A STUDY OF STUDENT ACHIEVEMENTS IN ENGLISH LITERACY AND MATHEMATICS LITERACY AT GRADE X

NEA TECHINICAL REPORT 2013-2014

Bhutan Council for School Examinations and Assessment
(BCSEA)
Thimphu : Bhutan

NATIONAL EDUCATION ASSESSMENT IN BHUTAN

A Study of Student Achievement in English Literacy and Mathematics Literacy in Class X, 2013

Technical Report

Bhutan Council for School Examinations and Assessment (BCSEA)

Thimphu: Bhutan

ACKNOWLEDGEMENTS

Bhutan Council for School Examinations and Assessment would like to extend our gratitude to everyone involved in the successful implementation of the National Education Assessment 2013. BCSEA wishes to acknowledge, in particular, the contributions made by the following organizations and persons:

INTERNAL

Data Analysis
Mr. Sonam Gyeltshen, ICT
Mrs. Jambay Wangmo, Asst IT Officer
Mr. Dorji Wangchuk, EMO
Mr. Kinley Dorji, EMO
Mr. Kinley Dema, EMO
Mr. Mani Dorji, EMO
Mr. Arjun Kr. Gurung, EMO

Report Writing
Mr. Kinga Drakpa, Secretary of Examinations
Mr. Tshering Tenzin, Executive Specialist
Mr. Sangay Tenzin, Chief AMD
Mr. Sonam Tshenley, Sr. Research Officer
Mrs. Sharda Rai, Subject Coordinator, English
Mrs. Kinley Dema , EMO
Mr. Arjun Kr. Gurung, EMO

Graphics and Technical Data
Mr. Arjun Kumar Gurung, EMO

Overall Coordinator:
Mr. Sangay Tenzin, Chief, AMD
Mr. Arjun Kr. Gurung, EMO
Mrs. Kinley Dema , EMO

Copy Editing and Proof Reading:
Mr. Kinga Drakpa, Secretary of Examinations
Mrs. Sharda Rai, Subject Coordinator, English
Mrs. Kinley Dema, EMO
Mr. Arjun Kr. Gurung, EMO

Editorial Advice:
Mr. Kinga Drakpa,Secretary of Examinations

Cover Design and Formatting:
Mr. Sonam Gyeltshen, ICT

EXTERNAL

- Department of Curriculum Research and Development (DCRD), MOE,
- Royal Education Council (REC),
- Education Monitoring and Support Service Division (EMMSD),
- Dzongkhags/ Thromdays Education Officers,
- All schools involved in the NEA Pilot Test 2012 and NEA Real Test 2013 and
- Teachers involved in making items, marking and data entry.

ISBN: 978-99936-635-4-6

Table of Contents

EXECUTIVE SUMMARY

National Education Assessment (NEA) is a system-wide assessment programme intended to investigate and monitor the 'health' of the education system. The main purposes of NEA are to provide policy-makers with information to monitor standards over time, to monitor the impact of particular educational initiatives, and to make decisions about resource allocation; to provide schools and teachers with information about school, class and individual pupil performance so that they can make decisions about resource allocation and support learning in the classroom; and to provide national system with information that will help to compare its performance with the international standards.

NEAs and other similar assessments are periodically conducted to address the national needs and concerns related to the quality of education. The process of conducting such an assessment usually takes two-three years to be completed.

The outcomes of such assessments provide system-wide results of:

- averages and distributions;
- performance against national norms;
- performance against expectations;
- comparison against international bench-marks; information on sub-groups of students including gender, cultural background, location of schools, etc.;
- information on other variables such as resources in schools;
- information on specific curriculum areas and
- comparison between the performance of students over a period of time.

For Bhutan, this is the fourth time such a study was undertaken to benchmark the quality and standard of national level school education at the key stages of student learning (Class X English and Mathematics - 2006, Class VI Literacy and Numeracy in 2004 and 2011 and Class X English and Mathematics - 2013).

In 2013, 45 schools were randomly selected as the sample population for the NEA 2013 for Class X English and Mathematics. To get a balanced representation of the sampling population, the selection was based on: the degree of both the geographical and demographic settings; from remote to urban location; by government or private type and the school level type (middle or higher secondary). As required by the standard, 40% coverage of the total population of 11,104 students sat for English and Mathematics tests and also responded to Student Questionnaire.

A total number of 165 teachers, from 45 participating schools in 20 Dzongkhags and 2 Thromdeys responded to the teacher questionnaires. In particular, there were 82 English and 83 Mathematics teachers who responded to their respective subject Questionnaire.

The NEA 2013 for Class X English and Mathematics was intended to address the following study questions that relate to the quality of basic education in Bhutan:

a. What is the level of English performance of Class X students?

b. What is the level of Mathematics performance of Class X students?
c. What are the contexts and conditions of student performance?
d. What are the implications of student performance on curriculum development, teaching pedagogy, resource allocation and policy decisions?
e. How do we compare the performances of the current Class X students in the two subjects with those of 2006 cohort?
f. What are the abilities of students to solve different types of questions based on cognitive, affective and cognitive domain of learning?
g. What are the implications of the student achievements on the quality of Bhutanese education?

SUMMARY OF FINDINGS

1. CLASS X STUDENTS
   a. More than 50% of the parents of the Class X students were farmers with majority of them being mothers.
   b. The majority of the student cohort was from Tshanglakha (25.90%), Dzongkha (23.14%) and Lhotshamkha (18.83%) speaking families.
   c. There were, more or less, an equal number of students in boarding and day-schools with slightly less number of girls being in boarding schools.
   d. Maximum of the day-scholars stayed with their parents (2498) while rest of them stayed with their relatives among whom the maximum walked for 30 minutes or less while significantly very few had to walk more than 1 hour to their schools.

2. ENGLISH AND MATHEMATICS LEARNING
   a. Almost all the students did an independent study of English for 30 minutes to more than 3 hours per day with the maximum of them studying for 1-3 hours per day.
   b. Almost all the parents were hugely concerned about the study of their children studying in Class X with 69.63% of them reporting of always providing them with support in their studies.
   c. While almost all the students were highly positive about their school ambience with 70% of them having enjoyed being in their schools, a handful of them felt bored with their schools and some of them even found them frightening.
   d. The schools were supportive in providing remedial classes, additional study measures, guidance and advice, access to learning materials and conducive learning environment. A few students, however, reported that they were *never* given any support.
   e. Most of the students spent 30 minutes to 2 hours on independent study of English a day, while quite a lot of them studied English for only less than 30 minutes. In Mathematics, maximum of the students spent 1-2 hours on independent study with very few having spent 3 hours and more a day.
   f. There were some discrepancies between the English homework assignments and corrections. Those who reported of getting frequent homework also reported of getting their works corrected less in a week. Most of the students were assigned Mathematics homework on a daily basis followed by 3-4 times a week. Compared to the assignment, homework correction in Mathematics on daily basis was less.

g. While the teaching-learning activities such as quizzes, debates and lectures always happened in their English classes, presentations and project works were among the activities that never happened.
h. Students practised reading, writing and use of dictionary only *sometimes* in their English classes, while very few of them practised them on a *daily basis.*
i. Most students read 2-3 books in a month with more female students reading more than male students.

3. STUDENT VALLUES AND ATTITUDES ON LEARNING OF ENGLISH AND MATHEMATICS
   a. Maximum of the students liked both English and Mathematics mainly because of the subjects being interesting and also because of the interesting teaching.
   b. Almost an equal number of the students faced difficulties in speaking and writing skills compared to listening and reading.
   c. Among the various aspects of English learning, grammar topped the children's list of importance of English learning followed by reading, writing, dictionary use, literature and composition.
   d. While the maximum of the students preferred National teachers for both the subjects, a significant number of them had no preference for the nationalities of their teachers.
   e. Majority of the students preferred the literatures in Bhutanese context and comparatively a few preferred literatures in the western context.
   f. Dzongkha was the most liked subject followed by English, History/Civics and Economics. The least liked subject was Physics with Mathematics closely following it.

4. ENGLISH AND MATHEMATICS TEACHERS
   a. The English and Mathematics teachers were mostly in the age group of 21-30 years followed by 31-50 years. A majority of them held the academic qualification of Bachelor's degree, followed by Class XII graduation and master's degree. A maximum of them also held B.Ed professional qualification followed by PGCE/PGDE and M.Ed qualifications.
   b. Close to half of these teachers had 1-5 years of teaching experience, while over a quarter of them had 5-10 years followed by a few having 10-15 years or more teaching experiences. A majority of them had spent 3-5 years, some had 5-8 years, 1-2 years and very few had spent 8 years and above in the same schools.
   c. They had spent between 1-15 years in the schools where they were currently teaching, with 38 of them having spent 1-5 years, 30 of them having spent 5-10 years, 10 below one year and five of them having been in that same school for the last 10-15 years.
   g. Maximum of them had been teaching English for 1-5 years, followed by those who had taught for less than one year and 5-10 years. More than a quarter of the Mathematics teachers had 2-5 years of experience in teaching Mathematics, another quarter had only one year experience, less than a quarter of them had 1-2 years, and only some had 5-8 years or more experience. Of the many Mathematics teachers who also taught subjects other than Mathematics, a majority taught science subjects, a quarter of them taught Computer/IT, while a handful among them also taught other subjects.

h. More than half of these teachers had 20-25 hours of teaching per week and a little over a quarter of them had 25 hours or more, while about 18% of them had between 10-20 hours.

5. TEACHING OF ENGLISH AND MATHEMATICS

i. Most English teachers spent a maximum of 2-4 hours on lesson planning and 1-4 hours on preparing project works for their students. Majority of them spent 3-5 hours on teaching each of the four strands of which most time was spent on teaching Reading and Literature, but comparatively less time on Listening and Speaking. In Mathematics, more than half of the teachers spent 3-4 hours per week in problem solving skills and less than half of them spent less than one hour on those activities. While many teachers spent 2-4 hours on reasoning and proof, some teachers spent also about an hour on those topics. Some teachers spent 2-3 hours, some spent 1-2 hours and some spent 3-4 hours per week on teaching communication and representation skills.

j. Majority of the teachers used Test Books and Teachers' Manual as the primary resources for teaching. They made very less use of magazines, newspapers, journals and audio-visual aids, which may have been otherwise very useful in the teaching of English.

k. Maximum of the teachers assigned home works 1 to 3 times a week while quite a many also assigned home works 2 times a week. Less than half the teachers corrected student works once a week, whereas 66% of them corrected 1 - 2 times a week. The feedback provided were mostly written comments, while grading was the least used.

6. ENGLISH AND MATHEMATICS CURRICULUM

a. Though most of the teachers found the content (quantity) of English and Mathematics syllabi just right and the period allocation adequate, quite a significant number of them found the period allocation inadequate considering the vast syllabus and large class size.

b. While a lot of the teachers reflected the teaching of English as easy and the syllabus content, in terms of quality, being good, they expressed that the novel, 'The Giver,' was very abstract and difficult for their students to understand. They expressed that the context of 'The Giver' was socially and culturally alien to the Bhutanese students. More than half of the teachers found teaching Mathematics easy and yet 62% responded that the appropriateness of Mathematics concepts in the Class X syllabus was only quite appropriate.

c. They found the moral-based content of Reading and Literature texts inadequate and teacher guidebooks (references) for teaching of essays and poems lacking appropriateness and relevance. English curriculum on the whole lacked a prescribed grammar syllabus for different class levels. There was also a lack of appropriate resources and guidelines for teaching grammar to students. Further, the time allocated for teaching of grammar was insufficient. The mathematical concepts such as algebra, geometry followed by number and operation, mensuration, and data and probability were rated as the most difficult ones. More than 30 % of the teachers were highly

satisfied, but almost 50% of them were not satisfied with the logical progression of the Class X Mathematics curriculum.

d. While the general mode of assessment was felt to be appropriate, the teachers strongly expressed that the BCSE examination should carry full 100 marks without any marks coming by way of the internal assessment.

7. PROFESSIONAL DEVELOPMENT NEEDS AND SUPPORT

a. About a half of both English and Mathematics teachers had the opportunity to participate in workshops and training during their teaching career and most of those who participated in the workshops got the benefit from some extend to a large extent.

b. The teachers expressed varying degrees of requirements for additional support to enhance the teaching particularly in ICT use, teaching skills, assessment skills and content knowledge. While they faced difficulties getting the required support from the various responsible agencies, the maximum support that they got was from their colleagues in schools rather than from any of the professional agencies. Besides, the teachers felt the need for timely and adequate orientation on teaching of the new curriculum through appropriate trainings and workshops.

e. They expressed a strong need to provide sufficient and appropriate teaching/learning materials to their schools. There was also a need for an equal distribution of the workload among the teachers. Their schools did not adequately facilitate them in the proper utilization of ICT facilities to support in making teaching of mathematics more effective.

f. Majority of the teachers did not read even a single book in a week, while some of them read one book in a week and a very few read two books in a week. On the other hand, more than half the teachers engaged themselves 1-3 hours a week in creative writing, while others preferred doing practical or business writing for 1-3 hours a week.

g. The teachers mentioned specific policy concerns related to teaching at Class X. Similar to the findings in the previous NEAs, the need for proper allocation of resources, workload, teaching time and periods, and timely support from various relevant sources and reducing classroom size were mentioned. They cited their students' weakness or lack of basic foundation in the subjects right from the lower classes which affected their performance at Class X. Easy access of students to electronic gadgets such as scientific calculators and mobile phones coupled with the incompetency of many teachers was a major cause for the decline in the learning interest of students in Mathematics. Student performance in English was hampered by failure to cultivate reading habit in their early learning stages and lack of parental support in this area.

8. PERFORMANCE IN ENGLISH

a. The performance of students in English in the NEA 2013 was 34.72 % which was a mere 20.83 out of 60 full marks on which the paper was set. However, the 2013

English performance shows a marginal improvement of 1.85% above the NEA 2006 national mean score of 32.87%.

b. The female students at a mean score of 35.08% performed marginally better than the male students with 34.33%.
c. Schools located in urban settings tended to perform better than schools located in other settings. The English performance of schools located in other than urban areas did not seem to depend on their locations, though semi-urban schools performed poorer than schools in any of the other locations.
d. While 17 schools had performed above the national mean of 34.72 %, their mean scores were below 40%. Three schools with 25.62 – 29.46 mean score range lingered at the bottom of the performance list.
e. Chukha, Paro, Bumthang, Thimphu, Sarpang and Trashigang Dzongkhags performed slightly better, with their mean score above the national mean of 34.72%, than the rest of the schools. All the other Dzongkhags performed below the national mean.
f. The students in the age group of 12-15 years performed much better than those in the age group of 21+ years. It could be concluded, with some confidence, that younger the Class X students, better the performance in English, and as their age increased their performance decreased.
g. Children of farmers, NGO employees, those in national work force, religious personnel and armed forces in general did not perform as well as the children of other occupational backgrounds who showed varying degrees of comparatively higher performance. Children whose mothers were in the government service performed better than those whose fathers were in the government service.
h. The day-scholar students outdid the boarders in English performance by a margin of 4.48%.
i. Those day-scholars who stayed with their parents had better mean performance than those who stayed with their relatives. Those staying with their sisters did much better than those staying with their brothers.
j. Shorter the distance children had to walk to schools, better was the performance in English. However, those children having to walk 3-4 hours surprisingly did better than those who walked 1-3 hours. But still, those who walked more than four hours performed the worst.
k. The students whose parents were often or always concerned about their studies seemed to perform better than those who were rarely concerned. However, too much concern and involvement from parents had a dwindling effect on children's performance.
l. Similarly, those who were often guided and advised by their parents did well. If parents often helped children with their homework, often kept in touch with their teachers, often provided with additional learning resources and always provided with enough teaching time, their children seemed to do very well.
m. Those who were always taught at home did not do well compared to those who have been rarely taught by their parents. Besides, the students for whom tuitions had never been arranged did very well as compared to those for whom tuitions had been arranged.

n. Those students who felt that their schools were caring to them performed better than those who felt their schools to be frightening. But those who were bored with their schools did slightly better than those who enjoyed being in their schools.
o. Students performed well in English, if the schools often provided them with study support. However, too much support or too little support was counterproductive for student performance.
p. Those who studied 2-3 hours a day seemed to have done slightly better than those who studied more or less hours in a day.
q. Frequency of homework assignment and correction did not also seem to bear much positive impact on student performance in English. In fact, performance was better for those who were given lesser number of homework in a week. Students whose homework was corrected less frequently did better than those whose work was corrected more frequently.
r. The performance was better for those who were given various feedback on their home works in the frequency range of sometimes to always than those to whom feedback had never been given.
s. The performance seemed to be better for the students who read more than three books a month. Those students who always read science fiction and comics tended to perform better than those who always read other types of books.
t. The students who liked the English subject performed better than those who disliked it. The performance was worst for those who disliked the subject for its being a difficult subject.
u. Having a preference for the nationality of their subject teachers had an impact on the performance. The students who had no preference between the Bhutanese and Non-Bhutanese English teachers performed much better than those who preferred the Bhutanese ones.
v. Similarly, the students who preferred to read western context of literature performed markedly better than those who preferred Bhutanese or Indian context of literature.

9. PERFORMANCE IN MATHEMATICS

a. The overall performance of the Class X students in the NEA 2013 Mathematics test was 38.03 out of 100 marks. Unlike in English, boys performed better with the mean score of 39.97 than girls with 36.19 mean score.
b. The students of higher secondary schools performed better than those of the middle secondary schools.
c. The students from urban schools (major bulk) performed a little below the national mean of 38.03. However, the students from semi-remote and semi-rural schools performed very well.
d. Nine Dzongkhags and Thimthrom performed above the national mean and 11 Dzongkhags below the national mean.
e. The students in the younger age group did better than those in the older age group. The 15-18 year age group having the bulk of the students (4038), for instance, did very well compared to those in the higher age groups.
f. Students of those parents who were in the government service, working in international organization and corporations had an edge over the students whose

parents were in other occupations. Farmers' children did much better than the children of parents working in National Wok Force (PWD), armed forces and in business.

g. Of the equal number of boarder and day-scholar students, the boarders performed slightly better.
h. The day-scholar students who stayed with their parents, performed better compared to those staying with their siblings, grandparents or friends.
i. Those who had to walk less than 30 minutes to schools performed better than those who spent more time walking to schools, though comparatively very less number of students walked more than 30 minutes to schools.
j. While parental concerns about their children's study did influence the performance in Mathematics, too much concern seemed to be less productive.
k. Parents providing study time, additional resources, keeping in touch with their teachers and providing guidance and advice were very important for their children to perform well. However, teaching at home and providing tuitions did not help them do any better in the subject.
l. As in English, school ambience, by way of how students felt being in their schools, seemed to play a significant role in how students performed in Mathematics. Those students who felt that their schools were caring performed much better than those who felt them to be frightening, while those who enjoyed being in their schools tended to do less well as compared to those who felt bored being there.
m. The students of schools where the learning environment was always or often conducive did well compared to those whose schools were never or only sometimes conducive for learning. Similarly, if the schools always or often provided easy access to learning facilities, the performance in Mathematics was better. However, those who were *always* given the additional support and remedial measures did less well.
n. While independent study between 1-3 hours per day seemed highly productive for students, those who studied independently for less than one hour or more than three hours did not perform well in Mathematics.
o. Those who were assigned more than three times of homework a week did better than those who were given lesser number of homework in a week. However, lesser the home works were corrected by teachers better was the student performance.
p. Students performed better in Mathematics, if they were never assigned or assigned project work only some times than those who were always given the project work. Similarly, the performance improved as frequency of lecture and classroom discussions decreased in the Mathematics classes.
q. Those students who liked Mathematics performed significantly better than who did not like it. The performance was worst for those who found the subject difficult or boring than that of those who did not like it due to other reasons.
r. Those who found the various learning strands in Mathematics easy and interesting did much better than those who felt them to be difficult and boring.
s. The students' preference for the nationality of their teachers did not impact much on their performance in Mathematics.

10. ANALYSIS OF TEST PERFORMANCE

a. Student performance in the grammar section with the mean score of 26.50% was poor compared to that of the other two strands of writing (39.40%) and Reading (38.15%).
b. Students did not perform well in item 1 of short answer section in which over a thousand students scored 0, though it fell under lower difficulty level. Whereas, most students did fairly well in the other two items (2 and 3) of the short answer questions.
c. The performance in poetry was also generally weak. While Class X English curriculum requires students to learn them at this level, most of the students failed to identify even the figures of speech used in the given poem.
d. Students failed to recognize the correct modal verbs even though the item was based on the requirement of the syllabus.
e. Students did not perform well in the grammar questions in the section that required them to re-write sentences using appropriate grammatical rules indicating that the students did not know the basic rules of grammar.
f. Students also did not do too well in the other three grammar items that required them to edit and re-write sentences correctly.
g. Majority of the students performed well in writing of an essay on the topic: *"What are the major opportunities and challenges facing Bhutan in the near future?"*. There were some students who wrote good essays by expressing their ideas, thoughts and opinions very clearly and also providing very appropriate illustrations and anecdotes.
h. Students were quite good in remembering and analytical skills. They seemed to lag in understanding and application skills while being average in creativity, the highest order in the difficulty level.
i. Students were below average (50%) in all the three major skills of English language. They seemed to be slightly better in reading (38.13%) and writing (39.38%) than in grammar which required them to use application skills.
j. Female students tend to perform slightly better in all the skills compared to male students indicating that girl students are slightly better in English.
k. In Mathematics, students had performed better in Number and Operations followed by Trigonometry and Data Statistics and Probability. The performance in Geometry was very poor.
l. Male students had performed slightly better than female students in all the content strands.
m. In multiple choice question (MCQ) items, students did not perform well; their mean score was 31.45.
n. Students found the short answer type items fairly difficult as 53.3% of the scores fell under moderately difficult category and 46.7% of the scores fell under difficult category. Out of 45 marks, the mean score of the students was 16.3 with the standard deviation of 17.8.
o. Students also found the extended answer items fairly difficult as 57% of the scores fell under moderately difficult category and 43% of the scores fell under difficult category. The mean score in this section was 17.5 out of 35 with the standard deviation of 10.5.
p. Unlike in English, the performance in Mathematics declined as the difficulty level of the items increased. Students performed best in items that involved remembering followed by those that involved applying and creating

q. Performance of both the genders was better in items of lower order of thinking skills than that of higher order of thinking.
r. Students performed well in *Number and Operations* but very poorly in *Geometry* with the score below 22%. In *Trigonometry, Data and Probability, Algebra and Measurement,* students performed at 35-42%.

11. PERFORMANCE COMPARISON

a. The top 50 performers who had an average score of 66.28 in English had an average score of 86.62 in Mathematics. Similarly, the top 50 performers who had an average score of 50.86 in Mathematics had an average score of 65.5 in English. This indicated that those who were good in English were also good in Mathematics but not vice versa.
b. Those who performed well in NEA 2013 also did well in the BCSE 2013 examination in both the subjects and conversely those who performed poorly in NEA 2013 also showed poor performance in the BCSE 2103 examination. Though the performance of these students was much better in the BCSE 2013 examination, their performance in NEA was directly proportional to their performance in the BCSE 2013 examination in both the subjects. However, for the BCSE Examinations, 20% of the total marks come from Continuous Assessment (CA) marks awarded by their schools.
c. The distribution of the scores on the English test was highly positively skewed, with fewer scores on the higher end of the scale meaning which the test was difficult for the students in Class X either due to low cognitive ability or difficulty of the items. However, though difficult, the items were acceptable within the abilities of the students. On the other hand, the distribution of the scores in Mathematics test was slightly positively skewed, with fewer scores on the higher end of the scale indicating that the Mathematics test was relatively difficult compared to the cognitive ability of the students as the mean score fell well below the mean score the range of 50. However, again, Cronbach's coefficient (α) of 0.89 and the p- value of (0.3803) suggested that though difficult, the items were acceptable within the abilities of the students.
d. Differences appeared between the performance English and Mathematics of NEA 2006 and NEA 2013. The overall mean performance in English had improved between 2006 and 2013 whereas the performance in Mathematics showed a slight decline between 2006 and 2013.
e. Students performed better in Mathematics than in English test as a large number of students were able to achieve competency and proficiency levels in Mathematics tests. Slightly over half of the Class X Mathematics students achieved minimum competency while a little less than half achieved minimum competency in English; only a much smaller fraction of the students achieved proficiency levels in both the subjects.

SUMMARY OF RECOMMENDATIONS

a. Schools must ensure that the teachers are allotted adequate number of periods so that teachers could qualitatively complete the prescribed syllabus on time. Workload needs to be distributed equitably among the teachers.
b. The Ministry should strive further to reduce walking distances between children's homes and schools particularly in remote and rural areas.
c. Reduce class size to make teaching learning more effective and to make resources available to every student.
d. Schools should put in place and implement homework policy and rationalize assignment and correction of homework. Both verbal and written feedback must be appropriately provided on student work.
e. The ministry should consider allocating adequate resources for schools in remote and rural areas.
f. Classroom lessons should be made more interesting and interactive by using varieties of teaching learning materials and methods for better learning outcome.
g. Schools must provide students with appropriate study support by providing remedial study measures, guidance and advice, access to learning materials and creating conducive learning environment.
h. Students need to be encouraged to study independently for 1-3 hours every day.
i. Concerned authority should facilitate the provision of more support for the children of farmers, arm forces and national work forces in their study.
j. Schools should pay equal attention and provide equitable support to both girls and boys in their learning.
k. Find out through research why teachers feel that the BCSE (X) examination should carry full 100 marks without 20% internal assessment marks from the schools.
l. Provide professional and timely support to the schools and teachers from the responsible agencies.
m. Parents should be sensitized on the need to be concerned and provide support in their children's study for better learning outcome.
n. Physical and social ambience of schools must be improved in order to make students learn well and perform better.
o. Conduct frequent in-service workshops for teachers on content knowledge validation, teaching skills, effective assessment practices and use of ICT in their teaching process.
p. Continuous assessment and summative assessment for Class X need to be rationalized and clear Continuous Assessment policies across all subjects at Class X with rubrics for 20 marks should be developed and implemented uniformly.

While there was an increase in the achievement in NEA 2013 Class X English by a mean score of 1.86 from 2006, the performance consistency in 2006 was better since the standard deviation was higher in 2013. The mean score in Mathematics had decreased by 0.89 in 2013 compared to that of 2006. The performance in Mathematics cannot really be compared since the cohorts of students and the test items were different. The NEA 2013 test items were designed based on the new Mathematics curriculum.

CHAPTER 1

CONTEXT OF NATIONAL EDUCATION ASSESSMENT

Bhutan is a small Himalayan kingdom situated between two big countries, China in the north and India in the south. It covers approximately an area of 38,394 square kilometers (RGoB-UNFPA 2006) and stretches about 150 km north to south and 300 km east to west. The population of the country is estimated at 746,936 (NSB 2012). Most parts of the country are a mountainous terrain, and the land elevation ranges from 160 meters above the sea level in the south to 7550 meters in the north. Due to its mountainous terrain and geography, commutation and communications between different parts of the country have still been a challenge.

Bhutan has been an independent sovereign nation throughout its history. In the 17th century, a great religious leader from Tibet, Zhabdrung Ngawang Namgyel (1594-1652) came to Bhutan and unified the country making one state under one rule. He introduced theocracy in 1652 and established a proper administrative system with a code of law to govern the country. The theocracy established by Zhabdrung Ngawang Namgyel ended in 1907 when Ugyen Wangchuck (1862-1926) was unanimously elected the first King of Bhutan. Since the establishment of monarchy, the country has been ruled by five successive hereditary kings. His Majesty the fourth King Jigme Singye Wangchuck initiated the smooth transition of the system of government from monarchy to a democratic constitutional monarchy in the late 1990s. The first national assembly election in the history of Bhutan was held in 2008. Since then the country is being governed by a democratically elected government where the King is the head of the state and Prime Minister is the head of the government. Buddhism and Hinduism are the two major religions practiced in the country.

Bhutan has pursued a development strategy that aims for people's spiritual and emotional wellbeing than materialistic economic growth. The country's development philosophy is popularly known as Gross National Happiness (GNH), first coined by the fourth king in 1973.

In keeping with GNH as the guiding force and principle of socio economic development, the Education and Health Sectors have always been accorded top priorities in the development effort of the country. As envisioned in its development goals, the country achieved 95% net enrolment ratio by 2011 in the primary schools (RGoB-MoE 2011, p.7).

1.1 BHUTANESE EDUCATION SYSTEM

The Royal Government has always accorded a high priority to the education sector as the key agency to address the critical shortage of human resources in the country. Education has continued to receive a major share of the government budget (around 10%) since the start of First Five Year Plan in 1960s even in the face of other emerging priorities in the national development areas.

Since 2000, the education sector has been working on the task of developing a strategic framework for education "Education Sector Strategy: Realizing the Vision 2020". It is an articulation of the goals and processes for achieving Bhutan's aspirations in the education sector as a part of the wider national development initiatives towards becoming a knowledge-based society and progressive sovereign nation.

1.1.2 STRUCTURE OF BHUTANESE EDUCATION SYSTEM

The structure of Bhutanese education system in general consists of a day care system called early childhood care development (ECCD), seven years of primary (starting from Class PP to VI), four years of secondary (VII to X), and two years of higher secondary education (XI to XII) which terminates at the age of eighteen.

The basic education level at present is up to Class X which includes 11 years of free education until the age of sixteen. In the current education system, there are at least four key-stages of student learning (Classes III, VI, X and XII) and at the end of which children had to sit for the competency based assessment tests in case of Classes III and VI; and public examinations for Classes X and XII set by the Bhutan Council for School Examinations and Assessment (BCSEA).

Dzongkha is the national language which is taught at all levels of schooling, and for other subjects English is used as the medium of instruction.

Day care (ECCD)

In the recent years, the Ministry of Education has also established a day care system which starts at the age of 3 (this includes early childhood care development (ECCD) prior to entering into the pre-primary education). There are 165 ECD centres (82 governments + 83 private) as of 2013.

Pre-primary Education

Children begin their schooling at the age of 6 when they enter the first grade of primary education known as Pre-Primary (Class PP).

Primary Education

Primary education for children was introduced in 1986 which starts from Class PP to VI. The educational curricula which children study during their primary education are Dzongkha, English, Mathematics, EVS in Dzongkha, Science and Social Studies.

Children are required to sit for a year-end examination on completion of Class III and also at the end of primary threshold (Class VI) which are set by BCSEA but administered and assessed by the respective schools. Primary education is provided to 348 schools (336+12) as of 2013.

