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‘Fostering Excellence in Teacher Education’

**COMPILATION OF RESEARCH STUDIES
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Research Works (2019-2020)

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ACTION RESEARCH REPORT
ON
STUDY ON READING PROFICIENCY IN ENGLISH
AMONG THE PRE-SERVICE TRAINEES OF
DIPLOMA IN ELEMENTARY EDUCATION
DIET, EAST, 2019

**STUDY ON READING PROFICIENCY IN ENGLISH OF D.EL.ED PRE-SERVICE TRAINEES OF
DIET, EAST**

Abstract

Reading is one of the five skills which need to be learned besides listening, speaking, writing and thinking. Reading has the considerable role in the language teaching to strengthen the skills which are acquired by the students in listening, speaking, and writing (Maxom, 2009: 139). Reading skill affects the other skills learning process.

Reading is a major requirement for students. Reading is a window to the world, its means by reading we can find out so much information or knowledge as possible. Reading as a source of knowledge and reading is as a reference source. Reading is the process of finding a variety of knowledge, with a lot of reading will train students to think critically, both for class or the outside. Reading make the students be able to imagine and squirt out in the form of written or the other. "Logic will get you from A to B. Imagination will get you everywhere."-Albert Einstein. .

Many researchers have found that teaching reading strategies is a key element in developing student comprehension. Therefore, the study or action research is an attempt to study on reading proficiency in English of D.EL.ED pre-service trainees of DIET, East and help them to improve in reading in English after

the interventions. This study also helps the trainees to enhance their self-esteem and confidence which ultimately going to help them in their teaching learning process. The various methods, different activities, rhymes, songs, talk or speech & videos used during the process of study can be used in their real life teaching in near future.

Key words- proficiency, confidence, comprehension, strategies, knowledge

INTRODUCTION

Reading skills is the ability of an individual to read, comprehend and interpret written words on a page of an article or any other reading material. The possession of a good reading skill will enable the individual to be able to assimilate a written work within a short period while reading. According to Nuttal (2000:2), reading means a result of interaction between the writer's mind and the reader's mind. It is the way how the reader tries to get the message or the intended meaning from the writer. In this process, the reader tries to create the meanings intended by the writer; the reader can get the point.

There are two kinds of reading involved in the process of reading -Reading aloud and Reading silently. Reading aloud is a very effective means of teaching and improving the sub skills of pronunciation, enunciation, intonation and reading with expression.

Silent Reading is the final stage of learning reading skill. This is the skill that we need not only for language learning but for other subjects also. Students will never be able to use their time in such subjects to the best advantage until they have learned the art of silent reading. As a matter of fact this is the skill which one needs throughout one's life. The chief aim of silent reading is the absorption of the idea in the passage. It is a method of concentrating on the significant idea of the passage.

The four main types of reading techniques are the following:

- Skimming- slow and careful detailed study of text
- Scanning- few important details are sought, its casual and fast
- Intensive- reading at one's fastest speed wishes to cover material in a hurry
- Extensive- read to find answer to a specific question

Reading is an essential skill for language learners. When your reading skills improve, your listening, speaking and writing skills improve too. Here are some of the specific reasons why English learners are encouraged to read in English:

- The constant repetition of words and patterns in reading helps you learn and remember vocabulary and grammar structures.
- Reading helps you become familiar with the rhythm of English. Over time it will start to feel natural and you will notice when a sentence or phrase doesn't seem right.
- Unlike conversation, reading is something you can do on your own.
- Good reading skills can improve your other language skills. You need to learn to read before you can write.

NEED & SCOPE OF THE STUDY

Reading is one of the five skills which need to be learned besides listening, speaking, writing and thinking. Reading has the considerable role in the language teaching to strengthen the skills which are acquired by the students in listening, speaking, and writing (Maxom, 2009: 139). Reading skill affects the other skills learning process.

However, based on the preliminary observation in 1st and 2nd year batches, the trainees found out that reading is the most difficult skills to master. They lack reading proficiency on English.

Therefore, this study or action research is an attempt to understand the lack of confident on reading proficiency in English by 1st and 2nd years D.EL.ED pre-service trainees of DIET, East and help them to build their confidence on reading English after the interventions. Further, the various methods, different activities, rhymes, songs, talk or speech & videos used during the process of study can be used in their real life teaching as well as real life situation.

OBJECTIVES

1. To develop reading proficiency in English by D.EL.ED trainees of 1st and 2nd years of DIET.

2. To imbibe the strategies of developing proficiency on reading skills in their teaching practices.

METHODOLOGY

Tools

1. Pre test and post test.
2. Discussion notes on the following topics- 'Definition of language, Importance of Language. Definition of Reading and its important (Annexure -1)
3. Used different journal like- magazine, story book, news papers, auto biography and D.EL.ED materials.
4. Used audio, videos, talk/speech on english.

Sampling

Total 87 trainees of 1st and 2nd year D.EL.ED course were selected for the study.

Course of action

Pre-test was conducted for eighty seven trainees of 1st and 2nd year, Diploma in Elementary Education. During the pre- test they were asked to read the text book of class VIII. Secondly, they were simply asked to read the headlines of the news papers and some portion of it. After the observation or evaluation of pre-test, it was found that the performance of the most of trainees were below average as they lack proficiency in reading skill (English). Accordingly intervention was done to bring desirable improvement. The following steps were taken for the interventions-

1st Phase

- Discussion on Importance of Language and language skills.

- Definition of Reading, types of reading, strategies of reading, importance of reading were discussed.
- English rhymes and songs were played, shown and sung for motivation.
- Practice reciting poems of classes I – V with tunes, for better pronunciation. Firstly, it was done group wise after that peer wise and then individual recitation.

2nd Phase

- The trainees were asked to underline all the words from classes I to III English textbook which they found difficult to pronounce it.
- The trainees learnt to break up words into syllabus and practiced sound of the words.
- Trainees practiced those words which help them to read the contents of textbook fluently.
- Similarly, the trainees were asked to underline all the words from classes IV to V English textbook which they found difficult to pronounce it. Words were practiced to pronounce which ultimately help them to read the contents properly.
- Reading of those chapters would help our trainees during practice teaching as well as in real life teaching.

3rd Phase

- In the third phase trainees were asked to underline difficult words from classes VI, VII, and VIII English textbook which they found difficult to pronounce it. Words were practiced to pronounce and reading session was conducted.
- Audio video was used to practice pronunciation.
- Short motivational talks were exposed for better pronunciations and confident.

4th Phase

- Different journal were used to practice reading. Such as story, fiction /non fictions, auto biography, and their own D.EL.ED materials.

- News readings, advertisement, report readings were practiced.
- Individual reading was done in regular basis.
- Regular sharing of new words with correct pronunciation along with the meaning was shared by the students/trainees regularly to enhance their vocabulary which ultimately contributes for better reading.

EVALUATION

1. After the series of intervention, post-test was conducted in which the trainees were asked to read text book of class VIII.
2. Trainees also read the headlines of the news papers and some portion of it.

FINDINGS

The result of post test for study on Reading Proficiency in English among the Pre-Service trainees of Diploma in Elementary Education, DIET, East has shown the vast improvement. Given below is the chart showing the improvement after the interventions.

CHART SHOWING THE SCORE OF PRE-TEST AND POST-TEST

2nd Year Trainees

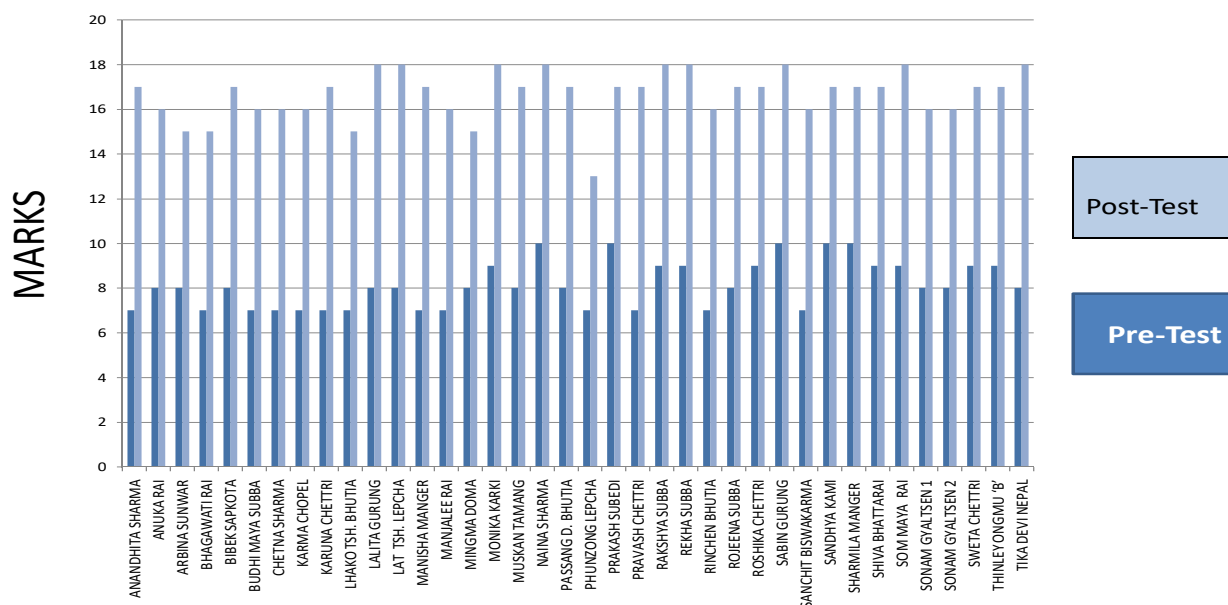


CHART SHOWING THE SCORE OF PRE-TEST AND POST-TEST

1st Year Trainees

RECOMMENDATION

Reading is one of the five skills which need to be learned besides listening, speaking, writing and thinking. Reading has the considerable role in the language teaching to strengthen the skills which are acquired by the students in listening, speaking, and writing. Reading skill affects the other skills in learning process. Reading is an exercise in language learning. Hence, lots of practice is needed to master on the reading skills. This study or action research is an attempt to develop Reading Proficiency in English among the Pre-Service trainees of Diploma in Elementary Education, DIET, East and help them to build confidence on reading. The different methods, activities, rhymes, songs, talk/ speech, and videos used in this action research can be used further with the other trainees as well as the schools' students to bring desirable improvement in their reading skills.

Following recommendations are suggested to develop reading skills.

- Ample opportunities should be given for reading before starting the lesson.
- Encourage group reading, peer reading and individual reading.
- Need to practice breaking up words into syllabus and practiced sound of the words.
- Encourage to read story books, news papers and other journals.
- Motivational talk, short inspiring movies and interesting videos can be shown which help them to develop their pronunciation along with other skills.
- Regular sharing of new words with correct pronunciation along with the meaning can be shared by the students/trainees regularly to enhance their vocabulary which ultimately contributes for better reading.

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- News papers local and national
- Text book of English classes I – VIII

ANNEXURE -1

DEFINITION OF LANGUAGE

- LANGUAGE learning plays an important role in the all round development of a child because it is through language that the child learns all other school subjects. English language occupies a place of greater importance in the school curriculum.
- A systematic means of communicating by the use of sound or conventional symbols.
- The definition of language is how we communicate with words. It is also the speech of group of a people or country, either written or spoken

- A language is considered to be a system of communicating with other people using sounds, symbols and words in expressing meaning, idea or thought. The language can be used in many, primarily through oral and written communication as well as using expressions through body language.
- Language is the expression of ideas by means of speech sound combined into words.
- Language is that system by which sounds and meanings are related. (Fromkin and Rodman, 1974)
- Language is the most sophisticated and versatile means available to human beings for the communication of meaning. (Brown, 1984)
- Language is a system of sounds, words, patterns, etc. used by humans to communicate thoughts and feelings. (Oxford advance learner's dictionary, 1989)

IMPORTANCE OF ENGLISH LANGUAGE

- English- Link Language.
- Global Language.
- Language of Science & Technology.
- Language of Trade, Industry & Administration.
- International Language.
- Lingua franca of the world.
- Library Language.
- A Window to the World Knowledge.
- A Foreign Language Already Known to Indians A Rich & Beautiful Language.
- International Language- First Language of UK, USA, Canada, Australia etc.
- Second Language – India, Russia, France, Pakistan International etc.
- A Window to the World, The gateway to the Thoughts and Culture “Anyone who can read English can keep in touch with the whole world without leaving his own house.” F. G. French

PHOTOS OF DIFFERENT ACTIVITIES



Title of the study: A STUDY ON ‘ATTITUDE TOWARDS MATHEMATICS AMONG STUDENTS OF EAST

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DISTRICT'

ABSTRACT

This study examined attitude towards mathematics among students of East District.

Objective of the study:

- To estimate the levels of attitudes of pupils towards mathematics along a five point category component wise and totally.
- To investigate the attitude of students towards mathematics in relation to sex variation.
- To estimate the attitude of students in relation to local variation.

The study used both quantitative and qualitative research designs to collect and analyze the data. Data was collected through questionnaires. The information from the questionnaires is presented in figures and percentages, in tables and graphs while the information obtained from interviews are analyzed using qualitative techniques. Quantitative data has been analyzed using the statistical software package for social sciences (SPSS). The findings of the study show that with reference to different components like, wider applicability, development of skills, reasoning, objectivity, intellectual development, non-intellectual development, individual outlook and universal outlook in relation to sex variation and local variation. The importance of the study of students' attitude towards mathematics in education being well acknowledged, there is much scope for carrying out further research in this field. Based upon this experience in carrying out the present study the investigator thought it to be worthwhile to put forth some suggestions which might be helpful in carrying out further investigation to throw some more light on this important aspect of learning.

INTRODUCTION

1.1 Background of study

All men by nature desire to know about his world have led him from primitive superstition to modern scientific knowledge and hence the process of scientific enquiry has become the prevailing method of behavioural science. This scientific enquiry is a more systematic activity directed towards discovery and the development of an organized body of knowledge.

Hence, it can be said that the development of any society or nation mostly depends upon how much knowledge. It has built or accumulated. This fact cannot be denied by any rational being. An assessment of the progress or the development achieved by a society or nation can thus be made as by seeing how much effort and resource have been spent on different branches of knowledge. For the full fledged development of the society the exploration of the every bit of the vast storage of knowledge is essential. A particular knowledge of a specific branch may be the basis for developing all other know ledges which helps in realizing the ultimate goal of the nation and humanity as such.

