for ecological sustainability, as shown in Figure 9.1.
Figure 9.1: The Outcome of Young People's Ecoliteracy

Extent of Influence of Social and Cultural Factors on Bangladeshi Young People's Ecoliteracy

The subsidiary questions underpinning the main research question were:

- What are Bangladeshi young people's ecoliteracy; their ecological perceptions, beliefs, knowledge and agency?
- To what extent do social and cultural factors influence Bangladeshi young people's ecoliteracy?

For the majority of young people, their ecoliteracy was influenced by social factors (parents, peers, gender, technologies, environment, school and community) and cultural factors (language, religion, economy, colonial Christianity, culture and indigenous knowledge). In comparison to the influence of schools, parents had a stronger influence on young people's environmental knowledge, which is consistent with Payne (2010) and Sykes et al. (2000).

Young people perceived a human/natural environment separation, reflecting the influence of their religious beliefs and values (Nooney et al., 2003) which emphasise human care of the environment and other living things. Martin (2007) stated religious guidelines are very powerful in developing people's ecocentric beliefs of environment because religious beliefs and values can stimulate people to grow progressive thinking and care towards nature. Young people's environmental perceptions are related to culture (including religion), politics and educational significance of local settings (Fien 2002; Yencken et al., 2000). Islam (2006) stated the basic ethical values, such as less consumption, being kind to all living beings and not abusing nature, are followed by all communities in Bangladesh. Thus, cultural beliefs and values possibly influenced young people's human–nature relationships (Boyd, 1999; Payne, 2014).

The modern education system portrayed the environment as for the benefits of humans, and young people's environmental perceptions were influenced by practiced school education. School is an important place where young people learn about the
environment and environmental issues from science and social science textbooks. This finding supports Walker and Loughland (2003) and Sykes et al. (2000). Smyth (2006) stated environmental concepts and knowledge help people with system thinking in terms of humans–nature relationships. Traditional social beliefs and values help individuals to understand environment is important for humans, therefore, they must respect and care for nature as they part of it (Islam, 2006).

It can be seen that the economy influenced young people’s ecoliteracy through environmental exploitation for the benefit of minority countries. In Bangladesh, many garments industry deteriorates the environment by disposing solid and liquid wastes in water bodies and workers are poorly paid (Farhana et al., 2015; Reza et al., 2017). Young people’s development and learning was influenced by technologies such as television and the Internet, supporting Johnson (2010). Young people’s strong belief in technology and technological advancement indicates the Bangladeshi community supports technological development for the improvement of the society and the state of the environment.

Indigenous ways of learning influenced young people's ecological knowledge and beliefs in Bangladesh. As Khan (2010, p. 105) stated, environment education should be rebuilt with 'indigenous people's traditional ecological knowledge' (p. 105). Bangladeshi young people demonstrated socioecological ways of learning about the environment through society and culture. Therefore, young people’s pragmatic, social and cultural ways of learning intensely marked it as transitional socioecological learning.

Harrington (2005) stated social theory is the scientific ways of thinking about social life including social behaviour, social structure, class structure, gender, ethnicity, power, social development and numerous social problems. The present study also discussed class, gender, economy, education system, culture, religion, power and various social problems. Figure 9.2 represents a theoretical model for this thesis based Bronfenbrenner's (1977;1994) and Quinton's (2015) socioecological systems theory of human development supplemented by the themes of the literature review and the theoretical positions uncovered through analysis and synthesis of the data presented in this thesis.
Figure 9.2: Theoretical Model of this Thesis (modelled after Bronfenbrenner’s [1977, 1994] socioecological system theory of human development).

Bronfenbrenner’s ecological model of human development simultaneously influences adolescents’ learning and development through different factors such as microsystem (e.g., family and friends) and exosystem (e.g., community and school) and macrosystem (e.g., culture). Johnson and Puplampa’s (cited in Johnson, 2010) socioecological techno-subsystem (communication technologies) significantly influence adolescents’ learning and development, which is an essential part of the microsystem. In the present study, young people’s ecological development was influenced by their parents, peers, school, community, technologies, environmental problems, culture, economy and governance. Therefore, this study and the resultant model (Figure 9.2) is guided by Bronfenbrenner’s socioecological system theory.