Secondary Education

Secondary education starts from Class VII when children reach the age of thirteen and continue up to Class X and complete their basic education in sixteen years. Children have to sit for a public examination in Class X (Bhutan Certificate of Secondary Education, BCSE). During the basic education period, children study the prescribed subjects in the school curricula:

- English, Dzongkha, History, Geography, Mathematics, Science and
- Optional subjects: Economics and Computer IT.

The Optional subjects are chosen based on students' interest and course relevance.
Presently, secondary education is provided to 61 lower secondary schools (59+2) and 53 middle secondary schools (36+17).

Higher Secondary Education

Higher Secondary Education starts from Class XI and completes at the end of Class XII when children reach the age of eighteen years. The children appear for the public examinations (Bhutan Higher Secondary Education Certificate, BHSEC) on completion of their two year study.

The core subjects studied in Classes XI and XII vary depending on the streams offered by individual students. At present, there are three academic streams: Arts, Science and Commerce. While Dzongkha and English are common to all the three streams, the core subjects for each stream are as follows:

- Arts (Geography; Optional: Economics, History/Civics, and Business Mathematics),
- Commerce (Business Mathematics, Accountancy and Commerce; Optional: Economics/Computer IT).
- Science (Biology, Chemistry and Physics; Optional: Mathematics and Biology) and

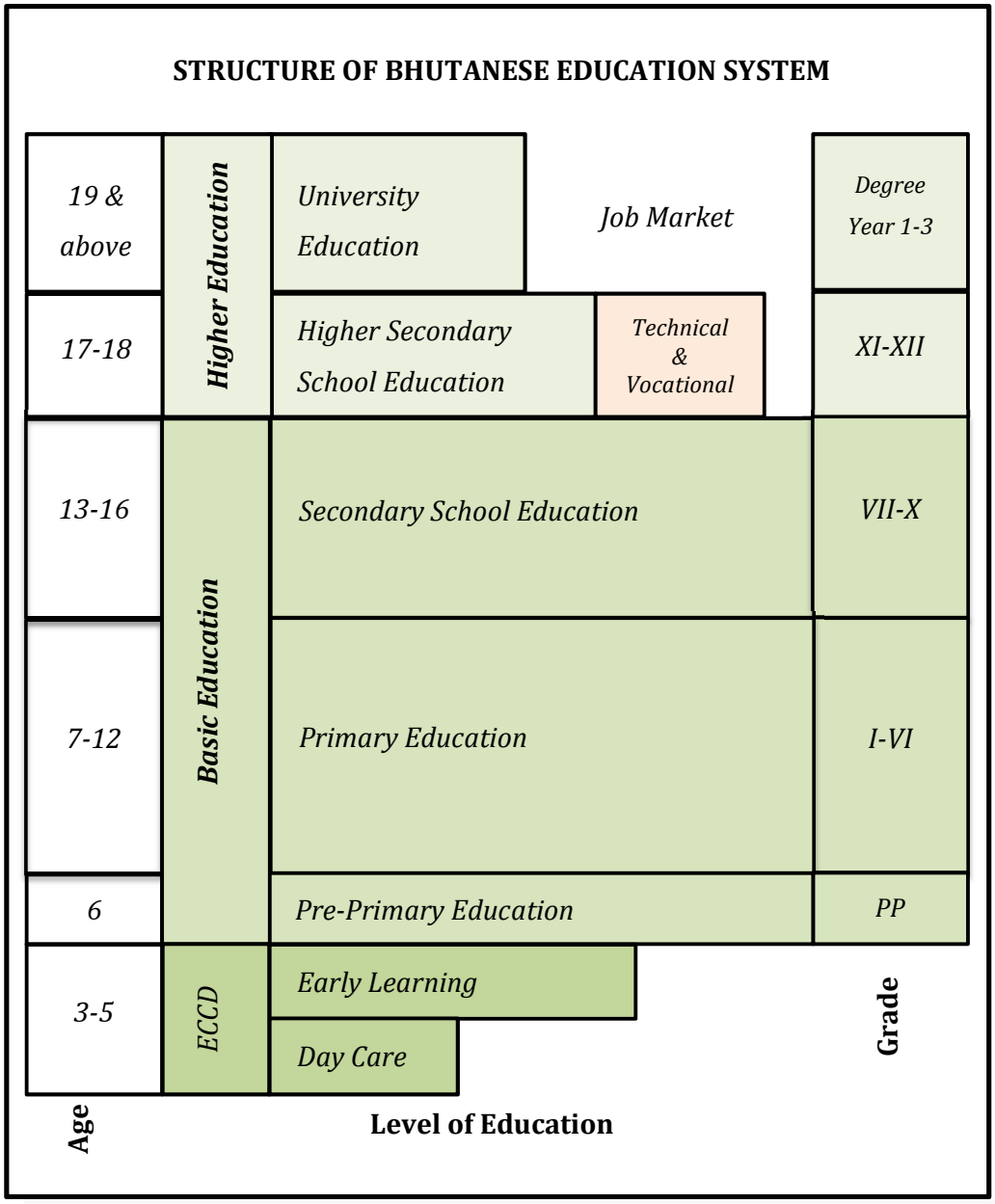
The optional subjects are chosen based on students' interest and course relevance to their choice.

Tertiary and Higher Education

After completion of the post-secondary education, most students pursue tertiary or higher education programmes in institutions/universities both within and outside the country, while the rest enter into technical and vocational training opportunities provided by the employment markets.

Academically potential students are selected to study abroad on government scholarship programmes as per the human resource requirement of the country.

Figure 1.1: Structure of Bhutanese Education System



1.2 SCHOOL EDUCATION ASSESSMENT AGENCY

With the start of public examinations in 1975, the need for a proper body to coordinate and conduct the public examinations was established in 1975 within the Directorate of Education headed by a Controller of Examinations. In 1986, the Examination Cell was upgraded to Bhutan Board of Examinations (BBE), with a Secretary as its head.

Although BBE lived up to its aspirations, educational assessment is rapidly changing across the globe, especially in the developed countries, where the national assessment bodies are taking up additional mandates to assist in the reformation of the education systems. The range and scope of public examinations and educational assessments are also expanding.

Against this backdrop and as recommended during the organizational restructuring exercise of the Government in 2007, the Government issued an Executive Order on May 26, 2011, endorsing the establishment of Bhutan Council for School Examinations and Assessment (BCSEA) from July 1, 2011 as an autonomous body replacing the erstwhile BBE.

It was envisaged that BCSEA would be an internationally recognized educational assessment and monitoring agency which will provide quality services to build integrity and profile of the education system as a whole.

BCSEA's remit is to drive the quality and standard of student learning and will play a pivotal role in promoting quality and standard in curricula, teaching and learning through advocacy, policy advice and support, specialist knowledge and skills, and services. It will be the watchdog of the education system in the country.

One of the key responsibilities of BCSEA is to conduct National Education Assessment (NEA) activities to monitor the health and soundness of the education system. It will report on the progress and standard of the delivery of educational services in the country.

CHAPTER 2

NATIONAL EDUCATION ASSESSMENT

2.1 BACKGROUND

National Education Assessment (NEA) is a system-wide assessment program intended to investigate and monitor the 'health' of the education system. The main purposes of NEA are to provide policy-makers with information to monitor standards over time, to monitor the impact of particular educational initiatives, and to make decisions about resource allocation; schools and teachers with information about whole school, class and individual pupil performance so that they can use to make decisions about resource allocation and to support learning in the classrooms; and the national system with information that will help to compare its performance with the international standards.

Widely used in countries like Australia, Canada and United States, such assessments are normally conducted to assess the learning outcomes in Literacy, Numeracy, Science, Arts, Health and Physical Education usually at 3 and 5 grade levels. For instance, in African countries like Kenya, Malawi, Mauritius, Namibia, Zambia, Mozambique, Tanzania, Swaziland and Zimbabwe, a consortium called SACMEQ (the South African Consortium for Monitoring Educational Quality) has been formed. These countries have been conducting NEAs to ascertain the quality of the process and product of their educational programmes.

NEAs and other similar assessments are periodically conducted to address the national needs and concerns of a country relating to the quality of education. A particular professional body or agency is normally entrusted with the responsibilities of preparing test specifications, developing instruments, piloting, revising instruments, conducting final tests, doing analysis, generating reports and dissemination of findings of such assessments. The process of conducting such an assessment usually takes two-three years to complete.

The outcomes of such assessments provide system-wide results of:

a. averages and distributions;
b. performance against national norms;
c. performance against expectations;
d. comparison against international bench-marks;
e. information on sub-groups of students including gender, cultural background, location of schools;
f. information on other variables such as resources in schools; and
g. information on specific curriculum areas.

2.2 NATIONAL EDUCATIONAL ASSESSMENT IN BHUTAN

This section provides a short definition, background to the National Education Assessment (NEA), a general history of NEA project in Bhutan funded under the second Education project of the World Bank (1997-2003), capacity building workshops conducted by the World Bank in South Asia and cooperation with the Australian Council for Education Research (ACER) and the subsequent NEAs conducted in Bhutan.

A national assessment may be defined as an exercise designed to describe the level of achievements, not of individual students, but of a whole education system, or a clearly defined part of it.

Bhutan happened to be one of the seven countries to be invited by the World Bank to participate in the Workshop on Policy and Implementation Issues under the "Capacity Building Programme on National Education Assessment in South Asia" held in Hanoi, Vietnam in 2002.

The objective of the programme was, "to provide education authorities of participating countries with a better understanding of the benefits of implementing effective national educational assessment systems that allow the linking of evidence on student achievement to education policy-making".

As a result of the programme, the team that participated in the workshop worked out the benefits of conducting National Education Assessment and presented at the monthly co-ordination meeting of the senior education officials of the Ministry of Education. The benefits of the NEA were forecasted to:

a. providing the Ministry of Education with objective information on the standard of education;
b. helping in monitoring the trends in achievement levels;
c. identifying specific challenges of learning;
d. identifying areas of the curriculum requiring reform;
e. identifying determining factors related to learning achievement;
f. to obtain information that can be used to assign accountability for student performance and
g. to provide information that can be used to aid decisions about the allocation of resources.

The team also recommended that, as the first exercise, NEA be conducted in Numeracy and Literacy for Class VI level. The study was to be coordinated by BBE in coordination with CAPSD, EMSSD, Planning and CERD. On the advice of the Ministry of Education, a Task Force consisting of officials from the BBE, CERD, CAPSD and EMSSD was then formed. The sub-task force was supported by external technical advice made available under the Second Education Project of the World Bank, in three phases namely, drafting (October 2002), piloting (November 2002) and evaluation and reporting (March 2004).

The entire study was funded by the World Bank under the Second Education Project and technical assistance sought from the Australian Council for Educational Research, Melbourne.

The members attended appropriate workshops in different locations under the aegis of the World Bank to gain relevant information and skills in carrying out NEA at different stages on Capacity Building in National Education Assessment in South Asia. The TF convened regular meetings to crystallize plans and prepare for the conduct of Class VI NEA in Literacy and Numeracy.

During the study period, technical assistance was provided by two consultants from the Australian Council for Educational Research, with the objectives to assist in developing standardized testing instruments for Class VI English and Mathematics comparable to international standards of learning achievement in these subjects at that level, and design a mechanism to institutionalize standardized testing at Class VI.

Their assistance was acquired in reviewing and modifying the test instruments for English and Mathematics for Class VI developed by the national team; reviewing the analysis of the results of the test piloted in selected schools and provide suggestions for the final form of the instruments; and assisting in the analysis of the results of the final tests and with the preparation of a report on the study in 2002-2004. Technical assistance was also sought for guidance in the design of a long-term mechanism for monitoring achievement levels in different subjects in Class VI in view of decentralization of the existing examinations. It was further envisaged that a strong institutional linkage would be developed between ACER and Ministry of Education for capacity building in this area for future studies.

It was felt important to conduct NEA exercises at the key learning stages of Classes VI, X and XII to assess the quality of student learning at these crucial levels. NEAs were conducted for Class VI Literacy and Numeracy in 2003, Class VI Dzongkha in 2005, Class X English and Mathematics in 2006 and Class VI Literacy and Numeracy in 2011. Through these exercises, the BCSEA staff gained tremendous amount of experiences in test development, administration of tests, data analysis and report writing. BCSEA has developed capacity not only to conduct NEAs on its own but also to extend its expertise to other organizations in conducting similar assessments.

2.3 NATIONAL EDUCATION ASSESSMENT IN CLASS X ENGLISH AND MATHEMATICS (2013)

The first round having been conducted in 2006, the current NEA for Class X English and Mathematics was the second round of assessment in the same subjects and level. This was planned to assess the learning achievements in the two crucial subjects for those who were completing the basic education of 16 years.

NEA 2013 for Class X English and Mathematics aimed to:

a) determine performance in English and Mathematics;

b) relate performance to conditions or context;
c) review curriculum development process, teaching pedagogy, resource allocation and policy based on the performance;
d) compare with the 2006 assessment;
e) measure abilities to solve problems based on cognitive, affective and cognitive domain of learning, and
f) relate student achievements to the quality of Bhutanese education.

Apart from answering the above questions, the study would allow Bhutan to learn the use of research and educational assessments to address pertinent educational policy issues. The programme would also equip Bhutan with the technical knowledge, skills and experience and build capacity to conduct research and assessment activities. Bhutan is at the juncture where the capacity to conduct high-quality, large-scale educational policy surveys continuously in order to monitor and evaluate the growth and performance of the Bhutanese education system.

CHAPTER 3

METHODOLOGY

This chapter describes the methodology followed in the conduct of National Education Assessment for Class X students in English and Mathematics. It describes all the events in the sequence-instrument revision, sampling procedures, assessment tools, administration of assessment tools, data processing, data cleaning exercises, analysis and report writing.

3.1 SAMPLING OF POPULATION

Out of the total of 114 secondary schools in the country, 61 were middle secondary schools and 53 higher secondary schools. Among them, 45 schools (25 middle secondary schools and 18 government higher secondary schools and 2 private higher secondary schools) were randomly selected as the sample population for the NEA 2013 for Class X English and Mathematics.

To get a balanced representation of the population, the selection was based on:

- remoteness (urban, semi-urban, semi-rural, semi-remote or rural);
- ownership (government or private) and
- level (middle or higher secondary schools).

The final sample consisted of 4 rural, 8 semi-remote, 7 semi-rural, 4 semi-urban and 22 urban schools across 20 Dzongkhags and 2 Thromdeys. The target was to get at least 40% of the total student population of 11,104 in Class X to participate in the assessment conducted by means of tests and Questionnaires. A total of 82 English teachers and 83 Mathematics teachers also were made to respond to the teacher questionnaire.

3.2 ASSESSMENT TOOLS

The two tests, with 26 items in English and 38 items in Mathematics, were designed to assess student competencies in the two subjects. The test items in both the subjects included the multiple choice questions (MCQ), short response questions (SRQ) and extended response questions (ERQ). They were designed by covering all learning standards of both content and concepts as per the curriculum and followed the mode of assessment prescribed by the Department of Curriculum Research and Development (DCRD). The question items were also spread well over the Bloom's Taxonomy of learning to ensure the balanced inclusion of all levels of thinking. The selection of contents for both the subjects was based on the competencies required to be acquired by the learners at the end of Class X.

Section A of the English test on Reading and Literature, Section B on Language and Section C on Writing were designed to assess student competencies in the strands. In Mathematics, test items were designed to test the learner's content knowledge, competencies and skills in problem solving, making connections, communication and reasoning and proof on the

contents in Algebra, Number and Operations, Statistics, Trigonometry, Geometry and Measurement.

The test items in both the subjects were developed in four different sets by selected groups of subject teachers with qualification, ample content knowledge and teaching experiences. All the four sets of the test in Mathematics were piloted with Class X students in selected schools in nine western Dzongkhags in 2012.

The NEA was designed to evaluate students' abilities in Class X English and Mathematics skills. Tests in English and Mathematics made up 26 and 38 questions were based on national curricula. The test paper contained three sections (MCQ, SAQ, ERQ). New question items were developed and added each year, but the test retained most of the common items over the time. Following Bloom's taxonomy, the test targeted six levels of cognitive abilities (remembering, understanding, applying, analyzing, evaluating and creating) and contained the following content weightings for the two subjects:

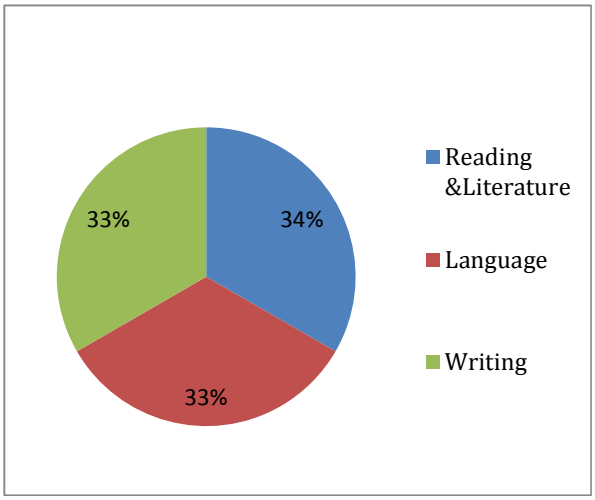


Figure 1.1 English Test Stands

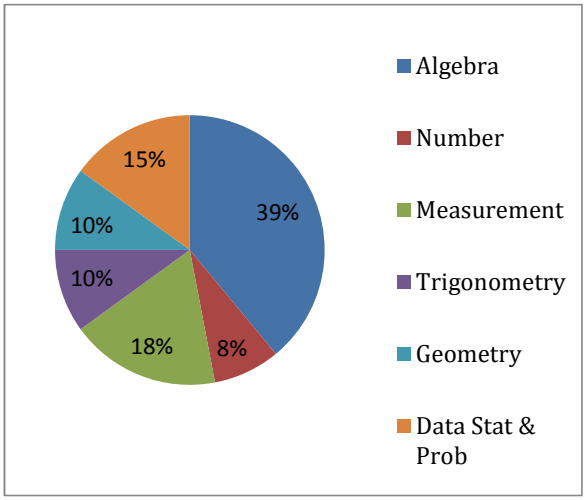


Figure 1.2 Mathematics Test Stands

To study the impact of other external factors and context of the student performance, students responded to English and Mathematics question items contained in the same questionnaire. Those teachers who taught English and Mathematics to the participating students were made to respond to the Teacher Questionnaire designed separately for their respective subjects. The English tests were already piloted in the past years. The piloted tests were then evaluated and the psychometric analysis of the items was quantitatively conducted for its validity and then they were redesigned to a single test paper before the real NEA test administration.

Other support tools included teachers and students tracking forms (STF and TTF) and Test Administrators Form (TAF) designed essentially to monitor and track the numbers of students participating in the assessment and to record the situations under which they participated.

3.3 ADMINISTRATION OF ASSESSMENT TOOLS

A total of 45 test administrators were involved in the test administration for English and Mathematics NEA 2013 in 20 Dzongkhags and 2 Thromdeys. The administrators included officials from BCSEA, DCRD, REC, EMSSD, ADEOs/DEOs snd TEOs/ATEOs. The officials were oriented to the assessment tools for one day. The Orientation included familiarization of Test Manual which highlighted on the conduct of English and Mathematics tests. In addition to this, 3 forms were used. One was the Test Administration Form (TAF) in which the administrators needed to fill in with problems and challenges encountered in the conduct of the tests. The other form was Teacher Tracking Form (TTF) where the test administrators were required to keep the record of all Class X English and Mathematics teachers who responded to Teachers Questionnaire. The final form was Student Tracking Form (STF) which was intended to keep the record of the students who appeared both the tests and Student Questionnaire. The tests administrators were responsible for the smooth conduct of NEA English and Mathematics tests and the questionnaire administration.

3.4 DATA PROCESSING AND ANALYSIS

Three statistical programs/tools were used to analyse the data: Data Query, Statistical Package for Social Sciences (SPSS) and Rasch analysis for its validity and reliability.

Most data were processed in Data Query and the statistical outputs were then processed in SPSS and MS office to validate them. Quest was used especially for Multiple Choice Questions (MCQs) to study the role of distracters in each item and study the discriminative capacity of these items.

Data processed in Data Query was cleaned systematically to correct typographical errors or omissions. The data so cleaned was then transferred to data query language, SPSS and Rasch for processing. Most of the data was processed in Data Language Query and some were processed in SPSS and Quest based on data and usage. Simple regression and cross-sectional analysis were adopted for processing data.

Data extraction was done based on format developed for report writing. This was done in keeping with the factors such as time, validity and proper execution of the data. The reporting was done, following seven major chapters and an executive summary outlining the assessment enquiry questions, major findings and recommendations.

3.5 ETHICAL CONSIDERATION

David B. Resnik, J.D., Ph.D., states the imperative of ethical consideration as follows:

> There are several reasons why it is important to adhere to ethical norms in research. First, norms promote the aims of research, such as knowledge, truth, and avoidance of error. Second, since research often involves a great deal of cooperation and coordination among many different people in different disciplines and institutions, ethical standards promote the values that are essential to collaborative work, such as trust, accountability, mutual respect, and fairness. Third, many of the ethical norms

help to ensure that researchers can be held accountable to the public**.** Fourth, ethical norms in research also help to build public support for research. Ethical lapses in research can significantly harm human and animal subjects, students, and the public.

The study was carried out after obtaining official approval from the concern agency. A prior approval for conducting NEA in the schools was sought from the respective Dasho Dzongda, District Education Officer of the respective dzongkhag administration and the principals from the respective schools as a standard norm to be followed while carrying out the research.

Accordingly, teacher's codes were used for the teacher questionnaire and student index numbers were used for the student questionnaire during the NEA test. Anonymity of all the participants was ensured in all the relevant sections of the report where data were presented. The entire questionnaire and other interview materials were stored in the secured place at BCSEA office after the conduct of NEA test.

No major ethical issues were encountered in the course of the study. The data presentation and dissemination method also ensured that the identities of the NEA participants would not be revealed.

CHAPTER 4

CONTEXTS FOR STUDENT PERFORMANCE IN ENGLISH AND MATHEMATICS

The NEA 2013 provided a lot of data and vital information for the Bhutanese education system. However, this document includes only those that are crucial to the making of this report as embedded where relevant. This chapter outlines findings from student background information, teacher background information, teacher questionnaire, student questionnaire that are of paramount importance to the education process of Bhutan.

4.1. SCHOOLS

Among a total of 114 middle and higher secondary schools in the country, 45 of them participated in the Class X English and Mathematics NEA test 2013. All the twenty Dzongkhags and Thimthrom were covered with at least one school representing each Dzongkhag or Thromdey. There were a maximum of 4 schools participating from larger Dzongkhags. Among the 45 participating schools, 25 of them were MSS, 18 higher secondary schools with one MSS and one higher secondary school representing the private schools. Of the total participating schools, 22 schools were from the urban locations, 3 from semi-urban, 6 from rural, 9 from semi-remote and 5 from remote locations.

Table 1.1: Summary of Participating Schools

Dzongkhag	School Category						Number Of School			No. of Std.
	Urban	Semi-Urban	Semi-Rural	Rural	Semi Remote	Remote	*MSS*	*HSS*	Tot	
Bumthang	2						1	1	2	205
Chukha	2		1		1		2	2	4	581
Dagana			2				1	1	2	232
Gasa		1					1	0	1	51
Haa	1			1			1	1	2	209
Lhuentse				1			1	0	1	66
Mongar	1		2				1	2	3	349
Paro	1			1			1	1	2	330
Peamgatshel	2						1	1	2	312
Punakha	1		1	1			2	1	3	235
S/jongkhar	1				1		1	1	2	215
Samtse					2		1	1	2	246
Sarpang	2						1	1	2	314
Thimphu	2						1	1	2	791
Thimthrom	3						2	1	3	
Trashigang	2				2		2	2	4	446
Trashiyangtse					1		1	0	1	186
Trongsa	1	1					1	1	2	208
Tsirang					1		1	0	1	142
Wangdue	1				1		1	1	2	261
Zhemgang		1		1			1	1	2	170
TOTAL	**22**	**3**	**6**	**5**	**9**	**0**	**25**	**20**	**45**	**5549**

4.2 STUDENTS

Among the 20 Dzongkhags with a total of 5549 student participants, Chukha Dzongkhag had the highest number of students of 581 with Trashigang Dzonghag closely following with 446 students participating in the assessment. Gasa and Lhguentse Dzongkhags had the least number of students with 51 and 66 respectively participating in it.

Though there were more middle secondary schools (25) participating in the assessment, the 20 higher secondary schools had more students of 2743 participating compared to 2719 middle secondary school student participants. A higher secondary and a middle secondary school, together representing the private schools in the NEA 2013, had a total of 87 students.

Table 1.2: Number of Participants Type of Schools and Gender

School Type	English Test			Mathematics Test			Student Questionnaire		
	M	**F**	**T**	**M**	**F**	**T**	**M**	**F**	**T**
Higher Secondary School	1296	1399	2695	1321	1432	2753	1313	1430	2743
Middle Secondary School	1348	1394	2742	1344	1397	2741	1341	1378	2719
Pvt. School	45	41	86	45	42	87	45	42	87
Total	**2689**	**2834**	**5523**	**2710**	**2871**	**5581**	**2699**	**2850**	**5549**

Of the three assessment tools administered for the assessment, Mathematics Test was attempted by the maximum number of students, followed by Student Questionnaire (5549). The English Test was attempted by the least number of students of only 5523. For the sake of data analysis and report, the number of students that responded to the students questionnaire, that is 5549, has been used as the difference between the number of students that responded to it and the numbers attempting either of the two tests was not significant.

4.2.1 BACKGROUND INFORMATION

In the group of 5549 students there were slightly more girls (2850) than boys (2699). The 5549 student respondents were mostly in the age group of 15-18 years (72.93%), followed by that of 18-21 age groups with 20.51 %. There were significantly a less number of students in other age groups. A total of 47 students (0.85%) did not mention their age group.

Table 1.3: Student Respondents by Age Group

Age-Group	**Male**	**Female**	**Total**	
			NO.	**PERCENT**
12-15 Years	92	164	256	4.61%
15-18 Years	1828	2219	4047	72.93%
18-21 Years	713	425	1138	20.51%
21+ Years	45	16	61	1.99%
Non respondents	21	26	47	0.85%
Total	**2699**	**2850**	**5549**	**100%**

More than 50% of the parents of the Class X students of 2013 were farmers, while significantly very less number of the parents were in each of the other fields of occupation. More mothers of these students tended to be farmers than fathers, whereas more fathers were

in the government service than mothers. An almost equal number of fathers and mothers were in the business sector.

Table 1.4: Student Respondents by Parental Occupation

FATHER'S OCCUPATION			MOTHER'S OCCUPATION		
Occupation	TOTAL	PERCENT	Occupation	TOTAL	PERCENT
Farmer	2805	50.55%	Farmer	3094	55.76%
National Work Force	34	0.61%	National Work Force	44	0.79%
Government Servant	860	15.50%	Government Servant	230	4.14%
Business	480	8.65%	Business	458	8.25%
Armed Force	381	6.86%	Armed Force	10	0.18%
Ngo	40	0.72%	Ngo	42	0.76%
Corporation	110	1.98%	Corporation	23	0.41%
Local Governance	40	0.72%	Local Governance	9	0.16%
Parliamentarian	49	0.88%	Parliamentarian	12	0.22%
Religious Personnel	81	1.46%	Religious Personnel	14	0.25%
International Organization	7	0.13%	International Organization	2	0.04%
Private Employee	268	4.83%	Private Employee	62	1.12%
Others	134	2.41%	Others	849	15.30%
Non-Respondents	260	4.69%	Non-Respondents	700	12.61%
TOTAL	**5549**	**100%**	**TOTAL**	**5549**	**100%**

The majority of the 2013 Class X cohort spoke Tshanglakha (25.90%), Dzongkha (23.14%) and Lshotshamkha (18.83%) at home, while less number of these students were from other languages speaking homes.

Table 1.5: Respondents by Language Spoken at Home

LANGUAGE	TOTAL	PERCENT
Dzongkha	1284	23.14%
Tshanglakha	1437	25.90%
Lhotshamkha	1045	18.83%
Kurtoepkha	404	7.28%
Bumtabkha	168	3.03%
Khengkha	453	8.16%
Others	661	11.91%
Non-Respondents	97	1.75%
Total	5549	100%

Almost half (2635 or 47.89%) of the students who participated in the program had been studying in their current schools for 1-3 years, while 40.62% of them had been studying in their current schools for more than 3 years with only 11.49% had been studying there for less than one year.

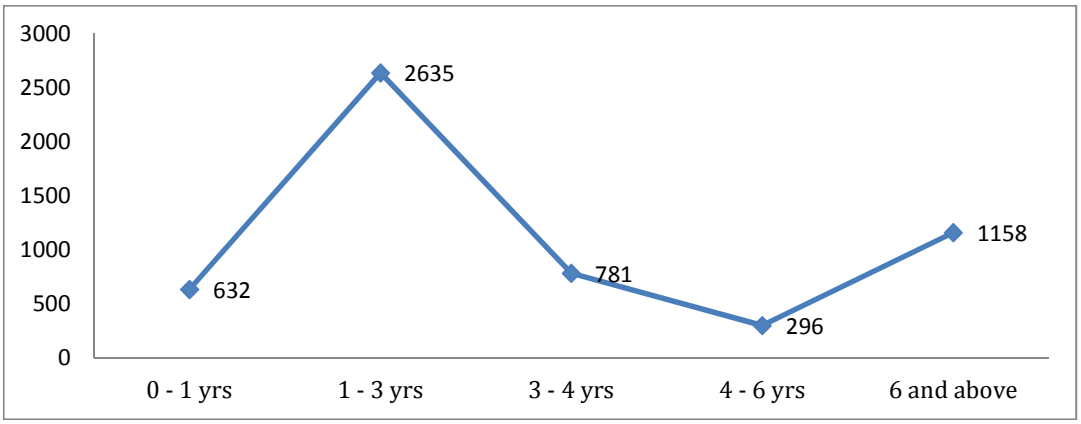


Figure 1.3: Number of years in the present school

There were, more or less, an equal number of students in boarding (2736 or 49.31%) and day-schools (2758 or 49.70%). A slightly less number of girls were found in boarding schools, while significantly more girls (53.52% of the total day-scholars) were day-scholar students.

Table 1.6: Day-scholars and Boarders

Category	Male	Female	Total	Percent
Boarder	1386	1350	2736	49.31%
Dayscholar	1282	1476	2758	49.70%
Non-Respondents	31	24	55	0.99%
Total	**2699**	**2850**	**5549**	**100%**

Among the students who attended their schools as day-scholars, maximum stayed with their parents (2498), rest of them stayed with their relatives such as sisters (2820, brothers (188), aunts (137), uncles (123), other relatives (319) and very few of them stayed with their friends and grandparents. Those day-scholar students had to walk various distances to reach their schools: 3227 of them walked for 30 minutes or less, 695 for 30 minutes to 1 hour, 205 for 1-2 hours, 84 for 2-3 hours and 100 of them for more than 3 hours to their schools. A huge number (1236) of the student participants did not respond to this item.