Mathematics is *defined* as the science of quantity and space. It is systematized, organized and exact branch of science. It is the numerical calculation part of man's life and knowledge. It helps man to give exact interpretations to his various ideas and conclusions. It is a science of logical reasoning and numerical problems. It deals with the quantitative facts and relationships as well as with problems involving space and forms.

The primary purpose of the teaching of mathematics should be to develop those power of understanding and of analysing relations of quantity and of space which are necessary to into and a control over our environment and to an appreciation of the progress of civilization in its various aspects, and to develop those habits of thought and of action which will make these power effective in the Alive of the individual.

1.2 Importance of mathematics teaching at the secondary school level

In these worlds of today there is not any person who can declare that he is going to do without mathematics all his life. Mathematics is perhaps involved in every moment of life it is the pivot of all civilization. It is a contributory factor in the rapid progress and the prosperity of the human race.

To enable the child solve Mathematical problems of his daily life. Mathematics is the most useful subject for most vocations and higher specialized courses of learning. The duty of the school is to give to the student a broad view of what he is capable of achieving in the future. The student should get a broader course to be able

to choose a suitable line out of that. The study of mathematics will benefit him to a great extent. High secondary school education will remain incomplete and incomprehensive if mathematics is excluded from it. No other subject will be a substituted of mathematics.

Teaching of mathematics is very important in the secondary school level because it enables the child to:

- To prepare the child for technical professions such as those of accountants, auditors, bankers, surveyors, cashiers, engineers, scientists, statisticians and mathematics teachers.
- To prepare the child for economic, purposeful, productive, creative and constructive living.
- To prepare him for elementary as well as higher education in sciences, economics, engineering, psychology, etc.
- To develop the habits of concentration, self reliance and discovery
- To create in the child love for hard work
- To develop in the child the power of thinking and reasoning
- To develop in the child a scientific and realistic attitude towards life
- To enable the child to solve mathematical problem of his/her daily life.

1.3 Attitude towards mathematics

Specific attitudes accompany learning experiences. The attitude that is caught differs with each learning experiences. Learning experience is pleasant, the learner's attitude usually is positive, and he is impelled to continue the learning. If it is unpleasant, he tends to avoid it. The successful learners adopt positive attitude towards their study-they do not waste time or energy fretting over what they have to do. Entire class may dislike in a particular subject. In such a situation the first responsibility is to motivate the learners that the learners will develop a change of attitude towards the subject. The attitudes are ideas with emotional content, important beliefs, prejudices, biases, predispositions, and as states of readiness or set. A variety of patterns are included in an individual's array of attitudes. There are attitudes towards healthy, life death, people, new situations, music and art, work play, government religion, and many more that are of like importance. These attitudes have been influenced by the educative process through planned and random experiences. Since creating and shaping of attitudes is one of the important functions of the school, attention should be given to a study of their genesis, nature, and dynamic aspects.

Definitions of attitude: that attitudes play a dominant role in shaping social behaviour both at the individual and the group levels is a fact that has long been **recognized. It is the most** distinctive and indispensable

concept in field of study a half century ago, it was commonly believed that it was the ‘scientific study of attitudes.’

The word attitude is derived from the Latin word “patus” meaning “patus” meaning apt, suited or prone, which according to **Allport (1950)**, has on the one hand the significance of ‘fitness’ or ‘adeptness’ and like its by form ‘aptitude’ connotes a subjective or mental state of preparation for action. Etymologically, it means a person’s bearing which has become suited for, apt or prone to be exhibited in his dealing with a situation.

Attitudes have been defined in a number of ways, indeed in so many ways as to give a feeling that the term is ‘elusive’. This is owing to the difference in approach and emphasis. Each of the traditional definitions contains a slightly different conception of what an attitude is or emphasizes a somewhat different aspect of it.

Allport (1967) analysing sixteen definitions, all of which have the essential feature of a ‘preparation or readiness for response’ has defined attitude thus: ‘an attitude is mentally and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual’s response to all objects and situation with which it is related’

Allport saw an attitude primarily as a set to respond in a particular way. His emphasis clearly was on its behavioural implications. Moreover he says that attitudes provoke behaviour that is acquisitive or aversive, favourable or unfavourable, affirmative or negative towards the objects with which it is related. ‘This double polarity in the direction of attitudes is often regarded as their most distinctive feature.’

Doob defined attitude as ‘an implicit, drive producing response considered socially significant in the ‘individual’s society. ‘He views attitudes as implicit response with drive strength which occurs within the individual as a reaction to stimulus patterns and which affects subsequent overt patterns. “He emphasized what an attitude is rather than its implications. His statement did not include overt behaviour, although it contained a clear assumption that an attitude would affect how an individual acts. Today a third definition is most commonly held, to some extent incorporating the other two ‘an attitude towards any given subjects, idea or person is an enduring system with a cognitive component, a feeling component and an action tendency.

The controversy about attitudes possessing both ‘directional’ and ‘dynamic’ properties still remains unsettled. For some, attitudes comprise of an implicit state of readiness to channelize the existing energy at the disposal of the organism, as well as to mobilize the energy, thereby leading to the overt response to the relevant stimulus.

For example, **McDavid and Harari(1968)** ascribe both ‘directional’ and ‘motivational’ properties to attitudes.

In this regard, **Allen (1960)** given the following definition: “ an attitude is an arrangement is an arrangement of mental processes , a mental set, an internal disposition or the way certain mental processes are organized in a person to make him set in a particular way. **“Thus, a person is said to have an attitude towards an object if he regularly responds in a particular way to that object”**”.

1.4 Rationale of the study

The present study is undertaken on the basis of certain considerations and keeping in mind the actual needs, in the field of educational research in Sikkim. It has been a common experience almost everywhere that of all the subjects included in secondary school curriculum, Mathematics is a subject which is disliked by a good number of pupils. This may be partly due to peculiar nature of the subject and partly due to the improper method of instructions. Even among the educated there are many who hate mathematics as a subject. The mathematics teacher is even conceived now as a hard task master. Children hate him and are even afraid of him. Left to themselves children in most case won't come forward to choose mathematics as a special subject unless they are in amicable terms with the subject.

It is argued that the teacher who initiates the subject in lower classes to be held responsible for the aversion towards the subject. Once we have an aversion to a subject, it becomes difficult: but if it is made known earlier and if remedial measures are attempted the difficulty we attribute to the subject might, to some extent, be reduced. Both the content and methodology have prominent roles to play in making the subject attractive. An early diagnosis of the pupil's unfavourable and or negative attitude towards the subject will go a long way in the improvement of having favourable and position attitude. The importance of mathematics in this ever changing world of today where technological development is taking place so rapidly needs hardly any emphasis. It is only the positive attitude towards mathematics which can help such a technological development in a nation. A study of the attitude of pupils towards this subject therefore is an interesting one.

We are passing through an era of rapid changes. One has to be aware of the world trends in order to be a good citizen. The Scientific development cannot be understood unless we have a mathematical bent or some basic knowledge of the subject. It may be remarked that mathematics plays a vital part in technical professions and atomic researches. Applied mathematics is necessary in all walks of life. Even layman requires some amount of knowledge in mathematics to live in this world. If one does not study mathematics at the school level it becomes difficult for him to apply the knowledge of the same in day to day life. The importance and need of

mathematics, therefore, cannot be ignored particularly in these days of technological development. Hence the need of the present study is utterly felt to find out whether the pupils of class VIII-IX standard reading in the schools of east Sikkim have a favourable or an unfavourable attitude towards mathematics.

It is felt the teaching of mathematics must enable the child to face life problems with courage and confidence. Habits of accuracy and systematic thinking also must be promoted through teaching of mathematics. Secondary school mathematics should lay foundation on which the superstructure of higher mathematics may be built. It should give the pupils a glimpse of higher mathematics and create in some of the pupils at least a desire to continue the study of mathematics and offer their contribution towards the advancement of knowledge and civilization.

Mathematics holds a unique place among the school subjects in that it can develop in the student such abilities as logical thinking, systematic examination of facts and analytical approach leading to discovery of solution of problems. Mathematics has been a common factor in the curriculum of the secondary schools. Since mathematics serves the purpose of life this subject deserves an attention and hence a systematic study of the student's attitude towards such subject is worthwhile.

The investigator is interested particularly, to find out the attitude of class VIII and IX pupils of secondary schools in East Sikkim, towards mathematics because some children are understood to be antagonistic to this subject and some children are understood to appreciate the subject to the maximum extent possible.

Hence a study is deemed to be worthwhile to understand the problem of such kind for improving the standard of education in Sikkim.

So, the findings of the present study will help the planning of the curriculum, for chalking out a useful and effective educational programme and for providing appropriate remedial measures to the pupils so as to shape and mould their attitude to the positive direction, if needed. It may also serve as benchmark to carry out further researches in this field. Though limited in scope the present study is perhaps a pioneering attempt in this direction, in the state of Sikkim.

Keeping in mind, therefore, the need of this particular region for a problem of such type it was thought to be worthwhile to undertake a study, exploratory in nature, in the area of attitude towards mathematics. It is hoped that the efforts will be considered useful enough, educative and interesting.

1.5 Statement of the problem

The problem of the present study has been stated as follows:

“Gender and local difference in attitude of students towards mathematics”.

1.6 OPERATIONAL DEFINITION:

For the purpose of the present study, the following definitions have been accepted.

Attitude: The term ‘attitude’ in this study was defined as a mental state of an individual which tends to acted or was ready to respond of the scale developed by Gakhar and Rajani (2004) in terms of development of skills, reasoning, objectivity, individual and universal development. Mathematics was a subject of study of subjects in the curriculum.

Mathematics: The term ‘mathematics’ in this investigation refers to that duly prescribed subject as mathematics which was to be studied compulsorily in the secondary schools, basic or standard being included in the secondary schools curriculum in East Sikkim. The present study, “Attitude towards mathematics among students of East Sikkim”.

Gender: Gender here refers to boys and girls reading in Junior Secondary and Senior secondary schools.

Local: Local here refers to place of habitation as an intervening variable considered as rural and urban.

1.7 OBJECTIVE OF THE STUDY:

- To estimate the levels of attitudes of pupils towards mathematics along a five point category component wise and totally.
- To investigate the attitude of students towards mathematics in relation to sex variation.
- To estimate the attitude of students in relation to local variation.

1.7 Hypothesis of the study

H₀₁: Attitude towards mathematics was not equally displayed by all the responds in the sample.

H₀₂: There does not exist significant difference in the attitude towards mathematics in relation to sex variations.

H₀₃: There does not exist significant difference in attitude towards mathematics in relation to local variation.

1.8 Scope and delimitation of the study:

- For the present study it was decided to restrict the work to 10% of the total schools in East District.
- The work was confined to only class VIII and IX students of these schools in Gangtok.
- For the purpose of selecting a representative sample from the population the stratification was done on the basis of sex and local variation.
- The sample was limited to 1500 students of class VIII and IX.
- Standardized test materials were alone used.

REVIEW OF RELATED STUDIES

2.1 Attitude towards mathematics: Reviews of researches

A brief summary of previous research and the writings of recognized experts provide evidence that the researcher is familiar with what is already known, and with what is still unknown and untested. Since effective research must be based upon past knowledge, this step helps to eliminate the duplication of what has been done and provides useful hypotheses and helpful suggestions for significant investigation.

The present chapter is therefore primarily devoted to a review of the past studies which have been conducted by different researchers in the area related to attitude towards mathematics. Practically, all human knowledge can be found in books and libraries. Unlike other animals which must start a new with each generation, man builds upon the accumulated and recorded knowledge of the past. His constant adding to the vast store of knowledge makes possible progress in all areas of human endeavour. The review mainly focuses on what works have already been done in this area and in which direction the future research should be geared so that, afterwards, the valuable findings may emerge to solve different problem in the field of education .

So, for any worthwhile study in any field of knowledge, the research worker must know what sources are available in his particular field of enquiry. He must also have adequate familiarity with up-to date information about what has been thought of and done in the particular area. A famous psychologist says-

“Every man in search of truth confronted with some problems pressing for immediate solution taps all sources of information at his disposal”.

Jain and Buuad (1988) have found the following causes as responsible for low results in secondary mathematics in Rajasthan : on availability of mathematics teachers due to late appointments and frequent teachers transfers , lack of appropriate classroom , blackboard and other physical facilities, irregular attendance of student ,low standard in the lower classes, non availability of textbooks, lack of timely correction of homework, overburdened and uninteresting curriculum, lack of child centred teaching

insufficient period for teaching mathematics and lack of suitable teaching aids. They have however not analysed whose cause's affects mathematics more than other subjects.

Nagar (1988) has examined the usefulness of computers in mathematics, area in mathematics which can be taught more effectively through computers and the status of computer-aided teaching of mathematics. This is a survey report of the three projects and ten research studies carried out in other countries. It will be useful if our research workers carry out similar research studies under Indian conditions

Khatton (1988) has studied the relationship of mathematical aptitude among boys and girls with interest and vocational preference. Though **Khatton, (1988)** finds no significant difference in the aptitude for mathematics among boys and girls, **Khatton (1988)** found a significant difference in the achievements. Vocational preference are influenced by environment factors like the occupation of the father; in general, boys prefer vocation related to mathematics.

Desmukh (1988) has studied the correlation of mathematics learning and certain personality variables of the students. **Desmukh (1988)** finds small but positive and highly significant co-relation between mathematics learning and responsible and ascendant temperaments.

Desmukh (1988) also finds low but negative and highly significant correlation between mathematics learning and their temperamental dimensions, viz sociable, accepting and impulsive IQ and reasoning are found significantly related to dimension, ascendants, responsible, critical and plentiful. The temperamental profiles of high, average and low achievers are found to differ significantly from each other. These are also found to be correlated with the socio- economic status of the individual students. **Desmukh (1988)** does not, of course, go into the reasons why students with certain temperamental characteristics should do well in mathematics.

Pindari (1988) has studied the effect of language, memory and process on students learning of mathematics. Pindari (1988) finds that all these influence learning but the type of the student's institutions does not affect this learning.

