

**A STUDY ON THE ENVIRONMENTAL EDUCATION
CURRICULUM OF PRIMARY SCHOOLS IN WANGDUE
PHODRANG DISTRICT**



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**A THESIS SUBMITTED IN PARTIAL FULFILMENT
OF THE REQUIREMENTS FOR
THE DEGREE OF MASTER OF EDUCATION
(EDUCATIONAL MANAGEMENT)
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entitled
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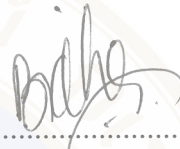
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A STUDY ON ENVIRONMENTAL EDUCATION CURRICULUM OF PRIMARY SCHOOLS IN WANGDUE PHODRANG DISTRICT, BHUTAN

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ABSTRACT

The purpose of this research was to study the environmental education curriculum in the primary schools of Wangdue Phodrang district, Bhutan, to compare between students' personal factors and level of environmental knowledge, attitude and practice and to assess the students' level of environmental knowledge, attitude and practice. Environmental education (EE) was taught through an integrated approach across the curriculum at all levels in the schools of Bhutan.

Mix-methods were applied in this study. A questionnaire was used to determine grade VI students' level of environmental knowledge, attitude and practice. In-depth interviews were conducted with teachers and curriculum experts. Both descriptive and inferential statistical analyses were used to analyze the data. In addition, content analysis was employed to analyze the qualitative data.

The findings indicated that the overall students' environmental knowledge and attitude were low, while the overall practice level of students was moderate. It is recommended that the current environmental education needs to be reviewed. The interviews further suggested that environmental education should be revised and updated to cover all the emerging issues.

From the findings, it could be suggested that a change is required from transmissive learning to transformative learning. EE should be integrated in holistic experiences, entailing discovery rather than reproductive learning, exploring the real world beyond reading books, taking productive action and gaining experiences. Teaching materials, textbooks and teaching contents should be refined. In addition, teachers should be equipped with environmental knowledge and, above all, process of multi disciplinary delivery.

KEY WORDS: ENVIRONMENTAL EDUCATION/CURRICULUM/

108 pages

CONTENTS

	Page
ACKNOWLEDGEMENTS	iii
ABSTRACT	iv
CONTENTS	v
LIST OF TABLES	vii
LIST OF FIGURES	viii
CHAPTER I INTRODUCTION	1
1.1 Background and Rationale of the Study	1
1.2 Research Objectives	6
1.3 Research Questions	6
1.4 Research Hypotheses	6
1.5 Scope of the Study	7
1.6 Limitation of the study	7
1.7 Definition of Terms	8
1.8 Theoretical and Conceptual Framework	8
1.9 Research Benefits	9
CHAPTER II LITERATURE REVIEW	10
2.1 Background on Education system of Bhutan	11
2.2 The Concept of Environmental Education	18
2.3 Theory and thought on Education	22
2.4 Curriculum definition and its significance	28
2.5 Environmental Education Curriculum in Bhutan	31
2.6 Related Researches	43
CHAPTER III RESEARCH METHODS	46
3.1 Research Design	46
3.2 Population and Sampling	47
3.3 Research Instruments	51

CONTENTS (cont.)

	Page
3.4 Data Collection	54
3.5 Data Analysis	54
CHAPTER IV RESULTS	56
4.1 Personal Factors of Students	56
4.2 Level of Knowledge, Attitude and Practice	57
4.3 Comparison of on the environmental knowledge, practice and attitude by Personal Factors	60
4.4 Relationship between environmental knowledge, attitude and practice	67
4.5 Content Analysis of Interviews	69
CHAPTER V DISCUSSION	79
5.1 Personal Factors of Students	79
5.2 Level of Environmental Knowledge	81
5.3 Level of Environmental Attitude	83
5.4 Level of Environmental Practice	85
5.5 Comparison on the environmental knowledge, attitude and practice by personal factors	87
5.6 Correlation between environmental knowledge, attitude and practice	89
CHAPTER VI CONCLUSION AND RECOMMENDATION	91
6.1 Conclusion	91
6.2 Recommendations	94
BIBLIOGRAPHY	97
APPENDIX RESEARCH QUESTIONNAIRE	101
BIOGRAPHY	108

LIST OF TABLES

Table	Page
2.1 Curriculum mapping on Environmental Education	35
2.2 Framework for EE module	43
3.1 Number of grade VI students in 10 schools	48
3.2 Division of items in questionnaire	52
3.3 Measurement of level of attitude	52
3.4 The scoring based on four different levels for attitude	53
3.5 Measurement of level of practice	53
3.6 The scoring based upon three different levels for practice	53
4.1 Personal factors of students	56
4.2 Level of environmental knowledge	57
4.3 Level of attitude towards environment	58
4.4 Level of environmental practice	59
4.5 Comparison of environmental knowledge based on gender	60
4.6 Comparison of environmental attitude based on gender	60
4.7 Comparison of environmental practice based on gender	61
4.8 Comparison of environmental knowledge based on age	61
4.9 Comparison of environmental attitude based on age	62
4.10 Comparison of environmental practice based on age	62
4.11 Comparison of environmental knowledge based on parental background	63
4.12 Comparison of environmental attitude based on parental background	63
4.13 Comparison of environmental practice based on parental background	64
4.14 Comparison of environmental knowledge based on nature club member	64
4.15 Comparison of environmental attitude based on nature club member	65
4.16 Comparison of environmental practice based on nature club member	65
4.17 Comparison of environmental knowledge based on location of school	66
4.18 Comparison of environmental attitude based on location of school	76

LIST OF TABLES (cont.)

Table		Page
4.19	Comparison of environmental practice based on location of school	67
4.20	Correlation coefficient between environmental knowledge and attitude	67
4.21	Correlation coefficient between environmental knowledge and practice	68
4.22	Correlation coefficient between environmental attitude and practice	68
4.23	Summary of research findings	68
4.24	Interview informants' characteristics	69

LIST OF FIGURES

Figure	Page
1.1 Conceptual Framework	9
2.1 Map of Bhutan	11
2.2 General Education Structure	13
2.3 Organogram of MoE	15
2.4 Map of Wangdue Phodrang district	18
2.5 Relationship between knowledge, attitude and practice	28
3.1 Schools in Wangdue Phodrang district	47

LIST OF ABBREVIATIONS

CO	Curriculum Officer
DCRD	Department of Curriculum Research and Development
EEO	Environment Education Officer
EEU	Environment Education Unit
GNHC	Gross National Happiness Commission
LSS	Lower Secondary School
M. Ed	Master of Education
MoE	Ministry of Education
NBIP	National Based In-service Programme
NC	Nature Club
NEC	National Environment of Commission
NFE	Non Formal Education
NGO	Non Government Organization
PHCB	Population and Housing Census Bureau
PP	Pre-Primary
PPD	Policy and Planning Division
PS	Primary School
PGDE	Post Graduate Diploma in Education
REC	Royal Education Council
RCSC	Royal Civil Service Commission
RGoB	Royal Government of Bhutan
RSPN	Royal Society for Protection of Nature
RUB	Royal University of Bhutan
UNEP	United Nations Environment Programme
UNICEF	United Nation International Children's Emergency Fund

CHAPTER I

INTRODUCTION

1.1 Background and Rationale of the Study

Throughout the centuries, the Bhutanese have treasured their environment and have looked upon it as the source of all life. This traditional reverence for nature has delivered us into the twentieth century with our environment still richly intact. We wish to continue living in harmony with nature and to pass on this heritage to future generations (His Majesty the King Jigme Singye Wangchuk, United Nations Environment Programme/UNEP, 2001).

Over the years, Bhutan has cultivated a unique approach to development, its national philosophy anchored on the principles of GNH which was promulgated as the country's philosophy of economic and social development by the fourth Druk Gyalpo, His Majesty Jigme Singye Wangchuk in 1972. The philosophy underscores that the development cannot be pursued on the premise of only economic growth, but has to take place in conjunction with the emotional and spiritual wellbeing of the people. Environmental sustainability is an integral part of this distinctive development philosophy (Dorji, 2009).

Furthermore, environmental sustainability is one of the Millennium Development Goals to which Bhutan is strongly committed as these goals reverberate the Bhutanese philosophy of Gross National Happiness. A significant milestone reflecting Bhutan's commitment to environmental conservation and sustainable development is the inclusion of a separate Article on the environment in the Constitution of Bhutan. One of the provisions under Article V states "the Government shall ensure that, in order to conserve the country's natural resources and to prevent degradation of the fragile mountain ecosystem, a minimum of sixty percent of Bhutan's total land shall be maintained under forest cover for all time" (NEC, 2009).

Bhutan has a special place in the global environment because it represents the last best chance for conservation in the Eastern Himalayas, one of the priority regions in the world for biodiversity conservation. The importance of biodiversity is increasingly recognized throughout the world, not only for sustaining the wealth of living organisms, but also as a genetic resource for humanity, providing food crop and medicinal species for both current and future generations (UNEP, 2001). The importance of an intact environment and natural resources also stems from the fact that the predominant occupation of the Bhutanese is agriculture with about 70 percent living in rural areas and dependent on agriculture and the appropriation of the natural resources for their livelihood (Tshering, 2006). The other factors contributing for richness in the environment was due to low population, rugged terrain and strong cultural ties with the environment. Bhutan never thought of education on environment before because the environment was intact, pollution was minimum, strong religious beliefs for the preservation of the environment pervaded the society, etc. (RSPN, 2006).

However Bhutan is now undergoing rapid changes resulting in a number of significant environmental issues and problems. Bhutan today confronts some major emerging environment issues like any other country around the world. These include climate change and glacial melting which is the threat of GLOF (Glacial Lake Outburst Flood), massive solid waste problems in towns and cities, deforestation, unsustainable agriculture and illegal and unsustainable use of wildlife, etc which need to be tackled on time. The deluge these issues can impinge on Bhutan is not oblivious. Bhutan being on a precarious geographical location and on the cross road of modernization and conservation of its environment, the fragile environment can give way to natural disasters at any time. If these upcoming issues are not dealt on time then it may lead to serious consequences. If Bhutan wants to maintain the pristine environment, every Bhutanese must be educated so that environment remains intact for all times to come. It is the thrust of the Royal Government to provide the concepts and knowledge of the environment through formal curriculum (Tenzin and Maxwell, 2009).

Recognizing these problems, Bhutan has been proactive in forming policies and legislation to regulate on the sustainable use of the environment.

Although the country is committed to ensuring a future where the natural environment is still intact, pressures are mounting due to an array of forces such as rapid population growth, infrastructure development and market expansion. In order to confront the issues, it is very important to create awareness on environment and its allied problems solutions to these issues. One way in doing so is through education. It is believed that education is one of the best tools to make people understand the consequences of their actions. Each country must realize that environmental education is an obvious necessity of human development and sustainable environmental development (UNEP, 1994, p.1) cited by Prarop Kaoses, (2001).

Further, environment issues and challenges were approached and tackled by different organizations, such as Department of Forestry, Nature Conservation Division, National Environment Commission, World Wide Fund, and Royal Society for Protection of Nature. However, an integrated approach was required for the policies to come into action to protect Bhutan's rich biodiversity and natural resource achieve Bhutan's overarching goal for development and the concept of Gross National Happiness. Critical to this is the need for adequate and effective environmental education for students, specific occupational areas, the community and the broader workforce in these issues. In line with this, the responsibilities of instilling environmental values and management of natural resources in young children are the obligations of the Ministry of Education, RGoB. Students are the ones that can bring in change in the society as they are the future citizens of the country.

Ministry of Education continually explores various means and strategies to provide environment education to young generation of today but the future citizens of tomorrow. The entire foundation of school curriculum is based on the principles, culture and values and the objectives of GNH (Gross National Happiness) that the country aspires for its citizens (National Education Framework, 2009:18).

Although environmental education has been discussed widely in Bhutan, it is still new to a large section of the Bhutanese population as it was never distinguishably included in the curriculum. Environmental education is a prerequisite before an individual possesses such qualities and it is with such qualities that people come together to pursue the goal of conservation and sustainable development. It is important for all sections of the population to possess the right understanding, attitudes

and values towards their natural environment so as to enable every individual to conserve and use natural resources with rationality and wisdom. (RSPN Strategic Plan: 2005-2010). According to Stapp *et al.* (1969, p. 30), environmental education is a process aimed to produce “a citizen that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solution.” One of key objectives of having environmental education as a subject is to develop abilities to explore and understand the environment in its totality (natural and social, political and their interactive processes), the environmental problems and the ways and means to preserve the environment, including conservation of natural resources and energy for sustainable development (National Education Framework, 2009, p.18).

Environmental education aims to extend students' *knowledge* about the environment, challenge the *attitudes* and *behaviours* that form the basis of environmental citizenship and develop *skills* to enable them to take action for the environment (Ballantyne, *et al*, 2005). Environmental education is important as it fosters better understanding and relationships between people and nature, people and society, and people themselves (Tenzin & Maxwell, 2009). The school curricula have always played an important role in imparting EE. It is believed that when students are reminded about the environment, they develop environmentally responsible manner and they engage in environmental conservation activities. Yet, environmental education is not delivered as an individual subject in the formal curriculum in Bhutanese curriculum as the current school timetable is already overcrowded.

The environmental concepts are found integrated across the curriculum in various subjects at both the primary and secondary levels schools in Bhutan. The concepts of environmental education are seen in subjects like Environmental Studies (EVS) in Pre-Primary to grade III which is taught in national language (Dzongkha) and likewise in other subjects like Social Studies, Science and Dzongkha in grade IV to VI. Since 2000, the three disciplines of science, Physics, Chemistry and Biology, have been integrated and taught as one subject, Integrated Science: Learning through Environment in grade VII to VIII. This was basically done to localize the curriculum to suit the needs of the Bhutanese students and its environment.

It underpins the global premises that children learn better if the learning is contextualised to their immediate environment and life and that they are challenged with issues to ponder and solve through series of investigations. In doing so, students are believed that not only they develop basic skills prerequisite for their future career; they gain knowledge on environment and related issues.

Environmental concepts are often transferred outside the classroom, for example through the activities arranged and organized by nature clubs, School Greening Program, etc. The activities outside the school often promote the significance of the environment and are more related to everyday practices. School is a place where every child is prepared to become productive citizen for future society and groomed as environment friendly individual. School is an avenue where a child comes from diverse background to become educated to be someone in one's society and they in turn can educate their own society. The young students can be original, creative as well as critical. They should be able to create the bond to link school, home and community. They can be a strong communicator between the school and community and also play a strong role in advocating environmental education through various awareness activities.

Though environmental concepts are seen integrated across the various subjects at different levels in the formal curriculum, but the implementation part is affected by limitation in resources, time constraints and also due to lack of teachers with adequate knowledge and skills to deliver the meaningful environmental education. Teachers' play an important role in imparting environmental education but the extent to which teacher actually teaches in their classroom is not known. However, if teachers are to engage their students effectively then they too should have good understanding of key contemporary environmental issues and positive attitude towards environment.

Environmental education can help our young minds to be aware of the environmental concepts and issues which in turn would help to start to be proactive in protecting the environment they will inherit in future. EE can help them develop into adults who understand and care about environmental stewardship and nurture their sense of wonder, imagination, and creativity. For these reason, the researcher aims to study the present curriculum on environmental education across all the subjects in

grade VI to find out whether the present curriculum caters to the need of EE. To study the integrated environmental education curriculum it is very important evaluate the present status of integrated environmental education curriculum. At the same time, the delivery of the curriculum must also be looked into as students are the passive recipient of the curriculum. The focus of this research was particularly on grade VI as; if there be any reform or review in the curriculum then it should be started from lower classes. The pattern of curriculum in grade 4 to 6 is similar but differs in the content of the subjects.

1.2 Research Objectives

1. To study the current environmental education curriculum content in the formal curriculum of grade VI
2. To compare students' personal factors and level of environmental knowledge, attitude and practice
3. To assess students' level of environmental knowledge, attitude and practice of the students.

1.3 Research Questions

1. How effective is the integrated environmental education curriculum in grade 6?
2. Do students' personal factors affect levels of environmental knowledge, attitude and practice?
3. How much are students' environmental knowledge, attitude and practice correlated?

1.4 Research Hypothesis

1. There is a significant difference on the level of environmental knowledge, attitude and practice of the students depending on their personal factors (gender, age, parental background, nature club member and location of school)

2. There is a strong positive relationship in the between environmental knowledge, attitude and practice of students.

1.5 Scope of the Study

The study is conducted in 3 Lower Secondary Schools, 2 Primary schools and 5 Community Primary Schools which come under the jurisdiction of District Education Office, Wangdue Phodrang. The study focuses on the environmental content in the formal curriculum materials used by schools. This mandated the researcher to examine and review the environmental content in Science, Social Studies and Dzongkha in grade VI. For the in-depth understanding of how environmental education was delivered in the classroom and outside, interviews were conducted with the teachers of these schools. In addition, survey questionnaires were given to grade 6 students to see how literate they are at the end of grade VI.

In addition, to understand the process of curriculum development in Bhutanese education system, interview is conducted with Curriculum Officers at the Department of Curriculum Research and Development (DCRD); and Environment Education Officer of Royal Society Protection of Nature (RSPN), Thimphu, which is the only NGO organisation with the mandate to protect the nature. With the above mentioned officials, in-depth interview was conducted to get a clear view on the effectiveness of the integrated environmental education curriculum.

1.6 Limitation of the Study

Out of 20 districts in Bhutan, the study is undertaken in the schools located in Wangdue Phodrang district only. There are 27 schools in Wangdue district ranging from Community Primary, Primary and Lower Secondary to Higher Secondary schools. For this study, the schools included Lower Secondary, Primary and Community Primary schools. The population in the study covered 10 randomly selected schools wherein, the researcher consulted with the students and teachers teaching in these schools only owing to time and budget constraints. Therefore,

thorough and rigorous examination and reviewing of the environmental content in the formal curriculum materials was done to review the effectiveness of the curriculum.

1.7 Definition of Terms:

Students are the passive receivers of the curriculum and here it refers to students studying in grade VI.

Teacher refers to teaching staff teaching Science, Social Studies and Dzongkha despite of their positions, gender and nationality. The teachers play an important role in effective implementation of curriculum.

Expert here refers to concerned personnel involved in the curriculum making for all the schools in all levels of schooling.

Environmental education here refers to a process which develops awareness, knowledge and understanding of the environment, positive and balanced attitudes towards it and skills which will enable students to participate in assessing the state of the environment.

Effectiveness of curriculum: The actual implementation of environmental concepts when taught through integration in various subjects.

Integrated environmental education curriculum: EE is not taught as separate subject rather taught through integrative approach across curriculum.

Environmental concepts are concepts related to environment and its related issues like ecosystem, air pollution, water pollution, waste management, global warming, climate change, interdependence, etc

1.8 Theoretical and Conceptual Framework

To study the current integrated environmental education curriculum in grade VI, the researcher surveyed the questionnaire with grade VI students from 10 randomly selected schools of Wangdue Phodrang district, Bhutan. The reason for selecting grade VI students for this study was that the curriculum for grade IV to VI was similar though it differed in content of the curriculum. The students of grade IV to

VI studied the same subjects i.e. Science, Social studies and Dzongkha (national language). The questionnaire is used to study the knowledge, attitude and practice level of EE when learnt through integrative approach in the above mentioned subjects. In addition, the teachers were interviewed to find out the problems and challenges faced in teaching EE through integrated approach. To get a clear intention of the formal curriculum on the status of EE in the present EE curriculum, experts from MoE were interviewed and also the education official of RSPN, the only NGO working for the environment was interviewed to substantiate the EE curriculum through non formal activities.