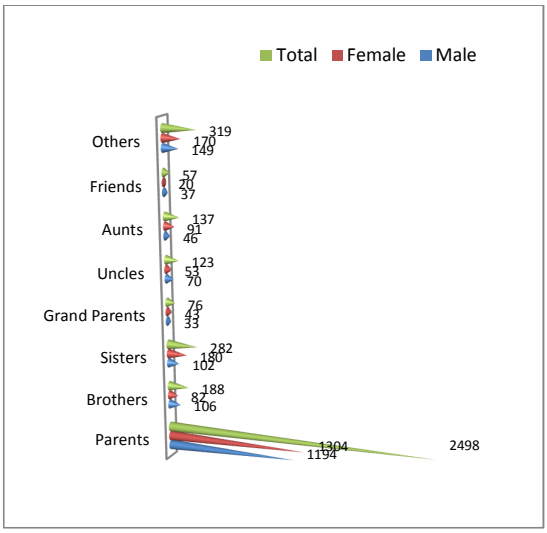


Figure 1.4: Day-scholars staying guardians

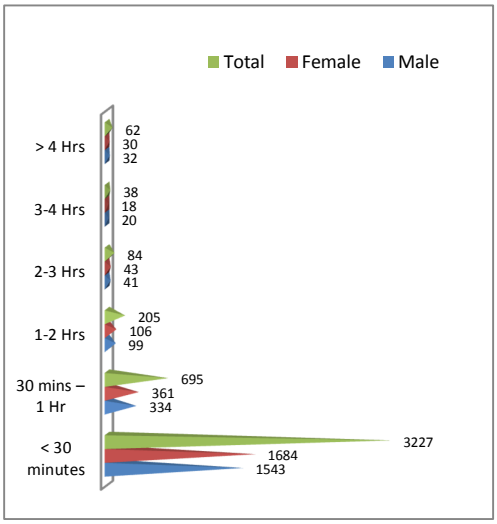


Figure 1.5: Day-scholars by walking distance to school

4.2.2 STUDY HABITS AND SUPPORT

The student participants were asked to provide information on their study habits, support for their studies from schools and parents and the enabling conditions for study at both schools and homes. The responses they provided to these items were interestingly varied as indicated by the details that follow.

Their responses indicated that very few of the Class X students study under 30 minutes (476) in a day. Almost all the students did an independent study of 30 minutes to more than 3 hours per day. The maximum (1592) of this category of students studied for 1-2 hours, followed by 1306 who studied for 2-3 hours and 972 for more than 3 hours a day. The responses also invariably indicated that the Bhutanese parents are hugely concerned about study of their children studying in Class X. There 4651 (N=5549) students who claimed that their parents were always concerned about their study, while comparatively very less of the parents seemed to be often (296), sometimes (4220) and never (42) concerned about their children's study.

Table1.7: Hours of Independent Study and Parental Concerns for Children's Study

Hours of Independent Study				Parental concerns on study			
Study Time	Male	Female	Total	Degree of concern	Male	Female	Total
< 30 mins	241	235	476	Always	2244	2407	4651
30 min – 1 Hr	520	520	1040	Often	161	135	296
1-2 Hrs	795	797	1592	Sometimes	199	223	422
2-3 Hrs	597	709	1306	Never	26	16	42
>3 Hrs	472	500	972				

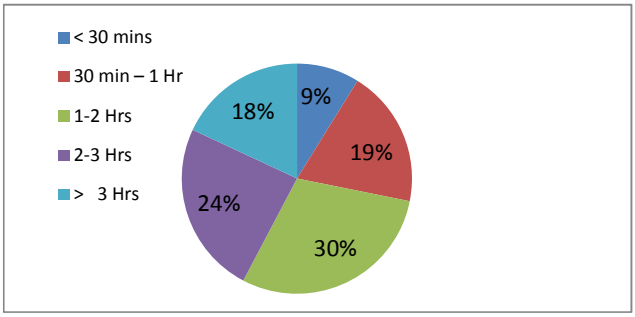


Figure 1.6: Hours of independent study

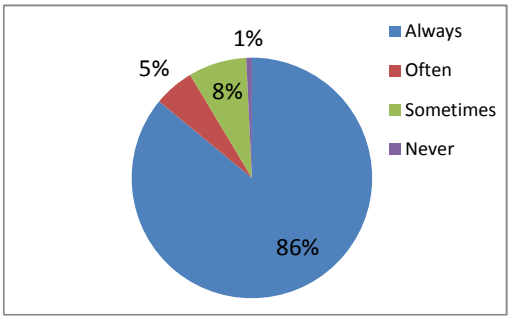


Figure 1.7: Parental concerns on study

The parents of Class X students in Bhutan also seemed to support their children in their studies. More than half of the parents always (3864 or 69.63%) provided the support, 511 often and 806 sometimes provided their children with the study support, while only 178 of the parents never provided the support.

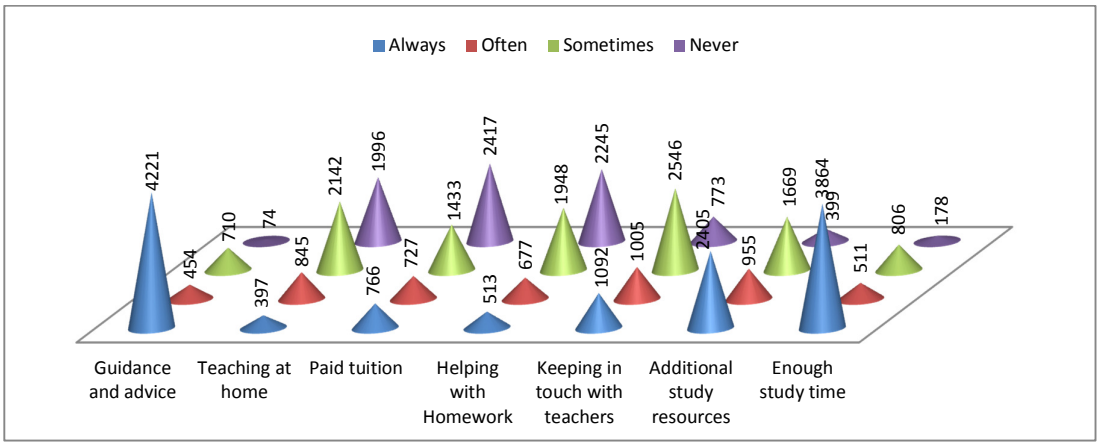


Figure 1.8: Parental support for children's study

The 2013 cohort of Class X students was highly positive about their school ambience. Of the total, 69% (3769) felt their schools to be enjoyable and 20% (1099) felt them to be caring, while only 353 were of view that their schools were boring and 255 of them found them even frightening.

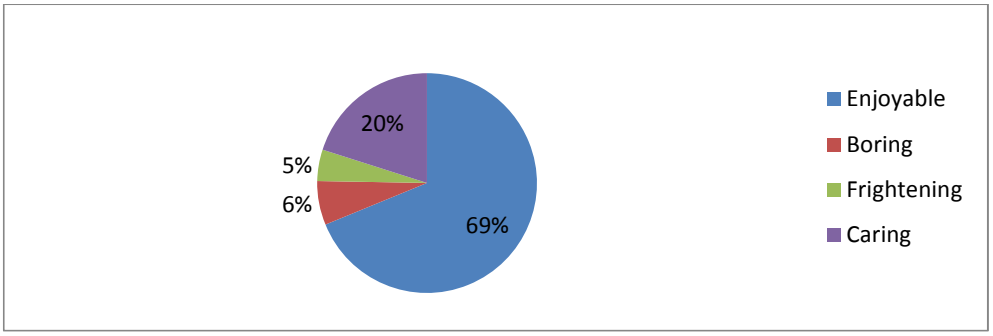


Figure 1.9: School ambience

Similarly, the students were of the view that their schools were supportive of their studies and provided various study supports to them. A lot of these students reported that their schools *always* provided them with remedial classes (1539), additional study measures (1749), guidance and advice (4342), access to learning materials (2112) and conducive learning environment (2029). There were other students who felt that their schools *often* supported them with remedial classes (1115), additional study measures (1271), guidance and advice (533), access to learning materials (1219) and conducive learning environment (1197). Other large groups claimed that the schools could support them only *sometimes* with remedial classes (2648), additional study measures (2201), guidance and advice (559), access to learning materials (1913) and conducive learning environment (1949). However, there were

students, though fewer, who felt that they were *never* given the support with remedial classes (195), additional study measures (252), guidance and advice (63), access to learning materials (229) and conducive learning environment (289).

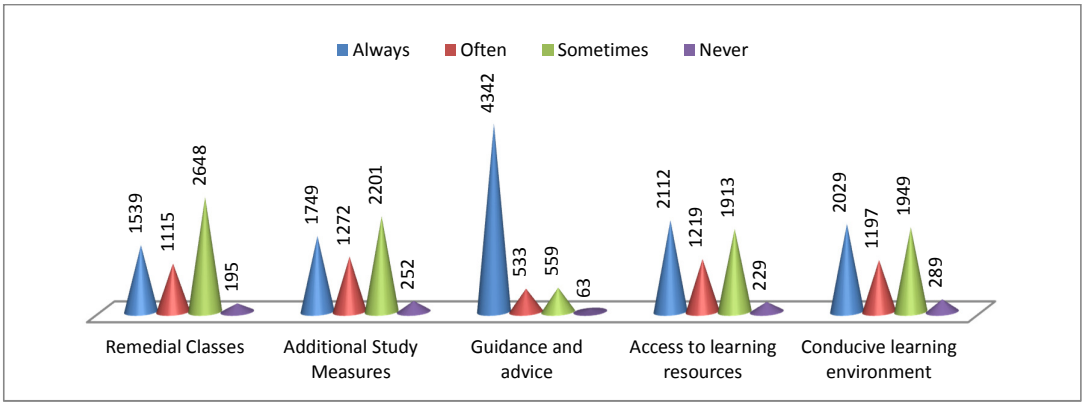


Figure 1.10: School support for study

4.2.3 ENGLISH LEARNING

To be able to understand the context of student achievements in Class X English, the participating students were required to provide information on how English was taught and learned in their schools. They were made to report about their study habits, reading and writing practices and about the home works and assignments they were given and assessed by their teachers. Their responses on these areas provided numerous information that was useful in drawing important conclusions about their learning achievements in English.

4.2.3.1 ENGLISH LEARNING PRACTICES

Most (2247) of the students seemed to spend 30 minutes to 1 hour on independent study of English a day. Quite a lot of them studied English for only less than 30 minutes, while a significant number of the students studied it between 1 to 2 hours a day. Very few studied the subject beyond 2 hours (218).

Table 1.8: Hours of independent study and frequency of English homework assignment & correction

Hours of independent study of English				English homework		
Hours of English study	Male	Female	Total	Frequency per week	Given	Corrected
< 30 mins	889	749	1638	Daily	802	571
30 mins – 1 Hr	1060	1187	2247	3-4 times	1840	930
1-2 Hrs	563	693	1256	2-3 times	1274	946
2-3 Hrs	133	172	305	1-2 times	1182	1491
>3 Hrs	43	46	89	Once	371	1310
				Never	68	285

As per their responses as seen in the details given above, there seemed to be some discrepancies between the English homework assigned to them and corrected by their teachers where those who reported of getting frequent homework also reported of getting their works corrected less in a week. For instance, a total of 1840 students were said to be assigned 3-4 times of English homework per week but, only 930 reported that their works

were checked 3-4 times a week. On the contrary, only 371 students said that they were given English homework only once a week and yet 1310 students claimed that their home works were corrected once a week only. Quite a handful (802) of them claimed getting English homework on a daily basis and 571 of getting them corrected by teachers daily, while 68 and 285 denied of being given any homework and getting any homework corrected respectively in a week.

The students' report on the type of feedback they were given on their homework was mostly positive where comparatively only smaller numbers complained of *never* getting feedback in the form of grading (588), verbal comments (866), written comments (762) and class discussions (306). However, majority of them reported that they were *sometimes* provided with feedback in grading (3079), verbal comments (3217), written comments (3371) and class discussions (1893). Other groups of students more positive on the teacher feedback on their home works; they reported of *always* getting grading (1720), verbal (1292), written (1271) and through class discussion (3211).

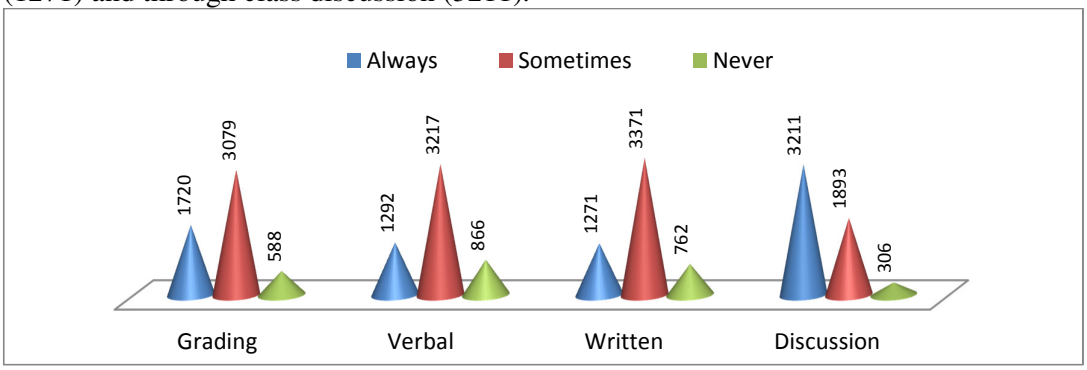


Figure 1.11: Types of feedback on homework

The students reported of practising reading (4028), writing (3725) and use of dictionary (3833) only *sometimes* in their English classes which seemed very normal. However, comparatively, lesser numbers of the students said they did reading (1368), writing (1603) and dictionary use (1458) practices *daily* while, some insignificant groups of the students claimed that they never did reading (126), writing (187) and dictionary use (219) practices in their English classes.

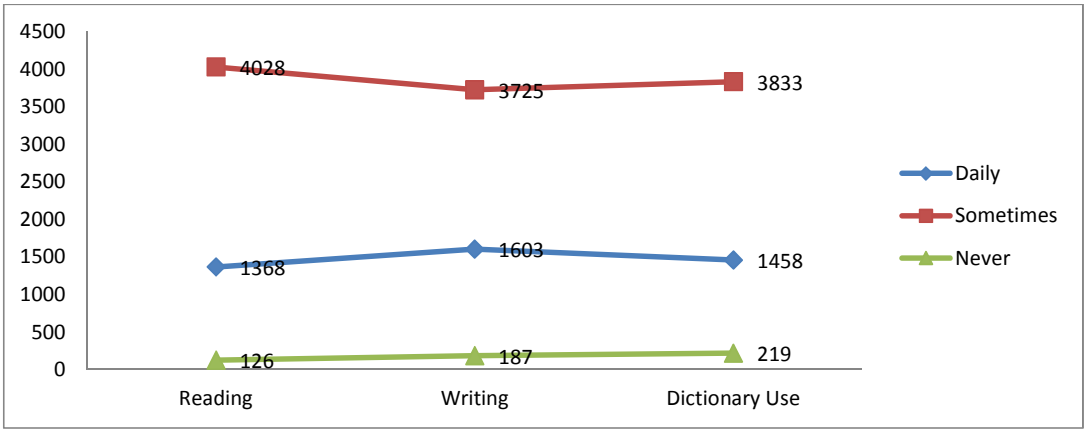


Figure 1.12: Reading and writing practice in English class

On their reading habits, most students (1685) read two books, followed by 1333 having read more than three books and 1314 three books and 976 reading only one book in a month, while 227 of them having not read any book in a month. More female students seemed to have read more books than male students.

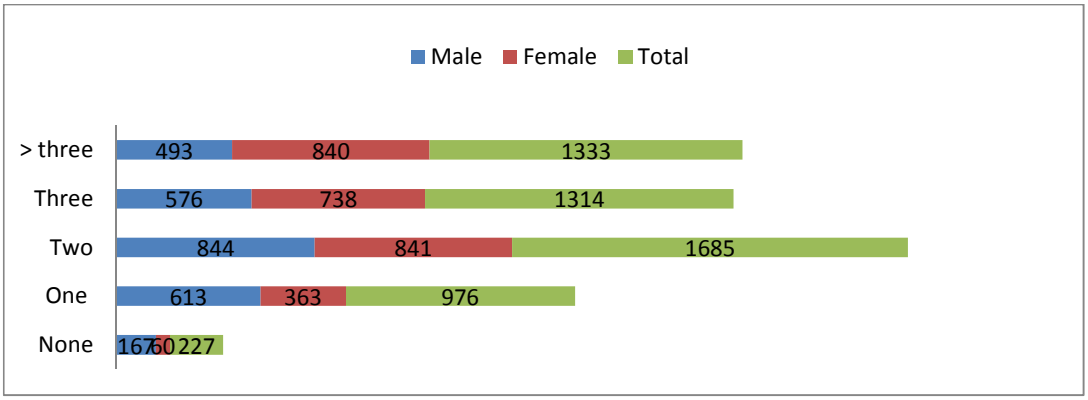


Figure 1.13: Number of books read per month

About 1000-3000 of the Class X students of 2013 cohort seemed to have *always* read more story books, novels, folktales, essays and newspapers than any other types of reading. However, more than 2500 and close to 4000 students claimed to have read all categories of books *sometimes*. Still, however, there were about 1000-2000 students who *never* read journals, newsletters, comics, biographies and science fictions.

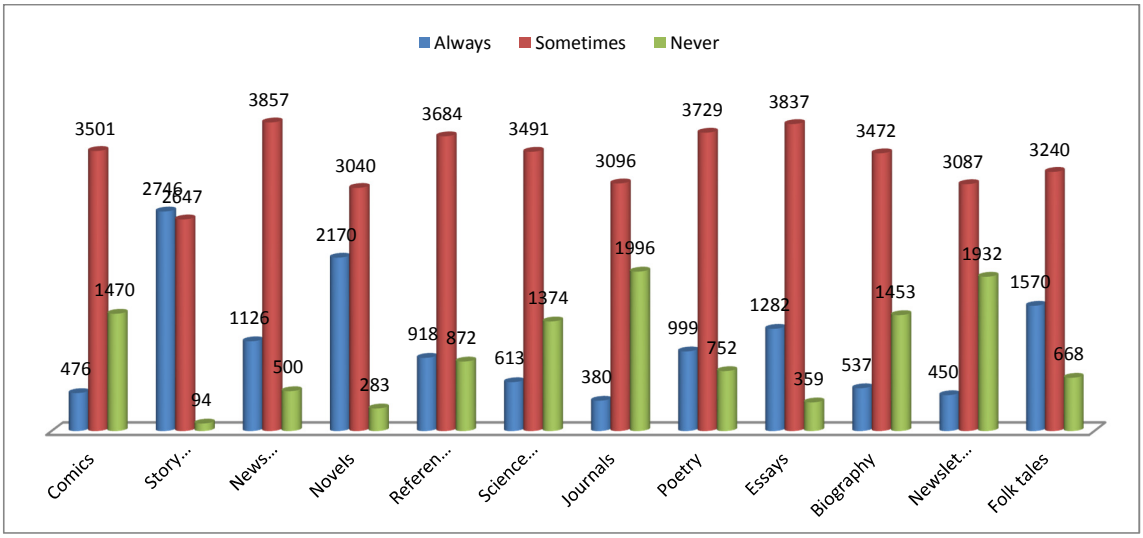


Figure 1.14: Reading types of books

4.2.3.2 STUDENT ATTITUDES AND PERCEPTIONS ABOUT ENGLISH SUBJECT AND TEACHERS

Students held certain values, attitudes and perceptions about their teachers and the subjects taught to them. These values and perceptions were mostly positive with only a few holding some pessimism.

For instance, 87.51% (4856) of the Class X students liked the English subject while, only 536 of them disliked it. Comparatively, more girls appeared to like the subject than boys. The primary reason for their liking the English subject was because it was interesting (2677). Some liked the subject because of the interesting teaching (1327) and others liked it as their teachers were good (826), while very few liked it because it was an easy subject (91). However, those very few who did not like the subject said that it was because the subject was difficult, there was too much to learn in it and also as the teaching was boring. Still very insignificant number of them thought that their teachers were not good and the subject itself was boring.

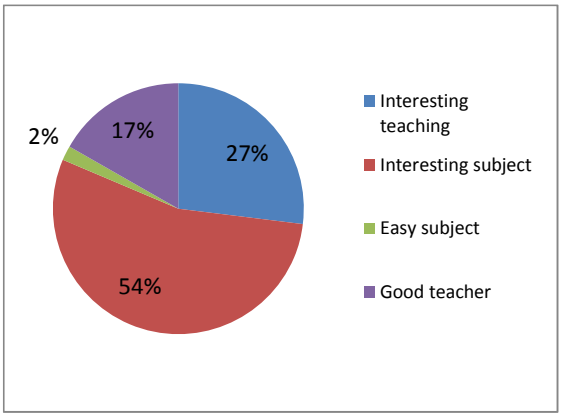


Figure 1.15: Reasons for liking English

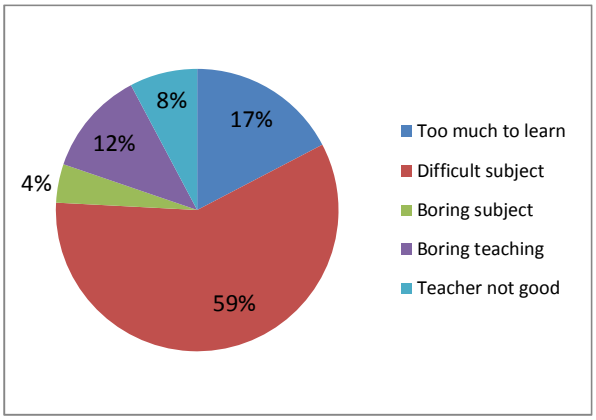


Figure 1.16: Reasons for disliking English

Although almost all of them appeared to like the English subject, almost an equal number of these students faced difficulties in speaking (2431) and writing (2267) skills compared to listening (477) and reading (258). A slightly more girls felt speaking was a difficult skill than boys, while slightly more boys found writing difficult as compared to girls.

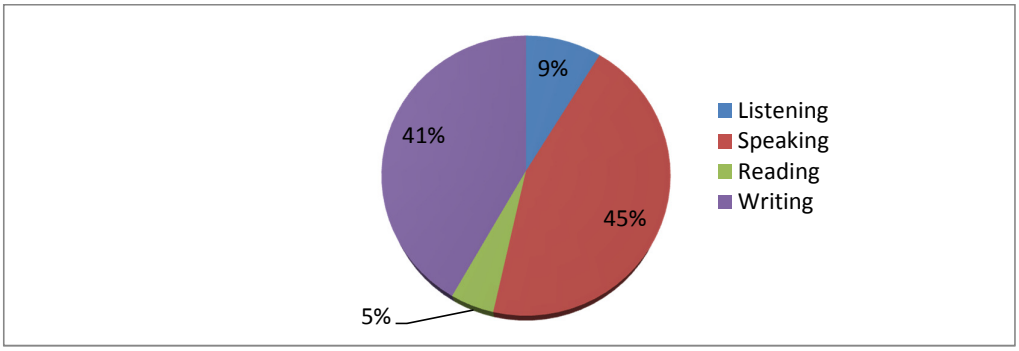


Figure 1.17: Learning difficulty among English language Skills

Among the various aspects of English learning, grammar topped the children list of importance of English learning. Out of the 5549 students, 5057 felt that grammar was very

important among all aspects of English learning. Second on the list was reading (very important = 4047), followed by writing (i.e = 3852), dictionary use (3759), literature (3178) and composition (1470) with comprehension (997) at the bottom of the preference list of very important aspects of English learning. However, their list indicated that all aspects of English learning were important. Whereas, comprehension (187) was at the top of the children's not important list of the aspects of English followed by composition (98).

Table 1.9: Importance of aspects of English learning

	Grammar	Writing	Reading	Composition	Comprehension	Literature	Dictionary use
Very important	5057	3852	4047	1470	997	3178	3759
Important	375	1542	1279	3008	2899	1934	1327
Fairly important	50	89	159	912	1394	340	369
Not important	21	16	12	98	187	44	43

The students also expressed their opinions about their teachers and context of literature that they would prefer to learn from and read about respectively. While the maximum of the students preferred Bhutanese (3589) English teachers, quite a many of them did not have any preference (1532) between Bhutanese and also preferred non-Bhutanese English teachers. However, a handful of them also had a preference for non-Bhutanese teachers (411).

On the contexts of literature they would prefer to read about, the majority of the students voted for the literature on Bhutanese (4148) context and only 1208 for that of the western context. There were still very minimal who preferred to read literature on Indian context (159).

Table 1.10: Preferences for English Teachers and Context of English Literature

Preference for English Teachers				Preference for context of literature			
English Teacher	Male	Female	Total	Context	Male	Female	Total
Bhutanese	1732	1857	3589	Bhutanese	1966	2182	4148
Non-Bhutanese	228	183	411	Indian	84	75	159
Any	729	803	1532	Western	629	579	1208

4.2.4 MATHEMATICS LEARNING

The students also provided information on their Mathematics learning practices both at home in schools. In this context and similar to that of English learning, the maximum students did an independent Mathematics learning for 1-2 hours followed by those who studied for 30 minutes to 1 hour (1218) and those who did for 2-3 hours. There were very few of them who studied for more than 3 hours (590) or less than 30 minutes (879).

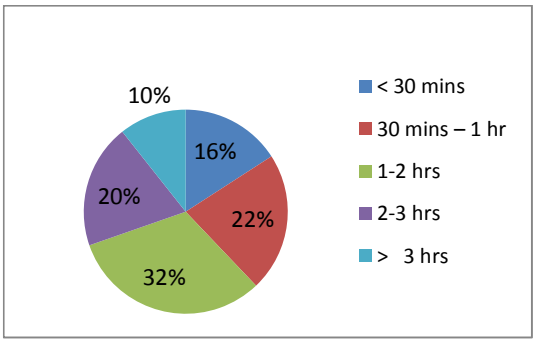


Figure 1.18: Hours of independent study of Mathematics

In the context of Mathematics homework assigned to them and corrected by teachers, most of the students were assigned it on daily basis (3642). There were 1157 students, who said they were given the homework in the subject 3-4 times a week whereas, very less number of students claimed that Mathematics homework was given less than 3 times a week. There was an insignificant number of students who said that they were never (19) assigned Mathematics homework in a week. However, compared to the assignment, homework correction done by teachers on daily basis (1263) was less. The data also indicated contrastingly that more correction of homework was done by the teachers than the homework given to students. A small (271) group of students claimed that their home works were never corrected in a week.

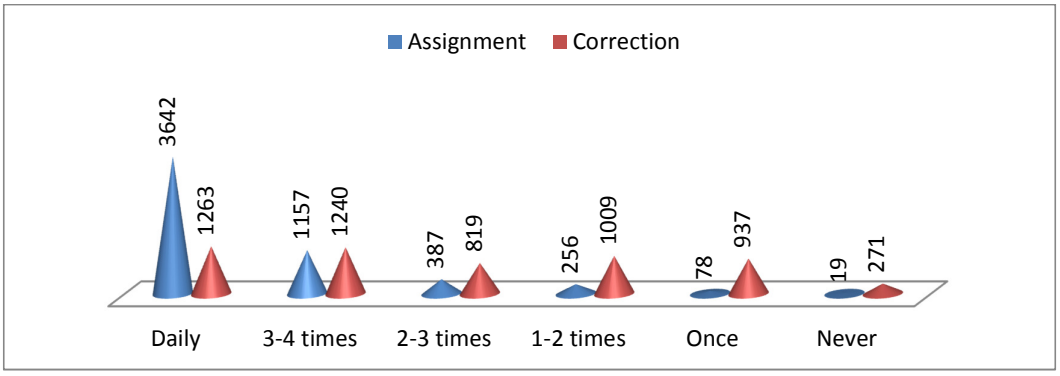


Figure 1.19: Frequency of Mathematics homework and correction

4.2.4.1 STUDENT ATTITUDES AND PERCEPTIONS ABOUT MATHEMATICS SUBJECT AND TEACHERS

While majority of the students liked (3611) the Mathematics a subject, there was a significant number of them who disliked (1415) it. The subject was liked by most of the students mainly because it was interesting (2341) and some liked it for the interesting teaching (832). There were less of them who liked the subject due to the good teachers (509) and the subject being easy (203). Many students did not like the subject because of the subject being difficult (1233) and as there was too much to learn (284) in it. There were also very few who disliked the subject because of the boring teaching (89), bad teacher (78) or the subject itself being boring (71).

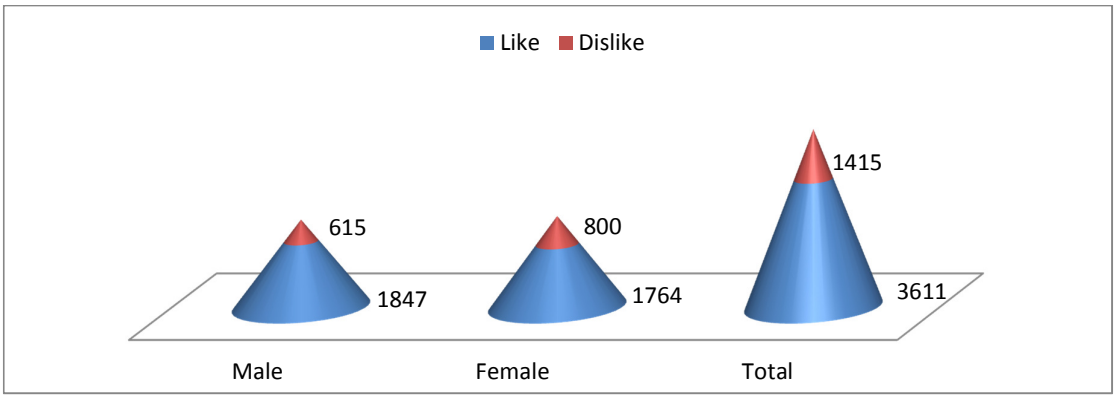


Figure 1.20: Liking of Mathematics subject by gender

Table 1.11: Reasons for liking and disliking Mathematics

Reason for liking Mathematics				Reason for disliking Mathematics			
Reason	Male	Female	Total	Reason	Male	Female	Total
Interesting teaching	388	444	832	Too much to learn	142	142	284
Interesting subject	1233	1108	2341	Difficult subject	492	741	1233
Easy subject	129	74	203	Boring subject	42	29	71
Good teacher	224	285	509	Boring teaching	53	36	89
				Teacher, not good	45	33	78

The students also expressed their views on how they found the various topics in Mathematics. The easiest topic in Mathematics for the Class X of 2013 cohort seemed to be Geometry (1536) and Algebra (1503) followed by trigonometry (1386), mensuration (985), statistics (790) and commercial arithmetic (608). On the other hand, most students found commercial arithmetic (3399) the most difficult while the other topics were of the same difficulty for about 1000 to 2000 students. Geometry, algebra and also trigonometry seemed to be the most interesting Mathematics topics compared to others. For some students, though less in number, the topics mentioned were found to be boring as well.