Biswal (1988) has studied creativity in mathematics as a function of study habits (SHM) and pupils perception of teacher impression about their performance in mathematics (PPTIM). It was found out that, pupils creativity in mathematics is a linear function of each of the variables SHM PPTIM. The product correlation in both cases is positive.

Yadav (1988) has found that there was no difference in the attitude towards modern mathematics of male and female teachers, more experienced and less experienced teachers and post graduate and undergraduate teachers.

Raman (1989) has identified the errors committed by students in calculus under of four categories, viz. entry behaviour, perceptual, conceptual and computational, and found that the errors followed by computational errors, entry behaviour errors and perceptual errors. **Raman (1989)** has developed a remedial package which reduces all type of errors significantly.

Doshi (1989) has studies the possible relationship between achievements in mathematics and cognitive preference style for all students the questioning style is the last, while for the majority of arts and commerce students, the recall style is the first no significant relationship is found between the cognitive preference styles and mathematics. It is an open question worth investigation whether by changing strategies we can change the cognitive preference style and mathematics. It is an open question worth investigation whether by changing teaching strategies we can change the cognitive preference, and whether this can lead to significantly improved learning of mathematics.

Pal (1989) has considered the dependence of achievement in mathematics on four variables of the affective dimension, viz, self-concept, anxiety, attitude and academic motivation. He formulates 56 hypotheses relating to these variables and classification of students into urban, semi0urban and rural students and male and female students. Pal (1989) finds the regression equation to predict the performance in mathematics as a linear combination of four affective variables.

Samuel (1989) has found that Piaget's main theses that the conceptual process follows stages of development and there are stages of development form perceptual reasoning to concrete logical reasoning are confirmed under Indian conditions. Samuel (1989) has found that there is a relationship between the mental ability of children and their ability to understand and concepts of conservation of area, mass and volume.

Chel (1990) has examined the problem of underachievement in compulsory mathematics in the Madhyamik examinations of west Bengal. He found the following causes responsible for under achievement: gaps in knowledge of concepts, difficulties in undertaking of mathematical language, lack of openness and flexibility in teaching.

Difficulty in Mathematisation of verbal problems and interpretation of mathematical result, the abstract nature of mathematics, fear and anxiety on the part of the students. They suggest greater motivation of the

students for learning mathematics, removal of their fear of mathematics, and clearer presentation of the subject based on the needs of the children.

Third (1990) has found, rather unexpectedly that socio-personal factors such as education of father or mother have no significant effect on the problem solving ability in mathematics of school children. However the education of the mother was found to have a significant effect on the problem-solving ability of the children class vii and ix.

Shankara (1990) has found that guided discovery learning is always better than learning under reception conditions .However, the students of the high intelligence perform better and the students with anxiety perform worse under both systems. The first-order interaction between the method of instruction and level of intelligence is found to be significant, but the corresponding interaction between the method of instruction and anxiety is not found to be significant.

Krishnan (1990) has found out that there is no significant relationship between identification of problem-solving strategies (IPSS) and either application of problem-solving strategies (APSS) or Achievement of problem solving in the mathematics (APSM). Though the last two are significantly correlated . The essential problem in school mathematics is how to teach problem-solving strategies to students so that they may become efficient problem-solver.

Sarala (1990) has analysed the conceptual errors of secondary school students in learning selected area in modern mathematics and has found out that the number of errors are quite large and these errors are influenced by sex , locality of the school, management of the school, intelligence, study habits and socio-economic status the errors decrease with intelligence.

Kasat (1991) has made in-depth study of the censuses of the failures in the SSC examination of Marathi-medium high school students in palghattehsil. He examined two hundred boys and girls who had failed and found that most of them had poor intelligence poor numerical ability, poor comprehension and recall ability, no interest in mathematics, poor study habits lack of help from parents and teachers and difficulties in certain topic in the course. They have not suggested steps to enable such students to do better in examination.

Mishra (1991) has shown that with appropriate teaching strategies even arithmetically disabled children can learn ‘addition and subtractions’. However such improve techniques have to be developed.

Nalayini (1991) has examined the effectiveness of using number games to teach arithmetic. In eight of the comparisons made, five have show significant improvement due to supplementary use of number games.

Such a study should be conducted particularly for children from backward classes, first-generation learners and others who otherwise show lack of interest in mathematics. It will be worthwhile to find out whether number games can lead to increase in interest in mathematics.

Wagh (1991) has developed a multi-media instructional system for remedial purposes for fractional numbers and has expectedly found that this package leads to better understanding than the conventional remedial methods.

Vasanthi (1991) has investigated the relationship of certain psychological, social, and educational factors with mathematical learning disabilities. The disabilities considered are: agrosiaa, mixed, laterality, up and down confusion, asynodia, starephosyanbilia, reversal of numbers, front-back confusion, time and distance confusion, acalculia and perceptual problems. These have negative relationship with behaviour. Mathematical learning ability is greater among monolingual than in bilingual students, MLA also depends on of schools.

Lalitha (1992) has identified the cognitive factor structures of high achievers (HA), average achievers (AA), Low achievers (LA) for the total sample the 31 cognitive variables reduce to a single factors, Viz, numerical ability, for the HA group, these reduce the three cognitive factors. Viz abstract reasoning, numerical spatial facility and non- language reasoning for the AA group there is a single factor, viz mental ability and for the AA group , two factors are identified , viz, numerical perceptual ability and numerical facility. It will be interesting to see how this research result can be used in actual classroom teaching.

Hariharn (1992) has developed measures to measures the attitude of high school students towards homework, mathematics, and to measure their academic achievement in mathematics, and tried to find out the relation between these measures, if any. The researchers finds that girls , urban students and private school students have a more positive attitude towards homework in mathematics than other and that students with this positive attitude towards homework have better academic achievement in mathematics. **Hariharan (1992)** has advocates that every mathematics teacher should assign such homework in mathematics as can develop a positive attitude towards it.

Bhagwat (1992) has prepared a package of divergent production type problems in mathematics and has found that the use of this package significantly helps in the development of divergent thinking abilities in both boys and girls. This appears to be a useful effort for development of creativity among school children.

Prabha (1992) has found that program learning of mathematics is superior to conventional learning of mathematics and that mothers and father's education as well as mother's profession significantly affect programme learning. Parent's income and caste affect significantly the learning of mathematics.

Rosaly (1992) has found that the attitude of high school students towards the learning of mathematics and their achievements in mathematics are highly correlated and that urban boys and girls have a more positive attitude towards mathematics than rural boys and girls .

Singha ,(1992)has discussed the relative merit of teaching mathematics through computer assisted instruction and conventional method of teaching . Computer- assisted instruction was always found superior, but the gains were more in the case of good students and there was a definite positive change of attitude towards learning mathematics on the part of both boys and girls due to the use of computer.

Setia (1992) has found that the rapid, average and slow learners differ significantly in their intellectual and socio- economic status levels and that the intelligence, SES, personality and adjustment of rapid, average and slow learners cluster together with achievement in modern mathematics. It will be useful to carry on a companion study of actual correlation of achievements of students in mathematics with intelligence, socio-economic status and personality.

Gakhar and Rajani (2004) studied attitude towards mathematics of the students studying at secondary level on the technique adopted by **Thurstone (1946)**. There were eight components in the scale and the validity and reliability were high. It was observed that the attitude of students towards mathematics varied due to sex and locale variation.

Thomas (2006) on the “ the effects of students achievements and attitude using integrated learning system with co-operative pairs found that students using ILS had more favourable attitude compared to individual learning.

Ravania, Mary and Julice (2008) on a study on attitude towards mathematics of XI standard students in Trichy district, found no significant difference in attitude towards mathematics owing to gender, religion, and medium of instruction differences, but significant difference existed in attitude towards mathematics owing to differences in stream of study, types of school management and socio-economic status.

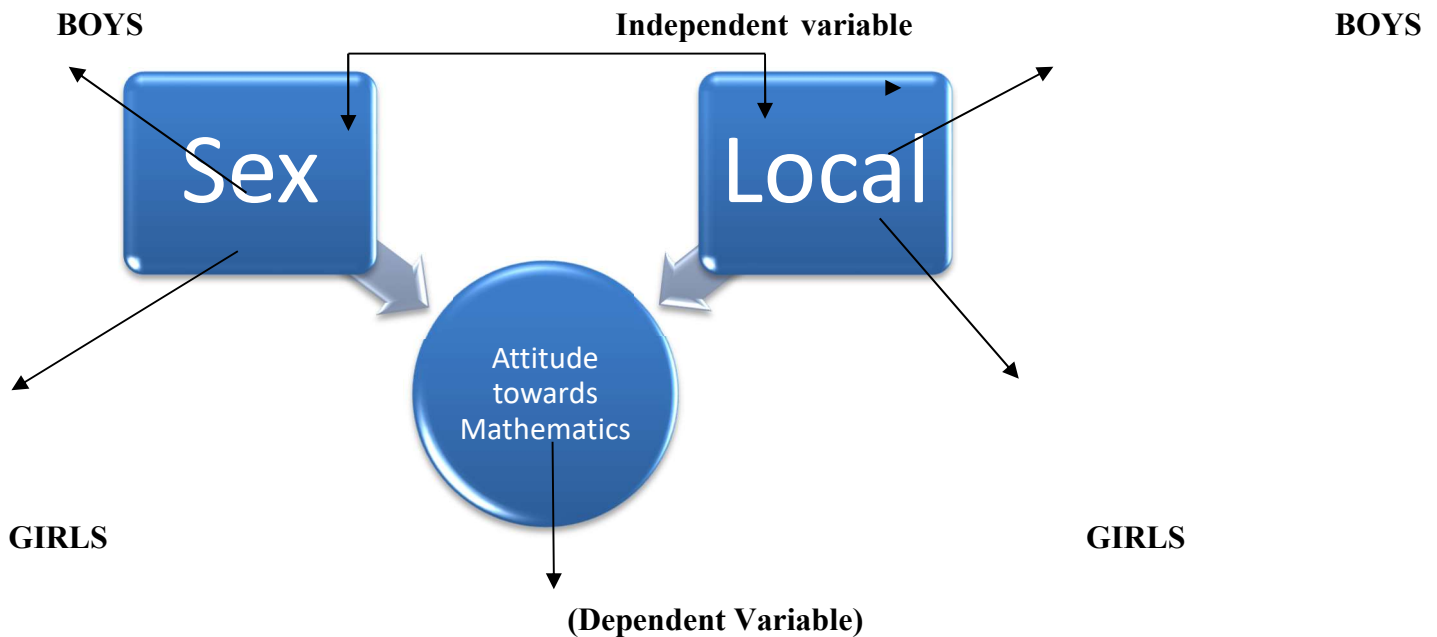
METHODOLOGY OF THE STUDY

3.1 Research Design

This study was a mainly a normative survey of investigation which was employed to find the general attitude of the secondary school students towards life and education. The historical study design has not been adopted in the context of the nature of the research. Because historical method is suitable for a research study that has interest in analysing a phenomenon, even or condition in the content of forces and factors that operated in the past. For this reason primary and secondary sources of data as well as internal and external evidences are required. But the present research work was not a development study since it's aimed at investigation of the factors influencing the dependent variable under present.

Application of experimental method of research was not thought to be suitable because of its objectives. This method was used in a research study that analyses the effect of predictors on the criterion variables under controlled situation.

Contrasted with historical or experimental design, normative survey design was more specific in this study. In this study the conceptual framework of the study was designed as follows:



3.2 Sample selection

The sample for the study has been chosen from among the Junior, Secondary and Senior Secondary School students of East Sikkim. Fifty schools have been chosen under 10 BAC. After chosen fifty schools the total strength of those schools in class VIII and IX was found. The sample for the investigation was drawn from various schools in East District. The school located in the heart of the Gangtok, Ranipool bazaar, Singtam-bazaar, Rongli bazaar, Pakyong bazaar and Rangpo bazaar were to be considered as urban locality, where as school located at the periphery in the remote was considered as rural areas. Simple at random sampling method was adopted for selecting the sample from class VIII and IX. As such 1500 boys and girls from both urban and rural areas have been taken as sample selected for the study. Total out of 1500 students, 700 boys from both urban and rural areas were taken as sample and 800 girls from both urban and rural were taken into consideration in the sample. Thus, the sample for investigation consists of group of boys and girls of urban and rural places of habitation.

Table 1 **Selection of the sample from ten BAC in East District**

Sl. No	BAC	Gender	Numbers	Total
01	Duga	Boys	79	150
		Girls	71	
02	Rhenock	Boys	60	150
		Girls	90	
03	Pakyong	Boys	70	150
		Girls	80	
04	Nandok	Boys	254	540
		Girls	286	
05	Reghu	Boys	34	60
		Girls	26	
6	Rakdong-Tintek	Boys	40	90
		Girls	50	
7	Khamdong	Boys	20	60
		Girls	40	
8	Ranka	Boys	64	150
		Girls	86	
9	Martam	Boys	64	120
		Girls	56	
10	Parakha	Boys	15	

		Girls	15	30
TOTAL				1500

Table 2

Details of the sample according to the intra-variables:

Sl. No	Variation	Sub-Sample	Numbers	Total
1	Gender	Boys	700	1500
		Girls	800	
2	Locale	Urban School	600	1500
		Rural School	900	

3.3 Tools used for the study

For the purpose of this study, the sample has been drawn from various schools of East District. Practical considerations and accuracy also played a vital role in determining the size of the sample. Taking into considerations all these factors which influence the size of the sample, it was decided that an ideal sample would consists of 1500 students from JHS, secondary senior secondary schools of East District of Sikkim. This sample was small enough to avoid unnecessary expenditure and large enough to avoid intolerable sampling errors. The variables were chosen (1) Boys versus Girls (2) Rural versus Urban senior secondary schools.

3.4 The instrument used

Attitude towards Mathematics Scale (ATMS), the tools developed by Gakhar and Rajani (2004) would be adopted which consists of eight components. It has been shown in the given below:

Table 3

Attitude towards mathematics scale

Serial Numbers	Name of the components	Number of statements
1	Wider applicability	11
2	Development of skills	05
3	Reasoning	03
4	Objectivity	06
5	Intellectual Development	07
6	Non-intellectual development	05
7	Individual Outlook	06
8	Universal outlook	03
	Total	46

3.4.1 Reliability of the Scale:

The reliability of the scale was obtained by split-half method. In order to make the two forms truly parallel to each other, all the statements of the scale were arranged in rank order according to the scale values. Successive pair was then marked off. Reliability of the scale was found to be 0.78.