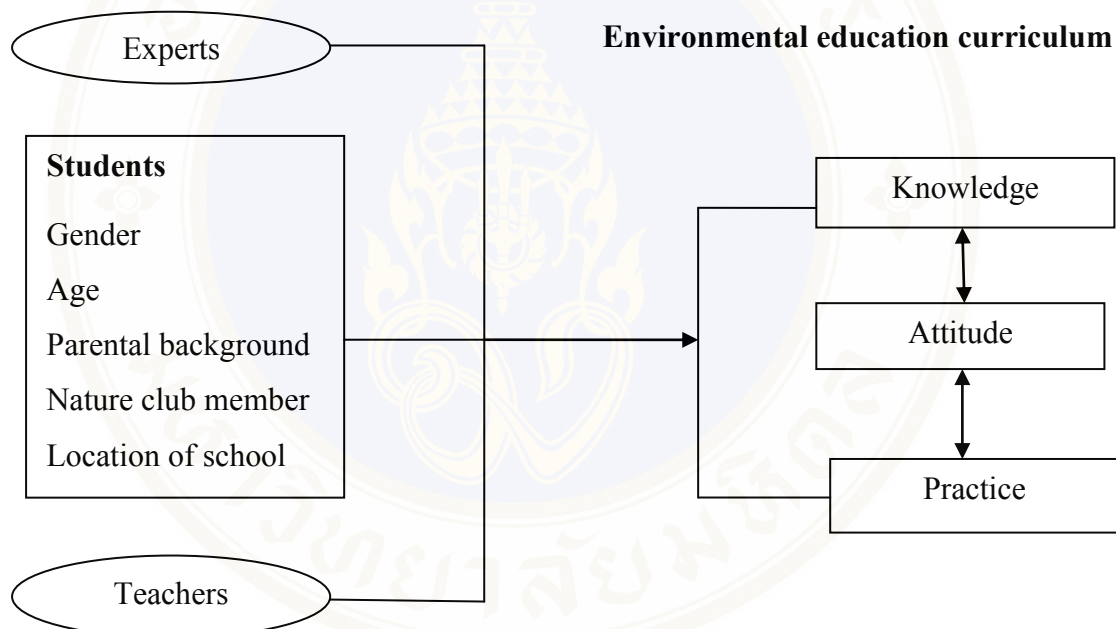


Fig 1.1: conceptual framework

1.9 Research Benefits

1. The result of the study could be used as a baseline for preparing policy guidelines for implementation environment education in Bhutan.
2. It could provide information for incorporation of relevant findings and recommendations for the curriculum reformation by the DCRD, MoE.

CHAPTER II

LITERATURE REVIEW

In the research study of integrated environmental education curriculum of the primary schools in Bhutan, the researcher reviewed the existing curriculum of grade IV to VIII as a baseline data for the study. The researcher interviewed the experts like the responsible education officials and the teachers to find out their opinion on the integrated environmental education curriculum. Then questionnaire was constructed to test the level of environmental knowledge, attitude and practice of grade VI students. The research guideline consists of the following:

2.1 Background on Education System of Bhutan

2.1.1 General Education Structure

2.1.2 General Education Curriculum

2.1.2.1 Key objectives of School curriculum

2.1.3 Educational Administration

2.1.4 Department of Curriculum Research and Development (DCRD)

2.1.5 Background of Wangdue Phodrang District

2.2 The Concept of Environmental Education

2.2.1 Objectives of Environmental Education

2.2.2 The Principles of Environment Education

2.2.3 Strategies in teaching Environmental Education

2.3 Theory and thought on Education

2.3.1. Knowledge

2.3.2. Attitude

2.3.3. Practice

2.3.4. Relationship between knowledge, attitude and practice

2.4 Curriculum Definition and its significance

2.5.1 Meaning of Curriculum

2.5.2 Significance of Curriculum

2.5.3 Integrated Curriculum

2.5 Environmental Education Curriculum in Bhutan

2.6 Related Researches

2.1 Background on Education System of Bhutan

The “traditional” education system in Bhutan has two major components, the ecclesiastical oriented institutions and the state led general or secular. With the advent of Buddhism in Bhutan in the 8th century, monastic education came to play important role in the lives of the people: and it continues today. It is assumed that “any form of education before the establishment of Buddhism, if it existed at all, would have been informal, home based, oral, and ritualistic.



Figure 2.1: map of Bhutan (NSB, 2010)

While monastic education continues to be an important part of the national culture, western education has been promoted and expanded since first Five Year Plan in 1961 to address the basic educational needs, and develop human resources required for the socio-economic development of the country. Within a period of four decades,

the government has been able to expand the modern education system from about 11 schools prior to the first Five Year Plan in 1961 to 556 schools and institutes in 2009, spanning from community primary schools to tertiary institutes. For those who could not attend or complete general or monastic education, basic literacy courses are offered all over the country in non formal education centers. Since 2006, the Ministry of Education in collaboration with private higher secondary schools, has initiated a continuing education programme, to allow school drop outs the opportunity to upgrade their qualifications (Annual Education Statistics, 2009).

Despite the country's mountainous terrain and its dispersed population, the Royal Government of Bhutan has always been committed to the objective of providing a largely free education to all its children. Since the start of modern development in the nineteen-sixties, the education sector has always been given high priority within the government's development policy and its share in the allocation of the total budget has never been below 10 percent. From 440 students in 11 primary schools in 1959, the education system in Bhutan has as of 2009 grown to include over 176,778 students in 542 schools/institutes, 10 daycare centers and 747 NFE centers (NSB, 2009). Increase in the number of students is an indicator that the education had advanced since the inception of modern education.

2.1.1 General Education Structure

The school-based education structure in Bhutan starts with 11 years of free basic education from classes PP to X. The 11 years of basic education are divided into 7 years of primary education (PP-VI), which starts at the age of 6, and 4 years of Secondary Education (VII-X). At the end of the cycle (Class X) there is a national board examination, Bhutan Certificate for Secondary Education (BCSE). Students continue their general education in classes XI and XII in Higher Secondary or students continue their general education in classes XI and XII in Higher Secondary or enter the labour market based on the students' performance in the board examinations (BCSE). After completing class XII (public and private), graduates continue their studies in the tertiary level or either enroll in the Vocational Training Institutes (VTI) or enter job market. Students join one of the institutes under Royal University of Bhutan (RUB) for a diploma or a bachelor's degree or join an institute abroad.

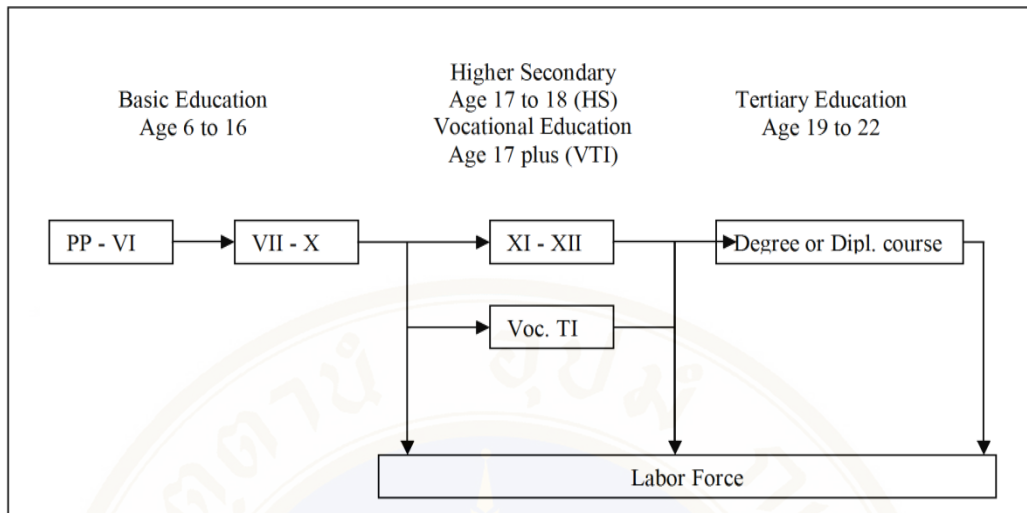


Fig 2.2: General Education Structure

Source: Annual Education Statistics, 2009

2.1.2 General Education Curriculum

Schools all over Bhutan follow the national curriculum designed by Department of Curriculum Research and Development (DCRD) erstwhile known as CAPSD (Curriculum and Professional Support Division). The entire foundation of school curriculum is based on principles, culture and values and the objectives of GNH that the country aspires for its citizens (REC, 2009). The medium of instruction for teaching is English throughout the nation except for the national language subject, Dzongkha which is compulsory in all the levels from pre-primary to tertiary. The objective of primary education in Bhutan is to impart basic literacy and numeracy skills, to provide knowledge of the country's history, geography, culture and traditions and to teach the fundamentals of agriculture, health & hygiene, and population education. Moral and value education are given special attention. Activity-based learning is used uniformly across the country to teach these skills and knowledge. During the 12th Annual Education Conference held on January 2009, one of the resolution was that future curriculum should incorporate the concepts of Gross National Happiness in the curriculum across all levels.

While Bhutan is known globally for GNH, but there seems to be a general lack of awareness of the concepts /ideas of GNH within the country. It was felt that school being a place where we teach children about all the good things in and about life and through education only, goals of GNH can be achieved. Therefore, it was

suggested that the concepts of GNH be embedded in the school curriculum so that our children learn about GNH at an early age. This responsibility fell on Department of Curriculum Research and Development (DCRD), MoE.

2.1.2.1 Key Objectives of school curriculum

The school curriculum must always provide maximum benefit to all the children in Bhutan. To enable maximum benefit to the students, the school curriculum was developed and designed in such a way that it promotes the following among the learners:

- Language abilities (listening, speaking, reading and writing) and communications skills needed for social living and further learning;
- Mathematical abilities to develop a logical mind and enable learners to perform mathematical operations and their application in everyday life;
- Scientific temper characterized by spirit of enquiry, courage to question, objectivity, divergent and independent thinking and knowledge of scientific methods of inquiry and its use in solving problems;
- Abilities to explore and understand the environment in its totality (natural and social, political and their interactive processes), the environmental problems and the ways and means to preserve the environment, including conservation of natural resources and energy for sustainable development;
- Pre-vocational skills, willingness to work hard, and entrepreneurship necessary for increasing productivity and for participating and participating in economic process; and broad generic competencies such as problem solving skills, evaluate skills and interpersonal and team skills that can be applied to a variety of work situations;
- Values that make a person humane and socially effective in various social settings and including inculcation of democratic, moral and spiritual values; development of self confidence to innovate and face unfamiliar situations; fostering a health attitude to the dignity of labour and hard work; a commitment to principles of secularism and social justice; dedication to uphold sovereignty, integrity and foster the development of the country; promotion of international understanding.

2.1.3 Educational Administration

The Royal Government, after the introduction of parliamentary democracy in 2008 is headed by the Prime Minister who is supported by a cabinet comprising of ten ministers; and is the executive branch of the government. The responsibility for administration of education and training in Bhutan falls on several organizations like the Ministry of Education, Ministry of Labor and Human Resources and Royal Civil Service Commission under the executive; independent institutes like the Royal University of Bhutan, the Monastic Body and private institutes.

The Ministry of Education is responsible for policy, planning, curriculum development and administration of Basic (Primary to Middle), Higher Secondary and Continuing Education, including non-formal education. For higher education, MoE is responsible for selecting students for international scholarships, for designing and implementing Higher Education policy and for liaising with the Royal University of Bhutan (RUB).

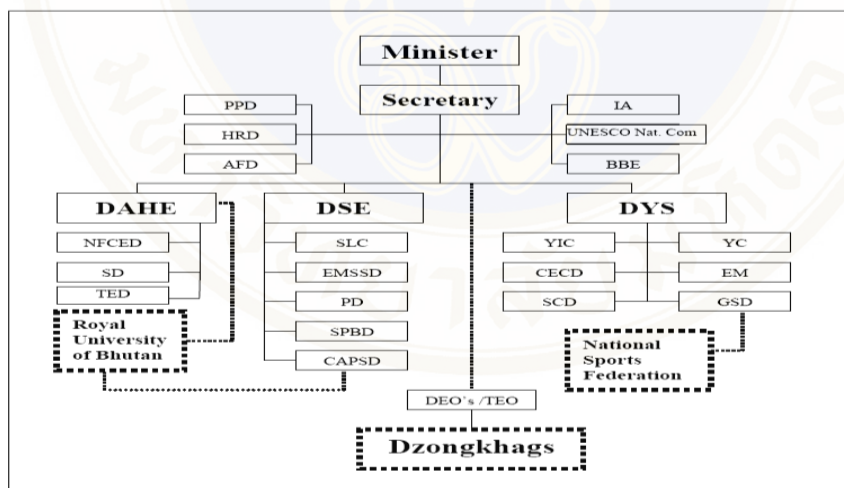


Figure 2.3: Organogram of MoE

Source: Annual Education Statistics, 2009

2.1.4 Department of Curriculum Research and Development

Department of Curriculum Research and Development (DCRD), erstwhile known as Curriculum and Professional Support Division (CAPSD), Ministry of Education, is the main body involved in curriculum research and development for the formal school system headed by Chief Curriculum Officer. DCRD is staffed by

Curriculum Officers working for different subjects like Science, Dzongkha, Information Technology, Social Studies, English, Arts, Environmental Studies and Mathematics. It also consists of subjects committee where it comprises of experienced educators and teachers as its members. All innovations and changes in the curriculum and curriculum materials are discussed in the subject committee meetings usually held twice a year. Proposals for initiating the innovations or changes are developed in consultation with the Chief Curriculum Officer, DCRD, for further submission to the DCRD Board, which meets once a year.

This division was formed mainly to; *Ensure provision of adequate, relevant and quality curriculum materials and enhance professional support to the teachers for effective curriculum implementation*

It also has other functions as follow:

- carrying out curriculum research and development
- looking after both academic and administrative matters.
- ensure proper functioning of DCRD and enhancing quality instruction in schools
 - direct and guide the work and functions of various subject committees.
 - carry out any other job that the Ministry of Education may assign from time to time.
 - coordinate all printing and preparing a list of the purchase of curriculum materials.
 - disseminate new curriculum development information to other agencies.
- work as a Member Secretary to the DCRD Board.

Curriculum Officers

- work as a Member Secretary to the subject committee in the respective subject area
 - take total responsibility for the effective curriculum development and practice in that subject in collaboration with the Chief Curriculum Officer, DCRD, and the Chairperson of the respective Subject Committee.
 - develop textbooks, course books and manuals in their subject area relevant to the Bhutanese context.

- conduct research studies culminating to improvement of curriculum and its implementation
- provide information to other sections in the division to facilitate distribution of books and equipment.
- disseminate new curriculum development information to Colleges of Education through involvement in the teacher education programmes.
- provide in-service programmes on curriculum changes and on need-based requirements.
- provide teaching-learning materials support to schools.
- prepare commissioning specifications for the development of curriculum materials and award the tasks

2.1.5 Background of Wangdue Phodrang District

Wangdue Phodrang is about 4308 square kms with an elevation ranging from 800 to 5800 meters above sea level. The summers are moderately hot with cool winters. The areas in the north remain under snow during the winter and the district receives about 1000 mm of annual rainfall. Wangdue Phodrang is the second largest district in Bhutan, comprising of 15 vast and diverse gewogs (sub-district). It has population of 28,079 according to Population and Housing Division, 2009. There are 27 schools; 2 higher secondary school, 1 middle secondary schools, 3 lower secondary schools, 2 primary and 19 community primary schools with 7212 students in Wangdue Phodrang district.

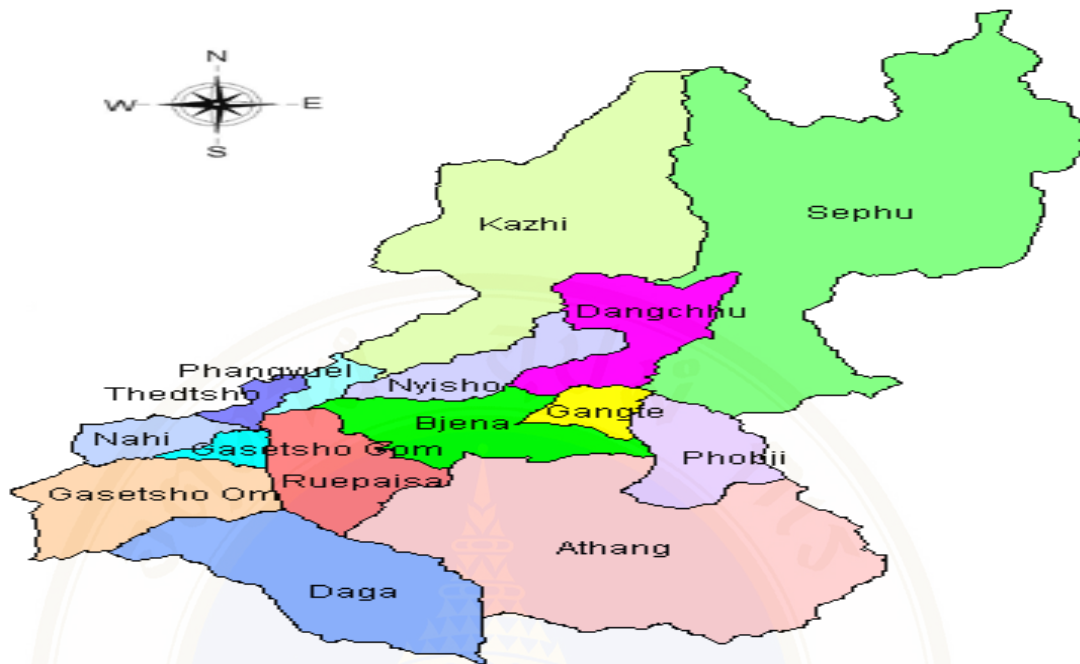


Figure 2.4: Map of Wangdue Phodrang district

Source: (NSB, 2010)

2.2 The Concept of Environmental Education (EE)

The concept of environmental education originated from the World Conservation Union or International for conservation of Nature Resources: IUCN which arranged meeting on environmental education worldwide. As a result, in 1975 Belgrade Charter had been invented as the concept and practice in environmental education (Office of Environmental Policies and Planning, 2004:270). In addition, the Belgrade Charter mentioned the aim of environmental education and guidelines because environmental education is process to develop human for environmental friendly, create values, awareness and understanding of combine existing of environment in nature, economy, social and political by giving everyone opportunities to develop knowledge, attitude, skill, how to make decisions for changing attitude and behavior in order to prevent and improve environment (Environment Quality Promotion Department, 2001:5)

One of the most widely definitions of EE which was developed at the international conference of environment educators sponsored by UNESCO in 1977

(MacGregor, 2003), “a learning process that increases people’s knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action” (UNESCO, 1978).

Environmental education is the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness among man, his culture and his biophysical surroundings. Environmental education also entails practice in decision-making and self-formulation of a code of behavior about issues concerning environmental quality (Hammerman DR and Hammerman, WR (1973). Environment education is education for life and it is a continual process (UNESCO.1993:13). Palmer defines EE as “the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness among man, his culture and his biophysical surroundings” (Palmer, 1998: 27). EE can also be defined as the effort to help people understand the complex aspects of the environment that result from the interactions among biological, physical, social, economic and cultural factors, and to equip people with the knowledge and instill in them the attitude needed to prevent and resolve environmental problems (Kang, 1999).

The ultimate aim of environmental education is to enable people to understand the complexities of the environment and the need for nations to adapt their activities and pursue their development in ways which are harmonious with the environment. In this way, it adds a new dimension to the efforts being made everywhere to improve living conditions. According to the European Resolution on the Environmental Education, the goals of environmental education are “to increase the public awareness of the problems which exist in this field, as well possible solutions, and to lay the foundations for a fully informed and active participation of the individual in the protection of the environment and the prudent and rational use of natural resources” (Giolotto *et al*, 1997: 37). The Tbilisi Conference (UNESCO, 1977) recommended three goals of environmental education identified at the Belgrade Charter (UNESCO-UNEP, 1976). They are:

1. To foster clear awareness of, and concern about, economic, social, political and ecological inter-dependence in urban and rural areas.
2. To provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment.
3. To create new patterns of behaviors of individuals, group and society as a whole towards the environment.

2.2.1 Objective of Environmental Education

The Belgrade Charter (UNESCO-UNEP, 1976) has set objectives for environmental education, which was endorsed by the Tbilisi Conference (Bhandari, n.d). The objectives of the environmental education according to Belgrade Charter (UNESCO, 1976. pp. 2-3) are as follows:

1. Awareness: to help individuals and social groups awareness of, and sensitivity to the total environment and its allied problems.
2. Knowledge: to help individuals and social groups acquire basic understanding of the total environment and its allied problems.
3. Attitude: to help individuals and social groups acquire social values, strong feelings of concern for the environment and the motivation for actively participating in protection and improvement.
4. Skill: to help individuals and social groups acquire the skills for solving environmental problems.
5. Participation: to help individuals and social groups develop a sense of responsibility and urgency regarding environment problems to ensure appropriate

2.2.2 The Principles of Environmental Education (EE)

According to the Belgrade Charter, the principles of EE are (Vinai Veeratanond and others, 1997:6 cited in Kaoses, 2001)

1. EE must deal with the entire concerned natural or man-made environment, including ecology, politics, economics, technology, social policy, law, legislation, culture and ethics.
2. EE is lifelong process.