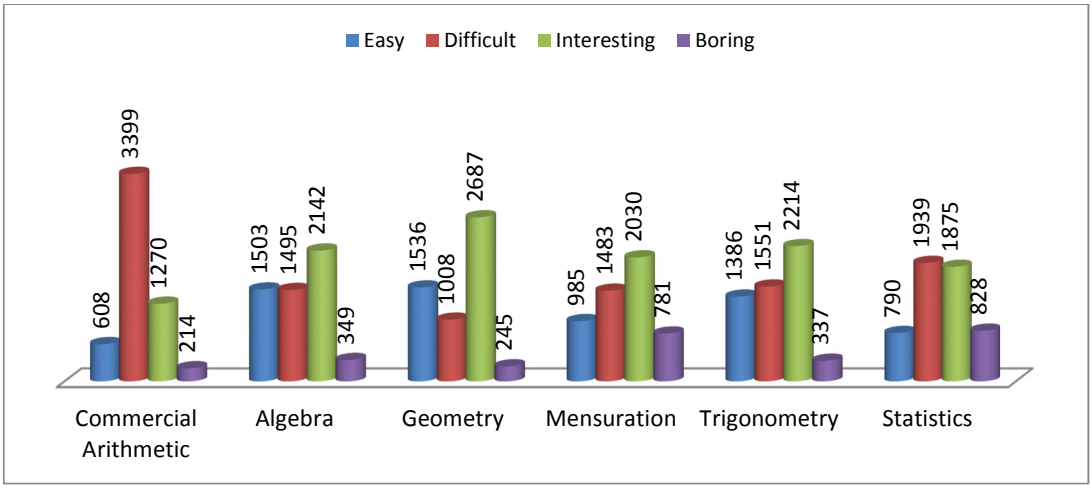


Figure 1.21: Students perception on Mathematics standards

Their preference for teachers was more for the Bhutanese teachers (2820) compared to the non-Bhutanese ones. However, there was a significant number of them who had no preference (1616) between the nationalities of teachers.

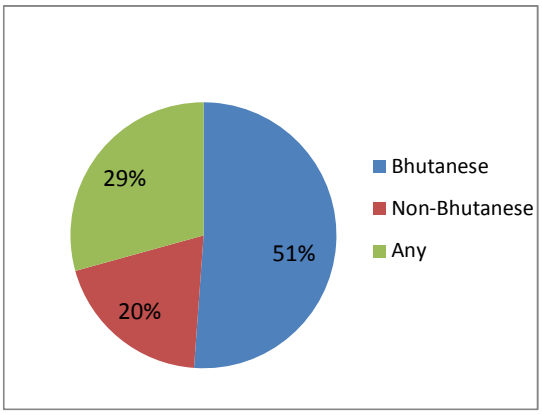


Figure 1.22: Preference for Mathematics teachers

4.2.5 GENERAL TREND AND PERCEPTIONS IN TEACHING-LEARNING PROCESS IN SCHOOLS

The Class X students of 2013 cohort had the opportunity to express their views and perceptions on the trend of teaching-learning process in schools. They made their observations and reflections on the teaching-learning activities taking place in their schools. They also expressed their opinions on which subjects they liked or disliked.

In this regard, the children reported that teaching-learning activities such as quizzes, debates and lectures always happened in their English classes. Extended activities and group work also often took place during English classes. However, project work, presentations and project works were among the activities that never happened. Independent work, role play and self-assessments were also the activities that rarely happened in their English classes. The least among the activities that always happened, often happened, rarely and never happened were presentations and debates.

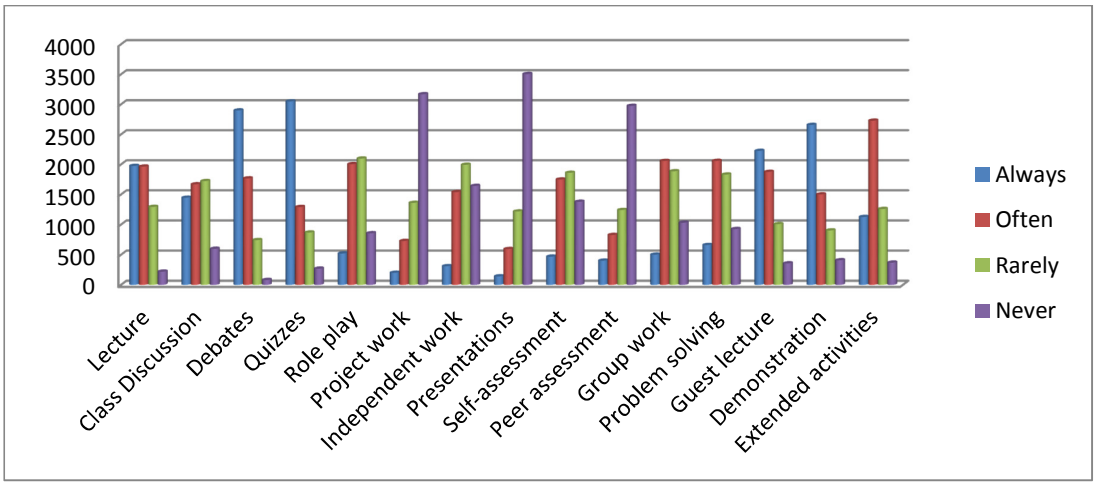


Figure 1.23: Types and frequency of learning activities in English class

In Mathematics classes, however, self-assessment was the only activities that always took place and the other activities were rated as not happening always. There were other activities which were reported to be happening but less often and also rarely. Among the activities that never happened, demonstration and peer assessment topped the list in the Mathematics classes. The least among the always happening, often happening, rarely happening and never happening in Mathematics were group work and self-assessment.

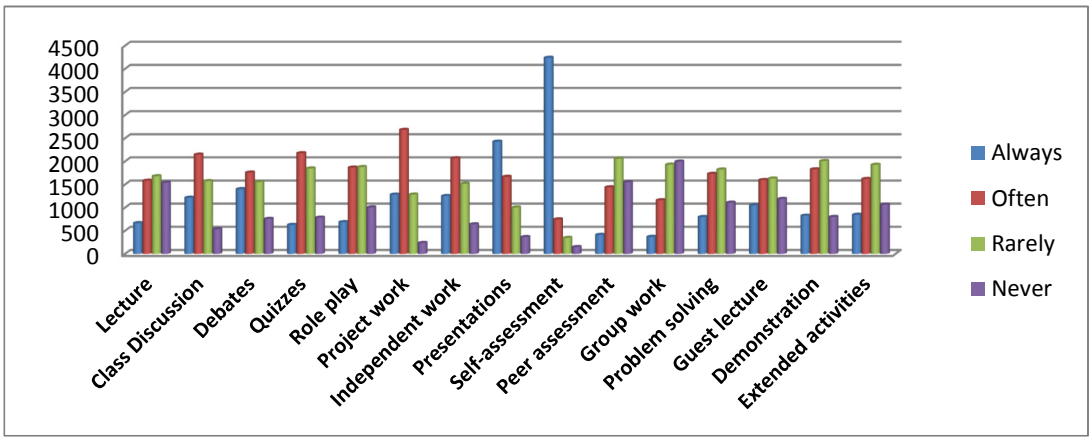


Figure 1.24: Types and frequency of learning activities in Mathematics class

Among these teaching-learning activities, most popular among students seemed to like quizzes, debates, role play and extended activities. They also often liked demonstrations, guest lectures and group work. Class discussion, lecture and group work were among the rarely liked activities in English classes. Presentations, peer assessment and project work were the least liked activities.

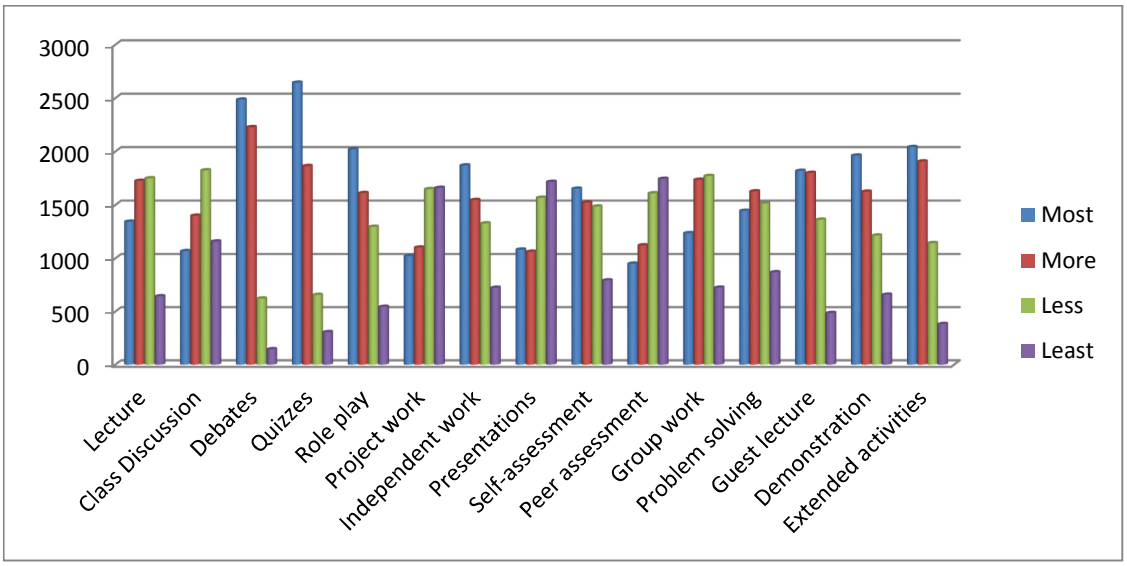


Figure 1.25: Liking for learning activities in English class

In Mathematics classes, self-assessment, presentations and independent works were the most liked activities. The students did not have much preference over the activities among the more liked activities. There were, however, a significant number of them who liked peer assessment, group work, role play and quizzes less. There were a very less number of students who had the least liking for the mentioned activities.

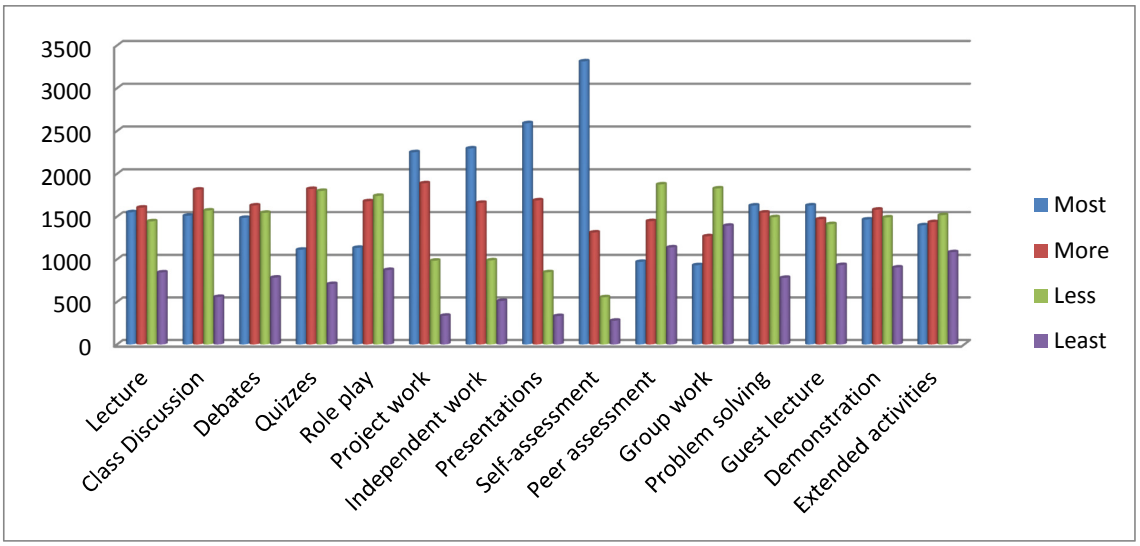


Figure 1.26: Liking for leaning activities in Mathematics class

As for their liking for the subjects taught in Class X, Dzongkha was the most liked subject of all among the cohort followed by English, History/Civics and Economics. Among the more liked subjects again appeared Hostory/ Civics closely followed by Biology, Chemistry and Mathematics and . The less liked subject was Physics and Mathematics closely following it.

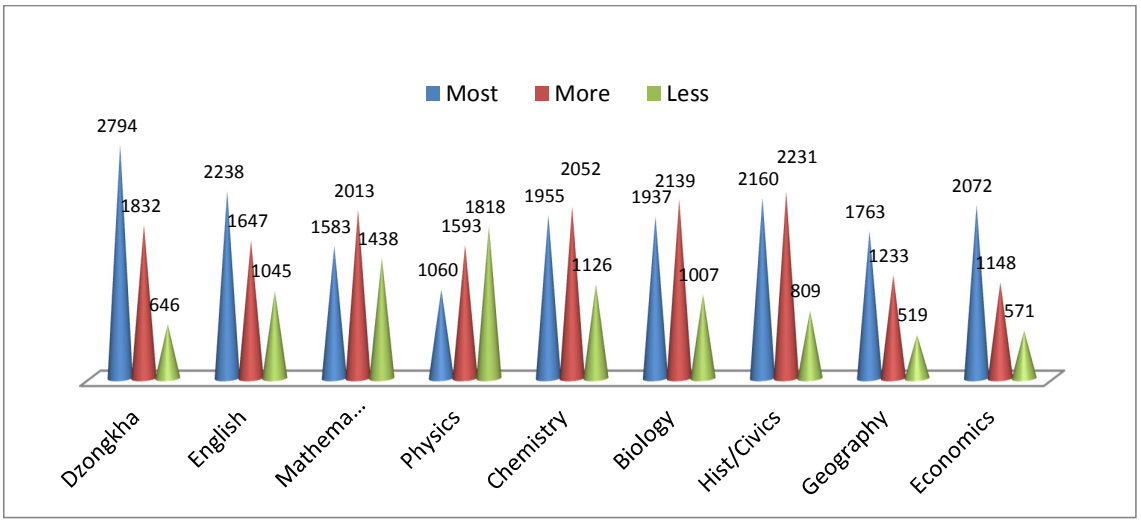


Figure 1.27: Students liking over different subjects

4.3 TEACHERS

Separate teacher questionnaires were administered among the English and Mathematics teachers who were teaching the two subjects to the Class X students who participated in the NEA 2013 in the 45 selected middle and higher secondary schools. The questionnaires were responded by a total of 167 teachers, 95 males and 70 females, corresponding to 56.88% and 41.92% respectively. In particular, there were 83 teachers who responded to the English Teacher Questionnaire which among them, 44.58% (37) were males and 54.22% (45) were females. Among the 84 teachers who responded to the Mathematics Teacher Questionnaire, 58 (69.05%) were males and 25 (29.76%) were females.

4.3.1 CLASS X ENGLISH TEACHERS

A total of 83 English teachers, 37 males and 45 females, responding to the English Teacher Questionnaire were mostly in the age group of 21-30 years (38) and 31-50 (38) years.

4.3.1.1 QUALIFICATION AND TEACHING EXPERIENCE

Based on their academic qualification, the teacher respondents consisted of 29 Class XII graduates, 47 Bachelor Degree holders and seven Master's Degree holders. The majority of these teachers held B.Ed (51) level professional qualification, while 27 of them held PGCE/PGDE professional qualification.

Most (35) of these teachers had put in 5-10 years of teaching experience, with 25 of them having taught for 1-5 years and 12 of them having completed 10-15 years in the teaching profession. There were six teachers with teaching experience of below one year. Similarly, the number of teachers with more than 15 years of experience was not more than five.

These English teachers had spent between 1-15 years in the schools where they were currently teaching, with 38 of them having spent 1-5 years, 30 of them having spent 5-10 years, 10 below one year and five of them having been in that same school for the last 10-15 years. These teachers have had taught English for a varying number of years with 34 of them having taught it for 1-5 years, 25 of them for less than one year, 15 of them for the last 5-10 years and eight of them for 10-15 long years.

4.3.1.2 ENGLISH TEACHING-LEARNING TRENDS IN SCHOOLS

Most English teachers spent a maximum of 2-4 hours on lesson planning and 1-4 hours on preparing project works for their students, on top of teaching the four strands of English. Majority of the English teachers spent, on average, 3-5 hours on teaching each of the four strands. Of the four strands, most teaching time was spent on Reading and Literature and comparatively less on Listening and Speaking.

Classroom discussions, closely followed by text books and additional exercises and group work were the most dominant mode of strategy used in the teaching of English. Excursions were never used in the teaching of the subject, while debates, quizzes, project work and lectures were used mostly.

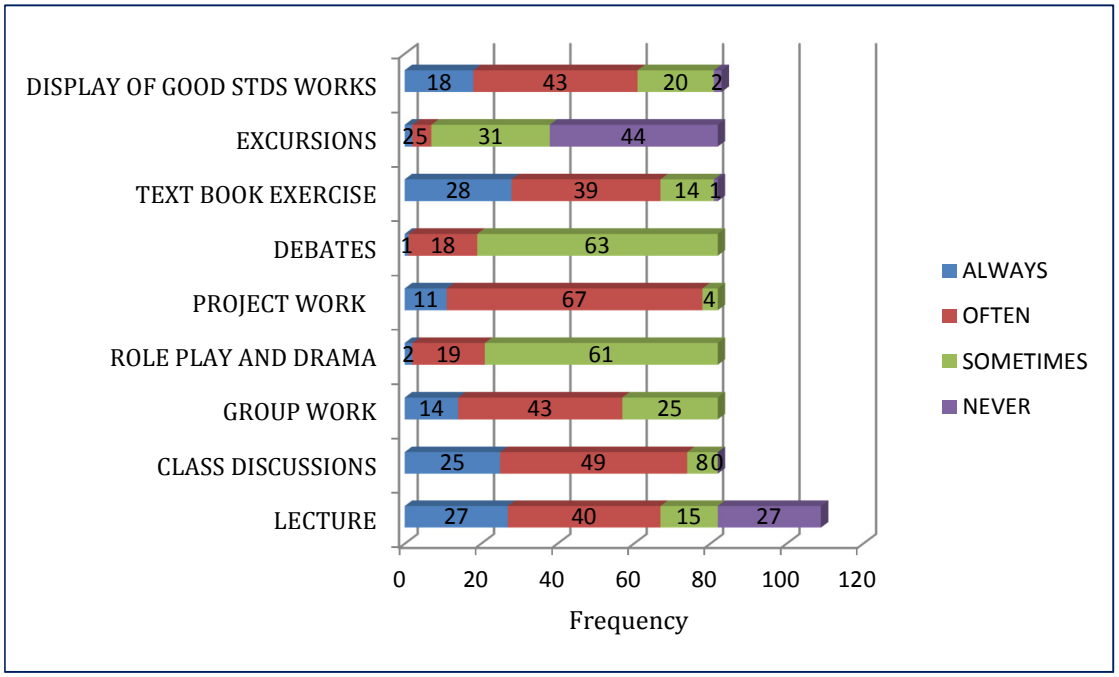


Figure 1.28: Activities carried out by English teachers

The indication was that teachers were either not familiar with the use of some of these methods or some of them were not feasible for use.

Comparatively, majority of the English teachers used Test Books and Teachers' Manual as their reference for effective teaching. They made very less use of magazines, newspapers and journals. This could be either because of non-availability of such resources or lack of

knowledge to use them in the teaching learning process. Audio-visual aids which may have been otherwise very useful in the teaching of English was rarely used.

Maximum (71) of the teachers out of 83 responded that home works were assigned 1 to 3 times a week. Majority of them assigned home works 2 times a week. Out of them, 46% corrected student works once a week and 66% of them corrected 1 to 2 times a week. Of the total, 97% of the respondents claimed that feedback was provided on student works.

Providing feedback, whether verbal or written, on student homework is considered very useful for the student learning. Of the three types of feedback, written comments were used the most and the least used was grading. Feedback through discussion was also quite dominant as 65 respondents claimed to have used it mostly or often times.

The English teachers also encountered some hindrances to effective teaching of English. They felt that English teaching could be more effective if the classes were not hampered by other activities such as holidays and ad-hoc programmes.

Some of the teachers found the maintenance of student portfolios to be a tedious task. Student performance in English, according to these teachers, seemed to be hampered by lack of a strong culture (habits) of reading among students in their early learning stages with parental support. Evaluation and assessment techniques (framework) in schools needed an improvement.

4.3.1.3 CURRICULUM ISSUES IN CLASS X ENGLISH

Around 86% of the teachers reported that the content (quantity) of English syllabus was just right, and also 77 % of them were of the view that the period allocation for English was adequate. However, still quite a significant number (20%) of them found it inadequate considering the vast syllabus and large class size.

Around 66% of the teachers found that teaching of English was easy and 39% found that the syllabus content of English in terms of quality was also good.

However, the English teachers expressed specific views on the existing English curriculum. The novel, 'The Giver,' was found very abstract and difficult for their students to understand. The context of 'The Giver' seemed socially and culturally alien to the Bhutanese students. The Reading and Literature texts had inadequate contents (topics) with good morals.

Teacher guidebooks (references) for teaching of essays and poems lacked appropriateness and relevance. Teaching of essays and poems, otherwise, seemed to provide good experiences to teachers in their professional development.

English curriculum lacked a prescribed grammar syllabus at different class levels. There was also a lack of appropriate resources and guidelines for teaching grammar to students. Further, the time allocated for teaching of grammar was insufficient.

4.3.1.4 PROFESSIONAL DEVELOPMENT NEEDS IN ENGLISH TEACHING

Only 44% of the English teachers reported having had the opportunity to participate in workshops and training during their teaching career, while 55% of them reported otherwise. They had difficulties and required support from all respective agencies.

However, when enquired about the number of times they had participated in any workshops or trainings, 22 of them reported of having participated once, eight of them twice, six of them thrice and one of them having participated more than four times. Of those who have participated in the workshops, 71.79% of them claimed to have benefited them to some extent and 25.64% of them to a large extent.

A strong requirement for professional support was felt by 40% of the teachers. More than half

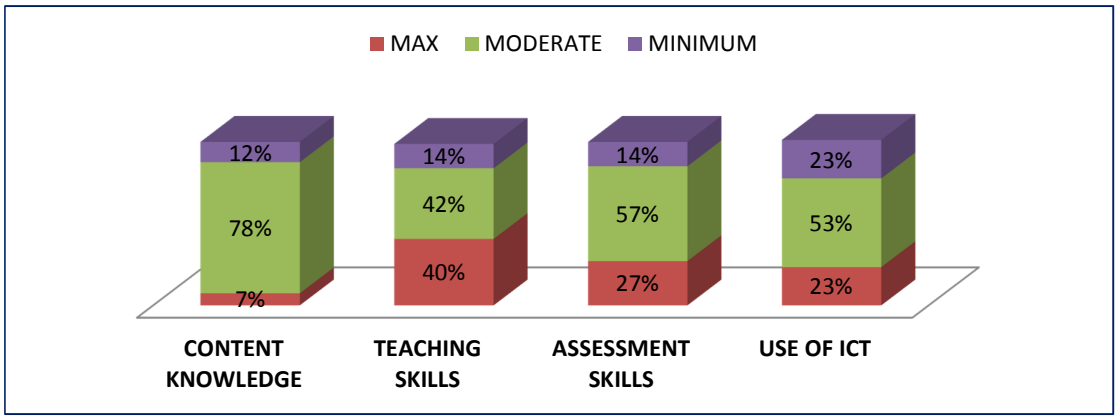


Figure 1.29: Types of professional development inputs required by the teachers

of the respondents felt a moderate degree of requirement for professional support. They claimed that the maximum support that the English teachers were able to get was from (in order of diminishing frequency) school (73%), DCRD, REC, their colleagues, EMSSD and BCSEA.

The need to provide sufficient and appropriate teaching/learning materials to their schools was also strongly felt. There was also a need for an equal distribution of the workload among the teachers.

Survey also indicated that 69.87% of the teachers did not read even a single book in a week, 20.48% read one book in a week and 8% of the teachers read two books in a week. On practice or habit of writing, 54% of the English teachers responded that they do creative writing for 1 to 3 hours a week. Other teachers prefer doing practical or business writing for 1 to 3 hours than creative writing.

4.3.1.5 CHALLENGES AND OPPORTUNITIES IN ENGLISH TEACHING

Table 1.12: Challenges in teaching English

Seriousness	Large Class Size	Resource Constraints	Too Many Activities	Heavy Teaching Load	Other Duties	Less English Periods
Most Serious	30	**38**	24	14	**32**	20
Serious	**47**	21	**30**	**30**	20	**24**
Quite Serious	5	8	21	27	17	22
Not Serious	1	16	8	12	14	17

From the table given above, 56% of the teachers complained that large classroom size was the most serious challenge in teaching English followed by 47 % of them with resource constraints. About 38 % of the teachers felt that having to take other duties apart from teaching was a serious challenge in their teaching learning process. The other variable such as heavy teaching load and too many activities in the school were also some of the issues that posed as challenges in teaching of English. Among them, 57% did not respond and 26% of the respondents did not know about the adequacy of reading material in their schools.

4.3.2 CLASS X MATHEMATICS TEACHERS

A total of 84 Mathematics teachers of the 2013 Class X cohort of students had participated in responding to the Mathematics Teacher Questionnaire. These teachers, similar to the English teachers, held myriad views and experiences in teaching of Mathematics.

4.3.2.1 QUALIFICATION AND TEACHING EXPERIENCES

Out of these 84 Mathematics teachers, 27 were Class XII graduates, 47 were bachelor degree holders and 15 had master's degree. Similarly, 7 teachers had attained the professional qualification of B.Ed (Pry), 64 had B.Ed (Sec), 8 had PGCE/PGDE and only 1 had M.Ed qualification.

Among them, 3 teachers had put in only one year of teaching experience, 40 had 1-5 years, 27 had 5-10 years, 7 had 10-15 years and two teachers had 20 years and above teaching experiences. A total of 12 teachers had spent one year in the current schools, 13 had been for 1-2 years in the same schools, 38 had spent 3-5 years, 15 had 5-8 years and 6 had spent 8 years and above in the same schools.

Likewise, out of the 84 Mathematics teachers, 23 had only one year experience in the teaching of Mathematics, 19 had 1-2 years, 26 had 2-5 years, 12 had 5-8 years and four had eight years and above experience in the teaching of Mathematics.

4.3.2.2 MATHEMATICS TEACHING-LEARNING TRENDS IN SCHOOLS

Out of the 67 Mathematics teachers who also taught subjects other than Mathematics, 8 taught English, 27 Science, 2 History/ Geography, 2 Economics and Commerce, 1 Accounts, 22 Computer/IT and 5 taught Health and Physical Education in their schools.

Pertaining to the teaching load in a week, only one teacher had below 10 hours of teaching in a week, 5 had 10-15 hours, 10 had 15-20 hours, 44 had 20-25 hours and 22 had a teaching load of 25 hours and above in a week.

When asked about the adequacy of teaching periods, most (73%) teachers responded as having adequate periods, 26% of them thought it inadequate and one respondent did not know whether it was adequate or not.

Most teachers (94%) always used text books in teaching Mathematics, they used sometimes and quite often reference books, journals, charts, journals, tables, models, ICT and games and sports. Newspapers and magazines were used sometimes and quite often respectively. Majority of the Mathematics teachers used Text Books and Teachers' Manual as their reference for effective teaching. They made very less use of magazines, newspapers and journals. In teaching of Mathematics too, audio-visual aids, which may have been otherwise very useful were rarely used.

It was evident that a variety of teaching pedagogy practice and processes was followed by the Mathematics teachers. Out of the 84 teachers, most (56) teachers spent 3-4 hours per week in problem solving skills and less than half of them (30) spent less than one hour on those activities. While many (24) teachers devoted 2-4 hours on reasoning and proof, 14 teachers spent about an hour on those same topics. Some teachers (29) spent 2-3 hours, 22 spent 1-2 hours and 11 teachers spent 3-4 hours per week on teaching communication and representation skills. There were 23 teachers who spent less than an hour per week on connection skills and quite a sizable number of them spent 2-3 hours per week on the same skills.

Mathematics teachers followed and practiced a variety of teaching pedagogies using different teaching techniques and skills. Majority of them (68%) seemed to always employ the problem solving approaches in teaching, 60% used demonstration method and 37% used question-answer methods often and others sometimes used discussion, group work, quizzes used, extended activities, and display of student works in the teaching of Mathematics. Sometimes project work, self-assessment, peer assessment and ICT based teaching methodologies were used, while field trip and survey methods were never used. Some of these teachers never used ICT based teaching, lecture, group work, extended activities, project work and self-assessment in the teaching of Mathematics.

4.3.2.3 CURRICULUM ISSUES IN CLASS X MATHEMATICS

About 83% of the teachers responded that the quantity of Mathematics content was just right, and 73% of the teachers were also of the view that the period allocation for Mathematics was adequate. However, still a significant (26%) of them found it inadequate considering the vast syllabus and large class size.

More than half (56%) of the teachers responded that teaching Mathematics was easy and yet 62% responded that the appropriateness of Mathematics concepts in the Class X syllabus was only quite appropriate. Out of the respondents, 82% did not find concepts difficult, while 13% them difficult while teaching.

The Mathematics teachers pointed out the concepts in their varying degree of difficulties. The mathematical concepts such as algebra (67%), geometry (15%) followed by number and operation, mensuration, and data and probability were rated as the most difficult ones. Mensuration (31%) followed by number and operation (18%), algebra and data and probability (14%) and geometry (12%) were in the list of the concepts with moderate difficulty. In the list of the concepts with least difficulty were mensuration (31%), data and probability (22%), geometry (15%), algebra (14%) and number and operation (12%). However, many teachers found no difficulty in teaching the concepts of geometry (57%) and number and operation (56%), data and probability (11%), algebra and mensuration (6%).

With regard to logical progression from one class level to the next in Mathematics curriculum, 33 % of the teachers were highly satisfied, but almost 50% of them were not satisfied with the logical progression of the Mathematics curriculum.