3.4.2 Validity of the scale:

For finding the validity of the scale the scores of the attitude scale were compared with the actual behaviour of the students which were nearly comparable.

3.4.3 Scoring procedure: The five points were quantified by giving score ranging from 1 for strongly disagree to 5 for strongly agree for positive statements. The other categories of response such as disagree, undecided, agree were given 2, 3, and 4 scores respectively.

The procedures of scoring for negative statements were reversed. Negative scores were given scores of 1, 2, 3, 4 and 5 for strongly agree, agree, undecided, disagree and strongly disagree respectively. For each statement response of the statement multiple by the scale value of the statement. Total of the scores of all statements would be the total scores on attitude towards mathematical scale.

3.5 Techniques of data analysis

The data for the present study has been collected through the use of attitude towards mathematics scale. Both qualitative and quantitative analyses were selected owing to the nature of the data collected. The data was scored manually and organized into frequency distribution tables, component- wise, sub-sample wise and totally.

For the analysis purpose, both descriptive and inferential statistics were adopted. Descriptive statistics of Measures of Central Tendency and Measures of Variability was calculated to assess the attitude towards students. The “t” ratio was calculated to find out intra- differences in perception due to sex and local variables.

3.6 Procedures

The following procedures were adopted

- Selection of the sample
- Administration of the questionnaire
- Scoring
- Preparation of the data sheet
- Compilation of the data according to the variables
- Presentation of the data in tables
- Assessment of the scores by the application of descriptive and inferential statistics
- Reporting
- Compilation of references submitting the thesis

ANALYSIS AND INTERPRETATION OF DATA

In this section, attempts have been made to present the data along with the analysis of the same. For this, the questionnaires were administered first and then scoring was made for description and differential analysis in accordance with the objectives and hypothesis formulated beforehand.

4.1 Administration of the scale and scoring of the scale

For administration of the scale over a sample of 1500 students of class VIII and IX selected at random. The principles of administering questionnaires are strictly followed. They are described as follow:

- The students are comfortably seated in a well lighted classroom under normal conditions.
- It should be made clear to them that their performance in the scales will in no way effect their achievements nor their image in the schools nor with the parents.
- The results would be used only for the improvements of the education policy. Conduct of research of change of syllabi. These results in no case will be given to the parents, teachers or heads of the institutions.
- When all the students are seated, then the booklets were distributed to the students.
- Each student was provided with answer sheets. It was to use those sheets for giving their answer s against the area of the attitude in the column which carries the no. of items.

- After that, the students were told to fill in the columns on answer sheets. This was supervised and help rendered wherever necessary.

All the scales were scored as per the scale manuals. The data sheet was prepared according; where as detailed records of the respondents standing in different scales were determined. Then all scores pertaining to scale were determined. Then all the scores pertaining to scale were studied in terms of the requirements as per the objectives and hypotheses stated above

4.2 Study of the scores distribution

The scores obtained on Attitude towards Mathematics Scale were compiled and the highest score as well as lowest score was found out. It ranged from 90- 219. The descriptive statistics procedures were then followed for analysing the scores. The frequency distribution of the scores has been presented in the following table and followed by bar graph with frequency polygon.

Table4.

Distribution of scores on Attitude Towards Mathematics Scale

CI	Mid-Point	Boys	Girls	Urban	Rural
210-219	214.5	10	07	05	12
200-209	204.5	11	24	11	24
190-199	194.5	38	58	29	67
180-189	184.5	78	85	63	100
170-179	174.5	102	113	103	112
160-169	164.5	150	161	120	191
150-159	154.5	106	141	82	165
140-149	144.5	84	99	90	93
130-139	134.5	63	40	43	60
120-129	124.5	37	41	36	42

110-119	114.5	12	14	06	20
100-109	104.5	02	09	06	05
90-99	94.5	07	08	06	09

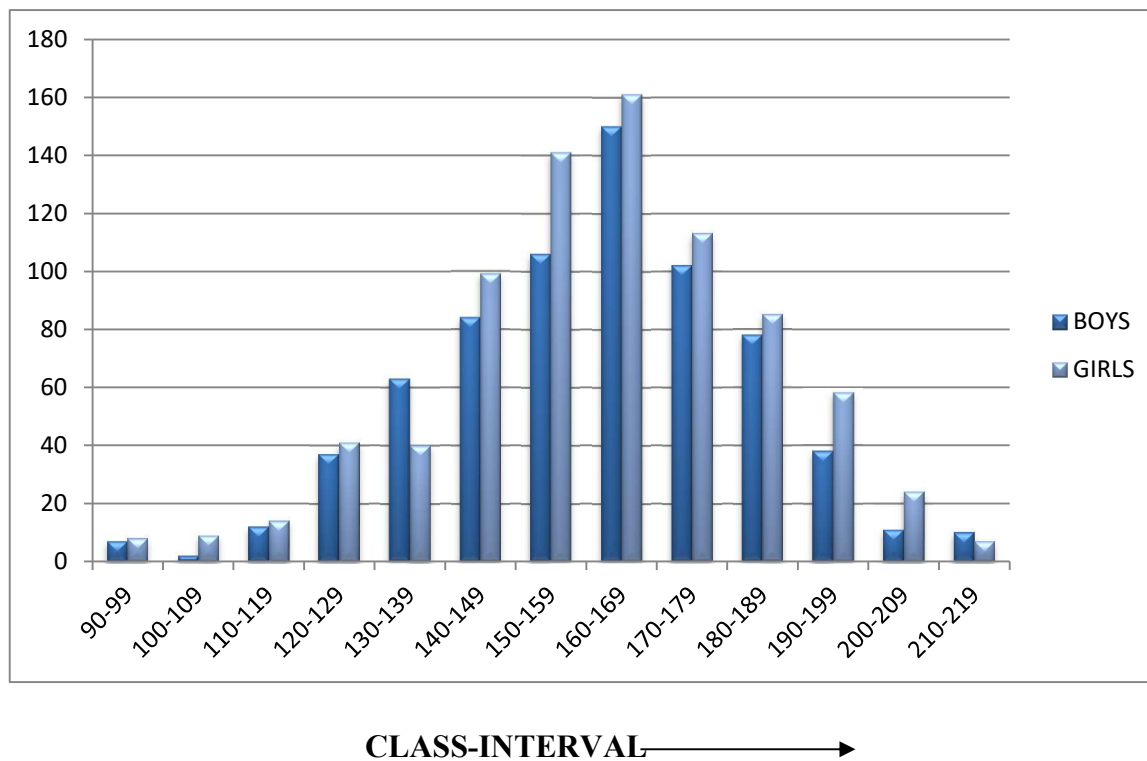
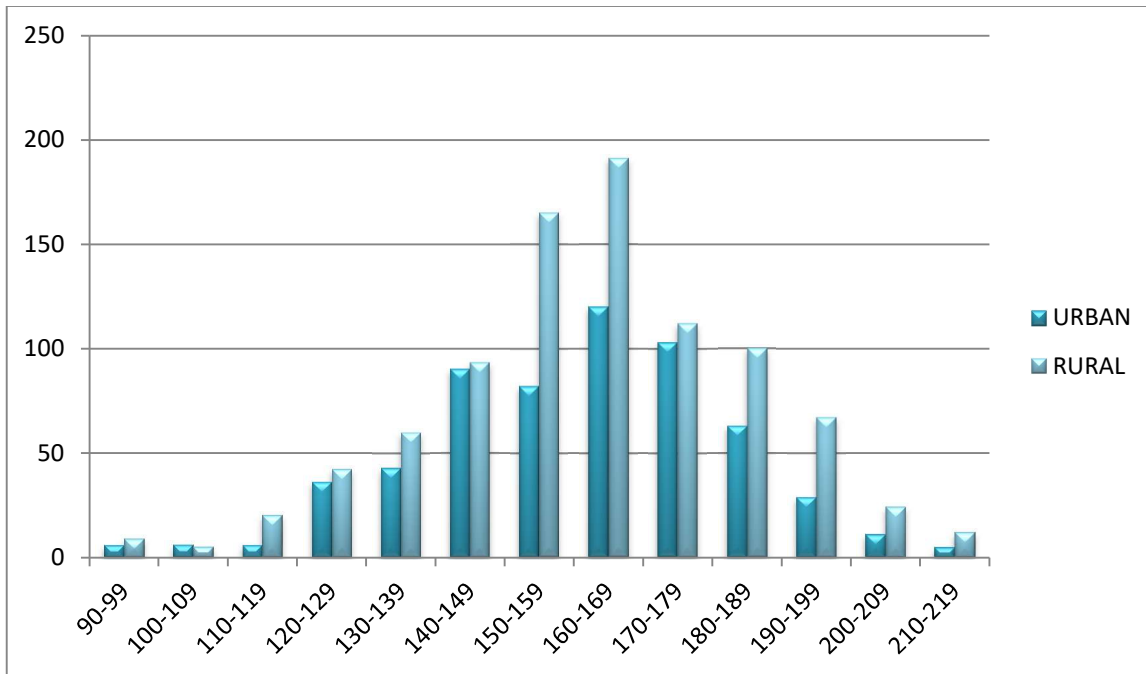


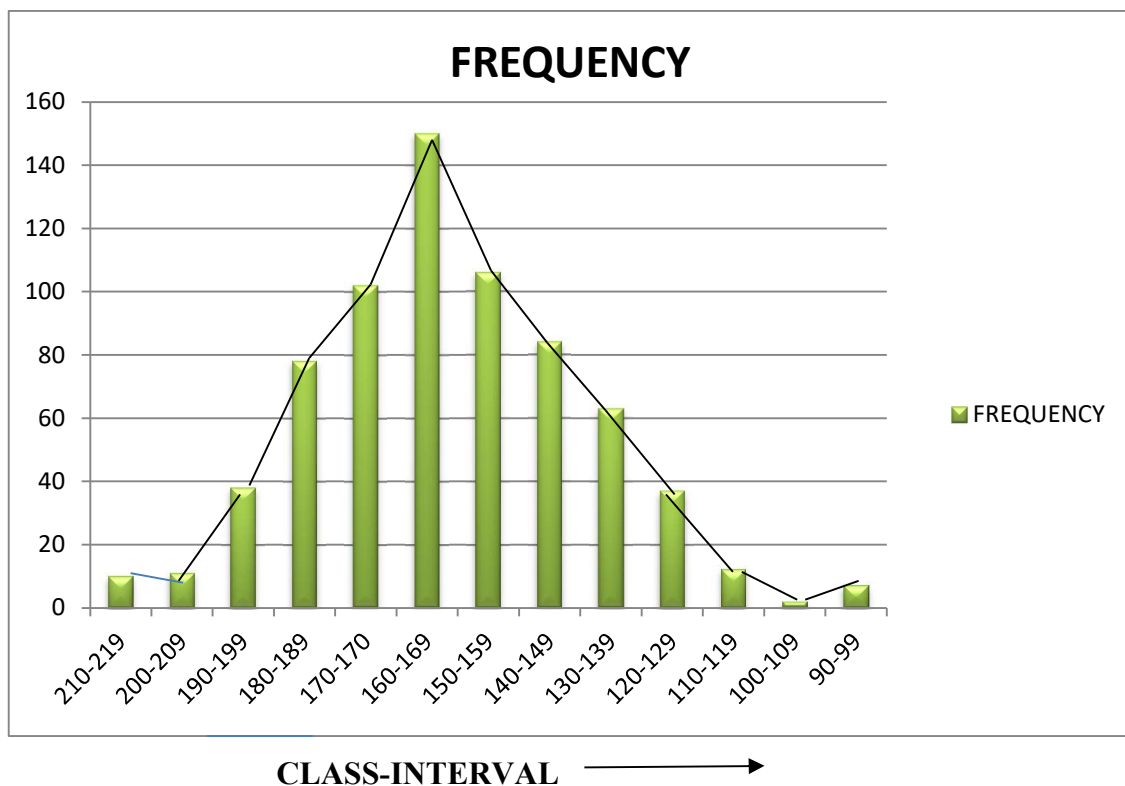
FIGURE:1 Bar graph showing the distribution of Boys and Girls



CLASS-INTERVAL →

FIGURE:2 Bar graph showing the distribution of Urban and Rural

29



CLASS-INTERVAL →

Figure :3 Bar graph and frequency polygon showing the distribution of boys.