3. EE should be interdisciplinary.
4. EE should emphasize co-operation and participation in the protection of the environment through finding solutions to environmental problems.
5. EE should consider global problems, while at the same time attend to local and regional problems
6. EE should consider the total progress and development with their proportional effects on the environment.
7. EE should encourage the people to appreciate the value and the necessity of cooperation and participation in protecting the environment and solving the environmental problems either at the local, national or global levels.

2.2.3 Strategy in teaching EE

Karl Schwab (Schwab, 1983:8-12) proposed an effective teaching EE which includes:

1. Outdoor learning or field experience which open the opportunity for students to have direct experiences.
2. Role playing and simulations to train the students to develop decision-making.
3. Problem solving methods which train the students on decision-making skills.
4. Value judgment which trains the students to recognize the value of the natural quality of the environment.
5. Lecture method for basic knowledge and theory background.
6. Discussion method which trains the students in brain storming and opinion formation.

Vinai Veeravatanand (1987:155-157) recommends the methods of teaching EE as follows:

In terms of outdoor education and field studies in and around the school or in market and in the community, the teachers must prepare carefully to determine the learning activities which will promote the goals and objectives of EE

1. movies or videotapes
2. color slides with careful description and commentary

3. module simulation
4. invitation of experts to give special lectures
5. experiments in the classroom or in the field
6. direct interviews with experts who require advanced planning and agreement
7. special activities and exhibitions concerning the environment within the school, community and global context as needed.
8. group or individual reports
9. voluntary debate and contests
10. role playing
11. To take advantage of the opportunity at appropriate times and events

The key to successful EE is the classroom teacher. The type of strategy to be used for effective teaching depends on the teachers and also the availability of resources in the school. If teachers do not have the knowledge, skills and commitment to integrate environmental issues into their curriculum, it is unlikely that the students will become environmentally literate.

2.3 Theory and thought on education

Education is about nurturing and developing a child morally, socially, physically, intellectually and aesthetically. It also teaches to appreciate the finer things in life and the beauty of the world around us (REC: 29). Education can play a crucial role in providing the necessary knowledge, understanding, values and skills needed by the general public and many occupational groups, for their participation in devising solutions to environmental questions. Education is the way knowledge, ideas and skills are passed on from generation to generation. The learning environment, including the home, the community and institutions, is the habitat that supports education (Buchan, 2004)

Education is an important process in human development because it promises morality and harmonious interaction with the environment. Men are part of nature and the environment and have lived with the environment harmoniously for million years. Therefore, men should realize the value of nature and avoid destroying

the environment (Surat Silapa-anond, 1998: 43). All people and organization should be comprehensively involved in environmental education (UNESCO, 1993:3). Society and the environment experience rapid, continual changes continually and school curriculum should therefore be adjusted and improved accordingly in a manner appropriate to the age and development period of children. Teaching – learning and training should stress practical skills and experience rather than rote memory learning (Pornpimol Jeamnakarin, 1996:27). The role of education in understanding protecting and solving problems related to environment has been realized all over the world since 1970. Education for environment might succeed if it deliberately directed towards school children. Realizing on education (1986) emphasized that “there is a paramount need to create a consciousness of the environment. It must permit all ages of sections of the society, beginning with child (Chethana, 2003). The field of education has an important responsibility in providing the public with the necessary knowledge and skills to participate in solving environmental issues (Jordan, Hungerford, & Tomera, 1986).

2.3.1 Knowledge

According to Encarta Dictionary (2006), knowledge means general awareness or possession of information, facts, ideas, truths, or principles. Likewise Lexicon Webster defines it as the act, fact, or state of knowing; all that has been perceived or grasped by the mind; learning; enlightenment; the body of facts accumulated by mankind (The Lexicon Webster Dictionary, 1997: 531). Knowledge is defined by the Oxford English Dictionary as (i) expertise, and skills acquired by a person through experience or education; the theoretical or practical understanding of a subject; (ii) what is known in a particular field or in total; facts and information; or (iii) awareness or familiarity gained by experience of a fact or situation. Bloom (1971:271) defines “knowledge” as the specific issue or general thought, which recognizes the method, process or situation through memory. Therefore knowledge means clear awareness of the facts and truths learned throughout time or understanding gained through experience or study.

Level of Knowledge

Bloom and others (1956:10-24) divided the cognitive domain into six levels ranging from simple to complex:

- knowledge as the capacity of human memory; this level of knowledge can be seen from the ability of the person to select from his/her memory.
- comprehension or the ability to communicate with other people to understand their intentions and thoughts.
- application, to the ability to apply what he/she has comprehended from memory to effectively solve new problems. This is not imitation from past experiences, but originates from his/her own ability.
- analysis, or the ability to analyze or breakdown the issues or problems into parts or pieces.
- synthesis or the ability to integrate all related and involved pieces together to form new concepts or issues.
- evaluation, or the ability to assess and evaluate according to acceptable criteria or standards

Knowledge Assessment

1. In psychological testing, there are three types of tests:

1.1 Achievement tests to assess knowledge and understanding, or the cognitive domain, which can be divided into:

1.1.1 Teacher-made Test or locally constructed test, either objective or for the essay type for local classroom use. It is an unqualified test.

1.1.2 Standardized test, or a test for which content has been selected and checked empirically, for which norms have been established, for which uniform methods of administering and scoring have been developed, and which may be scored with a relatively high degree of objectivity.

1.2 Aptitude Test or a test designed to indicate a person's potential ability for performance of a certain type of activity. This type of test can be divided into:

1.2.1 Scholastic Aptitude Test or a test used to predict the facility with which the individual will progress in learning academic school subjects.

1.2.2 Specific Aptitude Test or a test designed to measure some special ability or restricted group of capabilities

1.3 Personal –Social Test, a measure of social aptitude

1. Question-Answer type test: there are two types:

1.1 Essay Test, or the traditional type of examination in which the subject or examinee is asked to discuss, enumerate, compare, state, evaluate, analyze, summarize, or criticize

1.2 Short Essay and Multiple Choice Test or a series of test to which the subject is asked to respond by writing a brief answer and a recognition type of test in which the subject is asked to choose for each item, the most correct one, from several suggested answers respectively.

2.3.2 Attitude

Rosenburg and Hovland (1960) defined attitude as ‘predispositions to respond to some class of stimuli with certain classes of responses’ (p. 3) and recognize attitudes as having behavioral, affective and cognitive facets. Petty and Cacioppo (1981) suggest that ‘the term *attitude* should be used to refer to a general and enduring positive or negative feeling about some person, object or issue’ (p. 7). Also Anastasi (1967:543) and Hilgard (1962: 214) defined attitude as an acceptance or rejection towards a particular issue, or event, and readiness to respond with prejudice. Therefore attitude can also be defined as a behavior that has originated from some situation or experience or person.

Attitude is an element of the affective domain. It is formed through emotions of an individual that has experienced since first touch and response and eventually developed into habit. It is composed of three elements:

- Cognitive or belief component
- Feeling, or evaluative component
- Behavior component

1. Attitude measurement

The attitude measurement must measure all the components in a holistic manner.

1.1 The principle to measure the attitude of any individual should include the following components (Boonttham Kitpreedaborisuit, 1974:222 cited by Kaoses, 2001).

1.1.1 Content: the content to be measured must be the stimulus provoking a response that can be expressed and is measureable.

1.1.2 Direction: the direction of the attitude can be expressed in continuous linear form from left to right or negative to positive; the zero point is in the middle of the line.

1.1.3 Intensity: the response that is expressed must be either acceptance or rejection of the stimulus, which is indicated by the frequency or intensity on the line. High intensity means a feeling or opinion of acceptance or rejection of the content to a degree more than moderate or low intensity.

1.2 Instrument to measure attitude

Attitude test is to measure the mental and emotional set or pattern of likes and dislikes held by an individual or group, often in relation to controversial issues, personal adjustment, etc which is normally on a rating scale of opinion or response. The test is compared of two parts: the attitude statement and the answers on the rating scale. The popular attitude tests are Thurstone's type Scale, Likert Scale, and Osgood Scale. Every type of scale has weak and strong points; no test is complete and absolute in and out of itself. Therefore tests must be very carefully selected in order to implement the type that is appropriate to the research.

The Likert scale is most appropriate for this study based on these assumptions (Sawasdi Sukaontrungsi, 1972:290 cited by Kaoses, 2001)

1. The answers to the questions or statements are stable
2. The total response of each individual is in linear form
3. Each response represents only one subject or issue to measure

On Likert's rating scale, the statements should have equal weight between positive and negative statements. Normally there are five degrees of measurements ranging from least to most or from most to least. The average of the response will

indicate positive or negative towards the content to be measured (Anastasi. 1967: 482-485). Likert's rating scale was applied for this study.

2.3.3 Practices

1. Practice means something which is done again and again to gain perfection or some mental or physical action done for the purpose of learning or acquiring proficiency; the doing of something often as an application of knowledge and cognitive domain as well as attitude. The practical behaviour can be measured if expressed in terms of action, but the process which stimulates the practical action requires time and many steps of decision making (Prapapen Suwan, 1977:20-21 cited by Kaoses, 2001).

2. Practice measurement or practice test

A test primarily intended to afford practice or drill in the given field rather to measure knowledge or achievement, commonly used in arithmetic. Algebra, language and other subjects; sometimes used as a measure of attitude for some purpose. Checklists and Rating Scales are commonly used in test of practices (Sunan Solkosum, 1972:139-140)

2.3.4 Relationship between knowledge, attitude and practice

Knowledge, attitude and practice constitute a triad of interactive factors characterized by dynamism and unique interdependence. Emphasis is laid, for each component of the triad, on the value of ethical in raising the application of the component in real life to a peak (Badran, 1995). Knowledge, attitude and practice are closely related behaviors which occur simultaneously (Suchart Somprayoon, 1997:54) Parapen Suwan, (1997:75) suggested that knowledge alone does not insure an individual will to practice according to his/her knowledge. Attitude operates in conjunction with an individual's learned knowledge. Jintana Unipan (1984:31) stated that information is the principle knowledge and that includes experiences which are fundamental to human thinking, consideration, and decision making originating in constructive practice. Therefore, reinforcing knowledge would promote practice directly or indirectly. In the case of indirect means, attitude will be the middle joint as shown in the diagram:

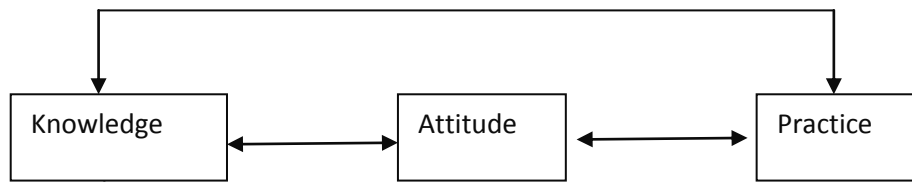


Figure 2.5: Relationship between knowledge, attitude and practice

2.5 Curriculum Definition and Significance

2.5.1 Meaning of curriculum

Good (1973:7) said: Firstly, curriculum means subjects contents that have system for learning. Secondly, it means generally structure of contents or something to be taught to the children in school. Thirdly, curriculum means subjects group and experience management for students beneath suggestions of students and educational institutions. Eakavit Na Thang (1968:108) has referred to the meaning of the curriculum as the collection of every provided experience for the students to learn, including the contents, vision, behavior, multifarious duties, different surroundings that were combined together as one experience to be transferred to the student recognition, course content or any matters that would encourage the learning process for the students. Curriculum is a process, not just textbooks and other learning materials but it needs to extend beyond an emphasis on acquiring fact-based knowledge to include skills, attitudes, and values.

2.5.2 Curriculum Significance

San Thumbumrung (1984:9) has stated the significance of the curriculum as the working plan or the tool to inform the working trend since the curriculum would decide the purpose, contents, teaching and learning process for the unity of the country toward the national educational objectives:

1. The curriculum as the official document, governments decree to enforce upon the responsible person in education process in the institution at different level

and also being a standard for provision of budget in personnel, infrastructure, equipment, instruction media and other items for public education in the institution

2. The curriculum as the standard rule of education to administer with the educational process in the institution at different level and also being a standard for provision of budget in personnel, infrastructure, equipment, instruction media and other items for public education in the institution

3. The curriculum as the operational plan of the educational administrator to provide the convenience and control in monitoring for result evaluation according to government policies in educational management.

4. The curriculum as the set up of concept in the promotion, growth and development of children according to educational objectives

5. The curriculum as the set up of trait and form of future society.

6. The curriculum as the set up of concepts of knowledge, skills, ability and behavior that should benefit society, involving the development of manpower leading toward the nation economic and social development effectively

7. The curriculum as the indication of the country's growth since education has become the instrument in human development. Any country that arranged for the proper educational system, being modernize with effectiveness and ability to cope with the change in current events would be able to obtain highly effective manpower.

Theorists "...argue that skills, values and understandings are best taught and assessed within meaningful, 'connected' contexts (Murdoch, 1998). When taught through integrating in various subjects, students get the opportunity to see or identify 'big picture' ideas in an overcrowded curriculum by transferring knowledge across curriculum areas.

2.5.3 Integrated Curriculum

A basic definition was offered by Humphreys (Humphreys, Post, and Ellis 1981), "An integrated study was one in which children broadly explored knowledge in various subjects related to certain aspects of their environment" (p. 11). This indicated that there was link among the humanities, communication arts, natural sciences, mathematics, social studies, music, and art. According to Shoemaker, (1989, p. 5) integrated curriculum was defined as ...education that was organized in such a way

that it cuts across subject-matter lines, bringing together various aspects of the curriculum into meaningful association to focus upon broad areas of study. It viewed learning and teaching in a holistic way and reflects the real world, which was interactive. Integrated Curriculum was a method of organizing learning where an activity, lesson, or unit draws upon more than one subject or discipline, thus promoting cross-links between content areas on a particular subject matter (Clement C. Maxwell Library, 2005). Integrated curriculum offers learning where it can reflect children's interests and suggestions. It can enrich students' learning experience themselves in conversation as well as provoke their thinking skills. Curriculum needs to be responsive to emerging issues as they arise like environmental education and this is one reason why curriculum must be integrated. According to Ozaner, 2004 cited in Taylor, Littledyke, Eames and Coll, 2009: 118, "when EE is made an integrated part of learning within classroom, school, social settings, and set in relationship to natural fields, students are more likely to become aware of environmental themes and to see EE not as a finite but as something that involves lifelong learning and application".

According to Hines (Hines et al., 1986), responsible environmental behavior are learned actions including understanding the ecological principles and processes. This may include interrelationship between social and natural systems. Also responsible environmental attitudes included strategies of environmental action (Hines, Hungerford & Tomera, 1986). Therefore environmental behavior of individuals' mostly reflects their environmental knowledge that this means responsible environmental behaviors (Roth, 1992, Wilke, 1995). The purpose of developing environmental knowledge is to empower individuals with a belief in their ability to contribute to environmental solutions through personal behavior, either as an individual or part of groups. Therefore integration of environmental education in the curriculum may contribute to increasing awareness of temporary and permanent environment issues (Oztas and Kalipci, 2009). The movement towards integrated curriculum is a move away from memorization and recitation of isolated facts and figures to more meaningful concepts and the connections between concepts (Lake, n.d). Ministry of Education of Bostwana took the infusion approach in 1997 whereby EE concepts and issues were integrated in subjects like science at upper level and

environmental science at the primary level. This was basically done as integrated approach would:

- overcome the problem of adding to already overcrowded curriculum;
- give structure to the revised curriculum by introducing new content and issues related to environmental concerns;
- help reinforce and complement different subject content; and
- be more economic in terms of time and employment of specialized teachers in EE (Ajiboye and Silo, 2009)

However this approach had its problems and challenges given that EE being still in infancy. Some of the problems were difficulty in preparation due to number of curricular and non-curricular issues, lack of skills to implement action-oriented, inquiry based approaches to EE learning, non-participation of teachers in EE curriculum development.

2.6 Environmental Education Curriculum in Bhutan

For centuries, Bhutan remained in self-imposed isolation from the outside world. A small population and a traditional agrarian lifestyle put little pressure on the natural environment, allowing Bhutan to emerge into modern world with most of its ecosystems intact. Bhutan has been recognized as one of ten global “hot spots” by environmentalist for its high level of biodiversity in combination with potential environmental threats (BAP, 2009).

Conservation is not a new idea to the Bhutanese. Buddhists teaching and practices have fostered a respect for all forms of life and a deep reverence for nature. With over 60% forest cover and the Royal Government’s commitment to environmental protection, Bhutan is in many ways an ideal model for conservation. However, a growing population will put greater pressure on Bhutan’s natural resources. Approximately 90% of the population is still engaged in agriculture, although only 16% of the land is permanently cultivable. This has led to practice the “slash and burn” method of shifting cultivation, and the increase in the size of livestock herds has caused overgrazing in many areas of the kingdom (NEC, 1994).

The 2005 Environmental Sustainability Index (ESI) compiled by the Yale Center for Environmental Law and Policy in conjunction with the World Economic Forum, ranked Bhutan as fourth among the Asian countries in its environmental performance. A total of 29% of its land area has been designated as protected areas, covering an area of 10,513 sq. km. In addition, 9% of the country's territory has been demarcated as biological corridors which connect the nature reserves, parks and wildlife sanctuaries to allow the free and uninhibited movement of animals and birds within a wide natural range (Planning Commission, 2007). Conservation of the environment is extremely important as the progressive and sustainable development of any human society fundamentally depends on viable and healthy eco-systems. It is also an essential condition for the fullest possible satisfaction of human needs and well-being and conversely, environmental degradation can deeply undermine development and threaten the various multi-dimensional aspects of human well-being (GNHC, 2009).

The school curriculum until mid-1980s was borrowed from India and all the teaching materials were those prescribed for Anglo-Indian schools, except for Dzongkha (Gyamtsho and Dukpa, 1998). From the mid-1980s, the then Education Department started Bhutanizing the education system so that teaching and learning in schools was in accordance with national needs and aspirations (Second Quarterly policy Guidelines, 1989: 8). Following the important policy change, there was development of relevant curriculum and materials for all the schools in the country. The first big curricular change came with the introduction of the New Approach to Primary Education (NAPE) project which emphasized activity-based learning, shifting the focus from 'teacher-centeredness to child centeredness, as well as from remoteness of content to familiarity of content' (Dolkar, 1995). The NAPE was based on children taking an active part in their lessons and using the local environments of school, district, and country as the context for learning (Tenzin & Maxwell, 2008). This approach proved to be very positive, and now the entire curriculum up to Class VIII is contextualized relative to Bhutan's environment. New materials on the environment were also gradually developed for Geography of Bhutan for classes IX-X; Introductory Economics for classes IX-X; Bhutan Economics for grade XI-XII; Natural Resources for Bhutan and their conservation for Class XI; and Tissue Culture in Practice for class

XII. Bhutan's consistent and ongoing EE-related contextualization of teaching and topic integration can be seen in Table 2.1, in order to teach children and young people about sensible use and conservation of the environment. Of particular note was the recent move to teach environmental studies in Dzongkha, the national language of Bhutan. Localization of school's formal curriculum facilitates better learning outcomes; students enjoy learning because it is contextualized to Bhutan (Tenzin & Maxwell, 2008).