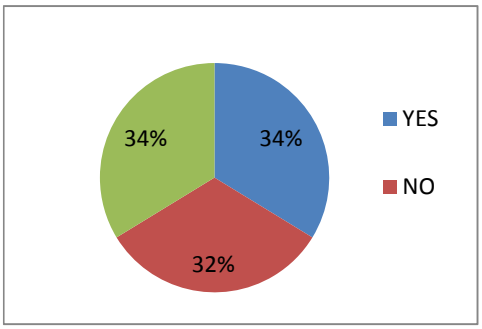


Figure: 1.30: Logical progression in Mathematics syllabi at Class (X- XII)

With regard to logical progression in Mathematics contents between Class X and XI syllabi, Mathematics teachers shared mixed feeling. A total of 33 % of these teachers were of the view that there was a logical progression in the Class X - XI Mathematics contents. However, 32 % of them felt that there did not exist a logical progression. There were an equal number of teachers who were not sure whether there was a logical progression.

The Mathematics teachers further expressed other curricular issues and concerns with regard to teaching of the subject. They raised the need for the revision of Mathematics curriculum with special focus on the logical progression through Class IX to XII contents. There were also concerns of some topics being irrelevant calling for a need to include more relevant contents and better teaching approaches for difficult concepts. The teachers also identified the difficult topics and concepts. Reasoning in Chapter 3 of Unit 6; Commercial Mathematics -

dividend and stocks (Chapter 8); Transformation of quadratic equations (Chapter 5); Data and statistics (2), Linear, non-linear equations and functions (3), Radicals (1), Geometry, trigonometry and efficiency of shapes (5), Inductive & deductive reasoning - unit 8 (2) Exponential (1) etc. were found to be difficult.

On the mode of assessment in Class X Mathematics curriculum, 44% of the teachers commented that the assessment mode was very appropriate, 38% appropriate, 21% quite appropriate and very few (2%) not appropriate. While the general mode was appropriate, the teachers strongly felt that the BCSE examination should carry full 100 marks without any marks coming by way of the internal assessment. If the current system of 20% internal assessment was there to stay, the process of this assessment must be closely monitored by DCRD or BCSEA for consistency and uniformity.

4.3.2.4 PROFESSIONAL DEVELOPMENT NEEDS IN MATHEMATICS TEACHING

About 50% of the Mathematics teachers reported of having had the opportunity to participate in workshops and training during their teaching career and the other 50% reported otherwise. Out of 41 teachers, 29 attended only one workshop, 8 attended two times, 2 attended three times, one attended four times, and one teacher attended more than four times.

Those who had the opportunity to participate in the workshops reported that they benefited from the workshops to some extend to a large extent. However, there was an insignificant number who responded that the workshop did not benefit them at all.

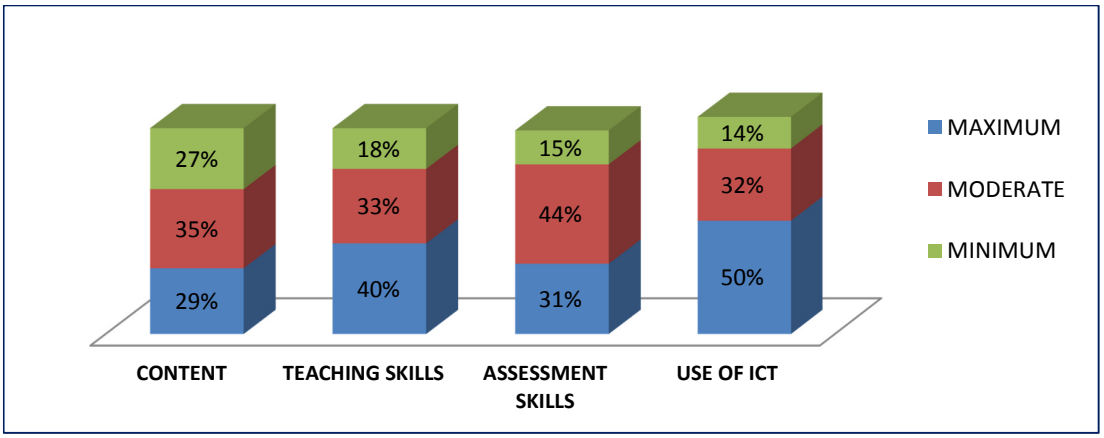


Figure 1.31: Additional support needed by teachers

The mathematics teachers expressed their requirements for additional support to enhance the teaching of Mathematics. Out of them, 50% required a maximum support in ICT use in teaching, 40% maximum support in teaching skills, 31% in assessment skills and 21 % in content knowledge. There was another group among them who required a moderate support. In this group 44% required moderate support for assessment skills (44%), 35 % for content knowledge, 33 % for teaching skills and 32 % in the use of ICT in teaching. Likewise, least support was required in content knowledge (27%), teaching skills (18%), assessment skills (15%) and use of ICT (14%). There were also a few of them who did not need any additional support.

At the same time, they had difficulties getting the required support from the various responsible agencies, though the need for professional support in the teaching of Mathematics subject was strongly felt. They revealed that the maximum support that they got was from

their colleagues in schools rather than any of the other professional agencies. Comparatively very less support was available from (in order diminishing frequency) their schools, REC, BCSEA, EMSSD, DCRD. It was an interesting revelation that the DCRD which is supposed to be the main source of professional support in the teaching of the subject was rated as the least available source.

Besides, the teachers felt the need for timely and adequate orientation on teaching of the new curriculum through appropriate trainings and workshops.

4.3.2.5 CHALLENGES AND OPPORTUNITIES IN MATHEMATICS TEACHING

The Mathematics teachers indicated that they encountered other problems as well in teaching the subject where 47% of teachers said that large class size was the most serious challenge, followed by 23% of them pointing out resource constraints, 15% mentioning school activities, 16% blaming on heavy teaching load and so on. Other factors had less impact on teaching of Mathematics.

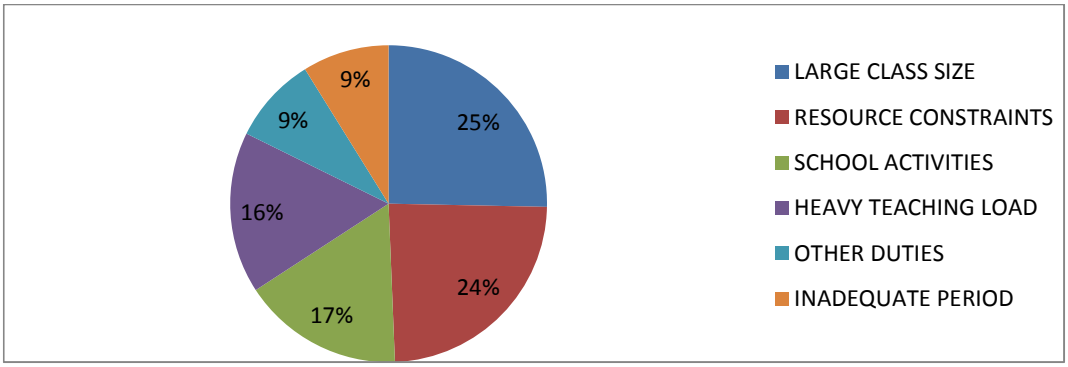


Figure 1.32: Challenges faced by teachers while teaching Mathematics

There were other resource related issues that confronted them while teaching the subject in Class X. They felt the need to provide their schools with appropriate and adequate teaching learning materials (models, journals, photocopy, etc.), and also facilitate them in the proper utilization of ICT facilities to support and make teaching of mathematics more effective.

While all the above areas had relevance to policy matters, the teachers mentioned specific policy concerns related to teaching of Mathematics in Class X. Similar to the findings in the previous NEAs, the need for proper allocation of workload, teaching time and periods, and timely support from various relevant corners was mentioned. They cited the weak or lack of basic foundation in the subject right from the lower classes affecting their performance at Class X. Easy access for students to electronic gadgets such as scientific calculators and mobile phones coupled with the incompetency of many teachers was a major cause for the decline in the learning interest of students. Little or total absence of incentivization to teachers based on the workload and performance has been pointed out as one of the major factors for the low morale of Mathematics teachers.

CHAPTER 5

STUDENT PERFORMANCE IN ENGLISH AND MATHEMATICS

5.1 PERFORMANCE IN ENGLISH

The English Test for the NEA 2013 for Class X containing 26 items for 60 marks was designed to assess student competencies in the learning strands of Reading, Writing and Grammar. The test items covered all the major types of questions - the multiple choice questions (MCQ), short response questions (SRQ) and extended response questions (ERQ). They were developed based on all learning standards of both content and concepts as per the curriculum. The development of the items also adhered to the mode of assessment prescribed by the Department of Curriculum Research and Development. The question items also maintained a logical balance of all levels of thinking of Bloom's Taxonomy of learning. The selection of contents was based on the English competencies required to be acquired by the learners at the end of Class X.

The test was conducted in the month of November 2013 when all schools had covered the syllabus prescribed for Class X. While a total of 5523 were made to sit for the English test, only 5473 candidates have been shown as having completed the test when mapped with those who have completed the Student Questionnaire. The discrepancy was because not all those who have completed the questionnaire have completed the test or vice versa. The calculation of the student performance in English, therefore, is based on 5473 candidates.

5.1.1 OVERALL PERFORMANCE

The performance of students in English in the NEA 2013 was 34.72 % which was 20.83 out of 60 full marks with standard error of measurement (0.47) on which the paper was set. However, the 2013 English performance saw a marginal improvement of 1.85% over the 2006 national mean score of 32.87%.

Table 1.13: Overall English Performance by Gender

NUMBER			MEAN			MINIMUM SCORE			MAXIMUM SCORE		
M	F	T	M	F	T	M	F	T	M	F	T
2668	2805	5473	34.33	35.08	**34.72**	10	10	10	80	84	84

The maximum score in the test was 84 and the minimum was 10 marks on 100. The female students (35.08%) had performed marginally better than male students (34.33%).

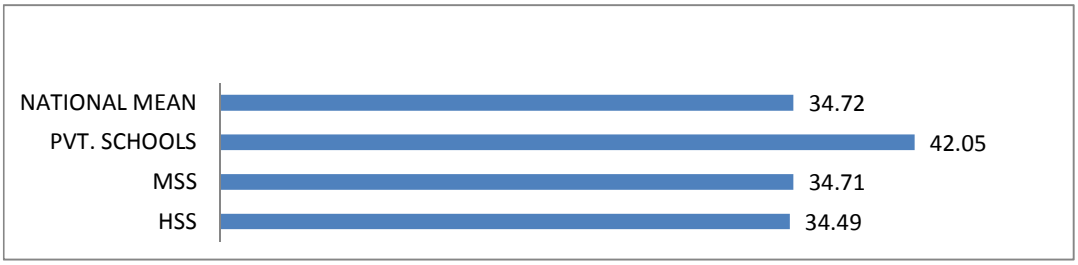


Figure 1.33: Performance by types of schools

Though the performance in English did not vary much between the secondary and middle secondary schools, private schools with the mean score of 42.05% have done much better than the government schools.

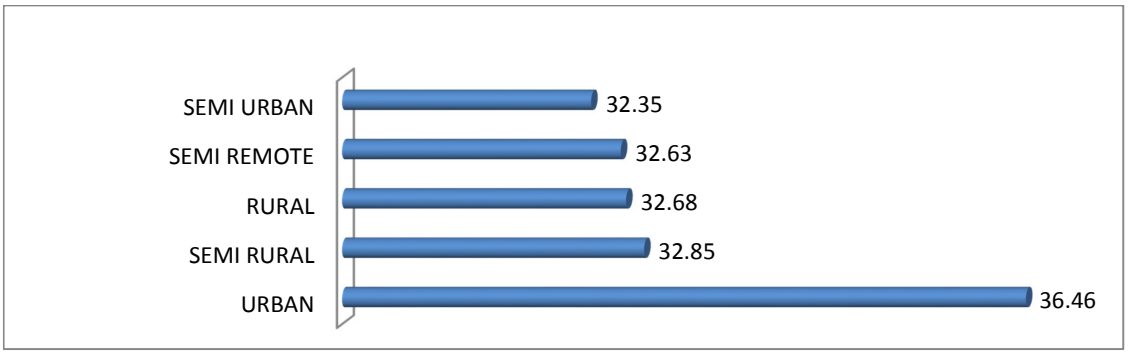


Figure 1.34: Performance by school location

Schools located in urban settings seemed to have a tendency to perform better than schools located in other settings. The English performance of schools located in other than urban areas did not seem to depend on their locations, though semi-urban schools performed a little poorer than schools in any of the other locations.

Among the 45 middle and higher secondary schools participating in the NEA 2013, Dr. Tobgyel School with just 16 Class X students was at the top of the list of English performance with 47.44% mean score. Khangkhu Middle Secondary School, Paro, Lungten Zampa Middle Secondary School, Ugyen Academy were the three schools that closely followed Dr. Tobgyel scoring above 40% in the English test. Khangkhu MSS was one of the few schools that had not much variance in the performance among the students with the score range between 28-62%.

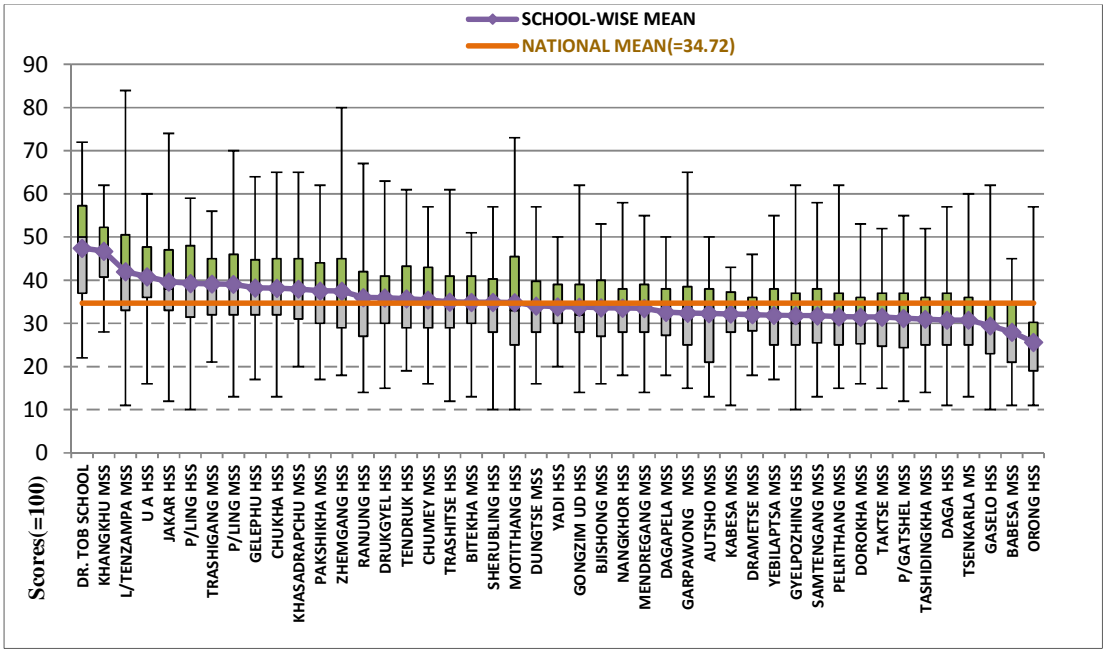


Figure 1.35: School wise performance in English

While 17 schools had performed above the national mean of 34.72 %, their mean scores were below 40%. Three schools with 25.62 – 29.46 mean score range remained at the bottom of the performance list.

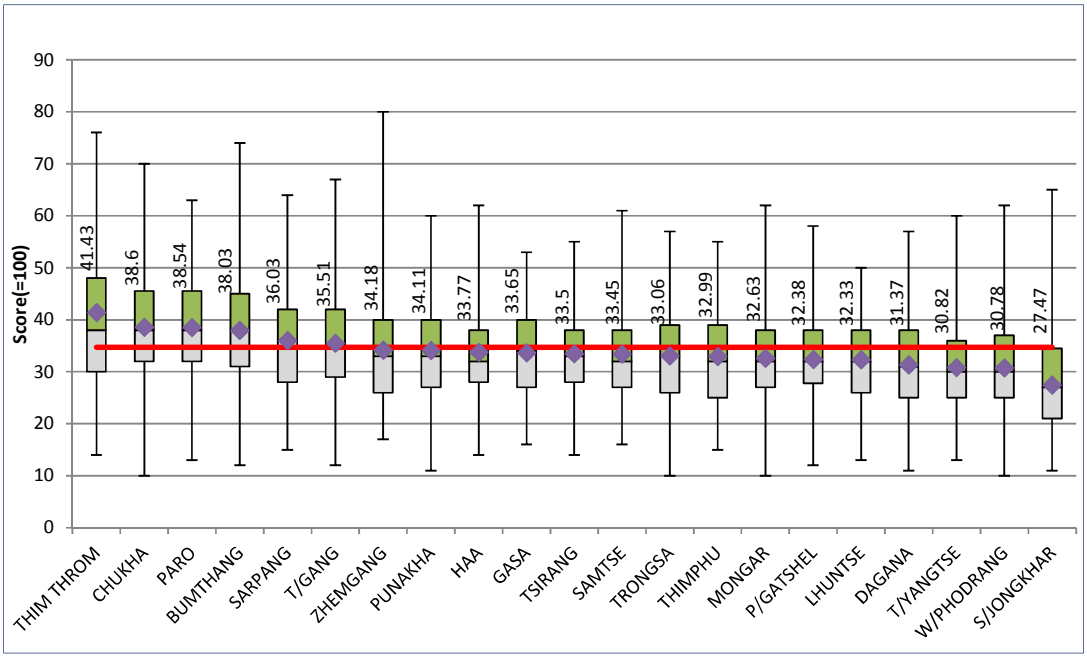


Figure 1.36: Dzongkhag-wise performance in English

All the 20 Dzongkhags and Thimphu Thromdey represented by 45 selected schools participated in the NEA 2013. The above chart shows the performance of these Dzongkhags and Thromdey in the English test. The performance of each Dzongkhag is provided in terms of mean percentage score. Chukha, Paro, Bumthang, Thimphu, Sarpang and Trashigang Dzongkhags performed slightly better with their mean score above the national mean of 34.72%, than the rest of the schools. All the other Dzongkhags performed below the national mean. While all Dzongkhags scored at 30-39%, Samdrupjonkhar was the only Dzongkhag that scored below 30% in English.

5.1.2 PERFORMANCE BY DEMOGRAPHIC DISTRIBUTION OF STUDENTS

The analysis of student performance in English by their age group indicated that younger children tended to do better. The students in the age group of 12-15 years performed much better than those in the age group of 21+ years. It could be concluded with some confidence that younger the Class X students better the performance in English, and as their age increased their performance decreased.

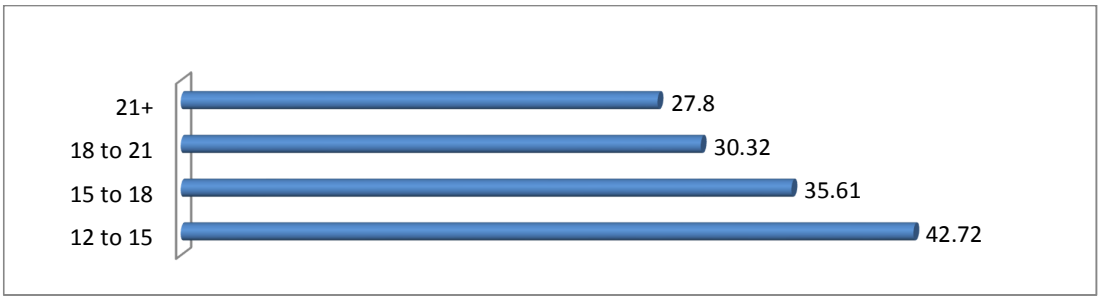


Figure 1.37: Performance in English by age group

The student performance in English was also looked at based on what languages they spoke at home. The data revealed that students from Bumtabkha speaking homes did better in English than those from other Bhutanese regional language speaking homes. Though the major bulk of the students were from Tshanglakha speaking homes, their performance in English was lower among the major groups that spoke other languages at home.

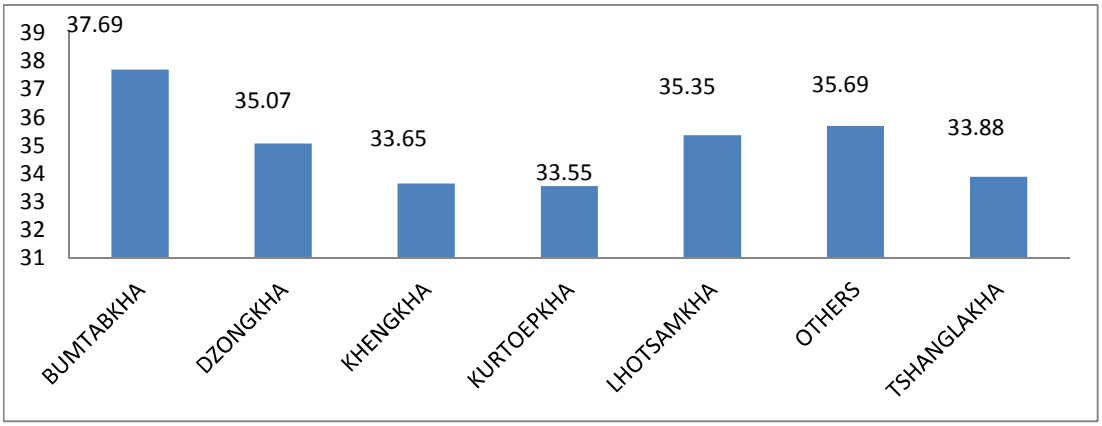


Figure 1.38: Performance in English based on the languages spoken at home

Parental occupation also seemed to have some bearing on the performance of students in English. While there were marked differences in the performance of students among other occupational background, children of farmers, those in Non-Government Organizations, national work force, religious personnel and armed forces performed poorly. Children whose mothers were in the government service performed better than those whose fathers were in the government service. It is indicative that educated mothers have a positive influence in the performance of children in English.

Table 1.14: Performance by Parental Occupation

FATHER'S OCCUPATION			MOTHER'S OCCUPATION		
	MEAN	N		MEAN	N
International Organization	47.29	7	International Organization	51	2
Corporations	41.19	110	Government Servants	42.96	225
Parliamentarians	40.02	45	Corporations	41.57	23
Government Servants	39.22	846	Parliamentarians	41.25	12

Private Job Holders	39	252	Others	39.41	833
Business	37.41	472	Business	37.49	447
Others	36.96	130	Pvt	36.8	61
Local Government	36.02	40	Lg	36.56	9
Armed Forces	35.45	376	Armed Forces	36.5	10
Religious Personnel	34.79	80	Ngos	34.61	41
National Work Force	34.65	34	Religious Personnel	33.69	13
Ngos	33	39	National Work Force	33.32	44
Farmers	32.01	2787	Farmers	32.73	3064

While there was about an equal number of boarders and day-scholar student participants, the performance of day-scholars in English outdid the performance of boarders by a margin of 4.48%.

Table 1.15: Performance by students being boarders or day-scholars

	MEAN	STD	CVAR	N
Boarders	32.52	9.21	28.32	2726
Dayscholars	37	11	29.73	2693

Among the day-scholar students who performed at 37%, those who stayed with their parents had better mean performance than those who stayed with other relatives. Among all, children who stayed with friends, brothers and other persons performed quite poorly. However, those staying with their sisters did much better than those staying with their brothers.

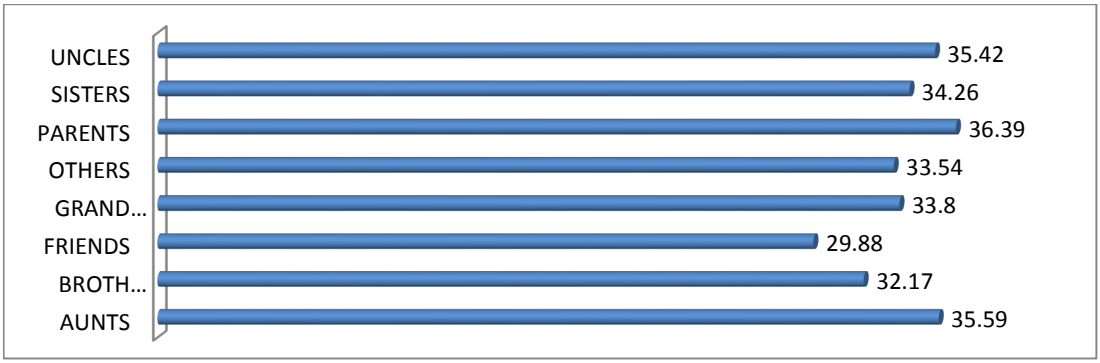


Figure 1.39: Performance of day-scholars with whom they stay

The distance or number of hours the day-scholar students had to walk to schools had consequences on their performance. On the whole, shorter the distance children had to walk to schools, better was the performance in English. However, those children having to walk 3-4 hours surprisingly did better than those who walked 1-3 hours. But still, those who walked more than four hours performed the worst.

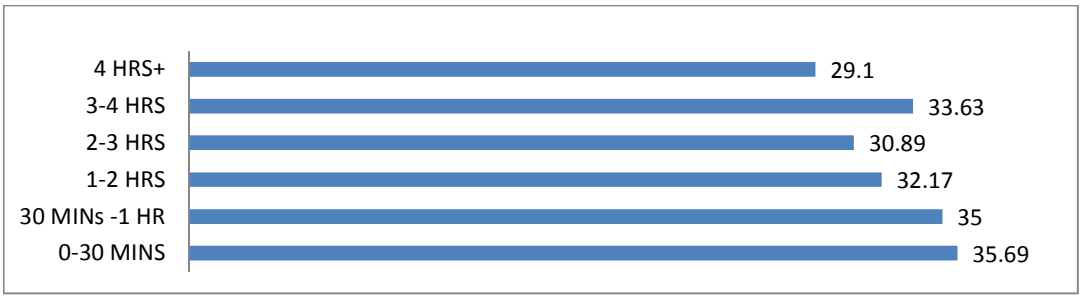


Figure 1.40: Performance by walking distance

On the whole, parents' concern and involvement in children's study had a positive impact on their children's performance in English. However, too much concern and involvement from parents had a dwindling effect on children's performance.

The students whose parents were often or always concerned about their studies seemed to perform better than those who were rarely concerned. Similarly those who were constantly guided and advised by their parents did well. However, those who were always taught at home did not do well compared to those who have been rarely taught by their parents. Those students who did not tuition classes performed better than those availed tuitions. If parents often helped children with their homework, often kept in touch with their teachers, often provided with additional learning resources and always provided with enough teaching time, children could do very well.

Table 1.16: Performance by parental support for children's study

Frequency	Parents Concern on Studies	Guidance & Advice	Teaching at Home	Arranging Tuition	Helping with Homework	Keeping in Touch with Teachers	Additional Resources	Enough Study Time Home
Always	34.87	34.73	33.06	34.52	32.34	33.15	35.85	35.93
Often	38.3	39.16	36.95	34.18	36.99	37.37	36.55	35.07
Sometimes	31.51	32.48	35.41	34.08	35.49	34.7	32.91	30.44
Never	32.79	32.92	33.68	35.64	34.18	34.36	32.65	30.76

5.1.3 PERFORMANCE BY TEACHING-LEARNING TRENDS IN SCHOOLS

The school environment also impacted children's performance in English. The students who felt that their schools were caring to them performed better than those who felt their schools to be frightening. But those who were bored with their schools did slightly better than those who enjoyed being in their schools. However, frightening school environment certainly had a negative consequence in student performance.

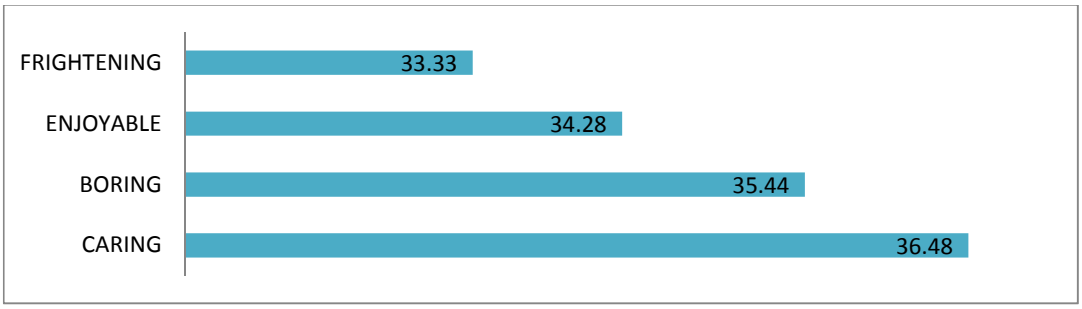


Figure 1.41: Performance based on the ambience of the school

Students performed well in English, if the schools often provided them with study support. However, too much support or too little support was counterproductive for student performance.

Table 1.17: Performance by study support from school

Frequency	Remedial Classes	Additional Study Measures	Guidance & Advice	Easy Access to Learning Facilities	Conducive Learning Environment
Always	34.15	34.04	34.68	35.26	36.26
Often	38.92	37.7	38.29	36.85	36.82
Sometimes	33.51	34.02	32.47	33.2	32.47
Never	33.11	32.3	31.1	32.73	31.95

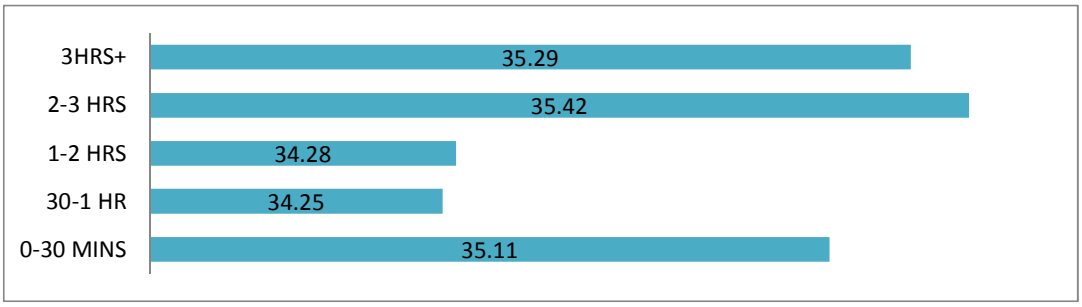


Figure 1.41: Performance by walking distance to school

The performance of students did not seem to depend much on the long duration of independent study they put in per day. Those who studied 2-3 hours a day seemed to have done slightly better than those who studied more or less hours in a day. However, those who spent 0-30 minutes on independent study performed better than those who spent 30 minutes to 2 hours.