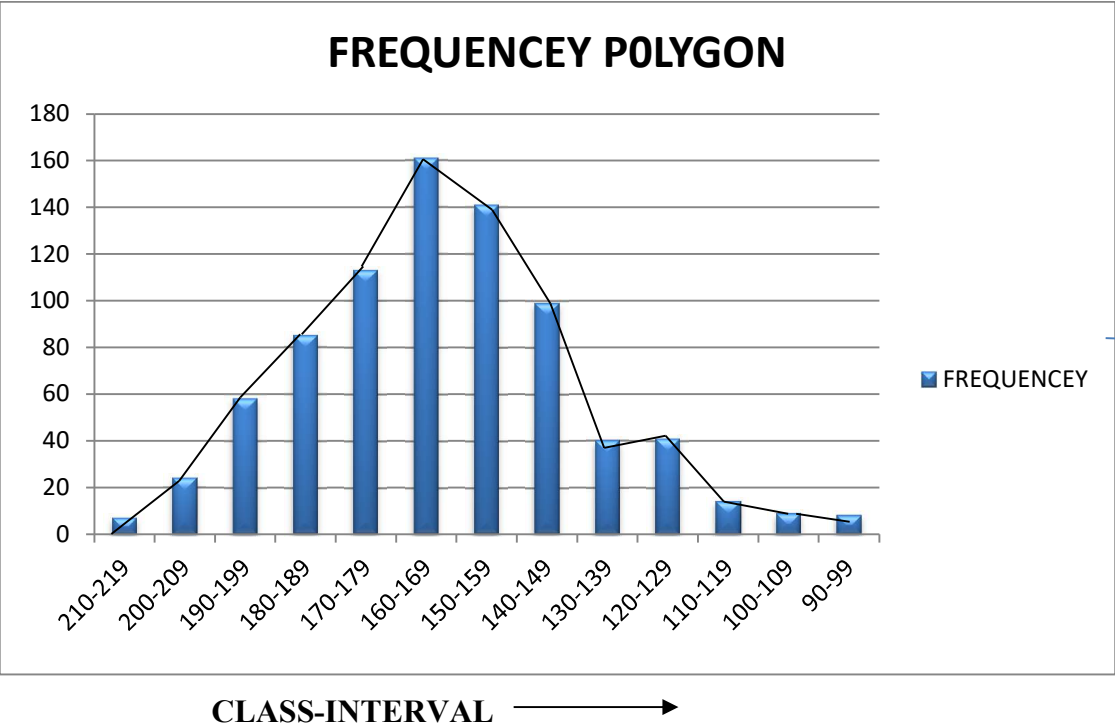
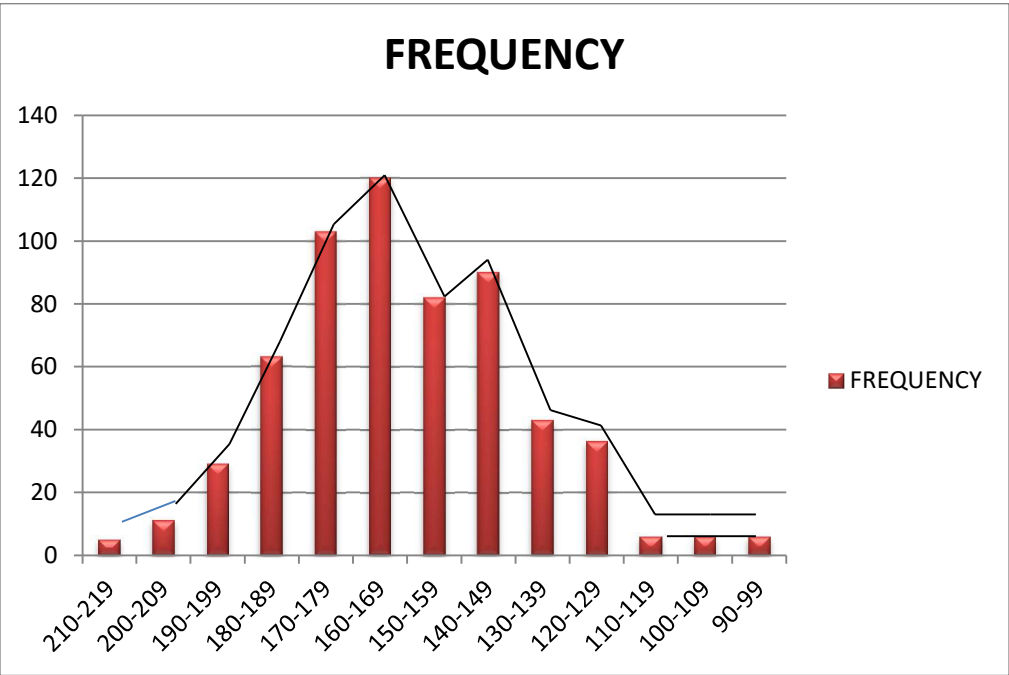


Figure:4 Bar graph and frequency polygon showing the distribution of girls.



CLASS-INTERVAL →

Figure: 5 Bar graph and frequency polygon showing the distribution of urban area.

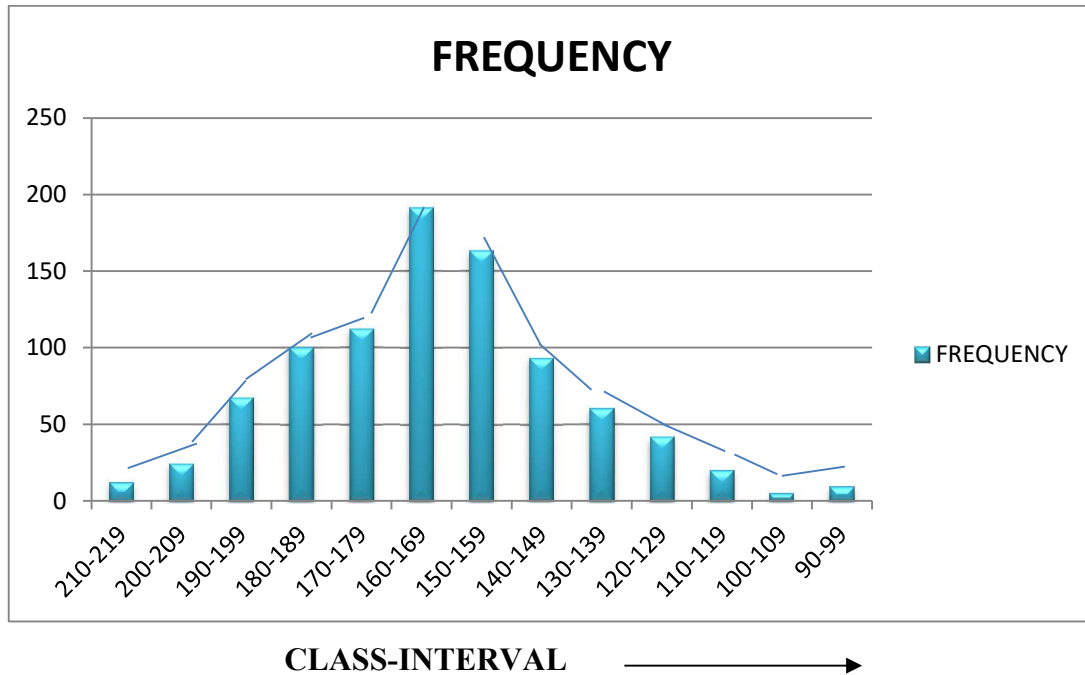


FIGURE: 6 Bar graph and frequency polygon showing the distribution of rural areas.

4.3 Study of normality

In the present study, the researcher has described the normality in the distribution of scores in Attitude towards Mathematics Scale.

In the normality curve the mean, the median and the mode all fall exactly at the midpoint of the distribution and are numerically equal. All these measures of central tendency coincide at the centre of the distribution. A distribution is said to be “skewed” when the mean and the median fall at different points in the distribution, and the balance is shifted to one side or the other- to left or right. In the present study, the researcher established the index of skewness using the formula.

It was found that the distribution of scores of teachers on both the scales seem to be negatively skewed, as the scores of the teachers were massed at the higher end (the right end) of the scale. The skewness for the

distribution of 1500 students 'scores on attitude was found to be -0.22.this skewness could have been the result of sampling error. The “kurtosis” was found to be 0.261 on attitude score by using the formula

For the normal curve, if k_u is greater than 0.263, the distribution is platykurtic; if less than 0.263, the distribution is leptokurtic. But despite this degree of negative skewness, the distributions seem to be approaching the normal form and it has been shown by plotting frequency polygon, best fitting curve and Ogive.

Table 5:Scores achieved by 1500 students on Attitude Scale:

Class interval(CI)	Frequency (f)	Mid-point (x)	Class -mark (fx)	Cumulative Frequency (cf)	Smoothed Frequency
210-219	17	214.5	3646.5	1500	17.3
200-209	35	204.5	7157.5	1483	49.3
190-199	96	194.5	18672.0	1448	98.0
180-189	163	184.5	30073.5	1352	158.0
170-170	215	174.5	37517.5	1189	229.7
160-169	311	164.5	51159.5	974	268.3
150-159	247	154.5	38161.5	663	247.0
140-149	183	144.5	26443.5	416	177.7
130-139	103	134.5	13853.5	233	121.3
120-129	78	124.5	9711.0	130	69.0
110-119	26	114.4	2977.0	52	38.3
100-109	11	104.4	1149.5	26	17.3
90-99	15	94.5	1417.5	15	8.7
Total	$\sum f = 1500$		$\sum fx = 241940$		

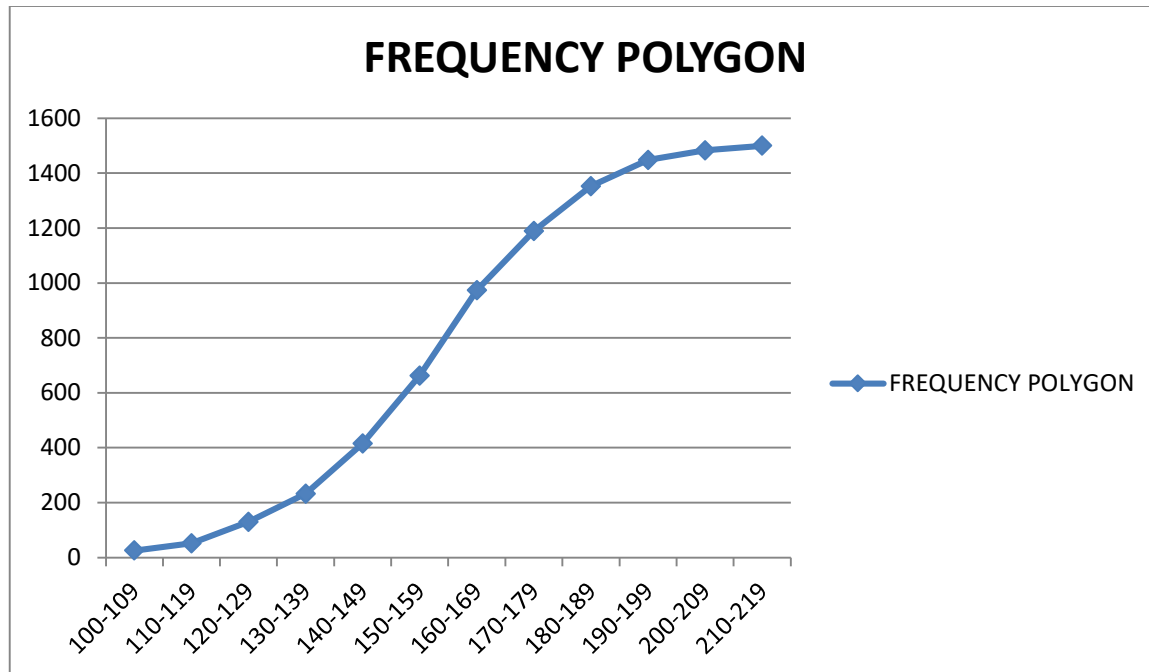


FIGURE: 7 Ogive for the total students on attitude scale.

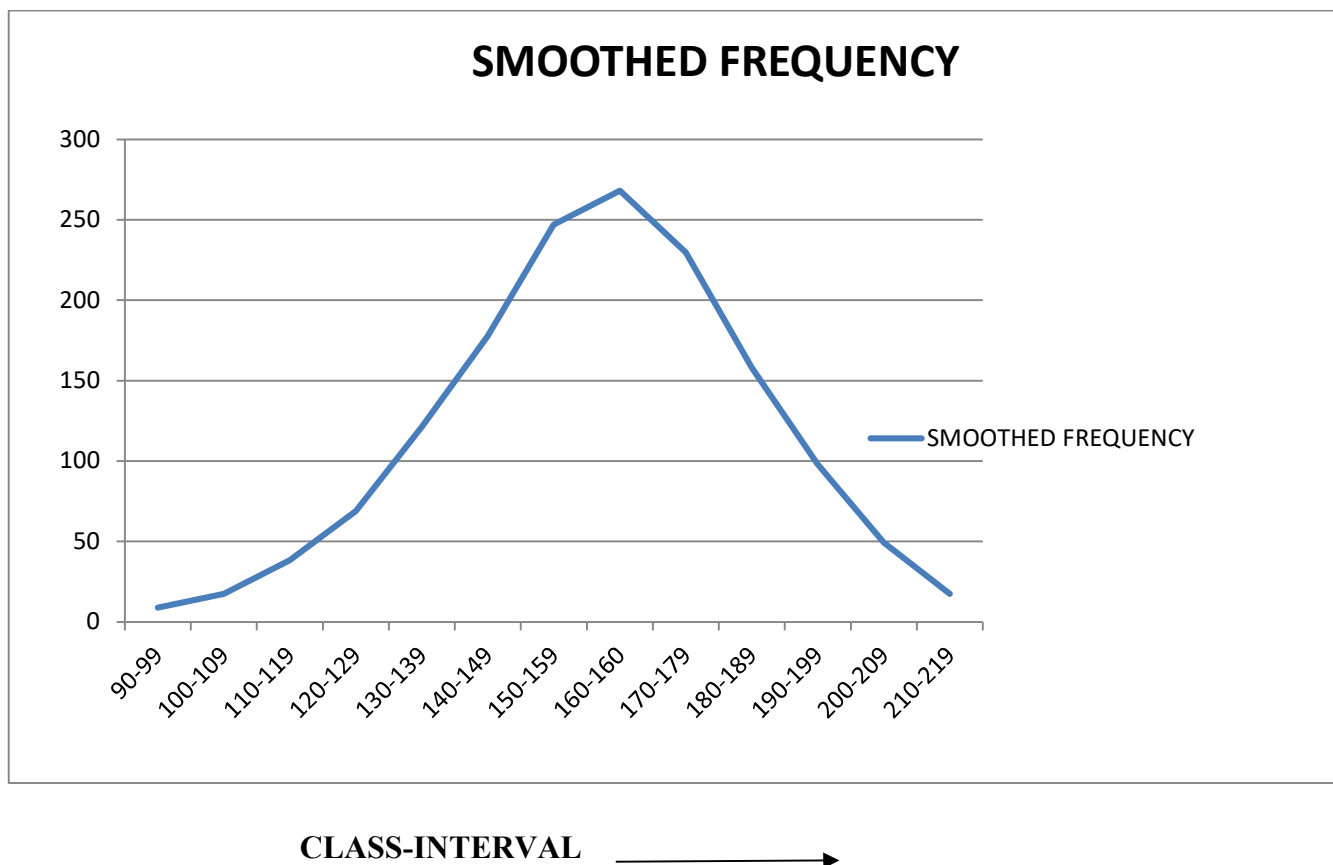


Figure: 8 Smoothed Frequency Polygon of total students on attitude scale.