Limitations of the Research

This research was conducted in only four secondary schools in two districts of Bangladesh. Therefore, the results of the research findings are not generalisable. This research encompasses and validates other studies engaging young people and illuminates lessons that indicate future research opportunities.
The research methodology that was employed was child-framed where young people became co-researchers (with the principal researcher) and carried out their own research and analysis. Young people articulated their gratitude to be included and contributed value data and insights. Findings of the current study and other studies with young people have similarities, which validates young people’s research contribution.

Native language was used between the young people and the researcher for an extensive discussion that guided young people, which are indications of young people’s socioecological positioning in cultural settings. Young people co-analysed the photo data with the principal researcher through a curation process. It would be beneficial to visit urban schools in Bangladesh working with young people utilising a mixed methods approach — this was not possible in this study and is recommended improvement for future research.

Although the research employed a child-framed methodology, young people were enabled to provide rich data from multiple perspectives regarding ecoliteracy, which indicated the research activities, were influenced by culture.

**Directions for Future Research**

New areas of research and research approaches have emerged from this study with respect to researching young people's ecolitearcy in a Majority world country. While child-framed research methodologies are becoming more common in research, this is not the case in Majority world nations. The methodology offered a mode of empowerment and agency. This was epitomised in this study through the young people’s take up of photography and journaling. The latter requires further exploration in future studies.

Furthermore, it would be meaningful to research other secondary students in different areas of Bangladesh. Research with urban young people would need to be more substantial as they appear less connected with nature and more vulnerable to climate change impacts. Further research in local rural areas with young people might explore the indigenous ways of learning environmental education. An additional area of
research could also focus on ecoliteracy and democratic participation; in other words focusing on how ecoliteracy is enacted.

**Concluding Comments**

This study identified significant gaps in research related to the environmental perceptions, knowledge, and agency of young people in less advantaged majority contexts such as Bangladesh. Research related to young people’s ecoliteracy is inadequate in the existing literature.

Rural young people’s environmental understanding and appreciation demonstrated their distinctive characteristics, which they developed from their everyday life and indigenous culture. Although nature was seen as therapeutic, a source of entertainment and aesthetic by urban youths, they also showed their empathy towards the natural environment. Young people's overall range of physical and cultural relationship to nature suggested low levels of ecoliteracy. Young people’s environmental engagement was also influenced by the components of socioecological systems, therefore, a socioecological approach of learning is an appropriate strategy of environmental learning, rather than formal education that stimulates young people’s personal, social and environmental learning and development.
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Appendices

Appendix One: Principal’s Letter and Package

Dear (Principal of School),

Ms Ferdousi Ara Khatun is carrying out a research project as part of her PhD studies at Southern Cross University. Ms. Ferdousi Ara Khatun is the principal investigator of this project and her supervisors Professor Amy Cutter-Mackenzie and Dr. Marianne Logan will oversee the project. The project title is: Bangladeshi Young People’s Ecoliteracy in Postcolonial Times.

The aim of the research project is to determine Bangladeshi young people’s level of ecoliteracy and to identify the social and cultural influences on this ecoliteracy.

Bangladeshi Young People’s Ecoliteracy in Postcolonial Times is a three-year project. The following outlines the objectives of this project:

1. To explore the ecological knowledge, beliefs and behaviour held by young people (aged 14-15, Grade 9-10) in Bangladesh;
2. To identify the extent of the influence of social and cultural factors on the extent of young people’s underlying ecological knowledge, beliefs and behaviour.

Up to 10 students from your school are invited to become student researchers in the ‘Bangladeshi Young People’s Ecoliteracy’ research project in the following ways:

1. As learners in research training workshops where they will learn the basic skills for conducting research about ecological beliefs and concerns in their communities (a half-day workshop in your school campus).

2. As student researchers who research the knowledge, beliefs and behavior of young people towards ecoliteracy in Bangladesh. The student researchers will be interviewing their own participants and documenting their research findings (over a period of six months).

3. As participants in individual and focus group interviews related to the project (one half-day workshop).

4. As producers of community exhibitions that showcase their research to the wider community (one exhibition for each school).

The research will be documented in the following ways:
1. Through photography and video of student participation in the research.
2. Through audio and video recording of interviews.
3. Through the researchers’ field journals, which document the proceedings.
4. Through the students’ own submission of photographs and text based on their research.