The government has always made an effort to ensure that the curriculum is relevant to work and is in line with national needs and aspirations of the people (EMSSD, n.d). One of the significant aspects of the curriculum is its contribution to the Gross National Happiness by providing scope for demonstrating relevant actions in daily life (National Education Framework (2009:1). The curriculum should focus on development of life skills that will enable an individual to transfer their knowledge and skills into actual abilities. In the primary and secondary education the curricular focus was on making the learning meaningful and relevant to students and providing the scope for students constructing their knowledge and not just acquiring information. In the higher secondary stage the diversification of curriculum ensures that students who want to pursue higher education have the opportunity to do so and those who wish to enter the world of work get adequate preparation (National Education Framework, 2009: 2). Curriculum represents the totality of planned learning experience provided to learners to enable them to discover their talents, to develop their potentialities to the fullest, to enable them to construct knowledge, and to develop their physical and interpersonal skills, cognitive abilities and subject-matter expertise, attitudinal and emotional predispositions, character formation and work habits, and capabilities and social and human values to function as responsible citizens(National Education Framework, 2009: 35).

It is imperative belief that the health of Bhutan's environment detects the wellbeing of the people and thus contributing towards the Gross National Happiness. Therefore, every Bhutanese should know more of, for and through of the environment. It is the thrust of the Royal Government to provide the concepts and knowledge of the environment through the formal curriculum in schools in spiral curriculum form across various subjects (Tenzin and Maxwell, 2009: 277 -288). Education is an important

process in human development because it promotes morality and harmonious interaction with the environment. Men are part of nature and the environment and have lived with the environment harmoniously for millions of years. Therefore, men should realize the value of nature and avoid destroying the environment (Surat Silapa-anond, 1998:43 cited in Prarop Kaoses, 2001:7). All people and organization should be comprehensively involved in environmental education (UNESCO, 1993:13 cited in Prarop Kaoses, 2001).

The Ministry of Education has been charged with implementing environmental education for youth in Thailand through integrating the corresponding issues into school curriculum. Every school should integrate environmental education and activities to their learning strategy (MoE, 1991 cited by Prarop Kaoses, 2001). In Bhutan too, the Ministry of Education takes the lead role in imparting environmental education to the youths of today but the future citizens of tomorrow. At the same time, it tries to explore various means and strategies to provide relevant environmental education to the students. The education system can play an important task in the formation of environment awareness and attitudes towards environment.

There is no separate subject concerning environmental protection and its related issues in all the levels of schooling in Bhutan. Environmental education was taught by integrating in various subjects across all the levels in the formal curriculum. Environmental education (EE) in Pre-Primary to Primary (class PP to III) is realized the subject Environmental Studies (EVS) which is taught in our national language, Dzongkha. The subjects that are closely related to environmental education in classes IV to VI are Social Studies, Science and Dzongkha. The concept of environment was seen in all levels across different subjects because it is very important that children know the concepts and then apply what they learn in the school. Once aware of the concepts, they would change their attitude and work towards the conservation of environment which was one of the pillars of GNH, the guiding principle of development in Bhutan. EE was also carried out through non formal curriculum. It included various programs and activities conducted outside the classroom.

2.6.1 Environment Education through Formal Curriculum

Environmental education plays a key role in helping individuals and communities understand the complex nature of their interactions with the natural world and in fostering the knowledge, attitudes and behaviours needed to improve and protect the environment (Palmer, 1998; Stapp, 1969 cited in Duvall and Zint, 2007).

Environmental education may be focused in schools through formal and non formal curriculum as “often a person’s outlook for the future is determined at early age of development and therefore school education had special significance for awareness and protection of the environment”. Once students enter the workforce, it is difficult to transform their principles and behaviours to be more environmental supportive. School grounds are an ideal environment in which to engage the potential of students providing them with opportunities that can lead to improved attitudes and behaviours towards the outdoor school environment and better overall feelings for the school within the community and themselves as members of the school community (Skamp & Bergmann, 2001).

Some of the concepts or topics that are delivered through the content in formal curriculum

Table 2.1: Curriculum Mapping on Environmental Education

Sl No	Class	Subject	Topics/areas of environment
1	PP-III	EVS(Environmental Studies)	Covers the contents of social sciences to gain broad understanding of and to develop the knowledge needed in their changing society and economy
2	IV	Science	Water & Soil; Trees and Wood
		Social Studies	Our Weather; The Land Around us; Our Forest and Farms
		Dzongkha	Care of Forest; Vegetable garden; Poultry; Conservation of Forest
3	V	Science	Farming and Gardening; Energy; Air
		Dzongkha	Cash crop; Manure for the fertility of soil
		Social Studies	The Earth in space; the seasons; the solar system, the universe; identify different climates, vegetation, wild animals, crops and livestock at different altitude levels at different parts of the Dzongkhag; Bhutan: Valleys and the river system; Evolution and timeline; World Geography – Deserts, polar regions, plains, oceans and seas, peninsulas, islands, bays and lakes
4	VI	Science	Living and Growing ; Changes and Reaction; Planet and Earth
		Dzongkha	Rivers and valleys; deer and hunting dog; conservation of animals; jackals and three friends; mushroom and asparagus

Source: Tenzin and Maxwell, (2009)

Table cont.

		Social Studies	The Earth we live in; the moving earth; finding places and time on Earth.
5	VII	Science	Our Natural Environment; Natural processes
6	VIII	Science	Using our Environment; Ourselves
		Bhutan Geography	Using the Forest Resources; Using Water and Energy Resources; Using Minerals Resources.
7	IX	Biology	Flowering Plants; Plant Physiology; Flowerless Plants; Animal Study
		Bhutan Geography	Geography of Bhutan; The natural systems-formation of the Himalayas; Rocks and Minerals; Soils; Climate; Forest and wildlife; Rivers and erosion; Map work
	XI	Biology	The living world; Diversity in life; Organisms and the environment; Units of life; Continuity of life, Natural resources of Bhutan and their conservation
		Geography	The lithosphere, atmosphere, biosphere; Remote sensing, Map projection
10	XII	Biology	Plant physiology; Animal physiology; Origin and evolution of life
		Geography	Introduction to resources: Definition of resources and types; Nature conservation

Source: Tenzin and Maxwell, (2009)

2.6.2 Environmental Education through Non-formal Curriculum

Non formal curriculum consists of all planned activities which occur outside the classroom or school subjects. Although it seems less important but was significant in many ways. Environmental education was also taught through various co curricular activities carried out in the school. The school offers various activities related to environmental education that supports knowledge and skills. The effectiveness of these kinds of programs depended on the individual interest of the students as well teachers. In addition, non government organizations played an important role in these kinds of programs by providing financial and technical assistance.

Some environmental education activities and approaches, for example, encourage students to discuss environmental issues and actions with their parents and other adults in the community (Ballantyne *et al.*, in press). Effective environmental education programs and materials need to present information and ideas in a way that is relevant to the learners (NAAEE, 1996 cited by Athmanand and Monroe, n.d). Some of the co curricular activities carried out in the schools are:

Nature Club

School based nature club was initiated by Royal Society for Protection of Nature (RSPN) and now almost all the schools in Bhutan have instituted Nature Club in their schools. RSPN was founded in 1987 by Dasho Paljor J Dorji and is a pioneer environmental NGO (Non Government Organization) in Bhutan which is now fully engaged in the new challenges and intends to:

“To inspire personal responsibility and actively involve the people of Bhutan in the conservation of the Kingdom’s environment through education, applied research, and information dissemination, in collaboration with concerned agencies and indigenous institutions”.

The Royal Society for Protection of Nature (RSPN) probably was the first organization to introduce concept of environmental education thorough educational programs in schools, monasteries and community groups. One of their components of the mission is to sensitize people to the complexities and real-life implications of these issues which can be done through awareness programs only. To educate illiterate on environmental issues, the Environment Education Unit has been organizing various forms of activities involving the key resource for the local communities around the Kingdom.

Since 1997, RSPN implemented conservation education programs through a network of nature clubs based in schools and training institutions. Schools and monastic institutions are seen to be best suited to advocate in their vicinity. The heads of the monastic institutions has been trained on basic gardening and caring of their own surroundings. Through various means of advocacy, RSPN has partially supplemented the National Environment Commission and other related stakeholders to achieve the mission of maintaining minimum of 60% of the Kingdom under forest cover in all times to come.

Nature club activities complemented the conservation efforts of Bhutan. It provided variety to school activities and also added values to their curricular learning. Further, it enables both teachers and students to find new models and approaches from which to build while retaining continuity with existing good practices. It also enabled them to investigate local issues in depth and generate information and data that can be

used to make positive changes in the locality. School students should be taught and trained to love their land and environment and be responsible to solve and protect their environment. Schools in Bhutan are located in various ecological zones with socio-economic variations. They are exposed to diverse environmental issues that need to be addressed locally. Nature clubs in schools have served as a forum for fostering environmental education, awareness and action to address local environmental issues. The nature clubs generally attempted to disseminate environmental education through the following activities:

1. literary activities on environment and environmental issues
2. plantation
3. school beautification
4. cleaning campaign
5. environmental messages through billboards
6. celebration of International Environment Days; World Environment Day, World Water Day, etc
7. environmental trip

Some of the outcomes of the nature activities in schools are:

- greener school environment
- eco-friendly waste management systems
- cleaner school surroundings
- higher level of environmental awareness, understanding and positive attitude among students
- students equipped with skills in planning, implementing and advocating environmental concerns to wider audience
- school and community have capacity to develop their own initiatives/actions for the local environment problems/challenges

The initiative of this network of nature clubs has been especially successful at grassroots level, contributing to increased environmental awareness and more sustainable lifestyles in schools and their immediate environment. Environmental awareness was better done through schools.

Despite the outcomes brought about by nature clubs, there has been lapse in terms of sustaining the nature clubs financially as well as planning for a longer term

operation. It was also noticed that many nature clubs perform well when the club receives support fund and on other times remain inactive or with very less outcome when it was not supported.

RSPN would continue its environment education programs involving the nature club networks, the Ministry of Education and various institutes.

School Greening Program

This concept was institutionalized on pilot bases in 30 schools spread across the country which was envisaged to develop natural facilities useful to strengthen the formal curriculum teaching and make school palatable for living and learning. School Greening Program is not only the physical greening but greening the young minds (Tenzin and Maxwell, 2009).

The School Greening Program was generally implemented by the school to develop resources for promoting environmental awareness in which students could do fieldwork and environmental action. The school greening program activities generally include:

- development of a nature garden for local flowering/non flowering plants to attract insects, a nursery, a compost heap, a pond, rock garden;
- making information notice for local, national, and global events and issuing publications featuring student work;
- having the school canteen reduce packaging and resource use;
- Establishing waste-pits, waste bins, and recycling centers to encourage and staff to dispose of waste properly and to recycle materials as well as to reduce resource consumption;
- carrying out energy and water conservation projects relating to school energy and water bills and finding way to reduce bills;
- planning more lessons outside so that environment stimuli can be used as part of teaching ; and
- organizing eco-friendly camping/trekking experiences (Tenzin and Maxwell, 2009)

The above mentioned activities were maintained actively by students under the supervision of teachers. This greening initiative also developed the landscape of

the school and made the school conducive for learning. The kind of activities carried out depended on the landscape and the need of the schools.

Environment Education through Non Formal Education

The non-formal education (NFE) system was first developed in 1993 as a joint venture of the Dzongkha Development Authority, erstwhile known as the Dzongkha Development Commission and the National Women's Association. In 1994, the Ministry of Education formally took over the NFE, which is now known as the Non-formal and Continuing Education Division (Policy and Planning Division, 2004:p.29). The NFE programs were originally established in order to enhance literacy achievement in Bhutan, and were conducted through alternative form of education, such as those outside the state school system and those offering adult literacy (Planning Commission of Bhutan, 1991). The NFE thus provided literacy education for learners who had no opportunity to attend formal education or for those who did not succeed in their studies owing to unavoidable circumstances (Ministry of Education, 1993a). The prime courses, in Dzongkha, included literacy and numeracy, personal sanitation management, cleanliness and conservation of the environment, preservation of national traditions and culture, and rural income generation through farming (Ministry of Education, 1993a).

NFE-based EE follows a similar process. Environment concepts are generally delivered through an expository approach involving group discussion and with explanations given by an instructor. For instance, at Level 1, the starting point for learners who have never been to school is forest preservation, followed by strategies for the preservation of forests (Ministry of Education, 1993b, 1993c). The concept of forest conservation is expanded on through interpretation of pictures and group discussion in level II (Ministry of Education, 1993a, 1993d). At level III, learners are taught about other ecosystems, including land, air, forests, and waters – the four essential elements for life in Bhutan. Since the livelihoods of most Bhutanese people depend on natural resource, such learning is central to their social and economic well being. Without this learning, the country could suffer destruction of the environment, culminating in drought, severe landslides, and loss of cultivable land (Ministry of Education, 1993b, 1993c).

Environmental Education Workshops

A comprehensive programme of in-service workshops was organized at the school, district and national levels to introduce teachers to the new curriculum and teaching methodology and other relevant programs. The national level workshops were held during the long winter vacation for approximately 1000 teachers each year. Since localization of the curriculum in grade PP to VIII, teaching resources have been contextualized to the Bhutanese physical, social and economic environments (Tenzin & Maxwell, 2008). This approach had improved the relevance of the school curriculum for learners in terms of content and process and at the same time students could learn different subjects by relating to their immediate world. This process would help children to gain better understanding of content and a greater awareness of their surroundings which in turn can foster to develop deeper appreciation of their environment. In keeping with this ideology, implementation of EE programs in Bhutan by DANIDA (Danish International Developmental Assistance) was accompanied by an initiative designed to train teachers on how to infuse EE across the curriculum through a series of National Based In-Service Programs (NBIP)(Tenzin and Maxwell, 2009: 284).

The key to successful environmental education is the classroom teacher. If teachers do not have knowledge, skill and commitment to environmentalise their curriculum, it was unlikely that an environmentally literate student will be produced (Shobeiri and *et al.*, 2006). For this, teachers must be trained as teachers and their ability was one of the most important factors for environmental education. This kind of training workshops were conducted for selected focal teachers to infuse importance of EE programmes in schools. Teachers play an important role in educating their students about environment which is possible only when the teachers themselves have the necessary level of environmental attitude.

Environmental education in schools was seen as an important strategy for environmental sustainability. However, if teachers were to engage their students effectively in EE, it was a reasonable assumption that they should have an understanding and secure knowledge of key contemporary environmental issues and a positive attitude towards the environment (Taylor, Jenkins and Kennelly, 2007). Said *et al.*, 2003 suggested that teachers can influence the environmental attitudes of their

students. To do so in positive manner, teachers require appropriate content and pedagogical knowledge (Summers and Childs, 2000) coupled with a favourable attitude towards the environment. Therefore this kind of workshop was conducted to equip the teachers with basic knowledge and skills to facilitate environmental education in schools.

2.6.3 Environmental education in College of Education (CoE)

There are two college of education in Bhutan and are the premier institutions of learning in the country, which provides training to Primary and Secondary teachers. The college offers courses in Bachelor in education science, commerce and humanities. It awards the Bachelor in Education Degree to candidates upon completion of the 8-month apprenticeship and 3 -year regular training courses. It is also the center for a number of in-service programmes conducted during winter breaks.

Realizing the importance of role of teachers in environmental education, RSPN initiated the revision of EE module in the two teacher colleges. Environmental education module needs to be reviewed and revised so that the future teachers are well trained when they go in to the field. This module would familiarize the student teachers with the basic understanding of the environment and emerging issues. The module would also equip them with the right attitude, necessary skills and appropriate tools to address environmental problems. The aim of this module was to produce teachers with the knowledge, attitude and skills to protect and preserve the environment. This will help to prepare teachers in knowledge and skills and instill the kind of innovative teaching styles that are required to bring about behavioral change in the students, and therefore translate environmental concern into action. Teachers can play an important role in educating their student about environment and its related issues. Shuman and Ham's (1997) model of Environmental Education Commitment suggest that teachers' attitudes toward teaching environmental education will be very much influenced by their commitment. Its model says. 'The stronger the teachers' commitments to teach environmental education, greater will be the probability that they will overcome existing barriers and actually carry out the behaviour'. Teachers are the keepers of the knowledge whereas students are the passive recipients.

Therefore the key to successful environment education is the classroom teacher. If teachers do not have the knowledge, skills and commitment to environmentalise their curriculum, it is unlikely that environmentally literate students will be produced (Fien, 1999: p.69). Therefore, teachers must be given the necessary level of environmental knowledge by introducing environmental education programs.

Table 2.2: Framework for EE module

SI No	Topic
1	What is environmental studies? 1.1 Definition of ES 1.2 Scope and importance of ES 1.3 Need for public awareness
2	The Natural World 2.1 elements of natural world 2.2 biotic components 2.3 abiotic components
3	Ecosystems 3.1 Definition, structure and function of an ecosystem. 3.2 Producers, consumers and decomposers. 3.3 Energy flow in the ecosystem. 3.4 Ecological succession. 3.5 Food chains, food webs and ecological pyramids. 3.6 Types of Eco-systems
SI No	Topic
4	Biodiversity
5	Human Impacts 5.1 Air environment 5.2 Water 5.3 Land 5.4 Other Pressures

(Source: CoE, 2010)

2.7 Related Researches

Biodiversity education at primary school level should be especially emphasized since it includes the suitable age range for awareness development (Piaget & Inhelder 1983). Moreover, children at primary school age are likely to be actively engaged in the investigation of nature, particularly outside the classroom (e.g. Lindemann-Matthies 2006). Thus, the primary school years seem to be the most opportune time for emphasizing affective, emotional concern for living species (Chawla, 1998 cited in Knecht, 2007).

May (2000) suggests the importance of a school climate conducive to environmental education, as well as teachers with the knowledge and skill base to teach environmental education whose teaching styles, content orientation, and personal behaviours are compatible with environmental education.

Environmental attitude of young people appears to be crucial as they ultimately play a direct role in providing knowledge-based solutions to incoming environmental problems (Bradly *et al.*, 1999; Eagles and Demare, 1999). Furthermore, school environmental program, although addressed to students can also influence upon the environmental knowledge, attitude and behavior of adults (parents, teachers and local community members) through the process of intergenerational influence (Evans *et al.*, 1996; Ballantyne, 1998; Gallagher *et al.*, 2000). Educators have globally accepted this role of preparing students to become critical thinkers, informed decision-makers and able communicators. In virtually every country “there is a frantic haste to develop programs in environmental education” (Wisconsin DPI, 1994: 10).

Sex differences did emerge in the attitudinal domains, with girls expressing stronger feelings of responsibility towards protecting the environment and greater alignment with the ecological social paradigm than boys (Thielking and Moore, n.d). Gender differences are also sometimes found for locus of control. Crandall (1965) found that girls tended to have higher internal locus of control of responsibility than the boys. This indicates that girls can be more responsible than the boys and work more towards the conservation of the environment. The attitude and practice towards environment conservation may also depend on one’s interest. When individuals are interested in the activity they are working on, they often process the information received more deeply retain it better, and stay engaged with it for a longer period of time (Wigfield, et al., n.d). In a study conducted to find the environmental literacy of year 3 students, it was found that girls displayed better environmental literacy than did the boys (Chu, *et al.*, 2007). It can be concluded that girls would display more responsible behavior towards the environment.

According to a research done to study the situation of environmental awareness of Primary and Secondary school students, it was found that the environmental awareness and behaviour was strongly affected by the family (Hao, 1999). This indicates that parents can influence their children’s attitude towards

environmental awareness. Parents' educational background affected environmental literacy of the children as found in a study to find the environmental literacy of year 3 students. It was found that students whose parents were educated showed higher levels of environmental literacy (Chu and *et al.*, 2007). The strong effect of parents' educational background on students' background on students' knowledge may be attributed to the fact that young children spend much time with their parents reading storybooks, playing and studying together at home. Research results from Musser Diamond (1999), cited by Chu and *et al.*, 1999, indicated that only parents who display concern for the environment can affect children's attitude strongly. Also, Bronfenbrenner (1986) reported that parents are really important role models for children to learn about pro-social behaviour and attitude. In contrast, the effect of parents' educational background is rarely evident in middle and high school students because older children tend to spend more time with their friends than with their parents (Ko *et al.*, 2004; Lee *et al.*, 2004 cited in Chu, *et al.*, 2007).