4.4 Categorization of the sample according to differential level of attitude

The obtained scores of the total sample on the attitude scale were compared and attempts were made to categorize the students into five categories of **Outstanding, High, Average, Below Average and Poor respectively**. For this, the standard of Normal Probability Curve was adopted. The cut off marks of scores range at ∞ (infinite) distance, number of students falling in that category and percentage of students were all calculated and presented in the following table:

Table 6
Categorization of students on Attitude Scale:

Categories	Distance	Score range	Number of students	% in case of Normal probability curve
Outstanding	+3 ∞	208-225	52	4 %
High	+2 ∞	191-208	259	17 %
Average	$\pm 1 \infty$	157-191	773	51 %
Below Average	-2 ∞	140-157	286	19 %
Poor	-3 ∞	90-140	130	9 %

A study of the above table reveals that the distribution of scores on attitude towards mathematics scale of the secondary students have a tendency in showing a larger cluster of scores at the centre and gradually tapering towards the upper and lower end. Such types of characteristics indicate normality.

4.5 Descriptive measures of the tools (total sample and sub-sample wise)

In the attitude scale of the present study there were 46 items out of which were positive statements and were negative statements. To determine the attitude of students towards mathematics, the positive statements were scored as 5-4-3-2-1 for the responses strongly agree, agree undecided, disagree and strongly disagree respectively. The negative items were scored as 1-2-3-4-5 for the responses strongly agree, agree, undecided, disagree and strongly disagree respectively.

The obtained attitude scores of all the students towards mathematics were then classified into a mean and standard deviation of the distribution were computed by employing suitable formulae. The obtained frequency distributions along with findings were presented in the following table: 7

Table: 7

Data grouped for the calculation of mean and standard deviation:

Variation	Students	Numbers	Mean	Standard Deviation (S D)
Sex	Boys	700	160.7	23.6
	Girls	800	155.6	13.5

From the above sample it is evident that the mean of total boys was 160.7 and standard deviation was 23.6. The mean of total girls was 155.6 and standard deviation was 13.5 respectively.

Table 8:

Data grouped for the calculation of mean and standard deviation due to local variation:

Variation	Students	Numbers	Mean	Standard Deviation(S D)
Sex	Rural	600	160.2	19.6
	Urban	900	163.5	11.9

From the above sample it was evident that the mean of total rural boys and girls was 170.5 and standard deviation was 19.6. The mean of total urban boys and girls was 177.8 and standard deviation was 11.9

4.6 Differential analysis and hypothesis testing

4.6.1 Sex-wise difference:

In order to verify the hypothesis related to sex variation, the “t” ratio was calculated and result was presented in the table below:

Table 9: Summary of test of significance between means of ATTITUDE TOWARDS MATHEMATICS STUDENTS due to sex variable:

Variation	Type	Nos.	Mean	SD	SED	't'	df	remarks
Sex	Boys	700	160.7	23.6	3.65	0.87	1498	Not Significant
	Girls	800	155.6	13.4				

It was observed that the significant difference ('t') ratio in case of sex variation was not significant because 't' for 'df' was 1498 required a critical value of 1.98 as the calculated 't' ratio was less than the table of 't'. The 't' ratio was considered not significant; therefore the null hypothesis that there does not exist significant difference in the attitude of boys and girls was not rejected. Considered the above, the investigator desired to conclude that there was no difference in the attitude of boys and girls students towards mathematics.

This finding was conformity with the study of Yadav (1988) and Ravanan, Mary and Julice (2008).

4.6.2 Locale-wise differences:

In order to verify the hypothesis related to locale variation, the 't' ratio was calculated and result was presented in the table below:

Table 10: Summary of test of significance between means of ATTITUDE TOWARDS MATHEMATICS SCALE due to locale variation:

Variation	Type	Numbers	mean	SD	SED	't'	df	Remarks
Locale	Rural	900	160.2	19.6	2.95	2.47	1498	Significant
	Urban	600	163.5	11.9				

It was observed that the 't' ratio in case of sex variation was significant, because 't' for df was 1498 required a critical value of 1.98 as the calculated 't' ratio was more than the value of 't'. The 't' ratio was considered significant; therefore the null hypothesis that there does not exist significant difference in the attitude of boys

and girls was rejected. The researcher thus concluded that the attitude towards mathematics was influenced by the locale variation.

The studies done by **Hariharan(1992)**, **Sarala (1990)**, **Rosaly (1992)** showed the results which was at par with the present findings.

4.6.3 Component-wise, sex differences:

Table:11 Component-wise test of significance of difference between the mean scores on attitude scale due to sex variation:

Dimensions	Total Items	Sex	No	Mean	SD	SED	‘t’	Remarks
Wider applicability	11	Boys	700	42.95	4.75	0.83	-1.02	Not significant
		Girls	800	43.80	4.25			
Development of skills	05	Boys	700	18.90	3.00	0.54	-1.20	Not significant
		Girls	800	19.55	3.00			
Reasoning	03	Boys	700	11.55	1.80	0.37	0.54	Not significant
		Girls	800	11.35	2.40			
Objectivity	06	Boys	700	21.05	3.65	0.59	-1.59	Not significant
		Girls	800	21.95	2.70			
Intellectual development	07	Boys	700	25.20	4.30	0.74	0.04	Not significant
		Girls	800	25.23	3.70			
Non Intellectual development	05	Boys	700	19.01	3.57	0.68	-0.82	Not significant
		Girls	800	19.57	3.50			
Individual outlook	06	Boys	700	22.28	6.24	0.98	-1.12	Not significant
		Girls	800	23.90	4.03			
Universal outlook	03	Boys	700	11.35	2.00	0.37	-1.08	Not significant
		Girls	800	11.75	2.20			

On perusal of the above table it was observed that with reference to different components like **wider applicability, development of skills, reasoning, objectivity, intellectual development, non-intellectual development, individual outlook and universal outlook** in relation to sex variation was found as not significant and the null hypothesis that there exists difference due to sex variation was accepted.

Hence, it was concluded that there does not exist significant difference among **boys and girls** in relation to the above mentioned components.

4.6.4 Component-wise, locale wise differences:

Table 12: Component-wise test of significance of difference between the mean scores on attitude scale due to locale variation:

Dimension	Total no of items	Locale	No	Mean	SD	SED	't'	Remarks
Wider applicability	11	Rural	900	42.80	5.02	0.81	-1.48	Not significant
		Urban	600	44.08	3.90			
Development of skills	05	Rural	900	18.91	3.20	0.54	-1.40	Not significant
		Urban	600	19.67	2.82			
Reasoning	03	Rural	900	11.50	2.50	0.47	2.55	Significant
		Urban	600	10.25	2.87			
Objectivity	06	Rural	900	21.17	3.80	0.58	-1.29	Not significant
		Urban	600	21.92	2.50			
Intellectual development	07	Rural	900	24.91	4.09	0.66	-0.89	Not significant
		Urban	600	25.50	3.20			
Non-intellectual development	05	Rural	900	18.66	4.00	0.61	2.29	Significant
		Urban	600	20.00	2.73			
Individual outlook	06	Rural	900	21.50	5.74	0.87	4.13	Significant
		Urban	600	25.08	3.64			
Universal outlook	03	Rural	900	11.34	2.50	0.37	-1.10	Not significant
		Urban	600	11.75	1.65			

The result of the above table report that mean difference in components like **wider applicability, development of skills, objectivity, intellectual development and universal outlook** was found as not

significant. This indicated that the locale variations have no effect on the attitude of pupils towards Mathematics on these components.

The mean difference was found to be significant due to the locale variation on components like **reasoning, non-intellectual development and individual outlook.**

Thus this means that **urban and rural** students have difference in their outlook towards Mathematics on those components.

SUMMARY AND CONCLUSION

SUMMARY:

5.1 Introduction

This chapter contains the summary of the study, implications, the conclusions from the findings based on the study results and recommendations for possible action by the relevant authorities and for further research.

The investigator was interested particularly, to find out the attitude of class VIII and IX students of secondary schools in East Sikkim, towards mathematics. Because some children were understood to be antagonistic to this subject and some children were understood to appreciate the subject to the maximum extent possible.

The findings of the present study will help the planning of the curriculum, for chalking out a useful and effective educational programme and for providing appropriate remedial measures to the pupils so as to shape and mould their attitude to the positive direction, if needed. It may also serve as benchmark to carry out further researches in this field. Though limited in scope the present study is perhaps a pioneer attempt in this direction, in the state of Sikkim.

Keeping in mind, therefore, the need of these particular regions for a problem of such types it was thought to be worthwhile to undertake a study, exploratory in nature, in the area of attitude towards mathematics. It was hoped that the efforts will be considered useful enough, educative and interesting.

5.2 Major findings

- There was no difference in the attitude of boys and girls towards Mathematics.
- The attitude towards Mathematics was influenced by the local variation.

- Majority of the students have shown a positive attitude towards Mathematics.

5.3 RECOMMENDATION AND FURTHER RESEARCH:

This investigation was an attempt to study the attitude of the students studying class VIII and IX of the schools of East Sikkim, towards Mathematics. The importance of the study of the students attitude towards Mathematics in education being well acknowledged, there was much scope for carrying out further research in this field. Based upon this experience in carrying out the present study the investigator thought it to be worthwhile to put forth some suggestion which might be carrying out further investigation to throw some more light on this important aspect of learning.

The suggestions given are follows:

- The present investigation was carried out in East Sikkim, Sikkim. A comprehensive study can be undertaken covering the entire state of Sikkim for finding out the attitudes of the students towards Mathematics.
- A similar study can be carried out by covering a larger sample and doing stratification in terms of local and sex variation.
- The same or a separate attitude scale can be constructed for measuring
- The attitudes of teachers also towards Mathematics and findings could be compared with the student's attitude towards the same attitude objects.
- A similar study can be carried out with the students, studying in other standards of Schools of Sikkim.
- Studies can be undertaken for finding out the relationship between student's attitude towards Mathematics and any other subjects of daily use like science, language, social studies etc.
- A study regarding the relationship between the attitude of pupils towards Mathematics and achievement can be conducted.
- A study regarding the relationship between different background variables like age, sex, relation, etc and attributes of the pupils can be carried out.
- Studies for measuring attitude of the Primary, Secondary, Senior Secondary schools, colleges and university Mathematics can be carried out.
- One of the impressive findings of the present investigation is that, the overall attitudes of the students towards Mathematics were quite favourable. It should give the pupils a glimpse of higher Mathematics

and create in some of the pupils at least a desire to continue the study of Mathematics and offer their contribution towards the advancement of civilization.

With these few suggestions the investigator concludes the report. It was hoped that the effort will be considered useful enough for carrying out a further investigation into the problem and also of some use to the advancement of guidance and counselling activities.

5.11 EDUCATIONAL IMPLICATONS:

The investigation was an attempt to study the attitudes of the students studying in class VIII and IX of the schools of East District, towards Mathematics. The importance of the study of students attitude towards Mathematics in education being well acknowledged. There was much scope for carrying out further research in this field. Based upon this experienced in carrying out the present study the investigator thought it to be worthwhile to put some suggestions which might be helpful in carrying out further investigation to thrown some more light on this important aspect of learning.

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**Influence of Training on Aligning Learning outcome with Pedagogy and
Assessment for the Elementary Science Teachers of North and East District
of Sikkim**

Submitted By

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2019-2020

Abstract

The policy directives under National Policy on Education (NPE) 1986 and Programme of Action (POA) 1992 require that the essential levels of learning are laid down and children's achievement should periodically be assessed to keep track of the progress towards the NPE goal of ensuring that all children achieve essential

levels of learning. Keeping this in mind NCERT reintroduced the minimum level of learning in terms of learning outcomes for all the subjects at the elementary level in 2017. DIET, Gangtok being a training center conducted subject-wise in-service training on “Aligning Learning outcome with Pedagogy and Assessment” for teachers from some blocks of East and North district. Teachers were trained on different pedagogical skills to achieve the learning outcomes among students and also aligning with continuous assessment strategies. Like in subject science the pedagogical emphasis was given to more activities and experiments with hands-on experiences to derive on any content. The training also focused on the integration of ICT, values with inclusive set up throughout the teaching-learning process. The main objective of the training was to involve the student in the process to know the product in science. The training also emphasized on nurturing and developing the processing skills of science.

The study is carried out to do a kind of follow up or evaluation of the effectiveness of the said training program. The works include the administration of questionnaires and classroom observation schedule to teacher participants of 28 schools.

Keywords: Learning Outcome, Pedagogy, Assessment

TITLE OF THE STUDY:

INFLUENCE OF IN-SERVICE TRAINING ON ALIGNING LEARNING OUTCOMES WITH PEDAGOGY AND ASSESSMENT FOR ELEMENTARY SCIENCE TEACHERS OF EAST AND NORTH DISTRICT OF SIKKIM

INTRODUCTION/RATIONALE OF THE STUDY:

Training is an act of teaching a person a particular skill to perform their roles effectively and efficiently. Training is a vital part of human resource development.

This study will be conducted keeping in mind the need to conduct follow-up studies after Training Programmes done by DIETs for effective evaluation.

A short term In-service Training on Aligning Learning outcome with Pedagogy and Assessment was conducted for Elementary Science Teachers of East and North District in the months of Jan-March 2019 at DIET, Gangtok. Further, the trained teacher participants have conducted 3- days of training at their respective blocks for other school teachers.

It is to ascertain the influence of this training upon the children via the Elementary Science Teachers of East and North District who attended the training.

The Learning Outcomes is the benchmark on which the National Achievement Survey is or will be conducted. The District report card of Sikkim in NAS 2017 shows that the average achievements of the students in the subject like science in class VIII are very poor based on Learning Outcome.

The policy directives under National Policy on Education (NPE) 1986 and Programme of Action (POA) 1992 require that the essential levels of learning are laid down and children's achievement should periodically be assessed to keep track of the progress towards the NPE goal of ensuring that all children achieve essential

levels of learning. Keeping this in mind NCERT reintroduced the minimum level of learning in terms of learning outcomes for all the subjects at the elementary level in 2017. DIET, Gangtok being a training center conducted subject-wise in-service training on "Aligning Learning outcome with Pedagogy and Assessment" for teachers from some blocks of East and North district. Teachers were trained on different pedagogical skills to achieve the learning outcomes among students and also aligning with continuous assessment strategies. Like in subject science the pedagogical emphasis was given to more activities and experiments with hands-on experiences to derive on any content. The training also focused on the integration of ICT, values with inclusive set up throughout the teaching-learning process. The main objective of the training was to involve the student in the process to know the product in science. The training also emphasized on nurturing and developing the processing skills of science.