Ethical Considerations:
Parents/guardians are also invited to participate in the project themselves by supporting their children through the process; and also joining in with focus groups after the students have conducted their research if they wish.

Students and parents are not obligated to participate in the project. Participants may participate in all phases or self-selected components. If a participant becomes distressed while participating in any phases of the research project, she/he should discontinue his/her involvement. No payment will be offered to parents/guardians or their children for their involvement in this research.

If students agree to participate, they may withdraw their participation at any time. They may do this by notifying the principal researcher by phone, in writing or via email. No participant will be disadvantaged by not participating in the evaluation.

No results or findings which could identify any individual participant will be published unless consent has been given by the participant and their parent/guardian. The students’ privacy will be protected because names will be removed from all data. These will be replaced by the participant’s chosen pseudonym (fictional name). It is important to clarify that results for this particular project may also be used in other research projects and/or publications. Only the research leaders and principal investigator will have access to this data which will be stored for at least seven years as prescribed by the university regulations. All hard-copy data will be destroyed after this period.

About this Package:
This package contains everything you need to invite your students at your school to participate in this project. Please find enclosed:

- A proposed timeline listing key dates associated with the project, including research training workshops, interviews, focus groups and community exhibitions.

- A series of information sheets, consent forms for students’ researchers and their parents, as approved by SCU’s Human Research Ethics Committee. Interested students and their parents/guardians will need to sign and return these consent forms to the address provided. Once we will receive these, we will inform students of their selection as student researchers.

- Ethics approval forms from Southern Cross University.

If you would like to register your school’s interest in being part of this research, please contact Ms Ferdousi Ara Khatun at: f.khatun.10@student.scu.edu.au

If you have any concerns about the project please contact my Principal supervisor Professor Amy Cutter-Mackenzie at: acutterm@scu.edu.au.

Thank you, and we are looking forward to hearing from you.
Ms Ferdousi Ara Khatun
Principal Investigator

Professor Amy Cutter-Mackenzie
Principal Supervisor

Dr. Marianne Logan
Co-Supervisor
Call for Expressions of Interest to participate in Bangladeshi Young People’s Ecoliteracy:

Bangladeshi Young People’s Ecoliteracy in Postcolonial Times is a project that enables young people in Bangladesh to engage in research and action about the environment. This project gives local young people both a voice and a hand in determining the future of their education, community and environment.

You are invited to join a research group of Bangladeshi Young People’s Ecoliteracy researchers and become part of this exciting project. Here’s what you’ll get to do:

- learn how to use photos, video and sound recording to conduct research about ecological knowledge, beliefs, concerns, and actions, in your communities.

- post your research findings on an Internet Blog: https://ecoliteracysite.wordpress.com/2015/09/29/bangladeshi-adolescents-ecoliteracy-in-post-colonial-times/ specifically set up for the project and discuss the issues and concerns that are important to you.

- join a think-tank where we analyse all the research.

- create an exhibition that shows your family and friends what you discovered through your research.

You can email: f.khatun.10@student.scu.edu.au to get all information.
Appendix Two: Participants’ Information Sheets and Consent Forms (students & parents)

Information Sheet—Student Researchers

Title: Young People’s Ecoliteracy in Postcolonial Times: Empowering Young People

This information sheet is for you to keep.

Ms Ferdousi Ara Khatun is carrying out a research project as part of her PhD studies at Southern Cross University. Ms. Ferdousi Ara Khatun is the principal investigator of this project and her supervisors Professor Amy Cutter-Mackenzie and Dr. Marianne Logan will oversee the project. The project title is: Bangladeshi Young People’s Ecoliteracy in Postcolonial Times.

Ferdousi is seeking secondary students to participate in this research project and as part of this project you are invited to participate in the following phases of the research:

1. As learners in training workshops where you will learn the basic skills for conducting research about ecology and students’ beliefs and concerns.
2. As student researchers to research the knowledge, beliefs and behaviour of young people towards ecology in Bangladesh. As participants where you interview your own participants as well as document your research through photography and video (film).
3. As participants in individual and focus group interviews related to the project.
4. As participants in community exhibitions which showcase your research to the wider community. The four communities participating include: two secondary public schools from Dhaka district and two secondary public schools from Jessore district of Bangladesh.

The research will be documented in the following ways:
1. Through photography and video of student participation in the research.
2. Through audio and video recording of interviews.
3. Through the researchers’ field journals, which document the proceedings.
4. Through the students’ own submission of photographs and text based on their research.