Doing homework did not seem to be popular among the Class X students. Those who were assigned 1-2 home works per week seemed to do better in English than those who were given more number of homework in a week. Similarly, those whose home works were checked

once or twice in a week did better than those whose works were checked more frequently. The increase in the number of homework assignment and correction seemed counter-productive to student performance in English. Particularly, there was a clear pattern of students performing less well as the frequency of homework correction in a week increased.

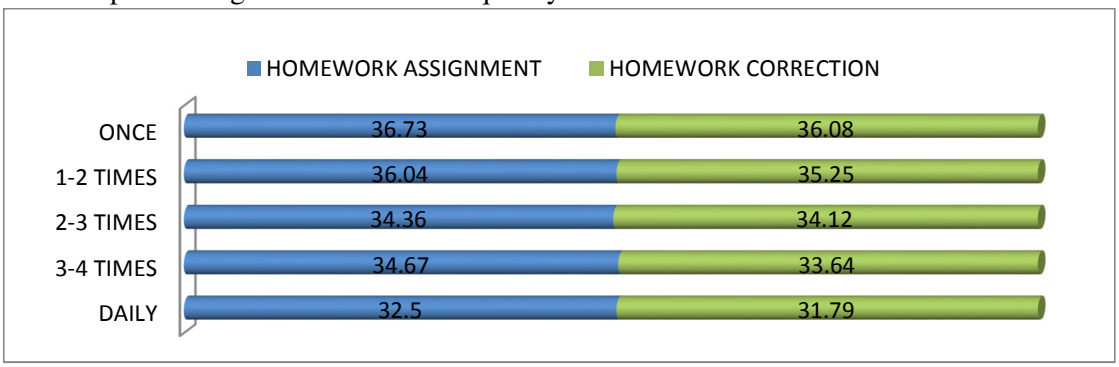


Figure 1.42: Performance by homework assignments and correction

Providing feedback, whether verbal or written, on student homework seemed very useful for the student performance in English. Student performance was better for those who were given various feedback on their home works in the frequency of sometimes to always than those to whom feedback were never given. Verbal feedback on student homework seemed to bring about more positive impact than other types of feedback. However, other types of feedback such as grading, written comments and discussions in the class brought about better performance if used only sometimes than always or never.

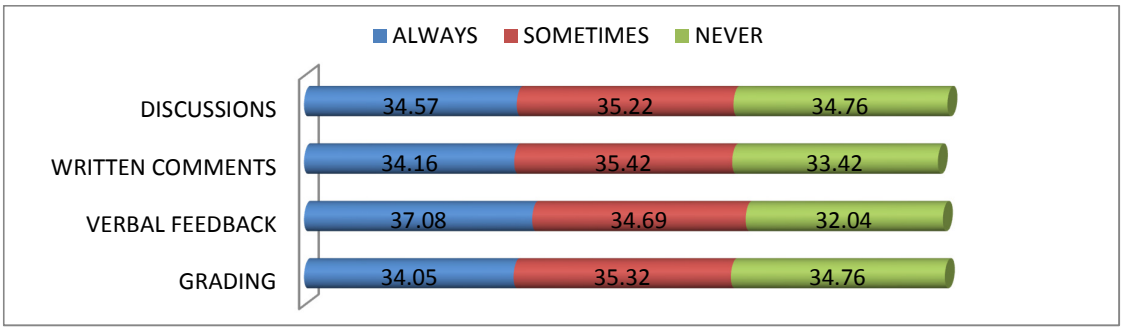


Figure 1.43: Performance by the type of feedback on homework

The study indicated that performance did not depend on the frequency of dictionary use. The performance was better for those who said they never used dictionary than those who said they used them daily or sometimes.

In performance by frequency of reading practice in English classes, interestingly students performed better if they never did reading practices in their classes than if they did daily or sometimes.

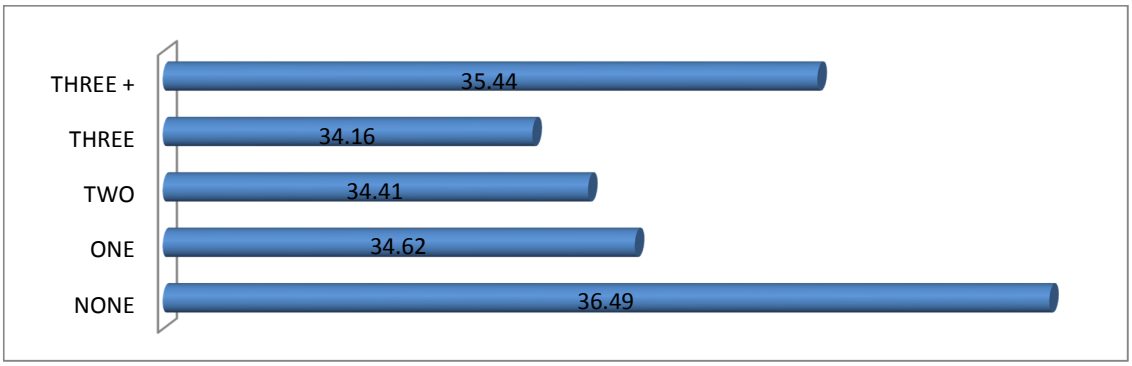


Figure 1.44: Performance by number of books read in a month

Disregarding the students who reported of reading not a single book in a month due to insignificant number of respondents in the group, performance seemed to be better for those who reported of having read more than three books a month. However, the performance interestingly decreased as the number of books read in a month increased from one to three.

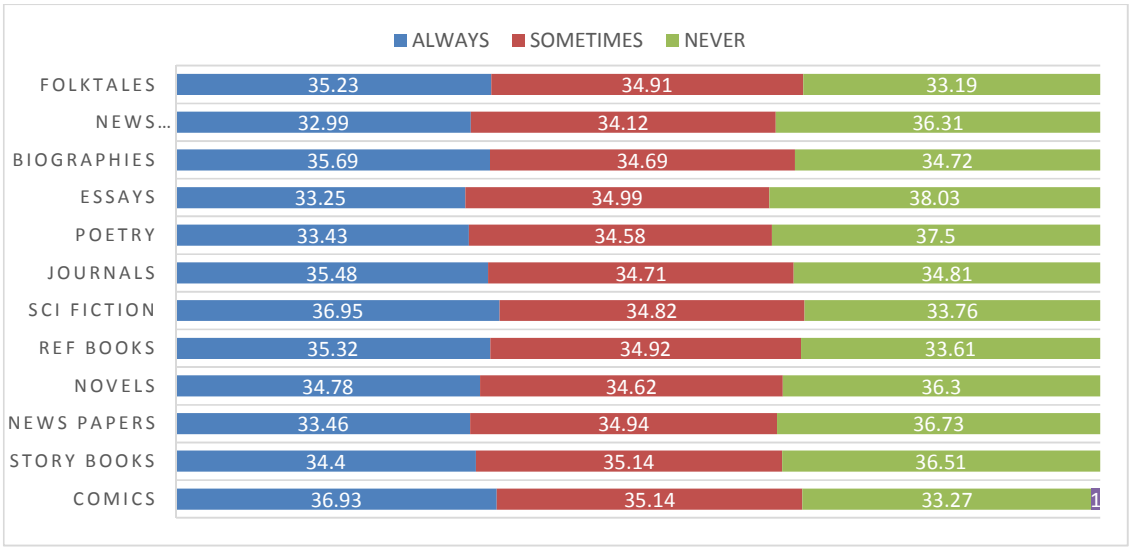


Figure 1.45: Performance by reading interests

Those students who always read science fiction and comics tended to perform better than those who always read other types of books. Students performed similarly, if they read all types of books only sometimes. However, the performance was better for those who never read essays, poetry, newspapers and story books.

5.1.4 PERFORMANCE BY VALUES AND ATTITUDE TOWARDS LEARNING

Performance by liking for English	Performance by disliking for English
35.03	33.5
Performance by reasons for liking English	Performance by reasons for disliking English

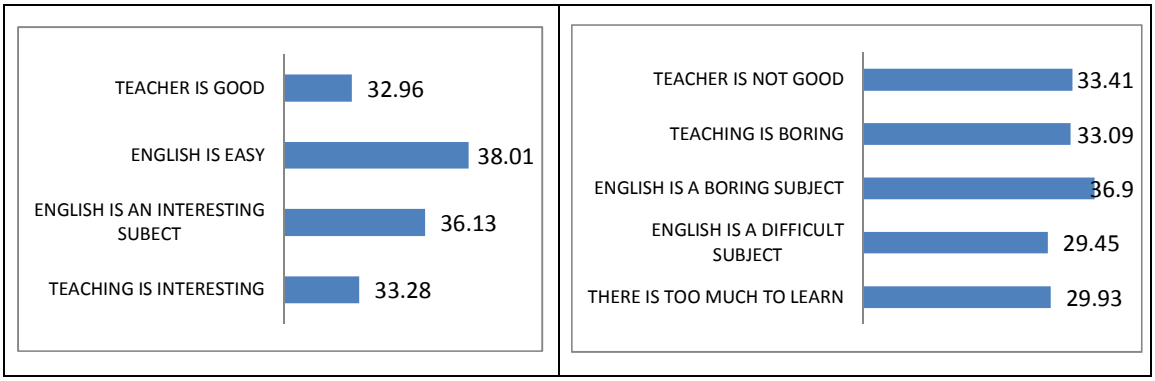


Figure 1.46: *Performance by liking/ disliking of English with reasons*

The students who reported of liking the English subject obviously performed better than those reported of disliking it. Those who liked the subject because it was easy did much better than those who liked it for other reasons. On the disliking of the subject, students did the worst, if they disliked it for its being a difficult subject. However, those who disliked the subject because it was boring seemed to do better than those who disliked it for other reasons.

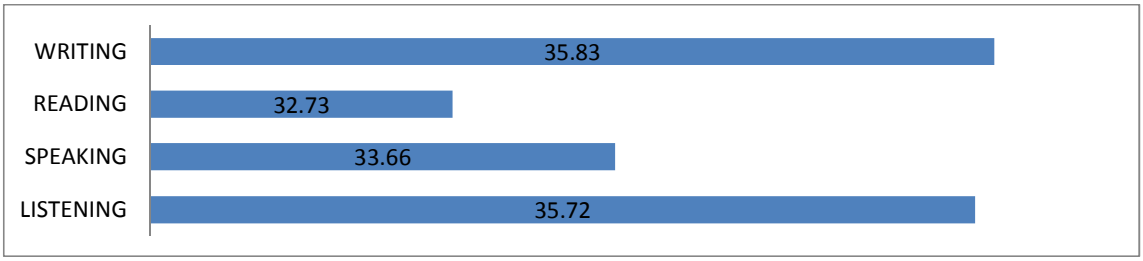


Figure 1.47: Performance by difficulty of learning strands

The students who found writing and listening skills difficult performed better than those who found reading and speaking difficult. However, it is to be noted that those who found reading and listening difficult were significantly lesser in number than those who found speaking and writing difficult.

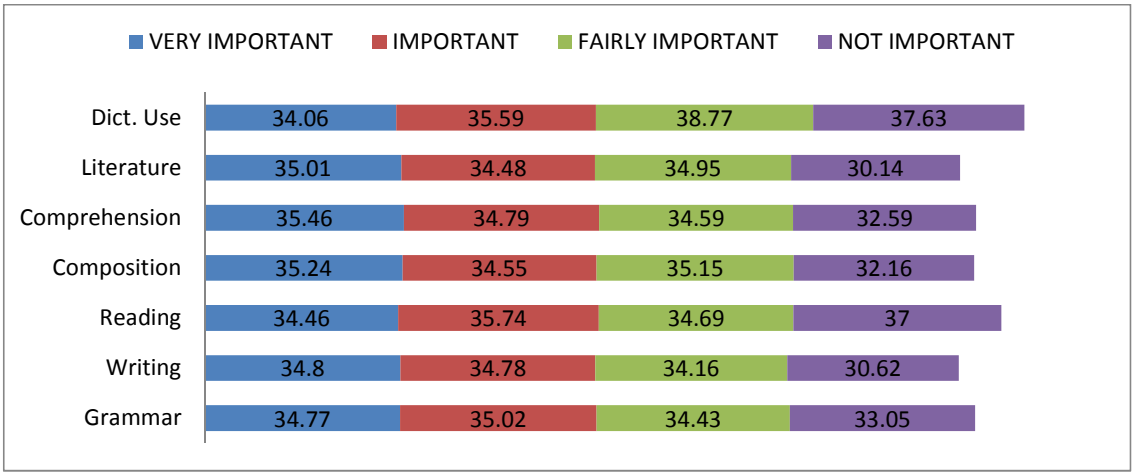


Figure 1.48: Performance by importance of aspects of English learning

There was not much difference in the performance among students who considered all aspects of English learning *very important*. The case was similar with those who reported of all aspects of English learning *important*. However, the performance was better for those who felt dictionary use only fairly important and those who treated dictionary use and reading not important at all.

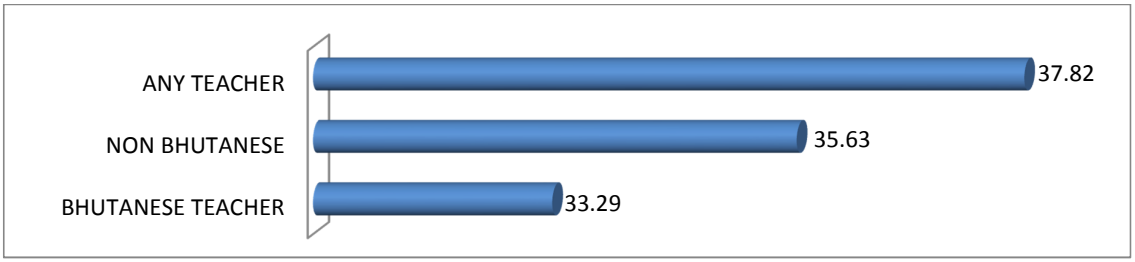


Figure 1.49: Performance by preference for nationality of teachers

Performance of students in English differed according to their preference for the nationality of their English teachers. While the number of students, who preferred Non-Bhutanese English teachers, was significantly less, the performance of those who had no preference between the Bhutanese and Non-Bhutanese English teachers was much better than those who preferred the Bhutanese ones.

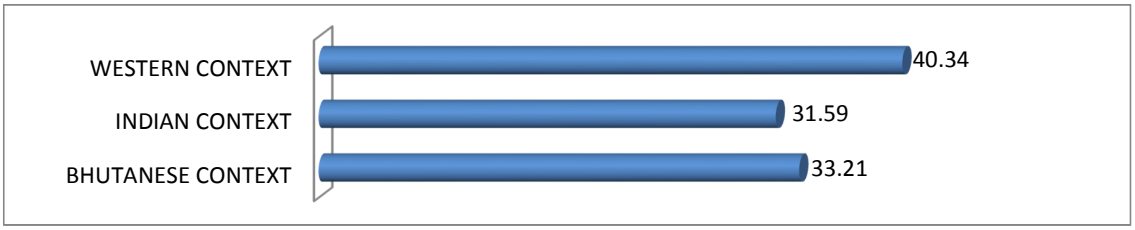


Figure 1.50: Performance by preference for context of literature

Similarly, the students who preferred to read western context of literature performed markedly better than those who preferred Bhutanese or Indian context of literature.

5.2 PERFORMANCE IN MATHEMATICS

A test paper containing 38 items was designed to assess student competencies in Class X Mathematics. The items included multiple choice questions (MCQ), short response questions (SRQ) and extended response questions (ERQ). They were designed by covering all learning standards of both content and concepts as per the curriculum and followed the mode of assessment prescribed by the Department of Curriculum Research and Development (DCRD). The question items were also spread well over Bloom's Taxonomy of learning to ensure the balanced inclusion of all levels of thinking. The selection of contents for

Mathematics was based on the competencies required to be acquired by the learners at the end of Class X.

Test items were designed to test the learner's content knowledge, competencies and skills in problem solving, making connections, communication and reasoning and proof on the contents in Algebra, Number and Operations, Statistics, Trigonometry, Geometry and Measurement. Following Bloom' taxonomy, the Mathematics test targeted six levels of cognitive abilities (remembering, understanding, applying, analyzing, evaluating and creating) and the test contained the different content strands.

The test items were developed in four different sets by selected groups of subject teachers with qualification, ample content knowledge and teaching experiences. All the four sets were piloted with Class X students in selected schools in nine western Dzongkhags in 2012.

5.2.1 OVERALL PERFORMANCE

The overall performance of the 5530 Class X students in the NEA 2013 Mathematics test was 38.03 out of 100 marks with standard error measurement (0.51). Among them, boys performed better with the mean score of 39.97 than girls with 36.19 mean score. The maximum score was 92 % and the minimum was 0% in the test.

Table 1.18: National Performance in Class X Mathematics

NUMBER			MEAN SCORE			MINIMUM			MAXIMUM		
M	F	T	M	F	T	M	F	T	M	F	T
2668	2842	5530	39.97	36.19	38.03	0	1	0	92	90	92

The students of higher secondary schools with 39.30 mean score had performed better than those of the middle secondary schools with 36.45 mean. Though the performance of the private school students was higher than those of the government schools, the number of private school students sitting for the test was significantly less with only 87 out of 5530.

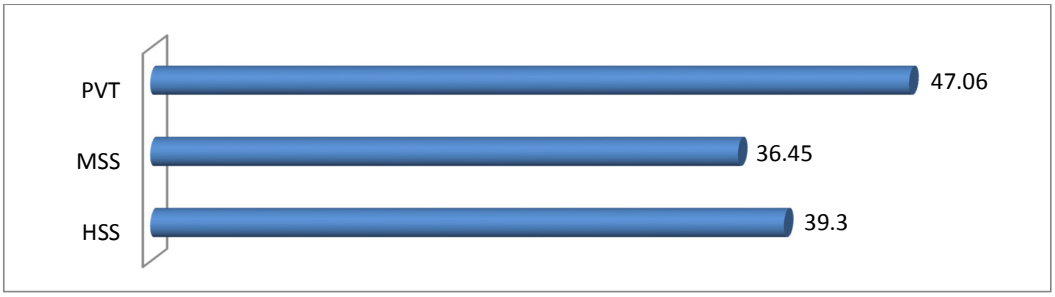


Figure 1.51: Performance in Mathematics by type of school

Similarly, though the students of schools located in rural areas performed better than those of the other locations, the number of students in these locations was significantly very less (246 out of 5530). The major bulk of students were from urban schools and their mean performance was 37.76 which was a little lower than the national mean of 38.03. However, the students from semi-remote and semi-rural schools performed very well.

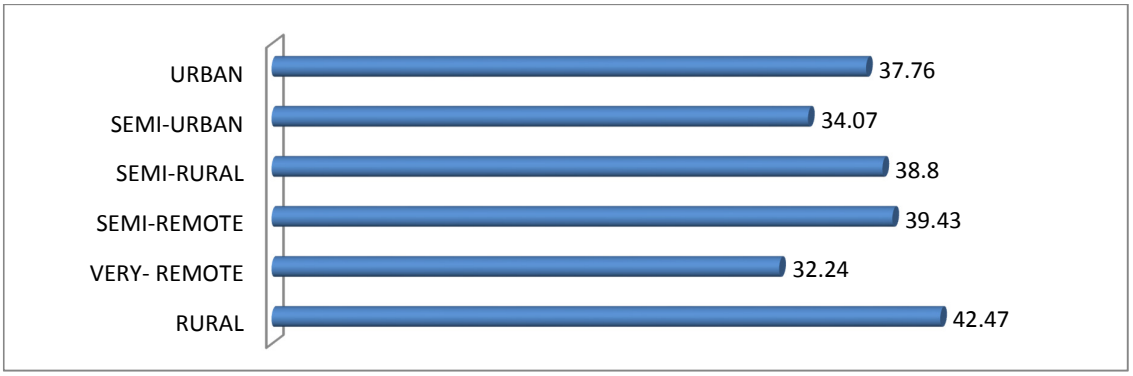


Figure 1.52: Performance in Mathematics by school location

Among the 45 schools, Nangkor Higher Secondary School with the mean score of 49.8 followed by Phunthsoling HSS and Samtegang MSS topped the list of 24 schools that performed above the national mean. Whereas Babesa MSS with the mean score of 17.19 followed by Pemagtshel and Bjishong Middle Secondary schools lingered at the bottom of the list of 21 schools that performed below the national mean.

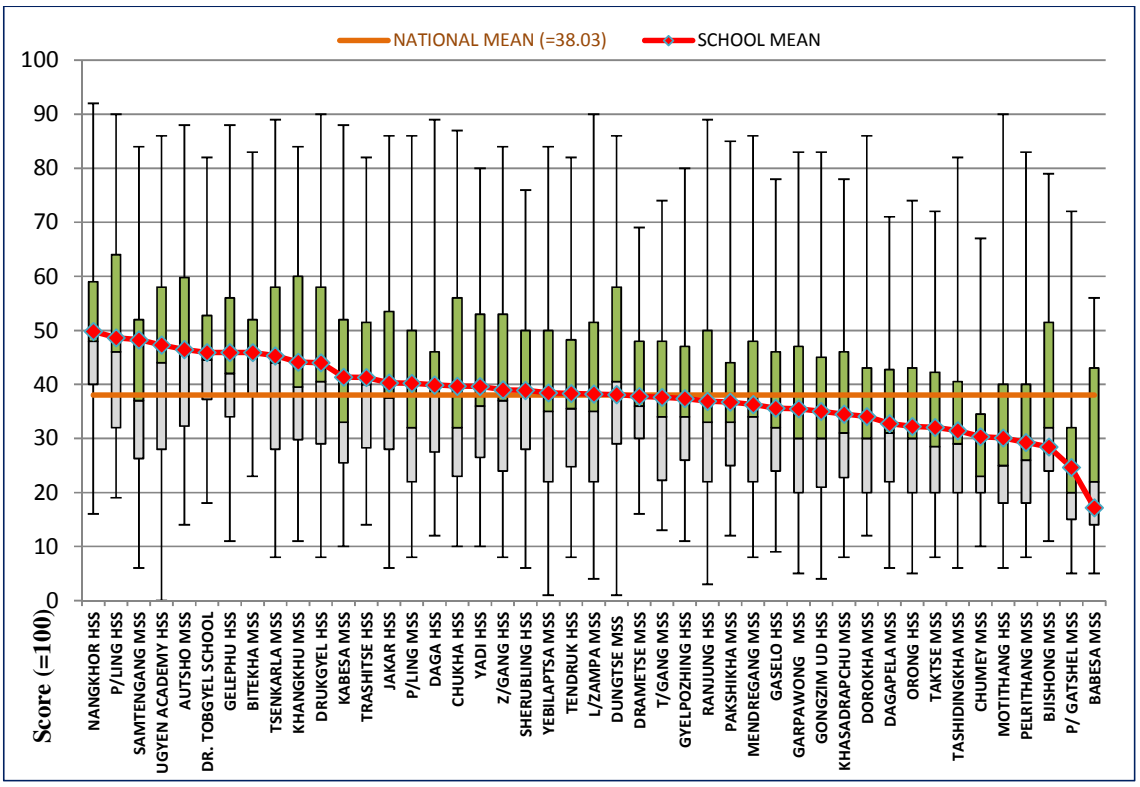


Figure 1.53: School wise performance in Mathematics

Of all the 20 Dzongkhags and one Thromdey (Thimthrom) that participated in the test, Lhuentse Dzongkhag (with 66 students) with 46.45 mean score was at the top of the list while, Thimphu Dzongkha (175 students) was at the very bottom. Nine Dzongkhags and Thimthrom were above the national mean and 11 Dzongkhags were below the national mean.

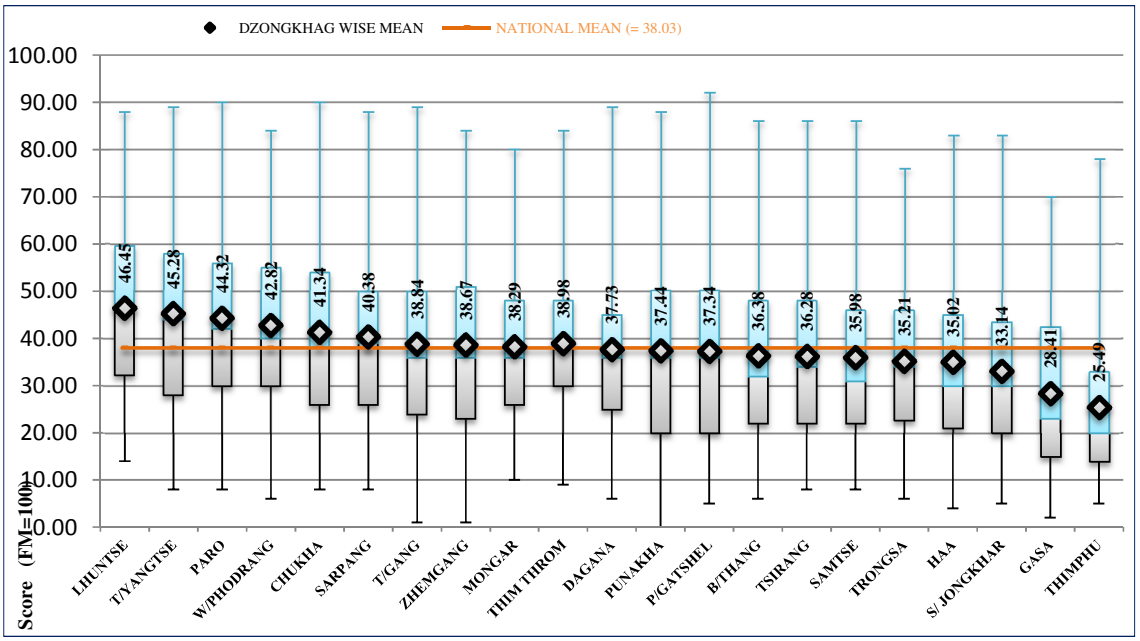


Figure 1.54: Dzongkhag-wise performance in Mathematics

5.2.2 PERFORMANCE BY DEMOGRAPHIC DISTRIBUTION OF STUDENTS

In the age-wise performance, the students in the age group of 12-15 years, though with only 254 candidates, did the best with 46.57 mean score. The 15-18 year age group having the bulk of the students (4038) also performed better than the higher age group students.

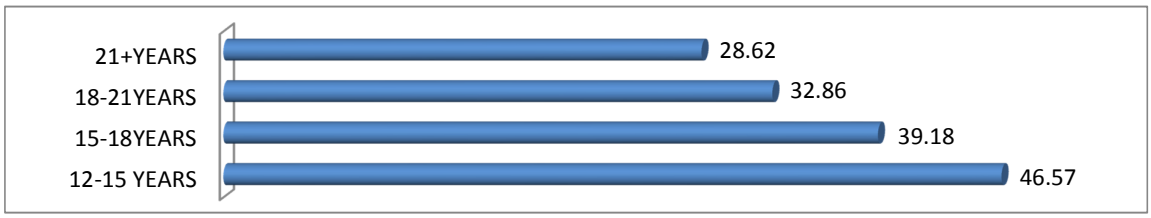


Figure 1.55: Performance in Mathematics by age group

As in the case of English, as the age of the students increased the performance in Mathematics appeared to proportionately decrease.

The results of the test based on the language spoken at home indicated that Tshanglakha and Kurtoepkha speaking students did marginally better in Mathematics than those speaking other languages at home.

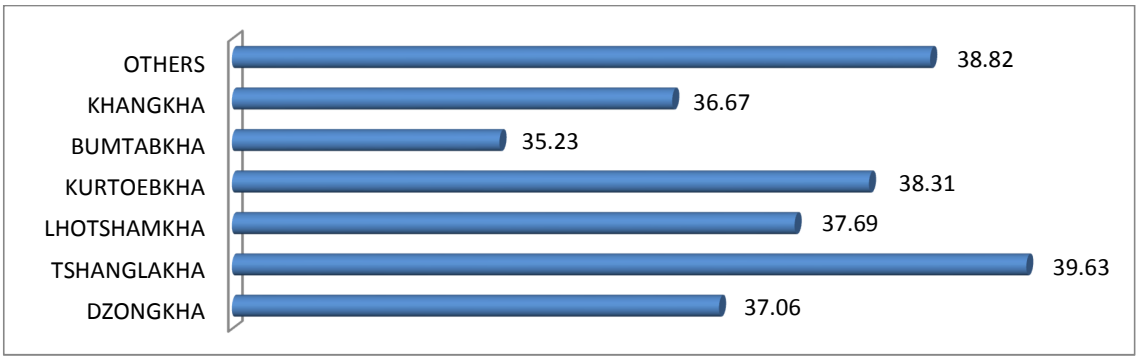


Figure 1.56: Performance in Mathematics based on the language spoken at home

Going by the occupation of parents, students of those parents in the government service, in international organization and corporations seemed to edge over the students whose parents were in other occupations. Farmers' children also did much better than the children of parents working in National Wok Force (PWD), armed forces and in business.

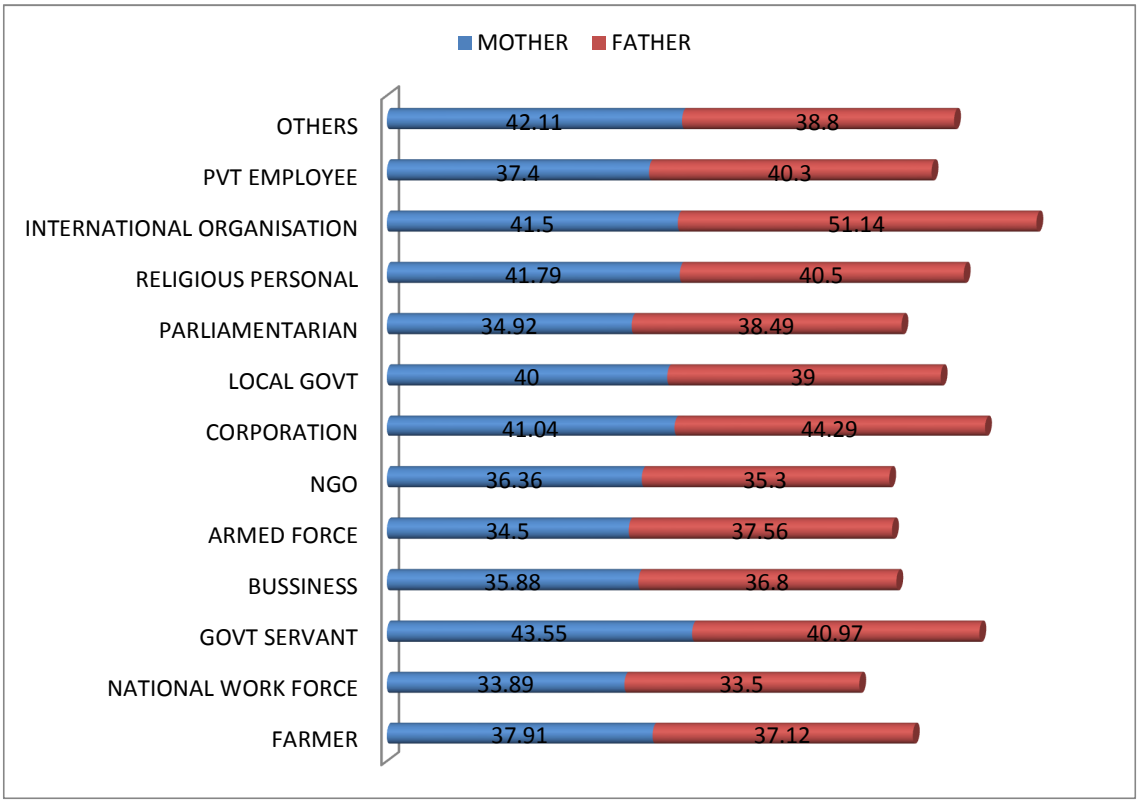


Figure 1.57: Performance by parental occupation

In the performance based on the number of years in the current school, except for those who spent less than one year, fewer the number of years students spent in that particular schools, better was the performance in mathematics.