The study is carried out to do a kind of follow up or evaluation of the effectiveness of the said training program. The works include the administration of questionnaires and classroom observation schedule to teacher participants of 30 schools.

OBJECTIVES OF THE STUDY:-

Following are the objectives of the proposed study:

1. To study the incorporation of Learning Outcome by the Elementary Science Teachers after the training was conducted.
2. To find out the different types of teaching Learning Methods that the Elementary Science Teachers are using in the classroom to align with Learning Outcome.
3. To study how the Elementary Science Teachers are conducting assessments aligned with Learning Outcome indicators.

RESEARCH QUESTIONS:-

The research questions of the study are as given below:

1. How Learning outcome objectives are incorporated into the Lesson.
2. What Teaching Learning method is being adopted by the Elementary Teachers to achieve the Learning Outcomes goals?
3. What assessment strategies are being aligned with the specific Learning outcome indicator by the teachers?

REVIEW OF RELATED LITERATURE:-

Many studies have been done previously about training and its impact on teacher training. But still, it is a vast field to be worked on, because training has a different impact on different areas (Chen-Chung et al., 2016). Every teacher training is conducted to achieve a specific objective contributing to organizational performance.

Teachers are key performers for any educational institution; hence they need to be equipped with a proper skill (Carnoy, Khavenson, & Ivanova, 2015). Teachers' training helps teachers and supervisors to overcome many learning limitations, such trainings should be a combination of desired techniques to be implemented (Silvia Baldiris, Panagiotis, Ramon Fabregat, & Demetrios, 2016).

In-Service Training and Teacher's Performance Samupwa (2008), analyzing the impact of teacher training on the performance of teachers in the classroom, declares that teacher's training behavior and performance of teachers can be changed positively.

A study on in-service training as a contributory factor influencing teachers' performance conducted by Jahangir, Saheen, and Kazmi (2012) to examine the effect of Higher Education Commission's sponsored in-service teacher training on the trainee's concept about good teachers. The present study has brought a significant change in perception of the teacher about the knowledge category, due to the in-service training. In short, the overall scenario of a good teacher has undergone a tremendous change because of the said training program.

A study conducted by Raina (2005) on the opinion of secondary school teachers on the effectiveness of in-service training programs in enhancing their professional competencies. The study reported that the in-service training programs were effective in developing professional competencies of teachers.

Subrahmanian (2001) conducted a study on the impact of DIETs on the work efficiency of primary school teachers of Kerala State. The study assessed the work efficiency of teachers after undergoing in-service courses in DIETs about content enrichment, class management, evaluation, and community participation. The study reported that after attending the in-service training programs teachers have positive impacts on their work efficiency in schools.

DELIMITATION:-

This study is delimited to the Elementary Science Teachers of East and North District from the BACs that were covered under the Training on Aligning Learning Outcome with Pedagogy and Assessment conducted by DIET, Gangtok.

POPULATION:-

8 Teachers from Kabi, Mangan and Passingdong BAC of North District

20 Teachers from Pakyong, Nandok, Ranka, Martam, Duga, Khamdong and Rhenock of East District.

SAMPLE:-

28 Elementary Science teachers of East and North District who have attended the training either at DIET or respective BACs.

DATA COLLECTION & ANALYSIS:-

Pre and Post-interview schedule was conducted with classroom observation tool.

METHODOLOGY

The investigators adopted the triangulation/survey approach for the collection of data. The researcher used the triangulation/survey method by employing different tools of research and also by triangulating the researcher.

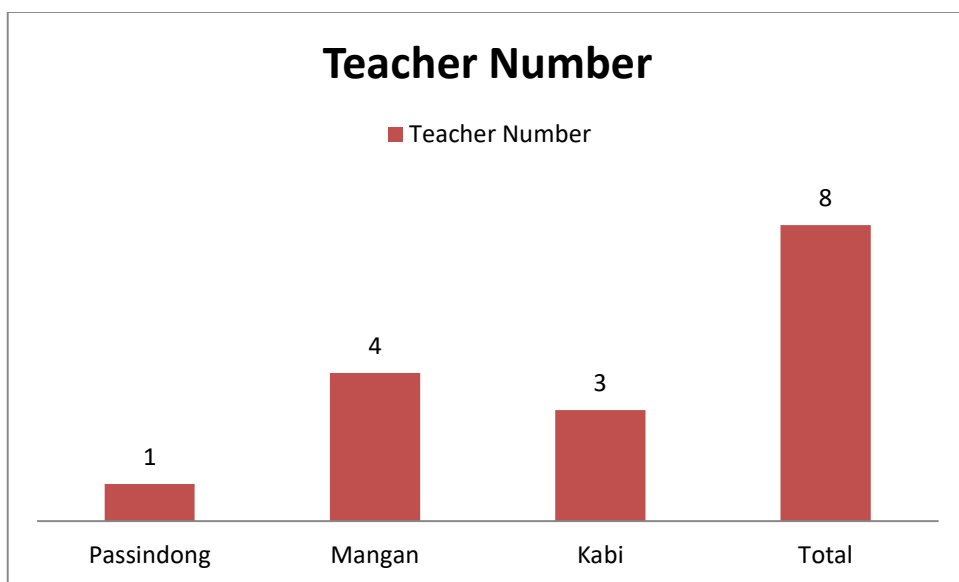
STATISTICAL ANALYSIS AND FINDINGS OF DATA

Both qualitative and quantitative data were analyzed using simple statistical tools.

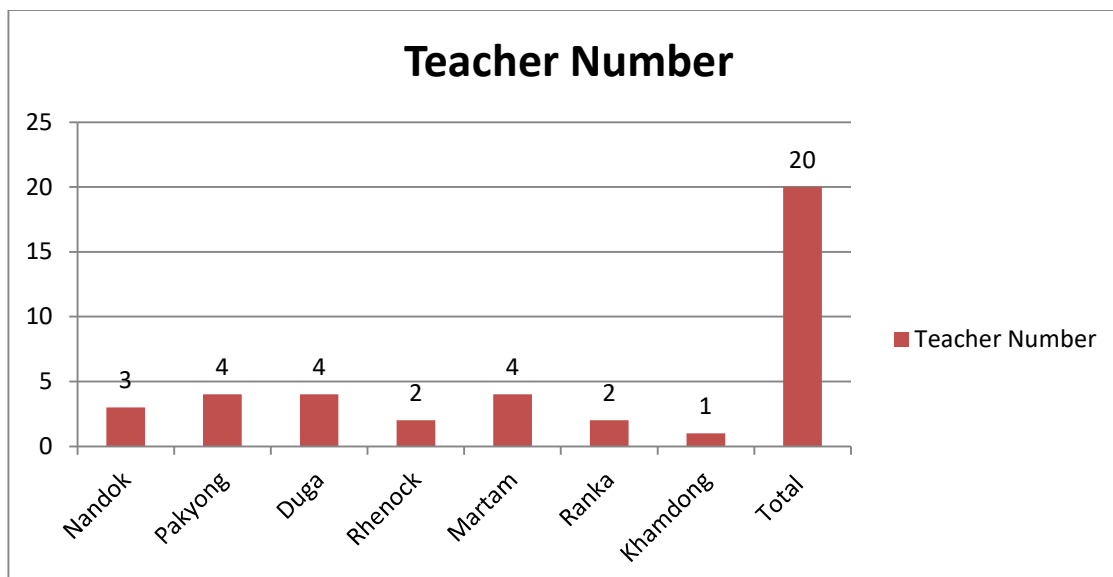
Qualitative Analysis of Questionnaires

1. BAC wise Teachers

BAC of North	Teacher Number
Passindong	1
Mangan	4
Kabi	3
Total	8



BAC of East	Teacher Number
Nandok	3
Pakyong	4
Duga	4
Rhenock	2
Martam	4
Ranka	2
Khamdong	1
Total	20

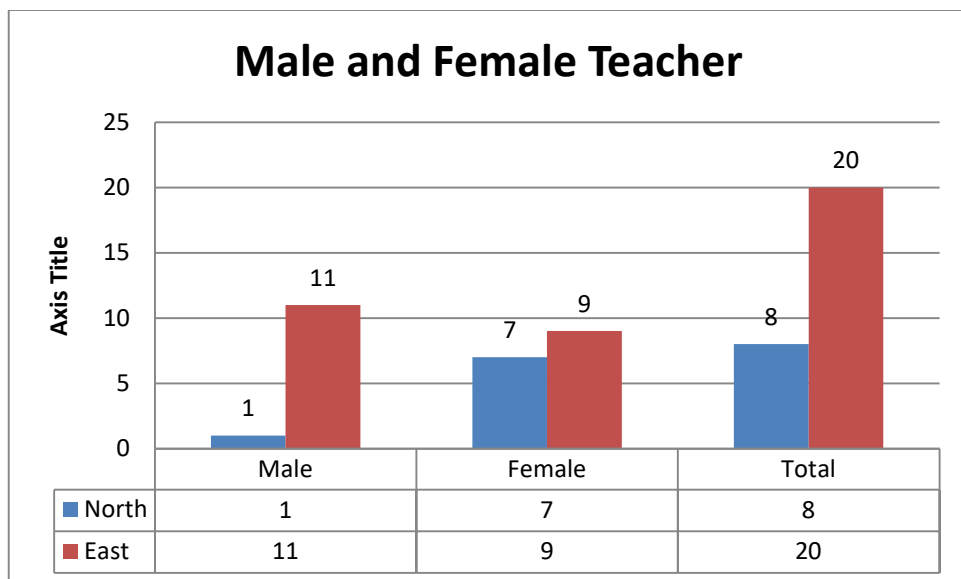


2. Lists of School

East	North
GSS, Sirwani	GSS, Singhik
GSS, Tarpin	GJHS, Namok
GJHS, Rhenock	GSS, Tingchim
GSS, Sang Tshalamthang	GJHS, Rangrang
GJHS, Burung	GSS, Passingdong
GSSS, Ranipool	GJHS, Tumlong
GJHS, Samlick Marchak	GSSS, Kabi
GSSS, Rumtek	GSS, Phensong
GJHS, Souraney	
GSSS, Bojoghari	
GSS, Lower Syari	
GSS, Ahopul Kisan	
GSS, Pachey	
GSS, Aho Shanti	
GSS, Amba	
GSS, Sumin Lingchey	
GSS, Majitar	
GSS, Rangpo	
GSSS, Ranka	
GSS, Lower Sumin	

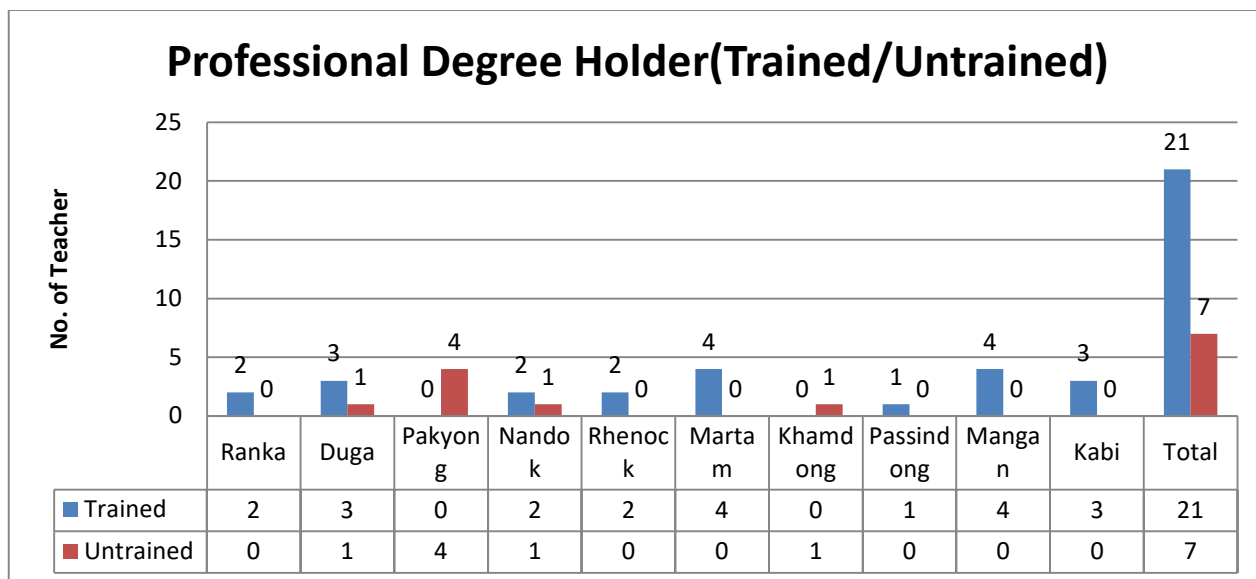
3. Male/ Female Teacher

District	Male	Female	Total
North	1	7	8
East	11	9	20



4. Professional Degree Holder

BAC	Yes	No
Ranka	2	0
Duga	3	1
Pakyong	0	4
Nandok	2	1
Rhenock	2	0
Martam	4	0
Khamdong	0	1
Passindong	1	0
Mangan	4	0
Kabi	3	0
Total	21	7



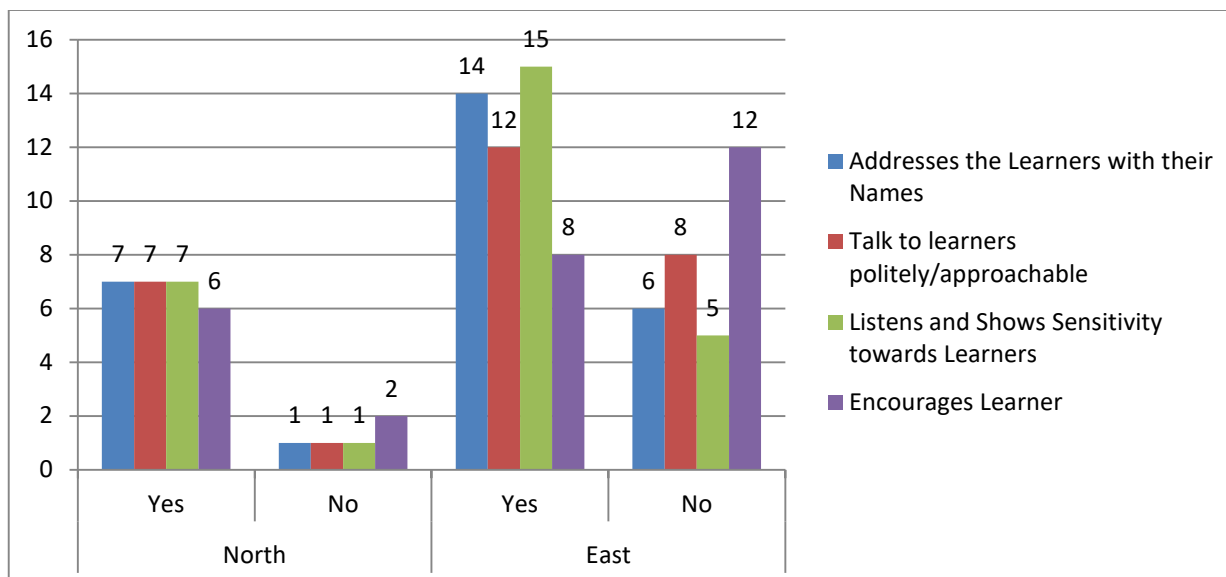
- a. Under Pakyong BAC three teachers are under adhoc without any professional degrees.