Students are not obligated to participate in the project. A student may participate in all phases or self-selected components. If a student becomes distressed while participating in any phases of the research project, she/he should discontinue his/her involvement. No payment will be offered to students for their involvement in this research.

If you agree to participate, you may withdraw your consent at any time. You may do this by notifying the principal investigator by phone, in writing or via email. You can refuse to answer interview questions. No participant will be disadvantaged by not participating in the evaluation.
No results or findings, which could identify any individual participant, will be published unless consent has been given by the participant and their parent/guardian. The students’ privacy will be protected because names will be removed from all data. These will be replaced by the participant’s chosen pseudonym (fictional name or avatar). It is important to clarify that results for this particular project may also be used in other research projects and/or publications. Only the research team will have access to this data which will be stored for at least seven years as prescribed by the university regulations. All hard-copy data will be destroyed after this period.

If you have any queries or would like to be informed of the research findings, please contact Professor Amy Cutter-Mackenzie at: acutterm@scu.edu.au. The findings are accessible for 7 years.

| Should you have any complaint concerning the manner in which this research is conducted, please do not hesitate to contact the Southern Cross University Human Research Ethics Committee re: Project Approval |
| The Secretary |
| Human Research Ethics Committee (HREC) |
| R block Division of Research Southern Cross University, Lismore NSW 2480 |
| Tel: +61 2 6626 9139 Email: ethics.lismore@scu.edu.au |

Thank you,

Ms. Ferdousi Ara Khatun
Principal Investigator

Professor Amy Cutter-Mackenzie
Principal Supervisor

Dr. Marianne Logan
Co-Supervisor
Consent Form - Student Researcher

Title: Bangladeshi Young People’s Ecoliteracy: Empowering Young People

NOTE: This consent form will remain with the Southern Cross University researchers for their records.

I agree to take part in the Southern Cross University research project specified above. I have had the project explained to me, and I have read the Explanatory Statement, which I keep for my records. I understand that agreeing to take part means that I am willing to do (please tick as applicable):

☐ Participate in research training workshops and semi-structured interviews;
☐ Be photographed and/or video recorded during interview sessions and research training workshops;
☐ Conduct research into ecology by recording documentary evidence and taking photographs/video during the project;
☐ Obtain consent to interview and take photographs/video of participants as part of my research;
☐ Participate in community exhibitions which will showcase the research for the wider community; and

I understand that my participation is voluntary, that I can choose not to participate in part or all of the project, and that I can withdraw at any stage of the project without being penalised or disadvantaged in any way.

I understand that any data that the researcher extracts from workshops, interviews, journals, film and/or images (photo/film) for use in reports or published findings will not, under any circumstances, contain names. If you would also like images or video footage de-identified by blurring your face using computer editing software please tick here.

__________________________________________________________________________

Student Researcher’s Name: ______________________________________________________

Student’s Selected Pseudonym: __________________________________________________

Date of Birth: __________________________________________________________________

School: ________________________________________________________________________

Signature: ____________________________ Date: _______________________________
Information Sheets and Consent Forms: Parents

Information Sheet – Parents

Title: Bangladeshi Young People’s Ecoliteracy: Empowering Young People

This information sheet is for you to keep.

Ms Ferdousi Ara Khatun is carrying out a research project as part of her PhD studies at Southern Cross University. Ms. Ferdousi Ara Khatun is the principal investigator of this project and her supervisors Professor Amy Cutter-Mackenzie and Dr. Marianne Logan will oversee the project. The project title is: Bangladeshi Young People’s Ecoliteracy in Postcolonial Times.

The aim of the research project is to determine Bangladeshi young people’s level of ecoliteracy and to identify the social and cultural influences on this ecoliteracy.

Bangladeshi Young People’s Ecoliteracy in Postcolonial Times is a three-year project. The following outlines the objectives of this project:

1. To explore the ecological knowledge, beliefs and behaviour held by young people (aged 14-15; Grade 9-10) in Bangladesh;
2. To identify the extent of the influence of social and cultural factors on the extent of young people’s underlying ecological knowledge, beliefs and behaviour.