A study carried out to find the effects of environmental education program on student indicate that students were more much more aware of issues related to the environment when they participated in environmental programs than those who had not participated (Volk and Cheak, n.d) The findings on relationship between attitudes of club members on environmental issues and those of non-members indicated that the pupils who are club members have positive attitudes towards most of the salient environmental issues while those pupils who are not members of the clubs have a negative attitude towards most of the salient environmental issues (Josiah O. Ajiboye and Nthalivi Silo, 2008)

Another study found that it was encouraging that a large percentage of students in all five classes reported having changed their behaviour as a result of participating in the environmental education programme (Ballantyne and *et al.* n,d). Klein (1993) found that students only recognize the importance of civic and personal actions if they are involved in relevant, local environmental problems, because distant or global problems are harder for students to see the relation to their own lives.

CHAPTER III

RESEARCH METHODS

This research aims to study the integrated environmental education curriculum in the primary schools of Wangdue district. The purpose of this study is to review the content on environmental education in the formal curriculum and also to test the level of environmental knowledge, attitude and practice of the grade VI students. The research methods for this study are presented as below:

- 3.1 Research Design
- 3.2 Population and Sampling
 - 3.2.1 Population
 - 3.2.2 Sampling
- 3.3 Research Instrument
- 3.4 Data Collection
- 3.5 Data Analysis

3.1 Research Design

A quantitative (survey research) and qualitative (in-depth interview) was adopted to study the environmental education curriculum of the primary schools in Bhutan. For quantitative approach, questionnaire was administered to collect the data on the level of environmental knowledge, attitude and practice of grade VI students. At the same time, for qualitative approach, in-depth interviews were conducted with the teachers teaching Science, Social Studies and Dzongkha in grade VI and the curriculum experts to supplement the data collected through survey.

3.2 Population and Sampling

3.2.1 Population

Bhutan has a total of 20 districts with 563 schools spread all over the country and a total of 6,668 teachers in all the levels of schooling. The study could not be carried out in all the primary schools in Bhutan due to time and financial constraints. Out of the 20 districts, the study focussed only in one district i.e. Wangdue Phodrang. In this district, there were 27 schools inclusive of Higher Secondary, Lower Secondary, Primary and Community Primary schools with 319 teachers. The study was carried out in Lower Secondary, Primary and Community Primary schools of Wangdue Phodrang district since the study focused on grade VI. The population for the survey research were 454 grade VI students. The population for in-depth interview were teachers teaching Science, Dzongkha and Social Studies. Out of 27 schools, 10 schools consisting of urban and rural schools which were accessible were taken up for the study. The researcher conducted in-depth interviews with teachers teaching Science, Social Studies and Dzongkha in grade IV to VI in 10 schools and also with the curriculum experts of MoE and environment education officer of RSPN, Thimphu.



Fig 3.1: Schools in Wangdue Phodrang district

3.2.2 Sampling

The 10 schools for sampling in this research were randomly selected from the total 27 schools in the district based on the location and its accessibility from the road. The number of teachers interviewed was based on the strength of the teachers in a particular school and also the number of teachers teaching Science, Social Studies and Dzongkha in classes IV to VI. In some Primary and Community schools, there were 1 or sometimes 3 teachers teaching all the subjects in all the classes.

Sampling for students

The sample size (n) of the students for the study was calculated using Taro Yamane (1967) with 95% confidence level and $P = .05$

$$n = \frac{N}{1 + N(e)^2}$$

where e = Error of random sampling = 0.05 (5%),

N = Population Size

n = sample size

Sample population

$$n = \frac{454}{1 + 454(.05)^2} = 212.646 = 213$$

n = 213

Table 3.1: Number of grade VI students in 10 schools

Sl No	Name of the School	No. of Students	Total Sample
1	Wangdue LSS	141	67
2	Nobding LSS	13	6
3	Gaselo LSS	50	24
4	Tencholing PS	108	51
5	Phobjikha CPS	54	26
6	Nahi PS	21	10
7	Samtengang CPS	24	11
8	Hebesa CPS	9	4
9	Rubesa CPS	21	10
10	Kazhi CPS	13	6
	Total	454	215

Source: Statistics, 2010, Ministry of Education

Sample calculation of students for each school:

1. Wangdue LSS

$$n = \frac{\text{total of no. of population X total sample}}{\text{total number of students}}$$

$$n = \frac{141 \times 216}{454}$$

$$n = 67.083 = 67$$

2. Nobding LSS

$$n = \frac{\text{total of no. of population X total sample}}{\text{total number of students}}$$

$$n = \frac{13 \times 216}{454}$$

$$n = 6.185 = 6$$

3. Gaselo LSS

$$n = \frac{\text{total of no. of population X total sample}}{\text{total number of students}}$$

$$n = \frac{50 \times 216}{454}$$

$$n = 23.788 = 24$$

4. Tencholing PS

$$n = \frac{\text{total of no. of population X total sample}}{\text{total number of students}}$$

$$n = \frac{108 \times 216}{454}$$

$$n = 51.383 = 51$$

5. Phobjikha CPS

$$n = \frac{\text{total of no. of population X total sample}}{\text{total number of students}}$$

$$n = \frac{54 \times 216}{454}$$

$$n = 25.691 = 26$$

6. Nahi PS

$$n = \frac{\text{total of no. of population X total sample}}{\text{total number of students}}$$

$$n = \frac{21 \times 216}{454}$$

$$n = 9.991 = 10$$

7. Samtengang CPS

$$n = \frac{\text{total of no. of population X total sample}}{\text{total number of students}}$$

$$n = \frac{24 \times 216}{454}$$

$$n = 11.418 = 11$$

8. Hebesa CPS

$$n = \frac{\text{total of no. of population X total sample}}{\text{total number of students}}$$

$$n = \frac{9 \times 216}{454}$$

$$n = 4.281 = 4$$

9. Rubesa CPS

$$n = \frac{\text{total of no. of population} \times \text{total sample}}{\text{total number of students}}$$

$$n = \frac{21 \times 216}{454}$$

$$n = 9.991 = 10$$

10. Kazhi CPS

$$n = \frac{\text{total of no. of population} \times \text{total sample}}{\text{total number of students}}$$

$$n = \frac{13 \times 216}{454}$$

$$n = 6.185 = 6$$

3.3 Research Instruments

The research instrument consisted of both qualitative and quantitative. Firstly, the study conducted in-depth interview with the experts to get their opinion on the content and effectiveness of the integrated environmental education curriculum. Secondly, teachers teaching Science, Social Studies and Dzongkha in grade VI were interviewed to get their opinion on the content and delivery of the environmental education curriculum when taught through integration. Thirdly, the students of grade VI were surveyed using questionnaire to find out the content and awareness level on the environmental concepts. The questionnaire had been adapted from the questionnaire “Young People and the Environment: An International Study of Environmental Knowledge and Attitudes” that was administered to study about the young people and their environment in Asia Pacific region. The questionnaire was modified and contextualize to the situation of present study by discussing with the curriculum experts and also with the major advisor. The questionnaire consisted of questions on environmental knowledge, attitude and practice. Knowledge of environmental issues includes local issues such using renewable, resources, carbon

cycle, wastes, global warming, pollution, recycling, biodiversity, ecology and conservation of habitats for creatures. Attitude towards the environment: attitude towards the environment comprises environmental sensitivity and concern for nature/environment. Environmental practice towards environment included personal involvement and actions to improve the environment.

The following experts were interviewed:

1. Curriculum Officer, Science, DCRD, MoE
2. Curriculum Officer, Social Studies, DCRD, MoE
3. Curriculum Officer, Dzongkha, DCRD, MoE
4. Environment Education Officer, EEU, RSPN, Thimphu

Table 3.2: Division of Items in the Questionnaire

SI No	Effectiveness of EE Curriculum	Item
1	Knowledge	15
2	Attitude	12
3	Practice	12

Table 3.3: Measurement of level of attitude

Measurement of level of environmental attitude	Positive Scores	Negative Scores
Strongly agree	4	1
Agree	3	2
Disagree	2	3
Strongly Disagree	1	4

The researcher derived the differences of 1 mean score between each level of decision towards level of environmental attitude by using the evaluation criteria of Best, (1977) as indicated below:

$$\frac{\text{Upper score} - \text{Lower score}}{\text{No. of Levels}} = \frac{4 - 1}{5} = \frac{3}{5} = 0.60$$

Table 3.4: The scoring based upon four different levels for attitude

Mean Scores	Meaning
1 – 1.60	Very low
1.61 – 2.20	low
2.21 – 2.80	moderate
2.81 – 3.40	high
3.41 – 4.00	Very high

The researcher derived the differences of 1 mean score between each level of decision towards level of environmental practice by using the evaluation criteria of Best, (1977) as indicated below:

$$\frac{\text{Upper score} - \text{Lower score}}{\text{No. of Levels}} = \frac{3 - 1}{5} = \frac{2}{5} = 0.40$$

Table 3.5: Measurement of level of practice

Measurement of level of environmental practice	Positive Scores	Negative Scores
Often	3	1
Rarely	2	2
Never	1	3

Table 3.6: The scoring based upon three different levels for practice

Mean Scores	Meaning
1 – 1.40	Very low
1.41 – 1.80	low
1.81 – 2.20	moderate
2.21 – 2.60	high
2.61 – 3.00	Very high

3.4 Data Collection

For data collection, the researcher requested permission from Dean, Faculty of Graduate Studies, Mahidol University. Further, the researcher acquired permission from the Ministry of Education, Bhutan to interview the curriculum experts and teachers and also to survey the questionnaire with the students. Then the researcher obtained permission from Dzongdag, Wangdue Phodrang district to visit the schools to administer the questionnaire and to interview the teachers. The researcher also sought appointment from Environment Education Officer to interview. The data collected were carried out in the following three steps:

3.4.1 Firstly, the researcher met with the principals of the respective schools and the cover letter requesting for data collection was given. Then, the students of class six were administered with the questionnaire to find out the level of environmental of knowledge, attitude practice on environmental. For this, the researcher sat personally with respondents whilst they filled and completed the questionnaire. The researcher also helped them in clarifying some questions since they were young children.

3.4.2 Secondly, the researcher interviewed the teachers teaching Science, Social Studies and Dzongkha in grade VI to learn about the opinion on content and delivery of environmental education curriculum.

3.4.3 Thirdly, in-depth interview was conducted with the curriculum experts from MoE and environment education officer of RSPN, Thimphu to find out the current status of environmental education and its effectiveness.

3.5 Data Analysis

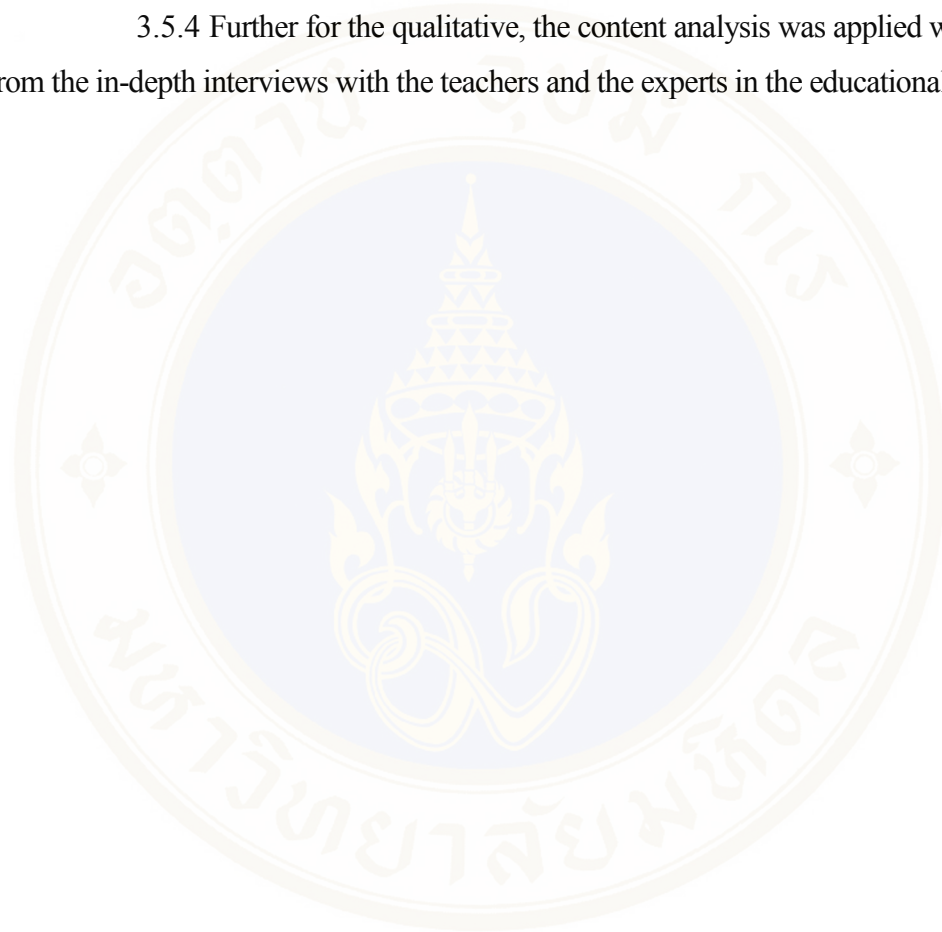
Once the researcher finished collecting the duly filled questionnaire, the data was then tabulated in the program “Statistical Package for Social Sciences for windows”. The data entered were then analyzed using descriptive and inferential statistics.

3.5.1 The descriptive statistics like frequency, percentage, mean and standard deviation was used to present the information.

3.5.2 Inferential statistics like T-test was used to compare the level of environmental knowledge, attitude and practice based on the personal factors of students in learning integrated environmental education curriculum and

3.5.3 Pearson Correlation Coefficient was used to find the relationship between environmental knowledge, attitude and practice of the students.

3.5.4 Further for the qualitative, the content analysis was applied with the result from the in-depth interviews with the teachers and the experts in the educational area.



CHAPTER IV

RESULTS

This research aims to study the integrated environmental education curriculum in the primary schools of Wangdue District of Bhutan. The objectives of the research are to: study the current environmental education curriculum of grade VI, compare the students' personal factors with the level of environmental knowledge, attitude and practice and to assess students' level of environmental knowledge, attitude and practice. The data is analyzed using descriptive statistics to present the information and t-test to compare the level of environmental knowledge, attitude and practice of the students depending on the personal factors. Correlation Coefficient is also carried out to find the relationship between the level of environmental knowledge, attitude and practice of the students. Content analysis is carried out to analyze interview results with teachers, experts from the Department of Curriculum Research and Development, erstwhile known as CAPSD and EEO, RSPN, Thimphu.

4.1 Personal factors of Students

Table 4.1: Frequency and percentage of respondents classified to gender, age, parental background, nature club-member and location of school.

(n = 213)

	Frequency	Percentage (%)
Gender		
Male	100	46.91
Female	113	53.1
Age		
12yrs	100	46.9
13yrs	60	28.2
14yrs	41	19.2
15yrs	11	5.2
More than 15	1	0.5

Table cont.

n = 213

	Frequency	Percentage (%)
Parental Background		
Literate	117	54.9
Illiterate	96	45.1
Nature club member		
Yes	29	13.6
No	184	86.4
Location of school		
Urban	161	75.6
Rural	52	24.4

Table 4.1 shows the personal factors that was analysed by frequency and percentage. Among the respondents, 46.9% (100 respondents) were male while 53.1% (113 respondents) were female.

According to the table, the majority of the respondents are in the age category of 12 which consisted of 46.9% (n=100). The remaining respondents fell in age 13 with 28.6% (n=60), age 14 with 19.2% (n=41), age 14 with 5.2% (n=11) and the least was age 15⁺ with 0.5% (n = 1).

The research finding shows that maximum number of respondents' parent are literate which accounted to 54.9% (n = 117) and the rest are illiterate, 44.6% (96). This directly related to the location of the school of the respondents.

The majority of the respondents are not enlisted in nature club in the school that accounted to 86.4% (n = 184) while the remaining respondents, 13.6% (n = 29) are enrolled in nature club in schools.

Out of 213 respondents, 161 are from urban school making it up to 75.6% (n =161) while the rest of the respondents, 24.4 % (n = 52) attends rural type schools.

4.2: Level of Environmental Knowledge, Attitude and Practice

4.2.1 Level of environmental knowledge

Table 4.2: Level of environmental knowledge

Item	Correct		Incorrect	
	N	%	N	%
1. resource to be considered to renewable	33	15.5	180	84.5
2. major human impact on carbon cycle	49	23.0	164	77
3. greenhouse effect	45	21.1	168	78.9

Table cont.

4. restriction of survival of plants and animals in a place	128	60.1	85	39.9
5. damage to the ozone layer	35	16.4	178	83.6
6. importance of tropical forest	22	10.3	191	89.7
7. Example of renewable resources	114	53.5	98	46.5
8. example of renewable resource	118	55.4	99	45.6
9. ecology	31	14.6	182	85.4
10. sustainable development	64	30.0	149	70.0
11. effect of climate change	31	14.6	182	85.4
12. greenhouse gases	89	41.8	124	58.2
13. most emerging issue	46	21.6	167	78.4
14. organic waste	74	34.7	139	65.3
15. hazardous waste	48	22.5	165	77.5
Average		28.91		71.09

The table presents the frequency and percentage of the respondents that have answered the questions correctly and incorrectly. As seen from the table, 28.91% of the respondents have good knowledge in environment. It indicates that the overall level of environmental knowledge of the respondents is very low. However, the most common questions that is answered correctly are item 4 (60.1%), item 7(53.5%) and item 8 (55.4%) respectively.

4.2.2: Level of attitude towards environment

Table 4.3: Level of attitude towards environment

Item	\bar{X}	SD	Meaning
1. Science and technology have improved our quality of life	1.63	0.87	Low
2. Human are subjected to the laws of nature as are other species	2.60	1.05	Moderate
4. People should adapt to the environment whenever possible	1.89	0.95	Low
5. Modern technology has increased our freedom and independence	2.02	0.90	Low
6. Natural resources should be saved for the benefit of future greenhouse	1.73	0.99	Low
7. Modern industrial countries are very seriously disturbing the balance of nature	2.25	1.02	Moderate
8. The earth is vast, with almost unlimited room and resource	2.29	1.03	Moderate
9. People must learn to live harmony with nature to survive	1.99	0.91	Low
10. Economic growth should be given priority over environmental protection	2.07	1.02	Low
11. Nature should be used to produce goods for people	1.73	0.89	Low
12. I have strong desire to improve the environment	1.65	0.90	Low
13. I wish to possess good skills and knowledge to bring about environmental improvements	2.13	0.94	Low
Average	1.85	0.96	Low

Note: Very low= 1.00 -1.60, Low=1.61 – 2.20, Moderate=2.21 –2.80, High =2.81-3.40, Very high = 3.41-4.00

The table indicates that the overall attitude of the students is low with mean score (\bar{X}) 1.85 and SD 0.96. As it could be seen in the table, three items scores moderate, while the other items are low. The lowest mean score obtained here is 1.63 with standard deviation of 0.87 for “Science and technology have improved our quality of life” while the statement, “Because we are human, we are not subject to the laws of nature as are other species” scored the highest mean with 2.60 and standard deviation of 1.05.

4.2.3: Level of environmental practice

Table 4.4: level of environmental practice

Item	\bar{X}	SD	Meaning
1. choosing household products that are better for the environment	1.96	0.60	Moderate
2. writing a letter, or signed a petition, or attended a meeting etc, with the aim of protecting or improving the environment	1.87	0.57	Moderate
3. deciding for environmental reasons to re-use or recycle something instead of throwing it away	2.08	0.65	Moderate
4. Trying to encourage someone else to change an activity or practice that you thought was harmful to the environment	2.04	0.65	Moderate
5. taking part in a clean-up campaign or anti-litter scheme of some kind	1.68	0.72	Low
6f. making a report or complaint about something that you thought was bad for the environment	2.08	0.68	Moderate
7. making an effort, for environmental reasons to reduce water consumption	1.96	0.64	Moderate
8. trying to get information for your own interest on some topic that you thought was relevant to protecting the environment	1.92	0.58	Moderate
9. taking part in a tree-planting scheme	1.29	0.51	Very low
10j. making a gift or donation to an environmental or nature club	2.02	0.60	Moderate
11. Discussing environmental issues with friends and family outside the school	2.00	0.66	Moderate
12. Teaching of environmental topics in classroom	2.53	0.60	High
Average	1.95	0.62	Moderate

Note: Very low= 1.00 -1.40, Low=1.41 -1.80, Moderate=1.81-2.20, High =2.21-2.60, Very high = 2.61-3.00

As seen in table 4.4, the findings show the level of environmental practice of the students. The finding indicates that most of the items are rated moderate except the three items. The item, “teaching of environmental topics in classroom” is rated as high with a mean score of 2.53 (SD = 0.60) while “taking part in a tree-planting scheme” is rated very low with a mean score of 1.29 (SD = 0.51). However the overall level of environmental practice of the students is rated as moderate with mean score of 1.95 (SD = 0.62).