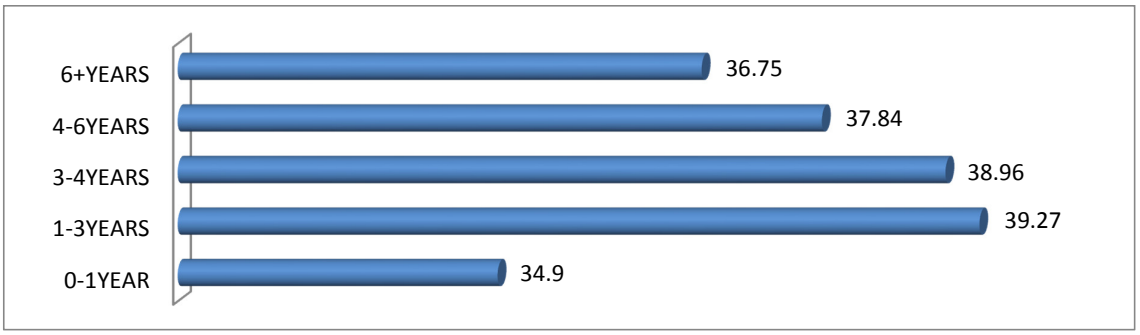


Figure 1.58: Performance by number of years in the current school

While there were an equal number of boarder and day-scholar students, the performance was slightly better for the boarder students.

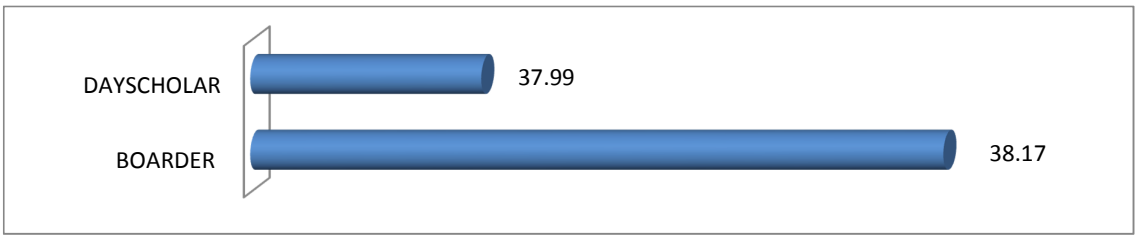


Figure 1.59: Performance by boarder / day-scholar

The day-scholar students who stayed with their parents, comprising 50% of the total students, performed well compared to those staying with their brothers, sisters, grandparents or friends. However, those staying with relatives other than those mentioned did slightly better than those staying with their parents.

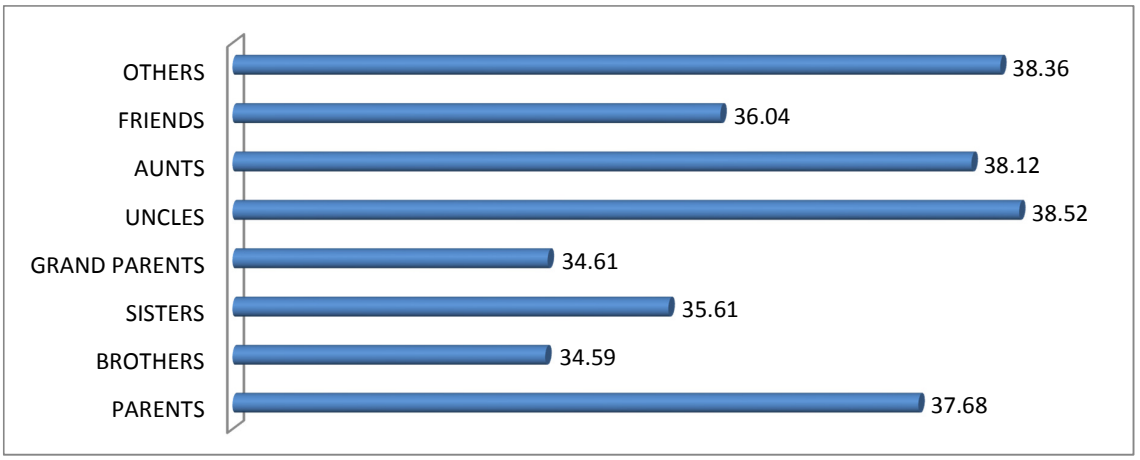


Figure 1.60: Performance of day-scholars by with whom they stayed

The results clearly indicated that those who had to walk less than 30 minutes to schools performed better than those who took more time walking to schools. However, comparatively very less number of students walked more than 30 minutes to schools.

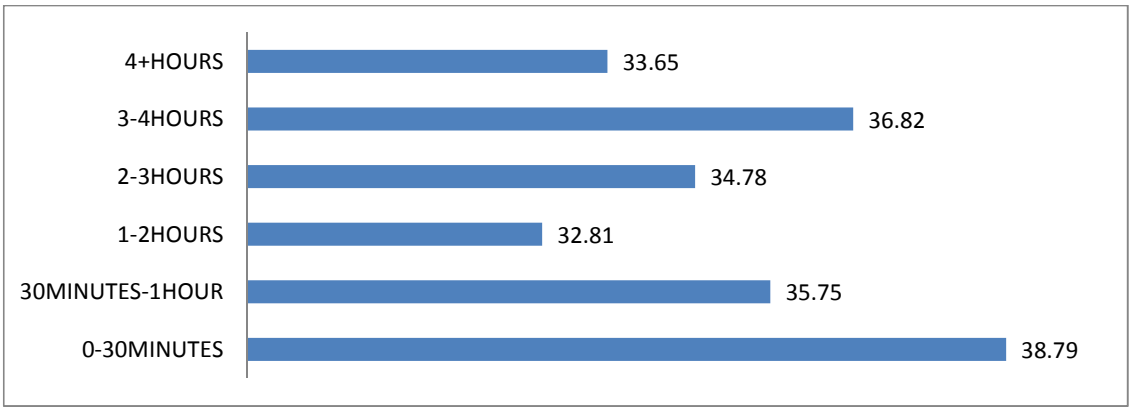


Figure 1.61: Performance by walking distance to school

Parental concerns on their children's study did influence the performance in Mathematics. However, too much concern seemed to be less productive.

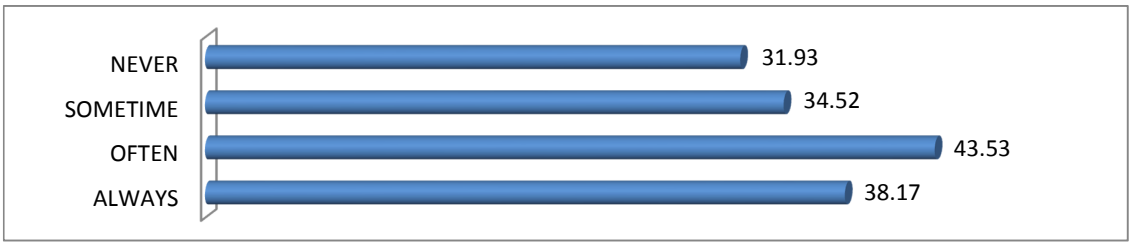


Figure 1.62: Performance by parental concern for studies

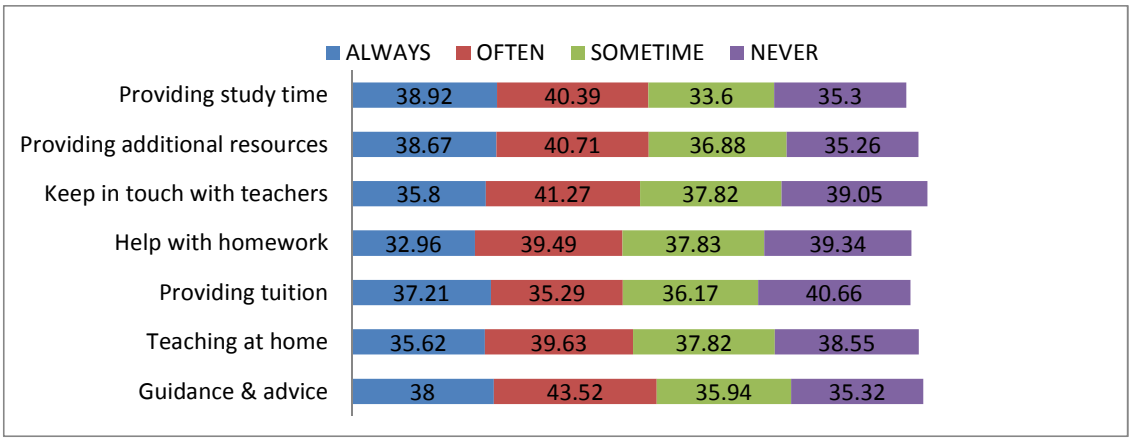


Figure 1.63: Performance by parental support for studies

Parents' concerns for their children's study were required to be complimented with various supports for their children to do well in Mathematics. Often providing study time, additional resources, keeping in touch with their teachers and providing guidance and advice were very important for their children to perform well. However, always providing tuition and teaching at home did not help them do any better in the subject.

5.2.3 PERFORMANCE BY TEACHING-LEARNING TRENDS IN SCHOOLS

With the overall frame work of pedagogical requirements all schools are required to fulfill, different schools have their own unique setup and also follow teaching-learning practices. These unique trends seemed to project a large impact on student learning as reflected by their performance in Mathematics, for instance.

School ambience, by way of how students felt being in their schools, seemed to play a significant role in how students performed in Mathematics. Those students who felt that their schools were caring performed significantly better than those who felt them to be frightening. However, those who enjoyed being in their schools tended to perform poorer than those who felt bored being there.

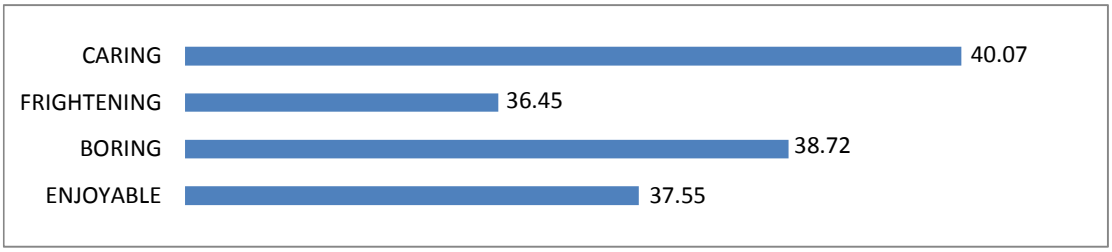


Figure 1.64: Performance by School Ambience

Providing various study support by their schools to students also influenced their learning outcome. The students of schools with the learning environment to be always or often conducive did better than those whose schools were never or only sometimes conducive for learning. Similarly, if the schools always or even often provided easy access to learning facilities, the performance of in Mathematics was better. Those students who were often or always given guidance and advice on their study also did much better than those who were never or given only sometimes. However, while those who often got additional support or remedial measures in their study seemed to do well, those who were always given the additional support and remedial measures did less well.

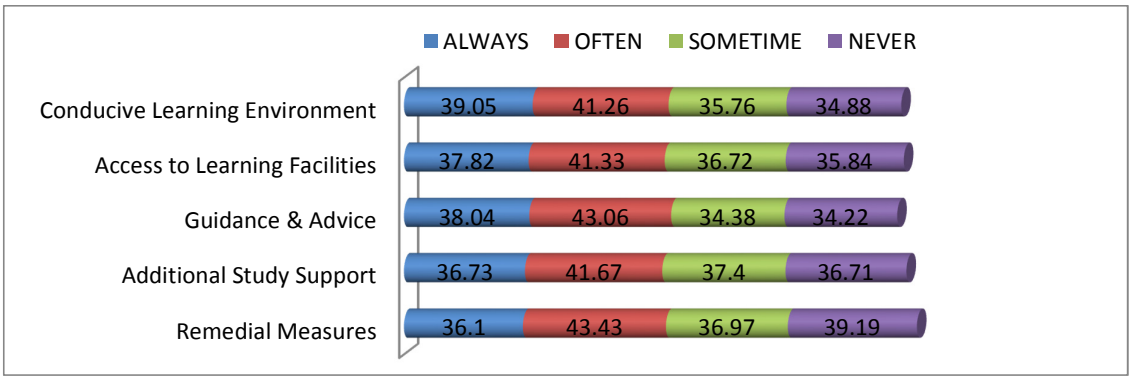


Figure 1.65: Performance by School Support for Study

Independent study between one to three hours per day seemed highly productive for students. However, those who studied independently for less than one hour or more than three hours did less well in Mathematics.

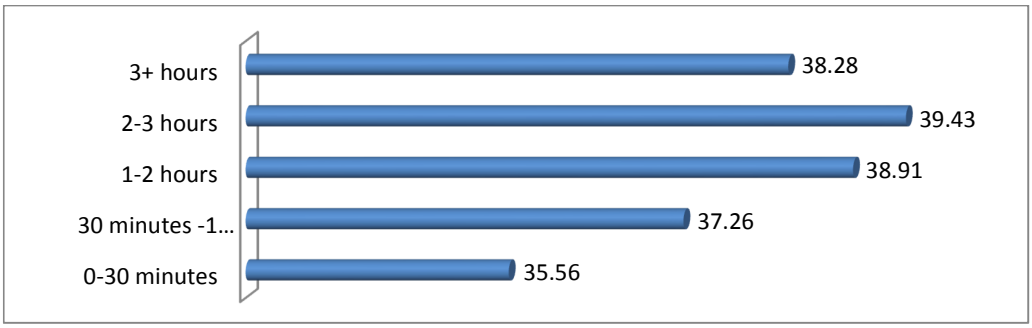


Figure 1.66: Performance by time spent on independent study

Frequency of homework assignment and correction revealed interesting fact about student performance in Mathematics. Those students who were never given any homework in week performed better than those who were given once a week to once a day. On the other hand, those who were assigned more than three times a week did better than those who were given lesser number of homework in a week. Similarly, lesser the home works were corrected by teachers, better was the student performance.

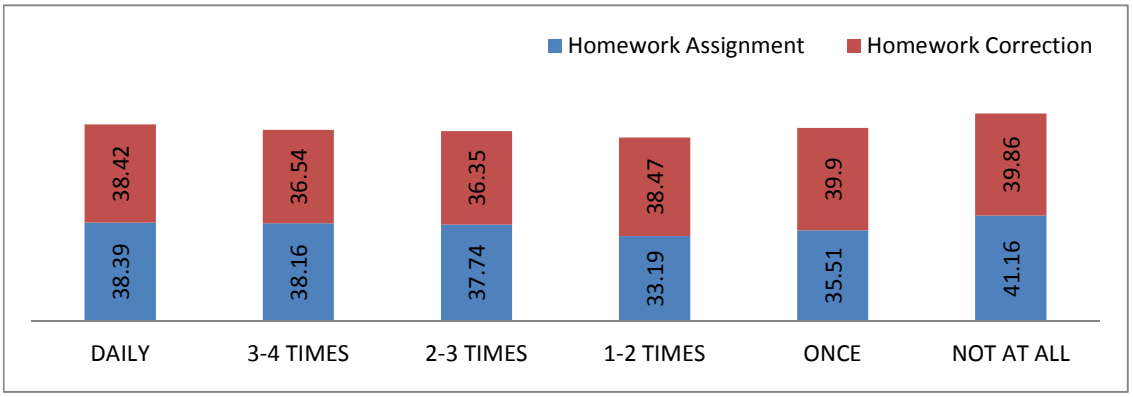


Figure 1.67: Performance by Frequency of Homework Assignment and Correction

Students performed better in Mathematics, if they were never assigned or assigned project work only some times than those who were always given the project work. Those students whose classes were engaged sometime or often in role-play, quiz and debate did better than those who were never or always engaged in them. However, the performance improved as frequency of lecture and classroom discussion decreased in the Mathematics classes.

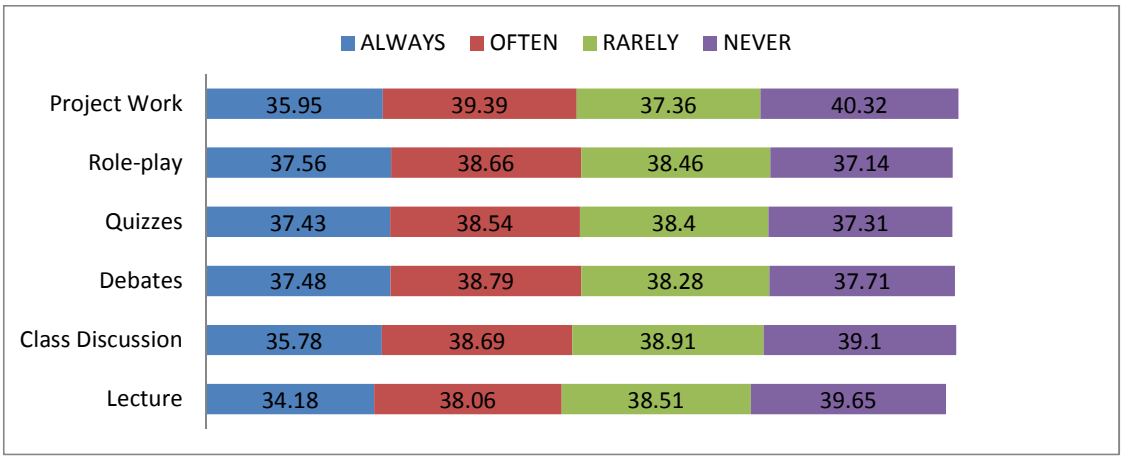


Figure 1.68: Performance by variety and frequency of classroom activities

5.2.4 PERFORMANCE BY VALUES AND ATTITUDE TOWARDS LEARNING

The Class X students of 2013 held various views and opinions on learning of Mathematics which accordingly influenced their performance in it. Those students who liked the subject performed significantly better than those who did not like it. Those who liked the subject, as it was easy or interesting, did better than those who liked it because of the good teachers or because of the interesting teaching.

Figure 1.69: Performance by Liking/ Disliking for Mathematics

Figure 1.70: Performance by reasons for liking Mathematics

The performance was worse for those who found the subject difficult or boring than that of those who did not like it due to boring teaching, bad teacher or its content being heavy.

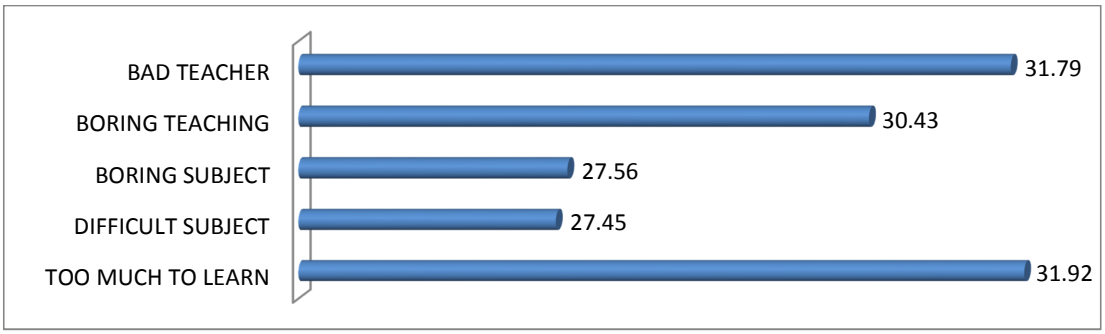


Figure 1.71: Performance by Reasons for Disliking Mathematics

It was very obvious that those who found the various learning strands in Mathematics easy and interesting did much better than those who felt them to be difficult and boring.

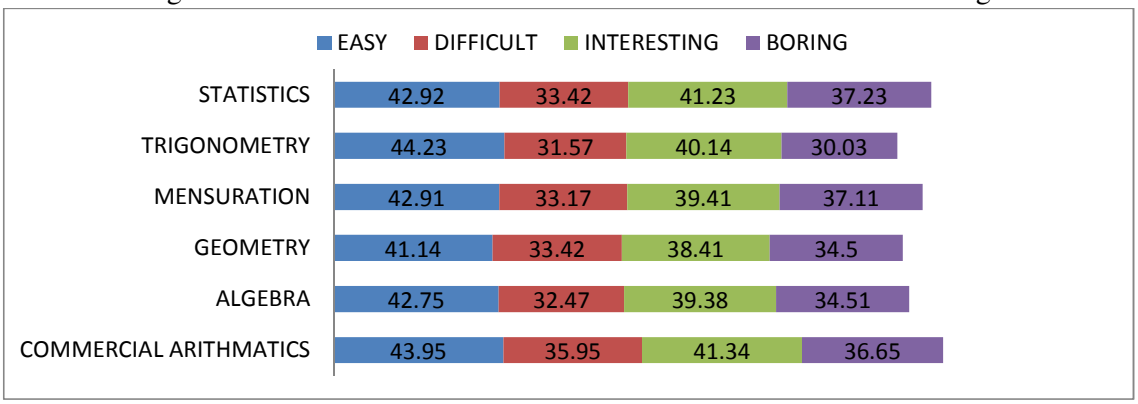


Figure 1.72: *Performance by Student Opinion on Learning Strands of Mathematics*

Student performance in Mathematics was not influenced much by their preference for the nationality of their teachers. However, those who preferred non-Bhutanese teachers did slightly better than those who preferred Bhutanese teachers.

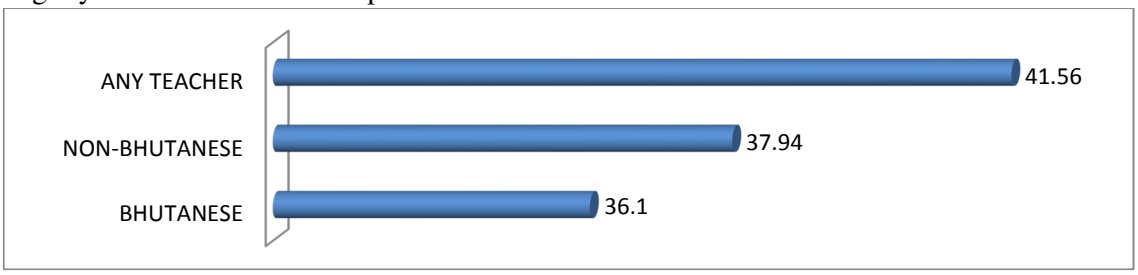


Figure 1.73: Performance by preference of teachers

CHAPTER 6

ANALYSIS OF TEST PERFORMANCE

6.1 ENGLISH TEST PERFORMANCE

The NEA Test in Class X English was divided into Sections A, B and C. Section A contained a prose passage and a poem to read and to answer 6 questions each that followed for 10 marks each with the first 3 items for each of them being MCQ and rest of them short answer question items. Section B contained 13 grammar items for 20 marks with 4 MCQ items, 5 fill-in the blanks and 5 short answer question items. Section C contained required the students to write an essay of 350 words for 20 marks.

In general, student performance in the grammar part was not very good compared to the other two strands of Reading and Writing. The mean score in grammar was only 26.5 whereas in Writing the score was 39.4 and in Reading 38.15.

6.1.1 MCQ ITEMS

The English test had a total of 10 MCQ items out of which 6 items had higher positive discrimination. These items had effectively discriminated between able and weak students. There were 4 items which had moderate positive discrimination ranging from 0.28 to 0.38 and were closer to 0.40 indicating that the items had well discriminated among the multiple ability learners.

6.1.2 SHORT ANSWER QUESTION ITEMS

Unlike the marks awarded in MCQ questions, the item marks for short answer type items in Section A-II (1-3) were distributed unevenly. On the whole, students did not perform well in item 1. Over a thousand students scored 0 in this item. Though the question fell under lower difficulty level, it seemed that most of the students did not really understand the question. The use of the phrase, “you got job?”, in the question could have confused the students and led them to misinterpreting the question. Most students had done fairly well in the other two items (2 and 3).

6.1.3 POETRY SECTION

The performance in poetry under Section A-IV (1-3) was generally weak. Maximum of the students scored 0 (zero) in all the three items. This indicated that the poem selected for the test had been difficult for their level of understanding. While Class X English curriculum requires students to learn and know the figures of speech at this level, it seemed that students lacked the ability in analysing and interpreting figurative language used in poetry. Most of the students failed to identify even the figures of speech used in the given poem. Over 3000 students got 0 out of 2 in this question. This evidence indicated that students did not do enough exercises of this sort.

6.1.4 GRAMMAR SECTION

Though the answers for the item in Section B-II (fill in the blanks) were provided in a table, the students failed to recognize the correct modal verbs and put them in the appropriate spaces provided. While a few of them scored in between 3-5, maximum of the students scored less than 3 out of 5. This indicated that either the usage of modal verbs was not familiar to them or the level of question used was too high for their standard even though the item was based on the requirement of the syllabus.

Students did not perform well in the grammar questions in Section B III (1-5) which required them to re-write sentences using appropriate grammatical rules. While a few students did score full 5 marks, maximum of them scored below 2. It indicated that the respondents did not know the basic rules of grammar. It also actually gave an impression that teaching and learning of grammar did not receive its due importance.

Students also did not do well in the other three grammar items in Section B-IV (1-3) that required students to edit and re-write sentences correctly. Thousands of them actually scored 0 (zero) in all the 3 items. However, compared to the other grammar items, they had done a little better in them. There were also hundreds of them who scored above 2 out of 3. This indicated that editing of sentences was neither too easy nor too difficult for them.

6.1.5 ESSAY WRITING

Majority of the students performed well in this item where students were required to write an essay of about 350 words on the topic: *"What are the major opportunities and challenges facing Bhutan in the near future?"*. However, there were few students who left the item un-attempted. This may have been done intentionally or because of the time limitation as it was the last item. However, there were some students who wrote good essays by expressing their ideas, thoughts and opinions very clearly and also providing very appropriate illustrations and anecdotes. On the other hand, there were few of them who tried their best but made a lot of grammatical errors resulting in the loss of marks.

6.1.6 LEVEL OF THINKING

Student performance in the test by the difficulty level of items indicated that the Bhutanese Class X students are fairly good in remembering and analytical skills. However, they seem to lag in understanding and application skills while not being too bad in creativity, the highest order in the difficulty level. The best performance was in the near top most level of thinking

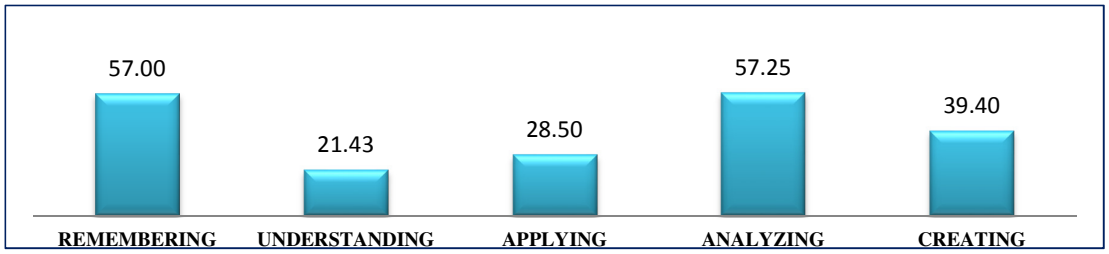


Figure 1.74: Performance based on the cognitive domain

Analysing) with 57.25% mean score and the poorest was in the near lowest level of thinking (Understanding) with the mean of 21.43%). The chart illustrates that that the students performed average in all levels of thinking.

6.1.7 LEARNING STRANDS

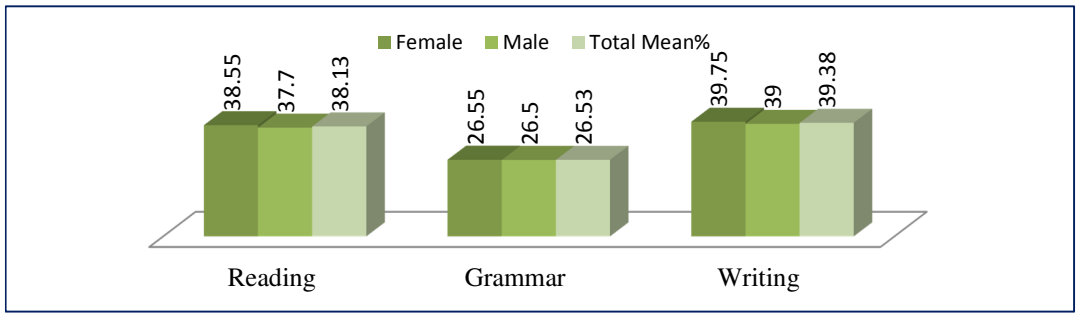


Figure 1.75: Performance by learning strands

While speaking skills testing was beyond the scope of the NEA, the other strands of reading, writing and grammar were covered in the test. The result of the tests indicated that the Bhutanese Class X students are way below average (50%) in all the three major skills of English language. They tend to be slightly better in reading (38.13%) and writing (39.38%) than in grammar. The poor performance (a mere 26.53%) in grammar is quite alarming.

Female students tend to performing slightly better in all the skills compared to male students which could, to some extent, be indicative of the Bhutanese girl students being a little better in English. Though not satisfactorily high enough performance, the maximum mean score for female students was in Writing (39.75%) and the least was in Grammar (26.55%), while the highest for boys was in writing (39%) and the lowest in Grammar (26.5%).