We would like to invite your child to participate in this project. Up to 10 students from your child’s school are invited to become student researchers in the ‘Bangladeshi Young People’s Ecoliteracy’ research project in the following ways:

1. As learners in research training workshops where they will learn the basic skills for conducting research about ecological beliefs and concerns in their communities (a half-day workshop in your school campus).
2. As student researchers who research the knowledge, beliefs and behavior of young people towards ecoliteracy in Bangladesh. The student researchers will be interviewing their own participants and documenting their research findings (over a period of six months).
3. As participants in individual and focus group interviews related to the project (one half-day workshop).
4. As participants in community exhibitions which showcase their research to the wider community. The four communities participating include: two secondary public schools from Dhaka district and two secondary public schools from Jessore district of Bangladesh.

The research will be documented in the following ways:

- Through photography and video of student participation in the research.
- Through audio and video recording of interviews.
- Through the researchers’ field journals, which document the proceedings.
- Through the students’ own submission of photographs and text based on their research.
Parents/guardians are also invited to participate in the project themselves by supporting their children through the process, and also joining in with focus groups after the students have conducted their research.

Parents/guardians and their children are not obligated to participate in the project. A participant may participate in all phases or self-selected components. If a participant becomes distressed while participating in any phases of the research project, she/he should discontinue his/her involvement. No payment will be offered to parents/guardians or their children for their involvement in this research.

If you agree for your child to participate, you may withdraw your consent at any time. You may do this by notifying the principal investigator by phone, in writing or via email. You can also refuse to answer interview questions. No participant will be disadvantaged by not participating in the evaluation.

No results or findings which could identify any individual participant will be published unless consent has been given by the participant and their parent/guardian. The students’ privacy will be protected because names will be removed from all data. These will be replaced by the participant’s chosen pseudonym (fictional name). It is important to clarify that results for this particular project may also be used in other research projects and/or publications. Only the research team will have access to this data which will be stored for at least seven years as prescribed by the university regulations. All hard-copy data will be destroyed after this period.

If you have any queries or would like to be informed of the research findings, please contact Professor Amy Cutter-Mackenzie at: acutterm@scu.edu.au. The findings are accessible for 7 years.

Should you have any complaint concerning the manner in which this research is conducted, please do not hesitate to contact the Southern Cross University Human Research Ethics Committee re: (approval number will be inserted here)

The Secretary
Human Research Ethics Committee (HREC)
R block Division of Research Southern Cross University, Lismore NSW 2480
Tel: +61 2 6626 9139 Email: ethics.lismore@scu.edu.au

Thank you.

Ms. Ferdousi Ara Khatun
Principal Investigator

Professor Amy Cutter-Mackenzie
Principal Supervisor

Dr. Marianne Logan
Co-supervisor
Consent Form – Parents

Title: Bangladeshi Young People’s Ecoliteracy in Postcolonial Times: Empowering Young People

NOTE: This consent form will remain with the Southern Cross University researchers for their records

I agree for my child to take part in the Southern Cross University research project specified above. I have had the project explained to me, and I have read the Explanatory Statement, which I keep for my records. I understand that agreeing to take part means that I am willing to *(please tick as applicable)*:

- [ ] Consent to my child’s participation in research training workshops and semi-structured interviews;
- [ ] Consent to my child being photographed and/or video recorded during interview sessions and research training workshops;
- [ ] Consent to my child keeping a journal, documentary evidence and taking photographs/video during the project;
- [ ] Consent for my child participating in a community exhibition which will showcase the research.

I understand that my child’s participation is voluntary, that I can choose for them not to participate in part or all of the project, and that my child can withdraw at any stage of the project without being penalised or disadvantaged in any way.

I understand that any data that the researcher extracts from workshops, interviews, journals, film and/or images (photo/film) for use in reports or published findings will not, under any circumstances, contain names. If you would also like images or video footage de-identified by blurring your child’s face using computer editing software please tick here _____

-----------------------------------------------------------------------------------------------------------------

Child’s Name: ____________________________________________________________

Parent/Guardian’s Name: __________________________________________________

Email: _________________________________________________________________

Contact Number: _________________________________________________________

School: __________________________________________________________________

Parent/Guardian Signature: ___________________ Date: _______________________

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PHOTO RELEASE FORM

I hereby grant permission to Ms. Ferdousi Ara Khatun and her Research Team to utilise the digital photographs that I have taken and/or am photographed in for the ‘Bangladeshi Young People’s Ecoliteracy’ Project. I understand that these photos may be reproduced in publications generated from this research journal article). No participant will be named. Such photos may also be utilised in the Project’s promotional and marketing material. If you agree to us using your photographs in this way, please sign below where indicated.