4.5: Comparison on the environmental knowledge, attitude and practice by personal factors

4.5.1 Environmental knowledge based on gender

Table 4.5: comparison of environmental knowledge by gender

(n = 213)

Gender	n	Mean	S.D	t	p-value
Female	113	4.19	2.12	-1.172	0.243
Male	100	4.53	2.95		

Table 4.5 shows the comparison of environmental knowledge by gender. It shows whether there is any difference in the level of environmental knowledge between male and female. The findings reveal that there is no statistically difference in the level of environmental knowledge between male and female students, p-value = 0.24.

4.5.2 Environmental attitude based on gender

Table 4.6: Comparison of environmental attitude by gender

(n = 213)

Gender	n	Mean	S.D	t	p-value
Female	113	1.96	0.30	-1.470	0.143
Male	100	2.03	0.33		

The above table 4.6 shows that there is no statistically difference regarding the level of environmental attitude between male and female students, p-value = 0.14.

4.5.3 Environmental practice based on gender

Table 4.7: comparison of environmental practice by gender

(n = 213)

Gender	n	Mean	S.D	t	p-value
Female	113	1.99	0.20	2.498	0.013*
Male	100	1.91	0.21		

*Significant at the 0.05 level

Table 4.7 shows the comparison environmental practice by gender. The results showed a p-value of 0.013 which could indicate that there is statistically difference in the level of environmental knowledge between male and female students. Mean score of female (1.99) is greater than mean score of male (1.91)

4.5.4 Environmental knowledge based on age

Table 4.8: comparison of environmental knowledge by age

(n = 213)

Age	N	Mean	S.D	t	p-value
12 years	100	4.27	2.21	0.540	0.590
13 and above	113	4.42	1.98		

Table 4.8 illustrates the comparison of environmental knowledge with age. Out of the total 213 respondents, 100 students are in age 12 while the remaining 113 are in the group 13 and above. Mean score for age 12 is 4.27 (standard deviation of 2.21) while mean score for 13 and above is 4.42 (standard deviation of 1.98). The p-value 0.590 shows that there is no statistically difference in the level of environmental knowledge by age of the respondents.

4.5.5 Environmental attitude based on age

Table 4.9: comparison of environmental attitude by age

(n = 213)

Age	n	Mean	S.D	t	p-value
12 years	100	1.98	0.30	0.460	0.646
13 and above	113	2.00	0.32		

Table 4.9 illustrates the comparison of environmental attitude by age. Out of the total 213 respondents, 100 students are in age 12 while remaining 113 students are in the group 13 and above. Mean score for age 12 is 1.98 (standard deviation of 0.30) while mean score for 13 and above is 2.00 (standard deviation of 0.32). The p-value 0.646 shows that there is no statistically difference in the level of environmental practice by age of the respondents.

4.5.6 Environmental practice based on age

Table 4.10: comparison of environmental practice by age

(n = 213)

Age	n	Mean	S.D	t	p-value
12 years	100	1.96	0.21	0.204	0.839
13 and above	113	1.95	0.21		

Table 4.10 illustrates the comparison of environmental practice by age. Out of the total 213 respondents, 100 are in age 12 while remaining 113 were in the group 13 and above. Mean score for age 12 is 1.96 (standard deviation of 0.21) while mean score for 13 and above is 1.95 (standard deviation of 0.21). The p-value 0.839 shows that there is no statistically difference in the level of environmental practice by age of the respondents.

4.5.7 Environmental knowledge based on parental background

Table 4.11: comparison of environmental knowledge by parental background

(n = 213)

Parental background	n	Mean	S.D	t	p-value
Literate	117	4.23	2.20	0.871	0.385
Illiterate	96	4.49	1.94		

Table 4.11 shows the results on the comparison on the environmental knowledge with parental background of the respondents. Out of 213 respondents, 111 respondents' parents have literate parents while 96 have illiterate parents. Mean score for literate parents is 4.23 (standard deviation of 2.20) and mean score for illiterate parents is 4.49 (standard deviation of 1.94). However the p-value, 0.385 shows there is no statistically difference in the level of environmental knowledge between the group of respondents who have a literate and those whose parents are illiterate.

4.5.8 Environmental attitude based on parental background

Table 4.12: comparison of environmental attitude by parental background

(n = 213)

Parental background	n	Mean	S.D	t	p-value
Literate	117	1.98	0.33	-0.507	0.613
illiterate	96	2.00	0.30		

Table 4.12 shows the results on the comparison on the environmental attitude with parental background of the respondents. Out of 213 respondents, 111 respondents have literate parents while 96 have illiterate parents. Mean score for literate parents is 1.98 (standard deviation of 0.33) and mean score for illiterate parents was 2.00 (standard deviation of 0.30). However the p-value, 0.613 shows there is no statistically difference in the level of environmental attitude between the groups of respondents who have literate parents and those with illiterate parents.

4.5.9 Environmental practice based on parental background

Table 4.13: comparison of environmental practice by parental background

(n = 213)

Parental background	N	Mean	S.D	t	p-value
Literate	117	1.93	0.21	-2.00	0.046*
illiterate	96	1.98	0.20		

*Significant at the 0.05 level

Table 4.13 shows the results on the comparison on the environmental practice with parental background of the respondents. Out of 213 respondents, 111 respondents have literate parents while 96 have illiterate parents. Mean score for literate parents is 1.93 (standard deviation of 0.21) and mean score for illiterate parents is 1.98 (standard deviation of 0.20). However the p-value, 0.046 showed there is statistically difference in the level of environmental practice between who have literate parents and those whose parents are illiterate. The mean score of students whose parents are illiterate (1.98) is found to be higher than mean score of students whose parents are literate parents (1.93).

4.5.10 Environmental knowledge based on nature club member

Table 4.14: comparison of environmental knowledge by nature club member

(n = 213)

Nature club member	n	Mean	S.D	t	p-value
Yes	29	4.20	1.88	0.403	0.688
No	184	4.38	2.12		

Table 4.14 shows the results on the comparison of environmental knowledge of the respondents with nature club member. Out of 213, 29 respondents are enlisted as member in nature club while majority of the respondents (184) are not enlisted in nature club. Mean score for nature club members is 4.20 (SD = 1.88) while for non-club members is 4.38 (SD = 2.12). The results shows a p-value of 0.688 which suggests that there is no statistically difference in the level of environmental knowledge between the groups that are members of nature club and non members of nature club.

4.5.11 Environmental attitude based on nature club member

Table 4.15: comparison of environmental attitude by nature club member

(n = 213)

nature club member	n	Mean	S.D	t	p-value
Yes	29	2.08	0.30	1.593	0.113
No	184	1.98	0.32		

Table 4.15 reveals the results on the comparison of environmental attitude of the respondents with nature club member. Out of 213, 29 respondents are enlisted as member in nature club while majority of the respondents (184) are not enlisted in nature club. Mean score for nature club members is 2.08 (SD = 0.30) while for non-club members is 1.98 (SD = 0.32). The results shows a p-value of 0.113 which suggests that there is no statistically difference in the level of environmental attitude between the groups; members of nature club and non members of nature club.

4.5.12 Environmental practice based on nature club member

Table 4.16: comparison of environmental practice by nature club member

(n = 213)

nature club member	n	Mean	S.D	t	p-value
Yes	29	1.97	0.18	0.614	0.540
No	184	1.95	0.21		

Table 4.16 reveals the results on the comparison of environmental practice of the respondents with nature club member. Out of 213, 29 respondents are enlisted as member in nature club while majority of the respondents (184) are not enlisted in nature club. Mean score for nature club members is 1.97 (SD = 0.18) while for non-club members was 1.95 (SD = 0.21). The results shows a p-value of 0.540 which suggests that there is no statistically difference in the level of environmental practice of the respondents based on nature club member.

4.5.13 Environmental knowledge based on location of school

Table 4.17: comparison of environmental knowledge by location of school

(n = 213)

Location of school	n	Mean	S.D	t	p-value
Urban	161	4.19	2.15	-1.978	0.049*
Rural	52	4.85	1.80		

*Significant at the 0.05 level

Table 4.17 shows the comparison of environmental knowledge of the respondents depending on the location of school. Out of 213, 161 respondents are in urban schools while 52 are from rural schools. Mean score of urban school is 4.19 (standard deviation of 2.15) while mean score of rural school is 4.85 (standard deviation of 1.80). However the p-value (0.049) shows that there is statistically difference in the environmental knowledge of the respondents between the respondents from urban and rural type schools. The mean score of respondents in rural schools (4.85) is higher than respondents in urban schools (4.19)

4.5.14 Environmental attitude based on location of school

Table 4.18: comparison of environmental attitude by location of school

(n = 213)

Location of school	n	Mean	S.D	t	p-value
Urban	161	1.99	0.30	0.322	0.748
Rural	52	1.98	0.33		

Table 4.18 shows the comparison of environmental attitude of the respondents depending on the location of school. According to the table, 161 respondents are from urban schools while 52 are from rural schools. Mean score of urban school is 1.99 (standard deviation of 0.30) while mean score of rural school is 1.98 (standard deviation of 0.33). However the p-value (0.748) shows that there is no statistically difference in the level of environmental attitude between the respondents based on the location of the school.

4.5.15 Environmental practice based on location of school

Table 4.19: comparison of environmental practice by location of school

(n = 213)

Location of school	n	Mean	S.D	t	p-value
Urban	161	1.93	0.20	-2.437	0.016*
Rural	52	2.01	0.24		

*Significant at the 0.05 level

Table 4.19 shows the comparison of environmental knowledge of the respondents depending on the location of school. According to the table, 161 respondents are from urban schools while 52 are from rural schools. Mean score of urban school is 1.93 (standard deviation of 0.20) while mean score of rural school is 2.01 (standard deviation of 0.24). The mean score of rural school is higher than the mean score of urban school. However the p-value (0.016) shows that there is statistically difference in the level of environmental practice of the respondents based on the location of the school.

4.6 Relationship between environmental knowledge, attitude and practice

Table 4.20: Correlation Coefficient between environmental knowledge and attitude (n = 213)

	r	P
Knowledge	0.021	0.756

Table 4.20 illustrates that the Pearson Correlation Coefficient between knowledge and attitude level of students. As it is seen from the table, the result shows that there is no statistically correlation between the level of environmental knowledge and level of attitude of the students ($p = 0.756 > 0.05$).

Table 4.21: Correlation Coefficient between environmental knowledge and practice (n = 213)

	r	P
Knowledge	0.062	0.366

Table 4.21 shows the relation between students' level of environmental knowledge and level of environmental practice. The result shows that there is no statistically correlation between students' level of environmental knowledge and practice ($p = 0.366 > 0.05$).

Table 4.22: Correlation Coefficient between environmental attitude and practice (n = 213)

	r	P
Practice	0.162	0.018*

*Correlation is significant at the 0.05 level

Table 4.22 illustrates the Pearson Correlation Coefficient between students' environmental practice and attitude. Therefore, there is statistical evidence ($p = 0.018 < 0.05$) to suggest that the level of environmental practice and attitude are positively related.

Table 4.23: Summary of research finding

(n = 213)

No.	Hypotheses	Result
1	There is significant difference on the environmental knowledge depending on gender	Rejected
2	There is significant difference on the environmental attitude depending on gender	Rejected
3	There is significant difference on the environmental practice depending on gender	Accepted
4	There is significant difference on the environmental knowledge depending on age	Rejected
5	There is significant difference on the environmental attitude depending on age	Rejected
6	There is significant difference on the environmental practice depending on age	Rejected
7	There is significant difference on the environmental knowledge depending on parental background	Rejected
8	There is significant difference on the environmental attitude depending on parental background r	Rejected
9	There is significant difference on the environmental practice depending on parental background	Accepted
10	There is significant difference on the environmental knowledge depending on nature club member	Rejected
11	There is significant difference on the environmental attitude depending on nature club member	Rejected
12	There is significant difference on the environmental practice depending on nature club member	Rejected
13	There is significant difference on the environmental knowledge depending on location of school	Accepted
14	There is significant difference on the environmental attitude depending on location of school	Rejected
15	There is significant difference on the environmental practice depending on location of school	Accepted
16	There is strong positive relationship between environmental knowledge and attitude	Rejected
17	There is strong positive relationship between environmental knowledge and practice	Rejected
18	There is strong positive relationship between environmental attitude and practice	Accepted

Content Analysis of Interviews

Teachers

In addition to the questionnaire, interview was conducted with teacher informants selected randomly from 10 different schools in Wangdue Phodrang district. The teachers had at least 5 years of experience in teaching Science, Social Studies and Dzongkha. Environmental education is taught through integrated approach and environmental concepts are mostly infused in the three subjects, namely Science, Dzongkha and Social Studies.

Table 4.24 Interview informants' characteristics

No.	Name	Age	Gender
1	Sonam	60	Male
2	Penjore	27	Male
3	Gyeltshen	33	Male
4	Ganga	55	Female
5	Dechen	29	Female
6	Dorji	29	Male
7	Devi	50	Female
8	Wangmo	36	Female
9	Ramu	55	Male
10	Karma	34	Female

**names have been changed to protect the informants' identity and privacy*

Science and Dzongkha curriculum for grade IV to VI had been reviewed and revised and implemented in the syllabus since 2008 while Social Studies has not been revised or reviewed. Compared to the previous curriculum, the new revised curriculum of Science and Dzongkha covered more environmental concepts than the earlier curriculum. The teacher informants explained that Science and Social Studies covered topics related to biodiversity, ecology, pollution, renewable resources, global warming and interdependence but Dzongkha covered theme based stories and poems emphasizing on environmental issues.

The informants agreed that environmental concepts were integrated in the above mentioned subjects though the concepts were not equally distributed in all the three subjects. Among the three subjects, the environmental concepts were commonly integrated in science subject. However, the environmental topics discussed in the subject were general issues and lacked current emerging issues which were of global concern. The informants viewed that those significant issues were not made aware to

the students. And the topics that were included in the textbooks did not have the detailed information on it. The informants found it difficult to deliver the course without appropriate information regarding the subjects. The teacher informants suggested that more information on the concepts should be included in the teacher's manual of the respective textbooks. This could enhance the quality of teaching and facilitate teachers in effective delivery of EE.

One teacher viewed environmental concepts as a linkage from textbook to students' living in the community:

I feel that the best way to educate people on environment is by educating our children. They can always take back to their community what they learn in the school (Sonam, 60yrs)

With regard to effective EE in schools, most of the teacher informants were satisfied with the current curriculum and accounted that EE would be delivered better through integrated approach as seen in the current curriculum. Teachers also believed that children would understand more when it was discussed many times through different subjects rather than focusing on one subject. When EE was taught integrated in other subject, they felt that EE teaching would be more effective as every teacher, one or the other way, would talk and discuss about environmental concepts.

Integration approach is most appropriate to teach EE as of now as every subject teacher will put in extra effort to inform students about environment and its related issues. There would be more impact on the students when all the teachers discusses and informs about the concept on environment. (Ganga, 55 yrs)

However all teacher informants agreed that every teacher must make an extra effort to make their students understand the importance of the environment and its related issues.

When asked about the delivery of EE in various subjects while teaching, most of the informants said that they infused as when the topics of the subjects were related to environment. It basically depended on the topics that were related to environment. The informants also mentioned that they tried their best to discuss and inform students whenever required. The informants took their own initiative to infuse EE into the respective subjects by getting information from other sources though it was limited.

Every morning, I listen to news and if I hear anything related to environment and its related issues, then I ensure that I shared with the students. I feel that this is also one way to create awareness to the students on what's happening around the world (Ramu, 55yrs).

Regarding teaching methods applied, majority of the informants used field trip and activity based while few teacher informants applied other strategies like cooperative learning, inductive-deductive and others. Most of the students enjoyed field trips as they could gain direct experience. The informants mentioned that though the students enjoyed going out but they faced difficulty in managing the class outside the school. Therefore fieldtrips were arranged only once in a while.

Regarding students' interest, all teacher informants agreed that most of the students were genuinely interested to learn about environmentally related issues. The reason for their interest was because of the teaching approach that was used; activity based method. This approach involved the students actively in the teaching-learning process. The students preferred going on field trip outside the classroom to learn rather than staying in a four- walled classroom.

They take more interest in Social Studies than other subjects as it is mostly activity oriented (Dechen, 29yrs)

One informant even pointed that the students scored better in Social Studies than they did in other subjects as the curriculum mostly required the students to be taken out of the classroom to teach not just environmentally related concepts but other topics too. Science subject too demanded a lot of activities to be implemented but it was not always feasible due to time constraint and unavailability of materials for the activity.

Though the students were genuinely interested, the informants never carried out any kind of standard form of assessment to evaluate the students' understanding of environment and attitude. The students were evaluated on how they performed in their subject as a whole and not on EE. Their opinion was based on their observation since they were closely associated with students throughout the academic year. This was because they could observe changes in the students' attitude at the end of the year.

When asked about the constraints in teaching EE, all the informants pointed out; inadequate time, unavailability of resources and no trained teaching staff

with environment education background to teach. The informants affirmed that they made sure that the students were aware of the environmental concepts in their small ways. The informants said that textbooks and teaching material in the class were not enough to create the environmental awareness amongst the students. So to complement the formal EE curriculum, schools adopted non formal approaches to bring in effective EE in schools. Most of the schools had nature clubs which mainly worked to create awareness on the importance of environment by involving the whole school as well as the community. It was mandatory to open nature club all over schools in Bhutan. Most of the clubs were affiliated with Royal Society for Protection of Nature (RSPN), the only NGO that worked closely with schools to educate people on the importance of environment and its role in our lives. The schools included in this study had active nature club whereby it carried out various awareness programs through activities like literary, cleaning campaign, tree plantation, gardening, campus beautification, etc. The informants were of the agreement that nature club's activities had a positive impact on the students. Student became more aware and conscious of the environmental issues and its impacts. Most of the informants included in this study were coordinating the nature clubs in the schools. The informants informed that even though nature clubs existed in most schools and worked towards the awareness of environment but due to time and limited resources, it could not function well.

The informants believed that school and the management as a whole can play a vital role in creating awareness to the students as well the community around it. This could be done by carrying out various awareness raising related activities by emphasizing on environment and its importance. Referring to attitude of the students, the informants said that students displayed positive attitude though they lacked knowledge on environmental concepts. The students were ready to participate in the activities which were conducted in the schools.

When asked about how to improve the delivery of EE in formal curriculum in school, most of the informants said that there should be inclusion of pertinent and emerging issues in the textbooks, detailed information in the teacher's manual so that it would help them while they teach and access to different sources of information. All informants agreed that students could play a vital role in educating people on the importance of environment. For this, students need to be educated for which school

plays a crucial role in it. The informants said EE should be taught through formal as well as non formal curriculum so that it had more impact on the students when learnt from various sources.

Curriculum Experts

Environmental education was taught through integrative approach mainly through Science, Social Studies and Dzongkha in grade VI. The curriculum experts were interviewed to get additional information on the status of EE in formal curriculum and its implementation and future strategies to improve EE in the curriculum. The environmental concepts were touched more in the two subjects, Science and Social Studies than Dzongkha (the national language).

When asked about the role of Science regarding EE in Bhutan, Science CO (Curriculum officer) said that Science curriculum is contextualized to Bhutanese physical, social and cultural environment. Therefore, science curriculum had environment related contents. Likewise the Social Studies CO and Dzongkha CO also said the same.

For instance, four elements of the universe, pollution and its prevention, natural resources of Bhutan including rare and endangered flora and fauna are included in Science (Science expert).