6.2 MATHEMATICS TEST PERFORMANCE

Mathematics test for NEA 2013 Class X contained three sections: Section A containing 10 MCQ items worth 20 marks; Section B with 14 short answer questions for 45 marks and; Section C with 6 long answer type or problem solving questions for 35 marks. All strands of learning: Number and Operations, Algebra, Geometry, Measurement, Trigonometry and Data & Probability were spread over all the three sections.

Though it was again way below average, the overall performance was little better in Mathematics with the mean score of 38.03% on 100. Students had performed better in Number and Operations with 54.38% followed by Trigonometry (42.20%) and Data, Statistics and Probability (39.93). The performance in Geometry was very poor with only 21.90%.

Male students had performed slightly better than female students in all the content strands. These differences between girls and boys in learning Mathematics remained significant in Mathematics (BBE NEA Report, 2006, p.12). Literature review says "disparity in the performance is very high in African countries (Ghana NEA report,2012, p.50)."

6.2.1 MCQ ITEMS

In Section A, there were 10 MCQ items out of which 7 items had higher positive discrimination meaning that the items had effectively discriminated between able and weak students. There were 3 items which had moderate positive discrimination that ranged from 0.35 to 0.39 and were closer to 0.40 indicating that the items were well discriminated among the multiple ability learners. The mean score of MCQ items was 6.29 (out of 20) with the standard deviation of 8.97.

6.2.2 SHORT ANSWER ITEMS

In Section B, there were a total of 14 short answer type items. Among them 11 items fell under moderate difficulty level while 7 items were under difficult items. Students found the items fairly difficult as 53.3% of the scores fell under moderately difficult category and 46.7% of the scores fell under difficult category. The highest score was in Q11b. which was just 69% and the lowest score in item Q22 with just 15%. On an average, students found Section B fairly difficult. There were no easy items in this section. Out of 45 marks, the mean score of the students was 16.3 with the standard deviation of 17.8.

6.2.3 PROBLEM SOLVING/ EXTENDED ANSWER ITEMS

In Section C, there were a total of 6 items broken down into several sub-items. Of them 6 items were under moderate difficulty level and 4 items were under difficult items. Students found the items fairly difficult as 57% of the scores fell under moderately difficult category and 43% of the scores fell under difficult category. The highest score was in Q26a which was 58% and the lowest was in item Q27a with a score of 11%. Students in general found the Section C difficult. There was no easy item in this section either. The mean score in this section was 17.5 out of 35 with the standard deviation of 10.5.

6.2.4 LEVEL OF THINKING

Unlike in English, the performance in Mathematics declined as it went further up the difficulty level of the items. Students performed best in items that involved remembering followed by those that involved applying and creating. Maximum students performed well in

the remembering level of thinking (58%) and performed lowest in evaluating level of thinking (18.67%) items. Over all, students had performed better in lower level of thinkingthan higher level of thinking. Performance of both the genders was also better in items of lower order of thinking than of higher order of thinking.

6.2.5 CONTENT STRANDS

Students seemed to have performed well, that is above 50%, in Number and Operations but very poorly in Geometry with the score below 22%. In Trigonometry, Data and Probability, Algebra and Measurement, students performed at 35-42% score range.

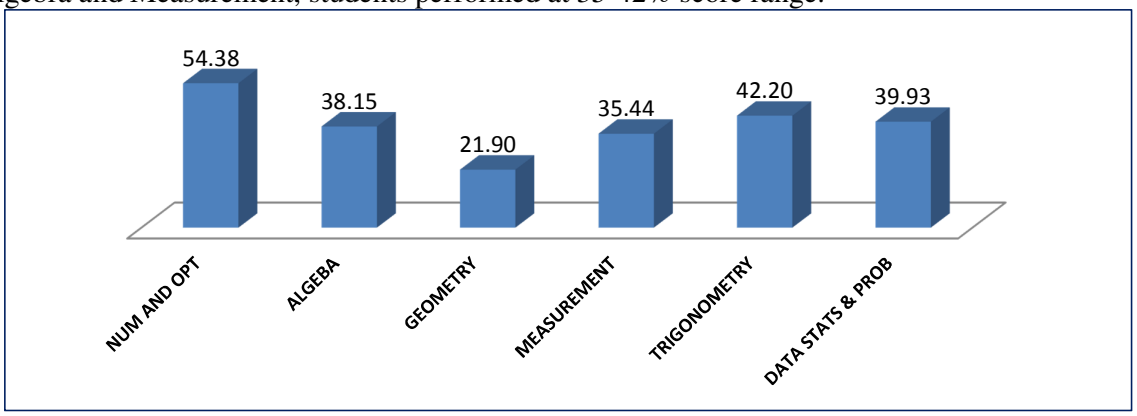


Figure 1.76: Performance by learning strands

6.3 COMPARISON OF PERFORMANCE IN MATHEMATICS AND ENGLISH

Table 1.19: Performance Comparison between NEA Mathematics and English

Sl	Subject	Category	Individual	By Eng	By Maths
1	English	Top 50	66.28	66.28	50.86
2	Maths		86.62	65.8	86.62
3	English	Bottom 50	10.94	10.94	22.86
4	Maths		6	22.72	6

The performance comparison between Mathematics and English was carried out by taking out the top 50 and bottom 50 performers in the two subjects from the total sample population as shown in the table. The top 50 student performers who had an average score of 66.28 in English had an average score of 86.62 in Mathematics. Similarly, the top 50 performers who had an average score of 50.86 in Mathematics had an average score of 65.5 in English. The same trend was found even in the bottom 50 performers in Mathematics and English samples. This indicated that those students who were good in English had an advantage over Mathematics performance but the reverse was not the case.

6.4 PERFORMANCE COMPARISON OF NEA-2013 AND BCSE-2013

Table 1.20: Performance Comparison between NEA 2013 and BCSE 2013

Sl	Type	English	Individual	By NEA	By BCSE
1	NEA	Top 50	66.28	66.28	59.82
2	BCSE		80.36	76.24	80.36
5	NEA	Bottom 50	10.94	10.94	21.52
6	BCSE		33.06	44.68	33.06
Sl	**Type**	**Mathematics**	**Individual**	**By NEA**	**By BCSE**
1	NEA	Top 50	86.64	86.64	80.72
2	BCSE		93.98	88.68	93.98
5	NEA	Bottom 50	6	6	16.08
6	BCSE		24.16	33.02	24.16

The performance comparison between NEA-2013 and BCSE-2013 was carried out by taking out the top 50 and bottom 50 performers in both the programmes in the two subjects from the sample population (5523) as shown in the table given above. The top 50 student performers who had an average score of 66. 28 in NEA-2013 English had an average score of 80.36 in BCSE-2013 English. Similarly, the top 50 student performers who in average scored 86.64 in NEA-2013 Mathematics had scored 93.98 in the BCSE-2013 Mathematics. The trend showed that those students who had done well in NEA had also done well in the BCSE examination in both the subjects and those who had not performed well in NEA had also not done well in the BCSE examination.

Though the performance of these students was much better in the BCSE 2013 examination, their performance in NEA was directly proportional to their performance in the BCSE examination in both the subjects. The national mean for NEA 2013 English was 34.72 whereas the national mean for the BCSE 2013 English was 56.20%. The national mean for NEA 2013 Mathematics was 38.03 and in the BCSE Mathematics examination the mean was 47.19. This indicated that students performed extremely well in BCSE Mathematics Examination than the NEA test. However, for the BCSE Examinations, 20% of CA marks awarded by their schools were added to the final score. The NEA English test was actually conducted out of 60, but for better comparison, the marks scored by the individual students in NEA test were all converted to 100% for easy comparison.

The analysis was based on comparisons as well as the information on the factors and variables gathered from teacher and student questionnaires. The findings derived from various variables of the teacher and student information which was cross-tabulated with the test performance score had been dove-tailed to make the gist of this chapter.

A slight improvement in the student performance in English and a slight decreased in the performance in Mathematics was detailed in the chapter. There were also variations in the performance based on type and difficulty levels of items and learning strands of the two subjects. Difference in the student performance on different level of thinking, on different skills, on different content standards and gender difference were discussed in this chapter.

CHAPTER 7

DISCUSSIONS AND RECOMMENDATIONS

This chapter describes some theoretical issues related to test and item characteristics, correlation among the subtest and highlight the discussions on the time series analysis of NEA test over the years. It will also describe in-depth the discussions on findings and some recommendations based on the findings from various variables from teacher questionnaire, student questionnaire and the test performance. It will also describe the limitations and recommendations for future NEA test.

7.1 SOME THEORETICAL ISSUES

Test and item characteristics are important issues in Classical Test Theory (CTT). The main test characteristics according to CTT are the reliability of a test. The reliability of a test can be estimated in various ways. One such way is by finding Cronbach's coefficient(α) as an estimate to determine the reliability of a test. Given variable x_1, …, x_k and $x_0 = \sum_{j=1}^{k} x_k$, Cronbach's alpha is defined as

$$\frac{k}{k-1}\left(\frac{\sum_{i \neq j}^{k} cov(x_i, x_j)}{var(x_0)}\right) = \frac{k}{k-1}\left(1 - \frac{\sum_{j=1}^{k} var(x_j)}{var(x_0)}\right)$$

A commonly-accepted rule of thumb is that an alpha of 0.7 (some say 0.6) indicates an acceptable reliability and 0.8 or higher indicates a good reliability. Very high reliability (0.95 or higher) is not necessarily desirable, as this indicates that the items may be entirely redundant. The p value (mean score divided by maximum score) and item-test correlation coefficient(r) are used to determine the main characteristics of the item. The p-value represents the proportion of examinees responding in the keyed direction, and is typically referred to as item difficulty.

7.2 DISTRIBUTION OF ENGLISH TEST SCORES

Table 1.21: Statistical Descriptive of English Test

Mean	SD	CV	Min	Max	N	No of Items	Avg. P Value	Cronbach's (A)
34.72	10.39	29.93	10	84	5473	26	0.35	0.84

Some descriptive statistics of the English test given in the table above represents the number of student taking the test, the minimum score and maximum test score, number of items, and the mean, standard deviation , covariance and average p value and coefficient alpha(α).

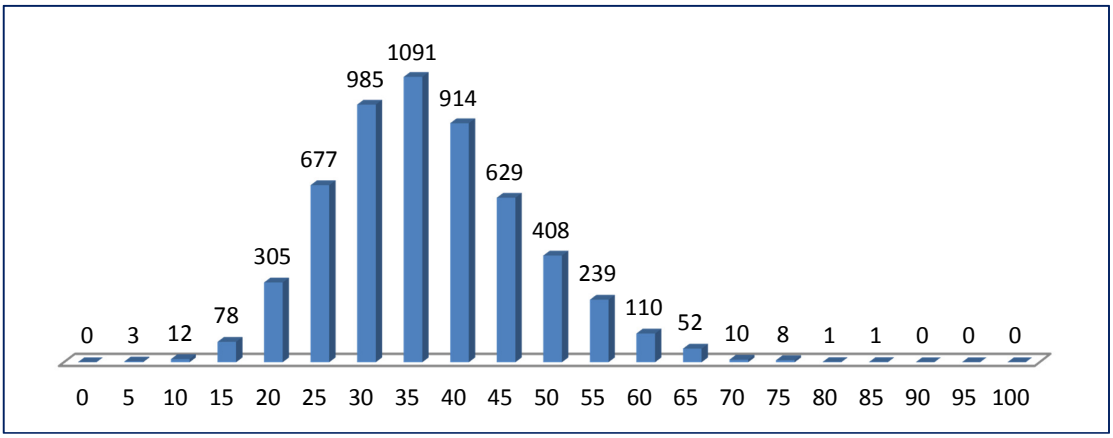


Figure 1.77: Distribution of Scores in English Test

In the chart given above, the distribution of the scores on the English test is displayed. This distribution is highly positively skewed, with fewer scores on the higher end of the scale. These results mean that the test was difficult for the students in Class X. Whether this is due to low cognitive ability or difficulty of items is an issue for debate.

Overall, item analysis showed great test validity with Cronbach's coefficient (α) of (0.8424). In terms of item difficulty, the p-value of (0.3472) suggested that items were difficult but acceptable within the abilities of the students.

7.3 CORRELATION AMONG SKILLS IN ENGLISH

Table 1.21: Pearson Pair Wise Matrix Correlations among Performance in Tested Learning Strands

Learning Strands	Reading and Literature	Language	Writing
Reading and Literature	1	0.52	0.46
Language	0.52	1	0.38
Writing	0.46	0.38	1

The correlation coefficient for each variable appears at the intersection of one variable's row and the other variable's column. The above table shows the relationship between the performances of the students on three skills by considering pair wise correlations coefficients. The performance in reading skills of the students correlates (0.52) strongly with the performance in their language skills. A moderate correlation exists in the performance across other skills. The fact that all these correlation coefficient had positive values indicates that the performance increase in one skill increases the performance corresponding to the other skill. Moreover, the positive correlation among the subtests indicates that there exists greater internal consistency of these items.

7.4. DISTRIBUTION OF MATHEMATICS TEST SCORES

Table 1.22. Statistical Descriptive of Mathematics Test

MEAN	SD	CV	MIN	MAX	N	No of Items	Avg P Value	CRONBACH'S (A)
38.03	18.27	48.04	0	92	5581	35	0.38	0.89

Some descriptive statistics of the Mathematics test given in the table above illustrate the number of student taking the test, mean, standard deviation, coefficient covariance, minimum score, maximum score, number of items, average p value and Cronbach's alpha(α).

In the above chart, the distribution of the scores in Mathematics test is displayed. This

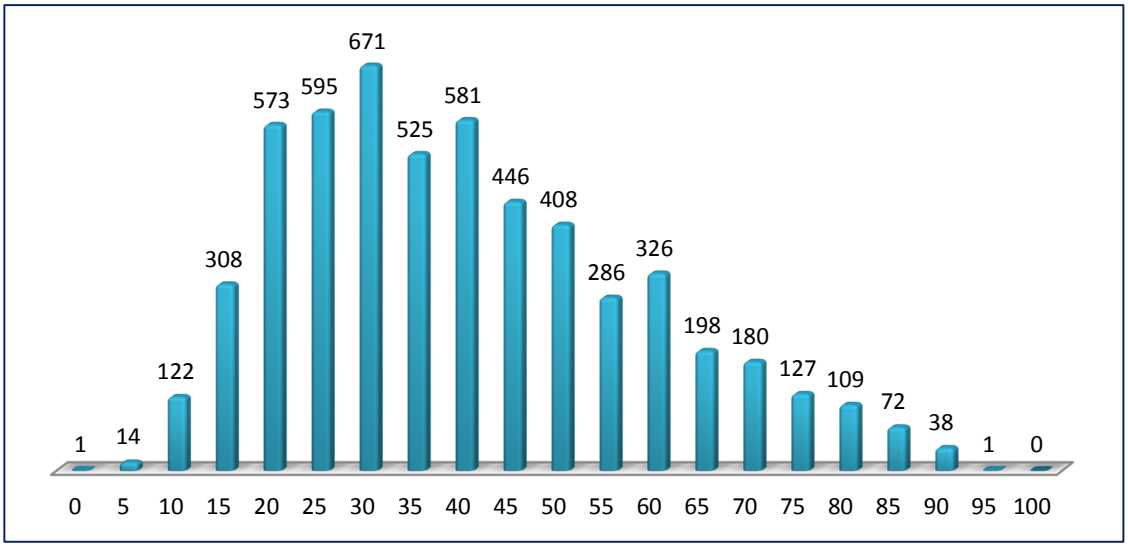


Figure 1.78: Distribution of Mathematics test scores

distribution is slightly positively skewed, with fewer scores on the higher end of the scale. It can be concluded that the Mathematics test was relatively difficult compared to the cognitive ability of the students, because the mean score is well below the mean score the range of 50.

Overall, item analysis showed great test validity and internal consistency with Cronbach's coefficient (α) of 0.89. In terms of difficulty, the p- value of (0.3803) suggests that the items were difficult but acceptable within the abilities of the students.

7.5 CORRELATION AMONG MATHEMATICS SUBTESTS

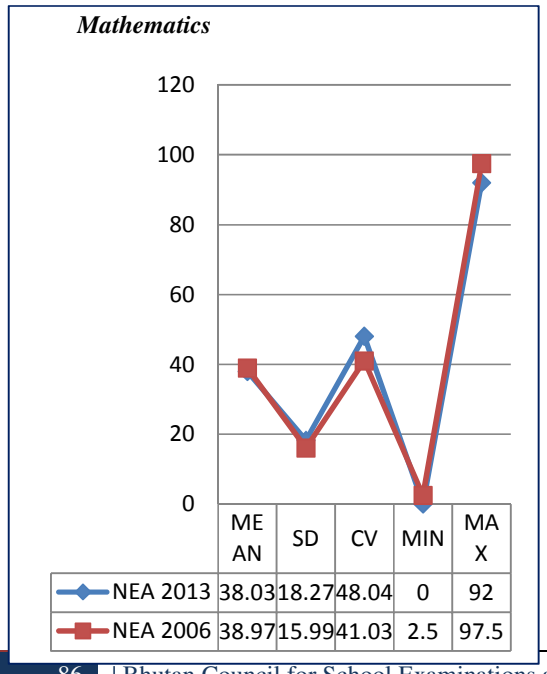
Table 1.23: Pearson pair wise matrix correlations among the performance on content strands

Learning Strands	Number & Operation	Algebra	Geometry	Measurement	Trigonometry	Statistics
Number & Operation	1	0.55	0.31	0.47	0.48	0.45
Algebra	0.55	1	0.47	0.71	0.69	0.62
Geometry	0.31	0.47	1	0.44	0.43	0.35
Measurement	0.47	0.71	0.44	1	0.63	0.57
Trigonometry	0.48	0.69	0.43	0.63	1	0.55
Statistics	0.45	0.62	0.35	0.57	0.55	1

The correlation coefficient for each learning strand appears at the intersection of one variable's row and the other variable's column. The above table shows the relationship between the performances of the students on five content strands by considering pair wise correlations coefficients. The performance of students in Algebra correlates strongly with their performance in Measurement (0.71). Similarly, the performance in Measurement correlates strongly with the performance in Algebra (0.71). A moderate correlation exists in the performance across other content strands. As in the case of English, the fact that all these correlation coefficients have positive values indicates that the performance increase in one content strand increases the performance corresponding in the other content strands.

7.6 COMPARISON OF NEA 2006 AND NEA 2013 RESULTS BY TIME SERIES ANALYSIS

As mentioned earlier, the NEA test was first administered in 2006 (Class X English and Mathematics) and the second round was administered in 2013 (Class X English and



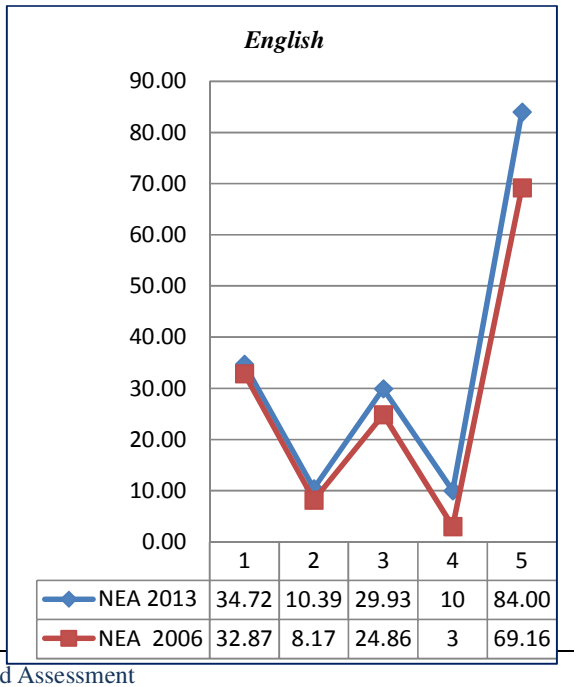


Figure 1.79: Performance comparison of 2003 and 2006

Mathematics). From the psychometric context, there were several data required for comparing the performance of these two tests. However due to data constraints of past NEA test, only qualitative conclusion was possible. The graphs given above indicate the stability in the overall assessment and student ability. This stability was due to similar test items over time. Looking at the individual information, differences appeared between English and Mathematics. The overall mean performance in English had improved between 2006 and 2013 whereas the performance in Mathematics showed a slight decline between 2006 and 2013.

7.8 ACHIEVEMENT CUT POINTS: MINIMUM COMPETENCY AND PROFICIENCY

The students who scored 35% or higher are defined as having reached the *minimum competency and* student scoring 55% or hiher are defined as having reached *proficiency* level. Thirty-five percent originally was set as the minimum competency which was regarded as pass mark in BCSE examinations. Note, however, that international standard generally classifies students as proficient if they achieve a minimum score of 70% as per PASEC assessment [1](Ghana NEA report, 2012), implemented by consortium of francophone countries.

Table 1.24: Percentages of Minimum Competency and Proficiency Levels

Test score cut point	Percentage of Students	
	Mathematics	English
Minimum competency (Score>=35%)	**50.63%**	**48.03%**
Proficiency (Score >=55%)	**19.26%**	**4.27%**
Score< 35%	**49.37%**	**51.07%**

The statistics given above shows that students performed better in Mathematics than in English test as a large number of students were able to achieve competency and proficiency in Mathematics tests. Slightly over half of the Class X Mathematics students achieved minimum competency (50.63%) while 48.03% achieved minimum competency in English. A much smaller fraction of students achieved proficiency levels in both the subjects.

7.9 IMPLICATIONS

The findings such as the ones mentioned above have implications on all policy, resource allocation, curriculum development and teacher training, school locations and classroom teaching.

[1] (PASEC) aims at providing information about the evolution of education systems' performance, to contribute to the development and monitoring of education policies.

Students are the centre of all plans and policy, resources allocation and efforts of school education programmes with the ultimate aim of improving their learning outcomes. Findings from this assessment indicate a numerous issues that impact student performance.

7.9.1 ENGLISH TEST

The following problems need to be addressed to improve the student learning outcomes in English:

Students should:

- be made thoroughly familiar with the English syllabus,
- develop reading habits,
- develop habits of studying independently for 2-3 hours daily, after school hours.
- appropriately guided by their parents in their studies,
- be discouraged from taking tuitions (specially paid tuitions),
- develop a good rapport with their teachers.
- practice independent reading of essays, poems, etc., and
- be given to consciously learn and practice grammar.

Teachers should:

- read and orient themselves with the English Curriculum Framework from PP – XII to be able to understand that the grammar portion needs to be learnt by the students at the given level,
- give equal emphasis on grammar teaching and literature teaching in the class,
- not entirely depend on the text books for teaching but also make use of audio-visual aids in their teaching process,
- plan and rationalize frequency of homework assignment and correction,
- provide students with adequate practice on answering higher order thinking questions,
- give students enough reading and writing practice on unseen texts, and
- read more.

Schools should:

- provide teachers with adequate teaching-learning materials.
- facilitate teachers in getting maximum professional support in teaching skills and content knowledge through regular conduct of SBIP on teaching-learning process and,
- encourage teachers in the effective use of available resources besides text books.

Ministry of Education should:

- further reduce walking distances between children's homes and schools particularly in the remote and difficult areas,
- consider allocating more resources for schools in rural areas, and

- facilitate in providing more support for children of farmers and national work force.

7.9.2 MATHEMATICS TEST

Students should:

- develop positive attitude, interest and liking for Mathematics which can lead to greater effort and higher achievements,
- practice mental Mathematics for simple calculation,
- develop habits of studying up to 3 hours daily, after school hours,
- be made to write in mathematical terms clearly and without errors what they are already good at such as their ability to organize, record and interpret the mathematical phenomena, and
- imbibe connections skills in students to be able to recognize and apply mathematical ideas in their real life scenarios.

Teachers should:

- pay more attention on the content strands of measurement and geometry especially in constructions and drawing,
- be familiar with Bloom's Taxonomy and use it while framing items,
- encourage students to do simple calculations without using calculators,
- keep provision for extracurricular activities to enrich the mathematics learning that could include:
  - special extra lessons and remedial classes,
  - Mathematics clubs,
  - display or exhibitions,
  - production of a magazine or periodical,
  - competition or contests, etc.
- Clear students' misconceptions across all the strands in mathematics, Misconceptions are a problem with understanding, not with fluency or memory of the students when they do not get certain concept correct. Therefore, concept must be taught properly in the classroom.
- Teach students how to express the mathematical phenomena in mathematical terms clearly and without errors,
- develop in students the skills that require making connections skills to recognize and apply mathematical ideas in their real life scenarios, and
- not teach Mathematics in isolation and focus on relating the concept of Mathematics in the real life situations where ever possible.

Ministry of Education, Curriculum Developers, Teacher Trainers and schools should:

- make the text book more detailed that requires teachers and learners to promote certain level of mastery of key concepts before moving to next lessons,
- facilitate in providing adequate teaching learning resources in mathematics (Text books, algebraic tiles, geometric models, geometric box, etc.),

- ensure that all students have access to technology (NCTM[2]) and train teachers on the uses of different mathematics software (Geogebra, Zgrapher, sketchpad, GrapCalc, spreadsheet, etc) which will help them to develop student understanding, stimulate their interest, and increase their proficiency in Mathematics,
- Provide adequate training to teachers on building their understanding on the proficiency strands of mathematics (problem solving, reasoning and proof, communication, connections, representation, etc.) as these are the building blocks behind the power of curriculum,
- Continuously train and revalidate the content knowledge of teachers ('the to teach') based on content stands of Mathematics curriculum in order to help them in solving the problem of student misconception,
- Provide mathematical Pedagogical skills on teaching and learning of mathematics that caters to the needs of 21st century learners,
- Review Class X and XI Mathematics curriculum to address the issue of logical progression and vertical alignment in some content strands,
- Provide timely orientation to the teachers on teaching of new curriculum through appropriate trainings and workshops,
- reduce the gender gap in Mathematics, programs and manual could be reviewed to include more girl-friendly content, and maths teaching to girls be emphasized, and
- include gender issues by modifying teachers' representation and persistent stereotype of girls being less talented in Mathematics.

7.10 LIMITATIONS AND RECOMMENDATIONS FOR FUTURE NEA TESTS

- Typographical errors were common in the 2013 assessment in all forms. Errors in symbols and number to specific questions might have confused students. Typographical errors led to misinterpretation of questions, multiple correct answers, and other situations. **Quality control protocols (QCP)** are important when instruments are designed for nationwide ability assessment.
- In any ability-measurement situation, test designers must follow curriculum guideline and strict criteria to ensure that items are constructed appropriately to target the ability construct of interest, also known as **face validity.**
- Number of items in the test must be consistent and the test weighting must be consistent for all subjects in the test. For example, English test was out of 60 and Mathematics test was out of 100. It is important to have **equal weighting** for both the tests.
- Same NEA items could be used in future NEA test or a minimum of 20% **common anchor** items could be used so that it provides the information needed for trends analysis.
- Include Progress in International Reading Literacy Study (PIRL) and Trends in Mathematic Study (TIMSS) items in order to produce **international comparisons/ benchmarking**.

NCTM[2]: NCTM is the public voice of mathematics education, supporting teachers to ensure equitable mathematics learning of the highest quality for all students through vision, leadership, professional development, and research.

- Design questions that **evaluate single skill** so that result is more easily interpretable.
- Test items, student and teacher questionnaires need to be **triangulated** in order to relate the performance of the students with the teacher findings.
- Some items in the student and teacher questionnaires must be relooked in terms of their validity and **redundancy**.
- **Randomize** the population at the school level so that it gives more valid sample for the study and also inform the schools well in advance so that the students are mentally prepared.
- Test administrators must be well oriented before the conduct of NEA test so that they can brief the students well and also the students write the test with some **degree of seriousness.**
- Some parameters such as dropout students, school management system, attendance of the teachers, etc. could be included in the questionnaire.
- Professional development on statistical analysis and data interpretation need to be enhanced in order to carry out NEA successfully.

7.11 GENERAL RECOMMENDATIONS

- Reduce class size to make teaching learning more effective and to make resources available to every student.
- Schools must ensure that the teachers are given adequate number of periods so that they could qualitatively complete the prescribed syllabus on time. Workload need to be distributed equitably among the teachers.
- Make lessons interesting and interactive by using varieties of teaching learning materials.
- Both verbal and written feedback must be given on the student homework.
- The ministry should consider allocating more resources for schools in remote and rural areas.
- Facilitate the provision of more support for the children of farmers, arm forces and national work forces.
- Schools should pay equal attention and provide equitable support to both girls and boys in their learning.
- Sensitise students on importance of each subject so that they like all subjects equally.
- Provide professional and timely support to the schools and teachers from the responsible agencies through frequent in-service workshops on content knowledge validation, teaching skills, effective assessment practices and use of ICT in teaching learning process.
- Parental concerns and their guidance are required in influencing their children's learning outcome. Sensitize parents on how to support their children in their learning.
- School's physical and social ambience must be made conducive in order to make students learn comfortably and perform better.
- Schools must give study support by providing remedial classes, additional study measures, guidance and advice, access to learning materials and creating conducive learning environment.
- Find out why teachers feel that the BCSE examination should carry full 100 marks without internal assessment marks from the schools.
- Continuous assessment and summative assessment for Class X need to be rationalized.

- Develop clear Continuous Assessment policies across all subjects at Class X with rubrics for 20 marks.

The final chapter presented the detailed discussions and recommendations arising out of the findings. It presented recommendations pertaining to the policy implications on curriculum development, teacher trainings, resource allocations and advise to students. Further, the chapter also drew up a list of limitations and recommendations from the study and points to be noted for the future studies.

REFERENCEs

1 B, H. (1980). *History of Bhutan Land of the Peaceful Dragon.* Thimphu: MOE, Royal Governmnet of Bhutan.

2 BCSEA. (2004). *National Education Assessment Report-2004* . Thimphu: BCSEA.

3 BCSEA. (2011). *National Education Assessment In Bhutan* . Thimphu: BCSEA .

4 Education, M. o. (2013). *Ghana National Education Assessment Report.* Ministry of Education , Ghana.

5 Examinations, B. B. (2006). *National Education Assessment class 10 Mathematics and English Report.* Thimphu: BBE, Ministry of Education.

6 Foster, M. (1980). A Policy Maker's Guide to System-wide Assessment Programs . Melbourne,Victoria, Austrila: Austrilan Council for Educational Research.

7 MOE. (2013). *General Statistics.* Thimphu: Policy and Planning Division.

8 N.G., DAS . *Statistical Methods.* Calcutta: N.G .DAS.

9 Kellaghan, T., and Greaney, V., 2001. Using Assessment to Improve the Quality of Education. Paris: UNESCO: International Institute for Educational Planning.

10 National Assessment of Educational Progress (NAEP), 2011 and 2013 Mathematics and Reading Assessments. http://nces.ed.gov/nationsreportcard/mathematics

ISBN: 978-99936-635-4-6