☐ I agree to Ms. Ferdousi Ara Khatun and her Research Team using and reproducing photographs of me in the manner explained above.

☐ I agree to Ms. Ferdousi Ara Khatun and her Research Team taking photographs of me in the manner explained above, but do not agree to the publication of the photographs.

☐ I do not agree to Ms. Ferdousi Ara Khatun and her Research Team using and reproducing photographs of me in the manner explained above.

Signature: ___________________________________________ Date: __________________

Name: ___________________ Email: ___________ Ph. ______________________

Parental/Guardian Consent (Young People Only)

☐ I agree to Ms. Ferdousi Ara Khatun and her Research Team using and reproducing photographs of my child in the manner explained above.

☐ I agree Ms. Ferdousi Ara Khatun and her Research Team taking photographs of my child in the manner explained above, but do not agree to the publication of the photographs.

☐ I do not agree to Ms. Ferdousi Ara Khatun and her Research Team using and reproducing photographs of my child in the manner explained above.

Signature: ___________________________ Date: ______________________

Name: ___________________ Email: __________________ Ph. ___________________
I hereby grant permission to Ms. Ferdousi Ara Khatun and her Research Team to utilise the digital footage (film) that I have taken and/or am filmed in for the Bangladeshi Young People’s Ecoliteracy Project. I understand that this film may be utilised and reproduced in publications related to this research. No participant will be named. Such footage may also be utilised in the Project’s promotional and marketing material. If you agree to us using the footage in this way, please sign below where indicated.

☐ I agree to Ms. Ferdousi Ara Khatun and her Research Team using and reproducing video footage of me in the manner explained above.

☐ I agree to Ms. Ferdousi Ara Khatun and her Research Team taking video footage of me in the manner explained above, but do not agree to the publication of the footage.

☐ I do not agree to Ms. Ferdousi Ara Khatun and her Research Team using and reproducing video footage of me in the manner explained above.

Signature: __________________________ Date: __________________________

Name: ____________________________ Email: ____________________________ Ph. ____________________________

Parental/Guardian Consent (of Children / Young People)

☐ I agree to Ms. Ferdousi Ara Khatun and her Research Team using and reproducing video footage of my child in the manner explained above.

☐ I agree to Ms. Ferdousi Ara Khatun and her Research Team taking video footage of my child in the manner explained above, but do not agree to the publication of the footage.

☐ I do not agree to Ms. Ferdousi Ara Khatun and her Research Team using and reproducing video footage of my child in the manner explained above.

Signature: __________________________ Date: __________________________

Name: __________________________ Email: ____________________________ Ph. ____________________________
Appendix Three: Co-Researchers Semi-Structured Interview Guide for Data Collection (English version)

1. Tell me your own environment definition.
2. How do you feel about the environment?
3. Do you have any concerns about the environment?
4. What environmental issues do you consider most important and why?
5. How do you know about the environment and environmental issues? Do you think these sources are reliable?
6. What are the unique features of the Bangladeshi environment? Tell me about that.
7. What will happen if the concentration of carbon dioxide increases in the air?
8. Do you think the climate is changing? What are the impacts of climate change?
9. To what extent could planting trees solve climate change?
10. Are you involved in any environmental conservation groups? Tell me about that.
11. Do what environmentally friendly practices do you practice at home or school? Please describe.
12. Do you have a farm/garden at home or in your community? How do you maintain your farm/garden?
13. Have you participated in any environmental activities/agency previously? Tell me about that.
Appendix Four: Focus Groups Discussion Questions (English version)