Referring to revision and development of curriculum, the experts said that stakeholders from different relevant government and NGO agencies were engaged to share their expertise for the curriculum. Teachers with sound knowledge were also heavily involved as writers and copy editors. The experts said EE curriculum had its strengths and weaknesses. Some of the strengths were:

- *environmental content was integrated in curriculum in Science, Geography, Social Studies and in Dzongkha,*
 - *environment is one of the pillars of GNH (Gross National Happiness)*
 - *policy to institutionalize nature club in all schools is in place*
- However, the weaknesses were:*
- *lack of equipment, fund and reference books for schools*
 - *teachers do not have adequate experiences and knowledge to integrate EE in their teaching subjects*

- *time limitation to conduct EE activities in schools even if they are part of the subject teaching.*

When asked about the steps that encourage the incorporation of EE in school, the experts replied saying that deployment of EE trained teachers who have environmental knowledge and skills, confidence and compassion for environment, national strategic plan for environment and environmental education and providing necessary physical support to institutionalize EE properly in schools were crucial. With regard to implementation of EE curriculum in schools, the experts said that environmental concepts were included in Science, Social Studies, Geography and Dzongkha. The teachers too could infuse through non formal curriculum activities that were being carried out in the schools.

The Nature Club in schools can organize few EE related activities in the form of literary activities, cleaning campaign, field trips, etc on human impact on environment or water or air.

One of the curriculum experts also mentioned about the steps that EE could be implemented better:

- *training NC coordinators to effectively plan and execute activities in schools*
- *training of teachers on the integration of EE in their teaching subjects*
- *providing necessary physical support (equipment, fund and reference book) to institutionalize EE in schools*
 - *incorporate EE module in Teacher Training Colleges with adequate support*

Presently, teachers were expected to teach EE though they had not received any sort of training or received any content updates on EE. In this regard the Science CO said that some teachers with different subject background were inducted on EE and the infusion of EE in their teaching subjects from 1998 – 2003. This kind of induction could not be provided to all the teachers as the projects were fund based. When the funding stopped then this kind of workshop had to be stopped too. At the same time, nature club coordinators who were teachers by profession were given short course training on the management of nature clubs in the schools by RSPN (Royal Society for Protection of Nature).

The experts also mentioned the key factors affecting the EE curriculum in Bhutan:

- *'more number of teaching subject and extracurricular overload in schools do not permit to have EE as separate subject.*
- *Need to design curriculum with EE concepts and EE activities well integrated into the formal curriculum.*
- *The budgetary support for the teacher training on EE activities is generally not forthcoming'.*

When asked whether EE curriculum was better if taught as separate subject, the experts said that in other countries, EE was taught as an individual subject starting from primary classes but in Bhutan, since curriculum was centrally designed, government was sensitive to overburdening the students with many subjects. However, with the development to diversify the curriculum, introduction of EE as individual subject in classes IX and X has been initiated.

EE in Bhutan is not considered as a separate subject but is mainly infused in various subjects across the entire curriculum. On the other side, students have the opportunity to learn EE in the 9th and 10th grade. This would be there as elective but optional subject (Science expert).

When asked about future development of EE in Bhutan, the experts said that thorough need assessment of EE in Bhutan in terms of contents, teaching and EE activities carried out as extracurricular initiatives to find the gaps to ensure the development of relevant and challenging EE learning activities. And also there should be national strategic plan for environment and environmental education.

Environment Education Officer, Environment Education Unit, RSPN

As reviewed in the literature, Royal Society for Protection of Nature (RSPN) was probably the first organization which started EE program for schools since 1987. Since then RSPN established nature clubs in schools and affiliated some schools to RSPN for recognition. Certificates were provided to schools to indicate that the schools had authentic nature club established under the network umbrella of RSPN. The RSPN provided financial and technical support once the clubs were affiliated. The Environment Education Officer, RSPN was interviewed as their office

was actively involved in environmental education awareness programs through non formal curriculum in schools.

RSPN initiated nature clubs in schools to encourage students to increase awareness and understanding of their local environment and to enable them to contribute to its conservation by sharing their knowledge and skills with their friends in school, among family members and the local community, ultimately influencing the whole society (Ugyen Lhendup, RSPN).

When asked about their role in EE in school, the EE Coordinator said, as an environmental NGO, “*our role is to inspire personal responsibility, impart environmental education and raise awareness among citizens for promoting positive attitudes and self sustaining citizen’s action to conserve Bhutan’s rich environmental heritage in collaboration with concerned agencies and indigenous institutes*”.

When asked about their involvement of schools, the EE coordinator said that it was more through informal approach. The nature club in schools conducted various awareness related activities as co curricular activities in schools. Some of the activities conducted were school landscape management, outdoor activity, literary activities, awareness campaigns, environmental awareness programs and environmental projects.

The concerned coordinators was supposed to take initiative to carry out the activities and most clubs do well in creating awareness among the students as well as the community. Though some of the affiliated clubs do well but it was not sustainable. The coordinators conducted activities only there was availability of fund but on the other hand, some club, though not affiliated took lots of initiative in carrying out environmental awareness activities (Ugyen Lhendup, RSPN).

The coordinator also said that ‘Award for Best Nature Club’ was initiated to encourage and motivate the clubs that performed well. The best club would be selected among the affiliated clubs based on their contribution and activities carried out through out one academic year to promote environmental education in school as well as in their community.

Regarding their support to schools to promote environmental education, the coordinator said that RSPN had so far provided the following:

- training for teachers to initiate and manage nature club
- reading materials like nature club activity and management handbooks, climate change manual, birds of Bhutan, newsletters, etc
- fund for nature club activities
- action grant to initiate bigger environmental projects.

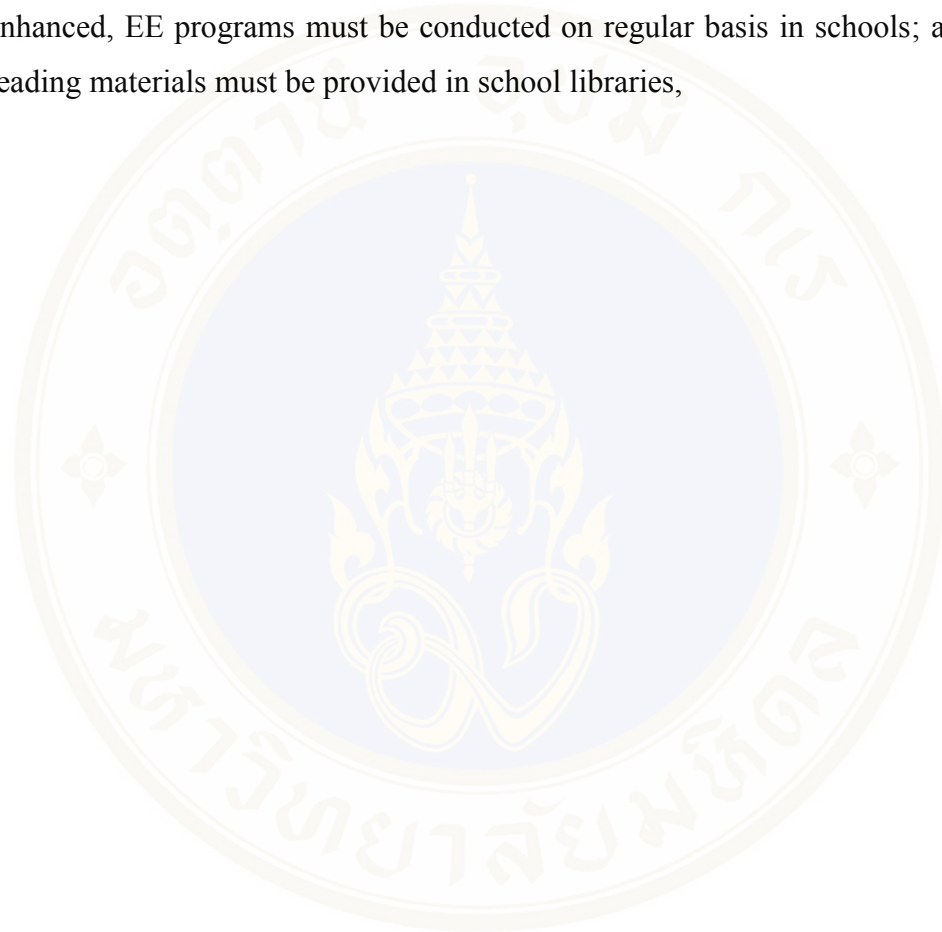
RSPN had been involved with the schools for more than 10 years in promoting EE through non formal curriculum. In this regard, the coordinator was asked about students' knowledge and attitude towards environment. To this the coordinator said, RSPN had conducted a survey in 2009 and found that the students above primary schools level do have substantial knowledge on environment but putting to practice was felt little below average. The coordinator also mentioned that there were some good observed impacts on students and teachers by the activities organized by nature clubs. There were number of programs initiated by schools to create awareness among the communities and actions taken to address the local environmental issues.

We saw the various programs initiated by the schools from the field visits as wells as from the technical and financial report on the activities submitted to the office. The concerned teacher sends the report with pictures as evidence (Ugyen Lhendup, RSPN)

When asked about the content coverage in formal curriculum, the coordinator said that EE in formal curriculum was integrated in various subjects like social studies, science, geography and therefore there was less focus and may not be logically graded. The students could be learning in pieces since EE was not there as a separate subject which was why students were not being able to concretize and apply the knowledge into practice.

Though schools have competent teachers to teach EE but their knowledge in environment needs to be updated and must be made aware of present emerging key environmental issues and to address the issues (Ugyen Lhendup, RSPN).

RSPN was the only NGO that heavily involved schools to educate people on environment and its related issues. Most of the programs were conducted as a part of co-curricular activities in schools which RSPN felt that it would not be enough to promote EE in schools. The coordinator said that to improve and promote EE in schools, MoE has to include EE in formal curriculum, capacity of teachers needs to be enhanced, EE programs must be conducted on regular basis in schools; and adequate reading materials must be provided in school libraries,



CHAPTER V

DISCUSSION

This chapter presents analysis of the findings regarding integrated environmental education curriculum of the primary schools in Wangdue Phodrang district Bhutan. This research has three objectives; to review the current curriculum of grade VI in subjects namely Science, Social Studies and Dzongkha, compare the students' personal factors and level of environmental knowledge, attitude and practice and to assess students' level of environmental knowledge, attitude and practice. The previous chapter presented data obtained from 213 students of grade VI who filled in the survey questionnaires. The set of questions was formed to assess students' levels of knowledge, attitude and practice regarding environment. This chapter aims to respond to research questions and bring the discussion further down by exploring the emerging situations.

The topics discussed in the chapter are presented as follows:

- 5.1 Personal factors of students
- 5.2 Level of environmental knowledge
- 5.3 Level of attitude towards environment
- 5.4 Level of environmental practice
- 5.5 Comparison of environmental knowledge, attitude and practice by personal factors of the students
- 5.6 Relationship between environmental knowledge, attitude and practice

5.1 Personal factors of students

The research finding showed that 53.1% was female while 46.9% was male. In Bhutan, there was more number of girls than boys or almost the same in the primary schools but the number of girls gradually decreased in the higher secondary schools. Annual statistics showed 82% of girls advancing to the secondary level

comparing to 93% of boys counterpart (Annual Statistics, 2010). Overall more female students participated at primary school level than males. However, the pattern shifted to favor male students studying at secondary school. This could be due to geographical condition like distance to the school and housing facilities. It could be simply understood that boys did well and many of them passed from primary to secondary school level comparing to smaller number of female students.

According to the result of the study, it showed that majority of the respondents (46.9%) were at the age of 12 years while the rest were 13 years (28.2%), 14 years (19.2%), 15 years (5.2%) and more than 15 years (0.5%). Majority of the parents enrolled their children at a very early age as they realized the value of education and also the government's policy of ensuring that all children be able to complete primary education to achieve Education for All by 2015 (Annual Statistics, 2010). It was clearly stated in the policy that a child must be enrolled in the school at the age of 6.

Among the respondents, 54.9% had literate parents whilst 44.6% had illiterate parents. This indicated that most of the respondents' parents had basic knowledge of how to read and write. Bhutan's overall literacy rate was 59.5 percent with the urban population (76%) more literate than the rural population (52%) (NSB, 2008). Three quarters of the population in urban areas and half the population in rural areas were literate.

Research findings showed that the majority of the respondents (86.4%) were not enrolled as nature club member while the rest (24.4%) were enlisted as nature club members. Schools in Bhutan had various clubs, with specific purpose and interest, such as nature club, literary, scouting, vocational clubs, games and sports, cultural, etc. At the same time, it was mandatory to have nature club in the school as its environmental awareness activities complemented EE in school. The enrolment in the club depended on the number of members required by each club as well as on the interest of the students. However, many of respondents were not enlisted as nature club member.

According to the research findings, most of the research sites were located in urban area (75.6%). Schools in Bhutan were categorised into urban, semi-urban and remote schools depending on the geographical conditions and accessibility to basic

facilities. However, the schools included in the research was categorised into urban type and rural type. Urban type school implied to a school where basic facilities for example, road, and electricity can be accessed.

5.2 Level of environmental knowledge

The research findings showed that 28.91% of the students managed to answer the questions correctly. The result clearly indicated that the student had low knowledge on the environment and its related issues. This finding suggested that the students were not at all aware of the environment and its related issues. However, the overall findings on environmental knowledge contradicted to what informants said during the interview. While interviewing, most of the informants said that there was enough environmental concepts integrated in the subjects like Science, Social Studies and Dzongkha. On the other hand, while reviewing the curriculum the researcher found that the curriculum contained contents related to concepts like carbon cycle, pollution, water cycle, ecology, renewable resources, biodiversity, greenhouse effect and sustainable development though not elaborated in detail. Many of the key and pertinent environmental issues like climate change and glacial melting; solid waste management in urban areas; land degradation; conservation were not included in the textbook.

Another reason could be because of the time constraint and limitation of resources. The teachers followed the manuscript while delivering the lessons as they had to complete the syllabus on time and due to this, the teachers could hardly to go beyond the course syllabus teaching manuscript.

A survey carried out by RSPN in 2009 found that primary and lower secondary students had comparatively less environmental knowledge than the students in middle and higher secondary schools and other institutes. They concluded that environmental awareness was more or less directly proportional to the level of education or the grades. This may hold true because the intention of curriculum in primary grades was to provide learners the opportunity to develop their psychomotor skills than the acquisition of concrete conceptual ideas, as observed in the primary science curriculum.

It was also found that EE concepts were mostly infused in the Science subject. Science became one of the important vehicles for the delivery of environmental education within schools. According to Harlen (2000), sound understanding of the knowledge base and processes of science were fundamental components of environmental literacy and a more rigorous approach to science education during the first stages of child's education was likely to lay suitable foundations upon which both the understanding and skills can be further developed later (Harlen, 2000). During the interview, the teachers said that though EE concepts were mentioned in the course syllabus, they found it difficult to explore concepts further since adequate information regarding EE concepts were not included in textbook and manuscript. The teachers suggested curriculum office to include more information regarding EE concepts in the teachers' manual. However, other factors were considered while discussing about the obstacle in delivering EE, limitation of time and resources and lack of trained teachers were rated important factors. The curriculum experts also shared concerns on weaknesses on EE:

Some of the weaknesses are lack of equipment, fund and reference books for schools. Teachers do not have adequate experiences and knowledge to integrate EE in their teaching subjects which is further aggravated due to time limitation to conduct EE activities in schools even if they are part of the subject teaching (Curriculum experts).

The curriculum experts considered strategy to improve the quality of EE implementation in schools through teachers' capacity building by providing rigorous training for teachers on the integration of EE in their teaching subjects. The expert from the RSPN also expressed the same concern about the teachers;

Though schools have competent teachers to teach EE but their knowledge in environment needs to be updated and must be made aware of present emerging key environmental issues and to address the issues (EEU, RSPN).

Most of the schools did not have facility to provide the students and teachers with information. The schools included in this study did not even have a proper library where they could look up for information. The schools were all primary schools where it had few books like supplementary books and some story books. Being primary schools, the sample schools did not have access to ICT facilities as

well. The curriculum experts also mentioned that availability of resource affected the proper implementation of EE in schools. On the other hand, it also indicated that there were not many sources of information like newspapers, magazines, internets, etc. A survey carried out by RSPN found radio to be the most popular form of medium of information. This implied that some information on EE could be done through radio as it was found to be a popular source of information. The strongest support for actions to improve the environment comes from others involved followed by teachers and then immediate families (Taylor et al, 2006).

This result could also indicate that the teaching approach needs to be changed from conventional teaching to modern activity based whereby students are actively involved in the whole teaching-learning process. The findings also suggest that a change is required from transmissive learning to transformative learning. The essential difference here is that transmissive learning is “instructive” whereas transformative education is constructive and participative (Stables, 2004). The latter, a learning-centered approach, inspired by the socio-cultural It suggests that active learners and more expert partners (educators) should engage together in learning in which both sides contribute. It should enable students to become critically aware of how they perceive the world with a view to fostering citizen engagement with social and environmental issues and participation in decision-making processes (Jickling&Wals, 2008).

Therefore, it could be recommended EE should be integrated with direct, holistic experiences, entailing discovery rather than reproductive learning, exploring the real world beyond reading books, taking productive action and gaining experiences. Environmental education is no longer be trained alone but to integrate the issues in every aspect of human beings and across disciplinary. This, in turn seems to lead to transformations in the way students go about making new sense of the world

5.3 Level of environmental attitude

The overall research findings showed that overall attitude of the respondents was low with mean score (\bar{X}) 1.85 and SD 0.96. This indicated that

students did not possess positive attitude towards environment. This could have resulted because the students did not have sound knowledge on environment and its related issues. According to Somprayoon 1997, knowledge, attitude and practice were closely related and must be developed simultaneously. Since the students lacked environmental knowledge and awareness, the level of attitude was expected low as well.

The findings on environmental attitude of the students were argumentative as the teachers during the interview said that the student possessed positive attitude. They also mentioned that they did not carry out any kind of measurement to see their attitude level. It was purely based on their observations as they were in contact with the student for the whole year. Another reason could be because the informants themselves (teachers) had low knowledge on environmental and its related issues. One key factor affecting the delivery of EE was there was no trained teacher with EE background. This concern was shared by both the teachers and the experts too during the interview.

A survey carried out by RSPN reported a significant gap between knowledge and attitude versus their environmental behaviour (RSPN, 2009). This suggested that the current curriculum should be reviewed and revised so that students become environmentally conscious. The level of environmental attitude was found to be low and it suggested that teachers as well as parents needed to work to instill in positive attitude in students. Environmental attitude of young people appeared to be crucial as they ultimately played a direct role in providing knowledge-based solutions to emerging environmental problems (Bradly *et al.*, 1999; Eagles and Demare, 1999). As Said *et al* (2003) suggested that teachers can influence the environmental attitudes of their students. To do so in positive manner, teachers require appropriate content and pedagogical knowledge (Summers and Childs, 2000) coupled with a favourable attitude towards environment

A similar study on primary and secondary school children in India and the Philippines showed that primary students lacked in environmental awareness and attitude necessary for protecting the environment (Chapman & Sharma, 2001).

5.4 Level of environmental practice

The research showed that the overall practice towards environmental activities was moderate ($\bar{X} = 1.95$ and $SD = 0.62$). On closer look to the individual items, it showed that ten items among thirteen had scored moderate. This indicated that students were interested and followed friendly environmentally practices though they had low knowledge and attitude on environment. Interestingly the item “frequency in teaching of environmental topics” scored the highest mean (2.53). This finding clearly indicated that students too agree that environmental concepts must be taught more often than what was done presently.

Teachers also supported this finding during the interview. They mentioned that students were very much enthusiastic to participate in various activities during the interview. It may be true, because environmental awareness activities through nature clubs were generally arranged outside classroom Nature club activities complemented the conservation efforts of Bhutan and it also provided varieties to teaching- learning processes in the schools. Unfortunately, nature clubs could hardly enrol 30 – 40 students as members; thereby 75-80% of students in the schools could not get opportunities to experience the environmental activities

There were some positive impacts observed in both students and teachers from the activities organized by nature clubs (Coordinator, RSPN).

Through nature club, awareness on local environmental issues can be transferred to students. Furthermore, school environmental program, although addressed to students, could also influence upon the environmental knowledge, attitude and behavior of adults (parents, teachers and local community members) through the process of intergenerational influence (Evans *et al.*, 1996; Ballantyne, 1998; Gallagher *et al.*, 2000).

This enabled them to learn by themselves and developed strong values and attitudes on social and environmental concerns. Though most informants agreed that nature club played an active role, it was not always functional since many factors like financial constraint, time constraints and availability of resources affected the management of nature club. Some of the lesson in the textbook required the teachers to take students out of the classroom. According to the teachers, students enjoyed field

activity. They also mentioned that they talked to the students on importance of basic environmental friendly practices.

“Most of the students enjoyed field trips as they could gain hands on experience whereby they could see and feel for themselves (all teachers)”.

When activity based method was applied in teaching, students learned by exploring, investigating, sharing, etc. This was in context with the present curriculum of Science, Social Studies and Dzongkha whereby the contents were all activity oriented. This was because the current curriculum was all designed to be student-centred. The interviewees pointed out that Science curriculum mostly had activities with less information on the content that sometimes made it difficult for them. However, it was found that some teaching activity could not be conducted due to limitation of resources.

Class VI science is good if a teacher can go beyond the text. Therefore if there could be more information in the manual (Ramu, 55).

If they could put in more information at least in the teachers manual then it would be easy for us while teaching. We can always refer to our manuals (Dechen, 29)

Though most of the students preferred activity-based, it was not always put in practice while teaching as the teachers said they found it difficult to manage due to the high number of the students in a limited space, especially in urban schools. A typical class consisted of at least 30 students. Time limitation was another constraining factor. If a teacher focused too much on activity suggested in the textbooks, it hampered the completion of syllabus. And the curriculum was more focused on completion of syllabus.

This finding also indicated that respondents were concerned about the environment though they did not understand much on the concept of the environment and its related issues. This implied that lot of work had to be done to fill in the gap and for this a teacher played vital role. A child should be equipped with right attitude, knowledge and skills necessary to rethink and change current patterns of action to

secure healthy and sustainable future for all. Therefore it is the responsibility of an adult to set in the changes needed to divert from our present paths. It is not good enough to 'educate the children, because the children are our future'. We are our children's futures (Davis, 1998).

5.5 Comparison on the environmental knowledge, attitude and practice by personal factors

Personal factors included gender, age, parental background, nature club member and location of school. Independent t-test was carried out to test whether there was a significant difference between the environmental knowledge, attitude and practice of the students by their personal factors.

The findings revealed that there was no statistically difference in the students' knowledge and attitude by their gender. However there was significant difference in the environmental practice between male and female. The result indicated that female were better in environmental friendly practices than male students. This finding was in agreement with the reviewed literature. Sex differences emerged in the attitudinal domains because girls generally expressed stronger feelings of responsibility towards environmental concerns and greater alignment with the ecological social paradigm than boys (Thielking and Moore, n.d). Bord and O'Connor (1997) claimed that gender differences in environmental surveys result from differences in perceived vulnerability to risk from the environment, not necessarily differences in ecological sensibility. Loughland *et al.* (2003) also emphasized the gender difference as one of the important factors influencing young people's conceptions of the environment. According to Crandall (1965), it was found that girls tended to have higher internal locus of control of responsibility than the boys. This indicated that girls were more responsible than the boys and worked more towards the conservation of the environment.

Age was grouped into those of 12 years and 13years and above and was compared to see the level of environmental knowledge, attitude and practice. The result revealed that there was no statistically significant difference in the environmental knowledge, attitude and practice by their age. Although the ages of the

students ranged from 12 to more than 15, majority of the respondents fell in the age category 12.

Parental background was divided into two groups: literate and illiterate. Of the 213 respondents, 117 had literate parents and 96 respondents had illiterate parents. The findings showed there was no statistically difference in the students' environmental knowledge and attitude by their parental background. However the result showed that there was significant difference in the environmental practice of the student having different parental background. Students with literate parental background showed higher environmental friendly practices than those with illiterate background. This finding could be because literate parents were more aware of the environment and its related issues and shared concern on the same. As reviewed in literature, the strong effect of parents' educational background on students may be attributed to the fact that young children spend much time with their parents reading, playing and studying together at home. Bronfenbrenner (1986) reported that parents are really important role models for children to learn pro-social behaviour and attitude.

Every school in Bhutan had various clubs to promote wholesome education. Some of the clubs were literary, scouts, nature, vocational, cultural, science, etc. Students joined the club as per their interest. Nature club here was grouped into two depending on whether the students were enrolled in it or not. The findings showed that there was no significant difference in the environmental knowledge, attitude and practice of the students by nature club member although nature club played an active role in school to complement EE informal curriculum as observed in the literature reviews. It also showed that there was change in the behaviours of the students after participating in environmental education programmes. The findings on relationship between attitudes of club members on environmental issues and those of non-members indicated that the club members had positive attitude towards most of the salient environmental issues while those pupils who were non club members of the clubs had a negative attitude towards most of the salient environmental issues (Josiah O. Ajiboye and Nthalivi, 2008). This finding could be because majority of the respondents were not enrolled in nature club.

Location of the school was grouped into two, urban and rural depending on the availability of basic modern facilities like road and electricity. Most of the

schools were under urban. The study showed that there was significant difference in the environmental knowledge and practice of the students by the location of the school while attitude was not affected by the location of the school. These findings showed that students in rural schools were better in environmental knowledge and practice than those in urban schools. This could be understood since rural setting brought students closer to nature.

5.6 Correlation between environmental knowledge, attitude and practice

Pearson Coefficient analysis was carried to test whether there was positive correlation between environmental knowledge, attitude and practice of the students. Research showed that there was no statistical evidence to suggest that environmental knowledge was correlated to attitude and practice. However there was statistical evidence that environmental attitude was positively correlated with practice.

This chapter discussed how the EE curriculum was integrated in formal curriculum of education system in Bhutan. It was found that the implementation of current curriculum was not very effective as students had low environmental knowledge and attitude. Majority of the students failed to answer correctly which could be assumed that knowledge on environment was low. Moreover the students did not show positive attitude though the result showed moderate when it came to environmental practice. The findings contradicted to what the teachers said during the interview as most of the teachers said that students had positive attitude. Their opinion was based on the observation as they had not carried out any sort of evaluation. This could suggest there was a gap in what teachers viewed about the students and their behaviour. This gap had to be filled so that students could have good positive attitude and also good environmental knowledge. Therefore, curriculum makers and teachers must work together to bring in effective EE curriculum in education system in Bhutan. However the research focused only on primary schools in one district of Bhutan. Therefore the results could not represent the whole country. The study aimed to provide a deeper understanding of integrated environmental education in formal curriculum. The result of the study showed that environmental education should be

considered in the national education reform to seek the proper delivery approach which in accordance with rapid changes. In the following chapter, the suggestions and recommendations at policy level, organization level and individual level are synthesized and discussed.



CHAPTER VI

CONCLUSION AND RECOMMENDATIONS

This chapter brings the discussion to the end of the study. The chapter conceptualizes the results of the study and provides a brief summary of the whole thesis. The research proposes different environmental education teaching approaches based on different circumstances. The chapter also certifies that research questions are achieved. At the end of the chapter, a number of research topics are proposed for further study.

This chapter presents as follows:

- 6.1 The overall conclusion of the research findings and
- 6.2 The recommendation

6.1 Conclusion

The research aimed to study the environmental education curriculum of the primary schools in Bhutan. It reviewed the current situation of EE curriculum of grade VI, compared students' personal factors and level of environmental knowledge, attitude and practice and also assessed the level of environmental knowledge, attitude and practice of the students.

The study adopted mix-methods for data collection. The survey questionnaire was carried out with 213 students in grade VI of Wangdue Phodrang district, Bhutan. Additionally, semi-structured interviews with 10 teachers involved in teaching grade VI and 4 curriculum experts were employed.

Mix methods were applied as a tool of inquiry through survey questionnaire with 213 students and in-depth interviews with 10 teachers and 4 experts. The samples included in the study were randomly selected from grade VI students in Wangdue Phodrang district. The data was analyzed by using descriptive

statistics such as frequency, percentage, mean and standard deviation. Independent t-test was carried out to compare the environmental knowledge, attitude and practice by their personal factors. Pearson Correlation coefficient analysis was applied out to find whether there was any statistically significant positive correlation between environmental knowledge, attitude and practice of students.

6.1.1 Personal factors of the students

The results showed that students' personal factors affected learning performance one way or another. Gender was grouped to males and females and the result showed that 53.1% made up the female for this study while 46.9% were male. Majority of the respondents fell in the age category of 12 which made up to 46.9% and the rest of 13 years old with 28.2%, 14 years old with 19.2, 15 years old with 5.2% and respondents aged more than 15 was the least with 0.5%. With regard to parental educational background, it was categorised as literate and illiterate. Majority of the respondents' parents were literate which meant that 54.9% of respondents' parents were capable of reading and writing while 44.6% had not acquired basic education (illiterate). The study revealed that majority of the respondents did not join nature club membership in the school. Out of 213 respondents, 13.6% were nature club members while 86.4% were not nature club members. Location of the school for this study was grouped as urban and rural schools. Urban schools were those schools which had access to facilities such as feeder road, electricity and few of the modern facilities while rural schools were located in villages with the limited access to basic infrastructure. It was reported that 75.6% of informants responded to urban school type while 24.4% attended rural school.

6.1.2 Level of environmental knowledge, attitude and practice

The overall knowledge of the students was found to be poor as only 28.91% could answer it correctly out of 213 students. The findings showed that the overall attitude of the students was low. This suggested that it could be because the students were low in environmental knowledge. Since the students were not aware of the environmental facts and figures, it affected the attitude level of the students. However, out of the three, practice towards environment was found to be moderate

which implied that respondents were aware of the dos and don'ts of environmental friendly practices.

6.1.3 Comparison of environmental knowledge, attitude and practice by personal factors of the students

Environmental knowledge, attitude and practice were compared amongst the students by personal factors: gender, age, parental background, nature club member and location of school. Independent t-test was used to compare the means to test whether there was a statistically significant difference in environmental knowledge, attitude and practice by their personal factors.

Gender was grouped to males and females, and compared with the environmental knowledge, attitude and practice. The results showed there was no statistically significant difference in the environmental knowledge and attitude between the two groups. On the contrary, there was statistically significant difference in the environmental practice between the two groups. The result showed that females practiced better comparing to males regarding environmental practices. This could suggest that girls were considered more responsible than boys. A number of studies also revealed that females expressed greater concern than males towards environment.

Age was divided into two groups: 12 years and 13 years and above. Research result showed that there was no statistically significant difference between the two groups regarding environmental knowledge, attitude and practice.

Parental background was grouped into two groups concerning literacy: literate and illiterate. Majority of the respondents' parents were literate. Research revealed that there was no statistically significant difference between the two groups in environmental knowledge and attitude. However, the result showed that there was statistically significant difference between the two groups in environmental practice. The respondents with illiterate parents showed better environmental practices than the respondents with literate parents.

Nature club member was categorized into two depending on whether the students were enlisted in nature club membership. The finding showed that majority of the students was not enlisted as nature club member. Research showed there was no

statistically significant difference between the two groups in environmental knowledge, attitude and practice.

Location of the school was categorized into two: urban and rural type. The results revealed that there was statistically significant difference between the two groups in environmental knowledge and practice. The students in rural schools obtained better knowledge and attitude than urban school students. This could possibly be because of the fact that students in rural type were closer to nature and more familiar with environmental friendly behaviours. Surprisingly, there was no statistically significant difference between the two groups in environmental attitude.

6.1.4 Relationship between environmental knowledge, attitude and practice

Pearson Correlation Coefficient analysis was carried out to see whether there was positive relation between environmental knowledge, attitude and practice. Research finding showed that there was no relation between environmental knowledge and attitude. The environmental knowledge and attitude level of the students was found to be low. Since the students had low environmental knowledge, it affected the attitude of the students. However the result showed there that environmental attitude significantly correlated practice of the respondents. This suggested that positive attitude leads to good and friendly practices.

6.2 Recommendations

In this section, recommendations are made based on the findings of the research.

6.2.1 Recommendations for Curriculum and Professional Support Division (CAPSD, MoE)

1. Interview with the informants revealed that the environmental concepts were not equally distributed in Science, Social Studies and Dzongkha. At the same time, they also mentioned that pertinent environmental issues were not discussed in

the textbooks. Therefore it is recommended that the emerging environmental issues be included in the textbooks while reviewing the curriculum.

2. Interview participants pointed out that lack of resources such as time, references and learning materials affected the implementation of EE in schools. Thus it is recommended that schools should be provided with at least basic resources for effective teaching. The curriculum office should decide on EE supplementary book for teachers to use it as reference book. In addition, teachers' manual should be interviewed regularly and it should include related important information which could be referred to during the teaching.

3. The teacher informants also pointed that they did not have EE as their background to bring about effective implementation of EE in schools. Even though MoE organized and conducted EE workshops but the workshop did not cover all targeted teachers. Therefore it is recommended to organize induction workshops on EE to enhance teachers' knowledge on environment to bring about effective implementation of EE in schools.

6.2.2 Recommendations at school level (Teachers)

1. From the findings, it was found that the level of knowledge and attitude were considered low. This could be indicated that the respondents did not have much understanding on environment and its related issues. Therefore, the concerned teacher needs to put in extra effort to emphasize on the importance of environment and its role through active learning activity and integrated curriculum. Karl Schwab (1983) suggested teaching strategy to bring about effective EE teaching; problem solving methods, outdoor learning or field experience, discussion method and role playing and simulation. The school management also need to provide support to bring about effective implementation of EE in schools. In doing so, every environmental education activity should be prepared with sufficient conceptual inputs so that learners' actions with the environment are environmentally friendly.

2. Research findings also revealed that respondents had good environmental practices. This could be understood that environmental activities which were conducted outside the classroom through co-curricular activities as well as lesson

taught using activity based. Therefore, it is recommended that teachers should conduct some relevant activities as deemed by the syllabus outside the classroom

6.2.4 Recommendations for further research

Given the limitations of the research, this study was carried out only in the primary schools of Bhutan. The findings of the study could provide as some basic guideline to further studies regarding such issues. The study proposed that further research should cover topics as follows:

1. A similar study could be carried out in all levels of schooling, primary to higher secondary schools in Bhutan. This could provide a clear and bigger perspective of EE in schools of Bhutan. The findings could enhance the development of environmental education in Bhutan.
2. A similar study could also be carried out among the teachers as teachers can play such important role in educating their students about environment and its related issues.

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RESEARCH QUESTIONNAIRE
A STUDY ON THE ENVIRONMENTAL EDUCATION CURRICULUM OF
PRIMARY SCHOOLS IN WANGDUE DISTRICT, BHUTAN

Part I: Personal factors

Could you please give us the following information?

Please tick (√) one box for each question)

- A. Gender: Female Male
- B. Age: 12 13 14 15 more than 15
- C. Parental Background: Literate Illiterate
- D. Nature Club Member: Yes No
- E. Location of school: Urban Rural

Please choose the answers which come to your feelings or are most likely to be correct. Please answer if you possibly can. Do not choose the 'not sure' answer unless you really can't make up your mind. The questionnaire consists of questions to test the knowledge, attitude and practice level on environment and its related issues.

Part II: Knowledge

1. For a resource to be considered renewable it must be able to:
 - a. be found in several different places at the same time
 - b. be re-used several times
 - c. be continually forming where it is found or capable of being grown
 - d. be made in the laboratory
 - e. not sure
2. The major human impact on the carbon cycle is:
 - a. planting crops that take up carbon dioxide from the air
 - b. burning carbon containing fossil fuels and destroying forests
 - c. increasing the run-off of nutrients(soil erosion) from farmland

- d. increasing the population and breathing out more carbon dioxide
 - e. not sure
3. The term Greenhouse Effect is best described as:
- a. excess energy from the sun causing changes in weather patterns
 - b. the destruction of the ozone layer by CFCs and halons
 - c. the warming of the Earth's atmosphere by a build up of gases in the atmosphere
 - d. not sure
4. The number of plants and animals able to live in a place is restricted by:
- a. how often young are produced
 - b. the availability of food, water, shelter, etc
 - c. predators
 - d. all of the above
 - e. not sure
5. Damage to the ozone layer is caused by:
- a. hydrocarbons
 - b. carbon dioxide
 - c. chlorofluorocarbons
 - d. all of the above
 - e. not sure
6. Tropical rain forests are important:
- a. they cause heavy rainfall on otherwise dry areas
 - b. they contain valuable timber which can be logged easily without damage to the ecosystem
 - c. many different species of plants and wildlife are to be found in the
 - d. they have especially fertile soils
 - e. not sure

7. In the process of economic development, it is important to
- take care to balance environmental and economic needs
 - wait until all the scientific evidence is known
 - when there is uncertainty or conflicting evidence, acting carefully in case the worst possibility happens to be right
 - not sure
9. Indicate which one of the following resources is renewable (can re-grow):
- coal
 - copper
 - forests
 - oil
 - not sure
9. 'Ecology' is best described as the study of:
- the relationship between humans and the environment
 - the relationship between organisms and the environment
 - pollution and its control
 - recycling of products
 - not sure
10. Sustainable development means:
- development we can sustain without damaging or overheating the economy
 - development which meets the needs of people today without compromising the ability of future generations to meet their needs
 - development which sustains people above the poverty line
 - development which preserves adequate reserves and parklands for endangered species
 - not sure
11. Which is the most widely discussed effect of climate change?
- increase in sea level
 - increase in temperature
 - increase of drought, fire and floods
 - changing landscape
 - not sure

12. Which of the following is not considered as greenhouse gases?
- a. carbon dioxide
 - b. nitrous oxide
 - c. ozone
 - d. hydro-fluorocarbons
 - e. not sure
13. What is the most emerging environment issue in Bhutan?
- a. glacial Lake Outburst Flood (glacial melting)
 - b. solid waste problem
 - c. land degradation
 - d. water pollution
 - e. not sure
14. Garbage can be categorised into bio-degradable and non-biodegradable waste. Which of the following forms the important part of organic waste?
- a. plastic bags
 - b. vegetables peels
 - c. glass
 - d. metal
 - e. not sure
15. Hazardous waste is generated mainly by the industrial sector. It not only causes harm to the environment but also leads to health problems. A small percentage of the hazardous waste is also generated in the house. One of the following is a hazardous waste that is generated in the house.
- a. paper
 - b. leftover foods
 - c. old batteries
 - d. plastic bags
 - e. not sure

Part III: Attitude

16. Please consider the following statements and place your views along the scale by putting tick (✓) where relevant.

1: Strongly Disagree (SD)

2: Disagree (D)

3: Agree (A)

4: Strongly Agree (SA)

Statements	Scale of agreement			
	4(SA)	3(A)	2(D)	1(SD)
a. Science and Technology have improved our quality of life				
b. Human are subjected to the laws of nature as are other species				
c. People should adapt to the environment whenever possible				
d. Modern technology has increased our freedom and independence				
e. Natural resources should be saved for the benefit of future generations				
f. Modern industrial countries are very seriously disturbing the balance of nature				
g. The earth is vast, with almost unlimited room and resources				
h. People must learn to live in harmony with nature to survive				
i. Economic growth should be given priority over environmental protection				
j. Nature should be used to produce goods for people				
k. I have strong desire to improve the environment				
l. I wish to possess good skills and knowledge to bring about environmental improvements				

Part IV: Practice

17. The following is a list of possible actions to improve the environment.

(For each statement, Please tick (√) one of the choices only)

1: Never (N)

2: Rarely (R)

3: Often (O)

	3 (O)	2 (R)	1 (N)
a. choosing household products that are better for the environment			
b. writing a letter, or signed a petition, or attended a meeting etc, with the aim of protecting or improving the environment			
c. deciding for environmental reasons to re-use or recycle something instead of throwing it away			
d. trying to encourage someone else to change an activity or practice that you thought was harmful to the environment			
e. taking part in a clean-up campaign or anti-litter scheme of some kind			
f. making a report or complaint about something that you thought was bad for the environment			
g. making an effort, for environmental reasons, to reduce water consumption			
h. trying to get information for your own interest on some topic that you thought was relevant to protecting the environment			
i. taking part in a tree-planting scheme			
j. making a gift or donation to an environmental or nature club			
k. Discussing the environmental issues such as family or friends outside the school campus			
l. Environmental topics should be taught in the class			

THANK YOU VERY MUCH FOR YOUR PARTICIPATION

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