1. What do you mean by the term environment? Tell me about that.
2. What is your views about the environment? Tell me about that.
3. What is your feelings about the environment? Tell me about that.
4. Do you have any concern about the environment? Please explain.
5. Are you environmentally aware? Please tell me about that.
6. Do you have any concern about climate change? Please explain. Can you explain what climate change is?
7. How do you know about environmental problems? Please tell me about that.
8. What is the population of Bangladesh? Does this have any impact on the environment? Please explain.
9. Are there pollution problems in your community? Please explain.
10. Is over consumption a problem in Bangladesh? Please tell me about that.
11. Do you spend time in the natural environment? Please tell me about that.
12. Do you have any special memory (of an experience) in the environment? Please explain.
13. What does sustainability mean to you? Please tell me about that.
15. What are the sources of renewable energy? Please explain.
16. How will you contribute to improve the environment in your own community? Please explain.
17. What are your thoughts about the future of the environment and the world?
18. Where does your food come from? Please explain.
19. How does climate change impact agriculture? Tell me about that
20. What does ecology mean to you? What is an ecosystem? Please explain.
21. Where does your water come from in your local community? Please explain.
22. What is your hobby? Please tell me about that
23. How does culture (for example religion) influence young people’s ecoliteracy? Please explain.
Appendix Five: Interview Guide for Data Collection (Bengali version)

১। পরিবেশ সম্পর্কে আপনার নিজস্ব ধারণা বলুন।

২। পরিবেশ নিয়ে আপনি কি অনুভব করেন?

৩। পরিবেশ বিষয়ে আপনার কোন চিন্তা আছে কিনা? পরিবেশের কোন বিষয়টা আপনার কাছে সবচেয়ে গুরুত্বপূর্ণ এবং কেন?

৪। পরিবেশ ও পরিবেশের বিভিন্ন বিষয়ে আপনি কিভাবে এবং কোন উৎস থেকে জানতে পারেন? জ্ঞানের উৎস গুলো আপনার কাছে বিশ্বাসযোগ্য কিনা?

৫। বাংলাদেশের পরিবেশের কোন বিষয় গুলো আপনার কাছে স্বতন্ত্র মনে হয়? এ বিষয়ে বলুন।

৬। বাতাসে কার্বন ডাই অক্সাইড এর ঘনত্ব বাড়লে কি হতে পারে?

৭। আপনি কি মনে করেন জলবায়ু পরিবর্তণ হচ্ছে? জলবায়ু পরিবর্তনের ফলাফল কি হতে পারে?

৮। গাছ লাগানোর মাধ্যমে জলবায়ু পরিবর্তন কতটুকু সমাধান করা যাবে?

৯। আপনি কি পরিবেশ সংরক্ষণ বিষয়ের কোন গুরুত্বের সাথে কাজ করেন? এ ব্যাপারে কিছু বলুন।

১০। আপনার বাসা অথবা বিদ্যালয়ে পরিবেশ বাণ্ডর কোন অভ্যাস আছে কিনা? সেটা কি রকম?

১১। আপনার বাসায় জীব পশুজীবনের কোন চাষ হয় কিনা? আপনি কিভাবে আপনার কৃষিকাজ পরিচর্যা করেন?

১২। আপনি কি পূর্বে পরিবেশ বিষয়ক কার্যক্রম করেছেন কিনা? এ বিষয়ে কিছু বলুন।
Appendix Six: Focus Group Discussion Questions (Bangla version)

১। পরিবেশ বলতে তুমি কি বুঝ? সে বিষয়ে বল।
২। পরিবেশ সম্পর্কে তোমার মতামত কি? সে বিষয়ে বল।
৩। পরিবেশের জন্য তোমার অনুভূতি কি? সে বিষয়ে বল।
৪। পরিবেশ নিয়ে কি তোমার কোন চিন্তা আছে? ব্যাখ্যা কর।
৫। তুমি কি পরিবেশগতভাবে সচেতন? সে বিষয়ে বল।
৬। জলবায়ুর পরিবর্তন নিয়ে কি তোমার কোন চিন্তা আছে? ব্যাখ্যা কর। জলবায়ুর পরিবর্তন বলতে তুমি কি বুঝেন?
৭। পরিবেশ বিষয়ক সমস্যা সম্পর্কে তুমি কিভাবে জান? সে বিষয়ে বল।
৮। বাংলাদেশের জনসংখ্যা কত? পরিবেশের উপর জনসংখ্যার কোন প্রভাব আছে? ব্যাখ্যা কর।
৯। তোমার সমাজে পরিবেশ দৃষ্টিকেন্দ্রিত সমস্যা আছে? ব্যাখ্যা কর।
১০। বাংলাদেশের মানুষের জীবন ধরন বিষয়ে তুমি কি জান? সে উপরে তার কি কোন প্রভাব আছে?
সে সম্পর্কে বল।
১১। তুমি কি কখনো প্রাকৃতিক পরিবেশে সময় কাটিয়েছেন? সে সম্পর্কে বল।
১২। পরিবেশ নিয়ে তোমার কোন বিশেষ অভিজ্ঞতা রয়েছে? তোমার অভিজ্ঞতা থেকে সে বিষয়ে বল।
১৩। ধারণক্ষমতা বলতে তুমি কি বুঝি? সে সম্পর্কে বল।
১৪। তোমার এলাকায় তুমি কি শক্তি ব্যবহার করেন? সে সম্পর্কে বল।
১৫। নবায়ন শক্তির উৎসগুলো কি কি ব্যাখ্যা কর।
১৬। তোমার সমাজে পরিবেশের উদ্ভিদ কি ধারণ করবেন? ব্যাখ্যা কর।
১৭। ভবিষ্যতের পরিবেশ এবং পৃষ্ঠপোষকের নিয়ে তোমার কোন চিন্তা আছে? সে বিষয়ে বল।
১৮। তোমার খাদ্যের উৎস কি কি কি ব্যাখ্যা কর।
১৯। কৃষির উপরে জলবায়ুর পরিবর্তনের প্রভাব কি? ব্যাখ্যা কর।
২০। বাস্তুসংস্থান মানে কি? একটি বাস্তুসংস্থান কিভাবে সংঘটিত কর।
২১। তোমার সমাজে পার্থক্যের উৎস কি? ব্যাখ্যা কর।
২২। তোমার শখ কি? সে সম্পর্কে বল।
২৩। সংস্কৃতি (উদাহরণ-ধর্ম) কিভাবে মূলকদের বাস্তুসংস্থানসংক্রান্ত সার্থকতাকে প্রভাবিত করে? ব্যাখ্যা কর।
Appendix Seven: SCU Ethics Approval

SCU HUMAN RESEARCH ETHICS COMMITTEE (SCU HREC)

NOTIFICATION

NEAF Application Approval

To: Marianne Logan, Associate Professor Amy Cutter Mackenzie and Ferdousi Ara Khatun
From: SCU Human Research Ethics Committee (HREC)
Project name: Bangladeshi Adolescents’ Ecoliteracy in Postcolonial Times
Approval Date: 22nd December 2015
Approval Number: EN-15-289
Expiry Date: 21st December 2018

Dear Marianne, Amy and Ferdousi,

Thank you for the NEAF application received 08th October 2015. This was considered by the SCU HREC at the Meeting on 02nd November 2015. Clarification was sought and responses were reviewed by the Chair of HREC, Professor Bill Boyd, as agreed at the meeting in November. Your responses were found satisfactory and the research has been approved. Please note the ethics approval number above.

The nominated participating sites in this project are:
1. Uttara High School and College (semi-government), Uttara area, Dhaka district.

This approval is subject to the following conditions being met:
1. The Coordinating Principal Investigator will immediately report anything that might warrant review of ethical approval of the project on the Adverse Events form.
2. The Coordinating Principal Investigator will immediately notify the SCU HREC, on the appropriate form, of any change in protocol.
3. The Coordinating Principal Investigator will report to the SCU HREC annually in the specified format and notify HREC when the project is completed.
4. The Coordinating Principal Investigator will notify the SCU HREC if the project is discontinued at a participating site before the expected completion date, with reasons provided.
5. The Coordinating Principal Investigator will notify the SCU HREC of any plan to extend the duration of the project past the approval period listed above and will submit any associated required documentation.

A copy of this ethical approval letter must be submitted by all site investigators to the Research Governance Office or equivalent body or individual at each participating institution in a timely manner to enable the institution to authorise the commencement of the project at its site/s.

This letter constitutes ethical approval only. This project cannot proceed at any site until separate research governance authorisation has been obtained from the CEO or Delegates of the institution under whose auspices the research will be conducted at that site.

Should you have any queries about this SCU HREC’s consideration of your project please contact ethics.ijmot@bcu.edu.au. The SCU HREC Terms of Reference, membership and standard forms are available from http://bcu.edu.au/research/index.php?ref_unit_id=1228&catid=123.

SCU-HREC wishes you every success in your research.

Kind Regards,

Per Prof. Bill Boyd Chair, Human Research Ethics Committee, on behalf of SCU-HREC