PART II- QUALITATIVE AND QUANTITATIVE ANALYSIS OF CLASSROOM OBSERVATION TOOL

1. Indicator- Knows and Understand Learners

Component	North		East	
	Yes	No	Yes	No
Addresses the Learners with their Names	7	1	14	6
Talk to learners politely/approachable	7	1	12	8
Listens and Shows Sensitivity towards Learners	7	1	15	5
Encourages Learner	6	2	08	12

Bar Graph showing - Indicator- Knows and Understand Learners

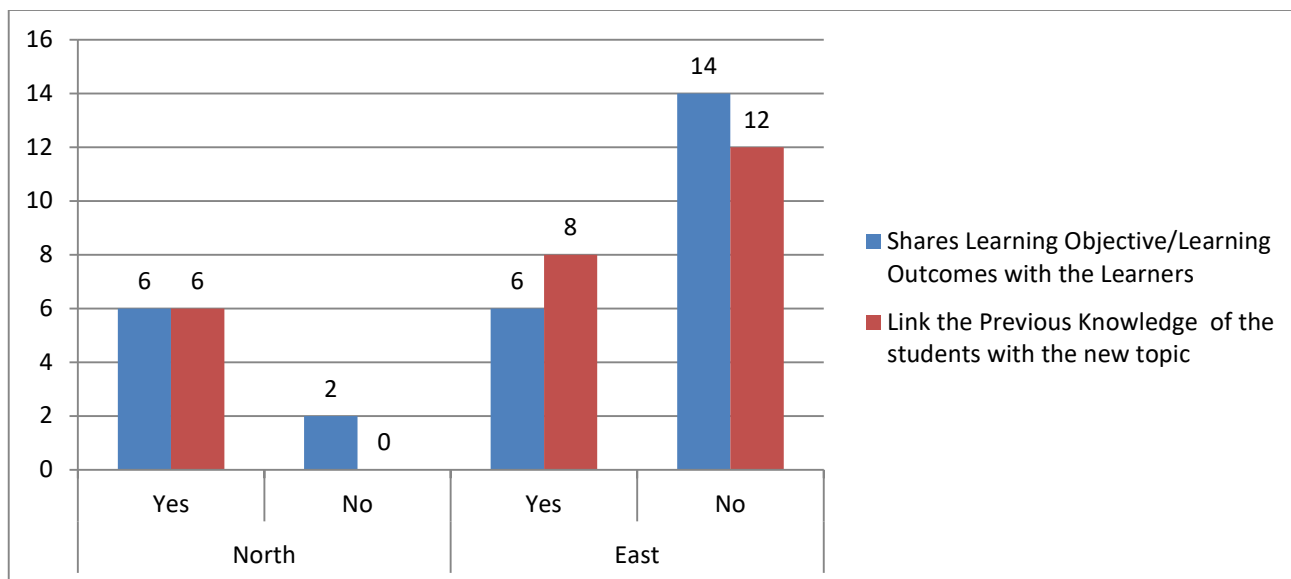


- One teacher lack in encouraging learner, addresses and listening to learners out of 8.
- Six teachers lack addressing, 8 lack to talk politely, 5 doesn't listen to learner and 12 teachers don't encourage the learner out of 20.

2. Indicator- Plans for effective transaction of the curriculum to achieve the Learning Outcome

Component	North		East	
	Yes	No	Yes	No
Shares Learning Objective/Learning Outcomes with the Learners	6	2	6	14
Link the Previous Knowledge of the students with the new topic	6	0	8	12

Bar Graph showing- Indicator- Plans for effective transaction of the curriculum to achieve the Learning Outcome



- a. Two teachers of the North did not share the Learning Outcomes with the learners out of 8.
- b. 14 teachers did not share the learning outcome and 12 teachers did not even link the previous knowledge of the students out of 20.

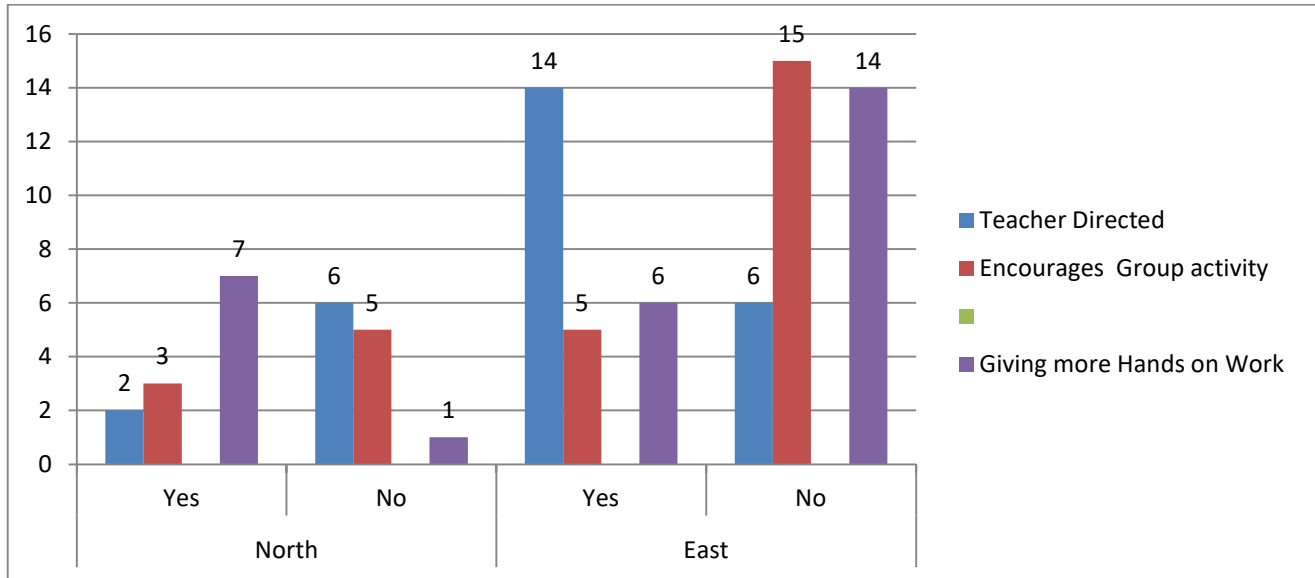
3. Indicator – Aligning Pedagogy with learning Outcome

4.

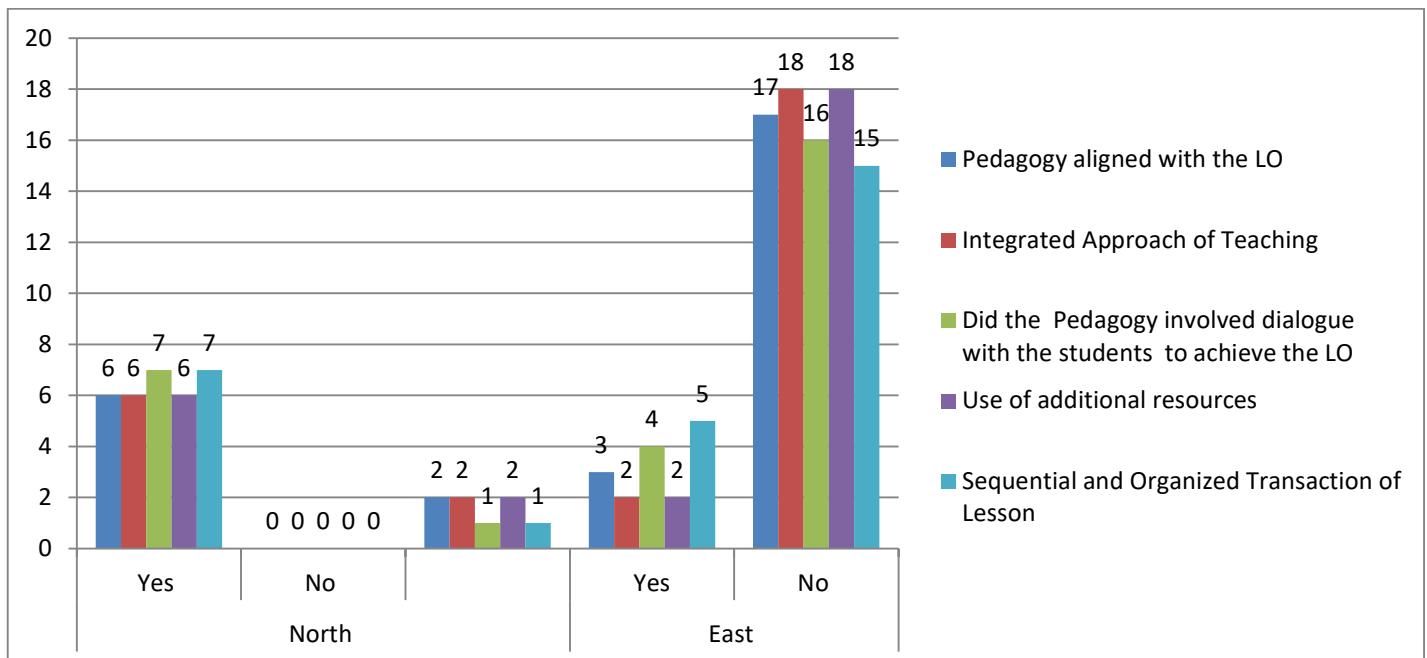
Component	North		East	
	Yes	No	Yes	No
Teacher Directed	2	6	14	6
Encourages Group activity	3	5	5	15
Giving more Hands-on Work	7	1	6	14
Component	North		East	
	Yes	No	Yes	No
Pedagogy aligned with the LO	6	2	3	17
Integrated Approach to Teaching	6	2	2	18
Did the Pedagogy involved dialogue with the students to achieve the LO	7	1	4	16
Use of additional resources	6	2	2	18
Sequential and Organized Transaction of Lesson	7	1	5	15
Component	North		East	
	Yes	No	Yes	No
Mastery over the Content	6	2	7	13
Actively Engages the Learners	7	1	3	17
Any other extra activity involved to make achieve the LO	6	2	3	17

Contextualization of the lesson	7	1	4	16
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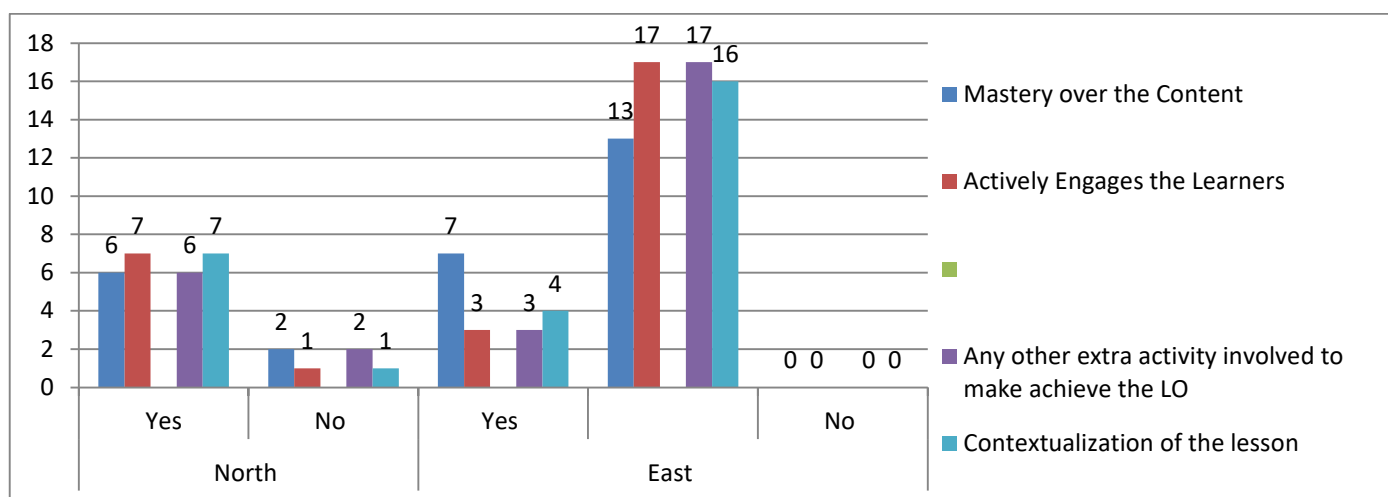
Bar Graph showing- Aligning Pedagogy with learning Outcome



- Two teachers' classes were teacher-directed, 3 teachers didn't do group activity and one teacher didn't give hands-on experiences to the learner in North Sikkim out of 8.
- 14 teachers' classes were teacher-directed, 15 teachers didn't do group activity and 14 teachers didn't give hands-on experiences in East Sikkim out of 20.



- a. Two teachers pedagogy not aligned with LO, 2 teachers didn't do integrated teaching, 1 didn't do dialogue, 2 didn't use additional resources and one teacher class was not sequenced and organized in North Sikkim.
- b. 17 teachers pedagogy not aligned with LO, 18 teachers didn't do integrated teaching, 16 didn't do dialogue, 18 didn't use additional resources and 15 teacher class was not sequenced and organized in East Sikkim.

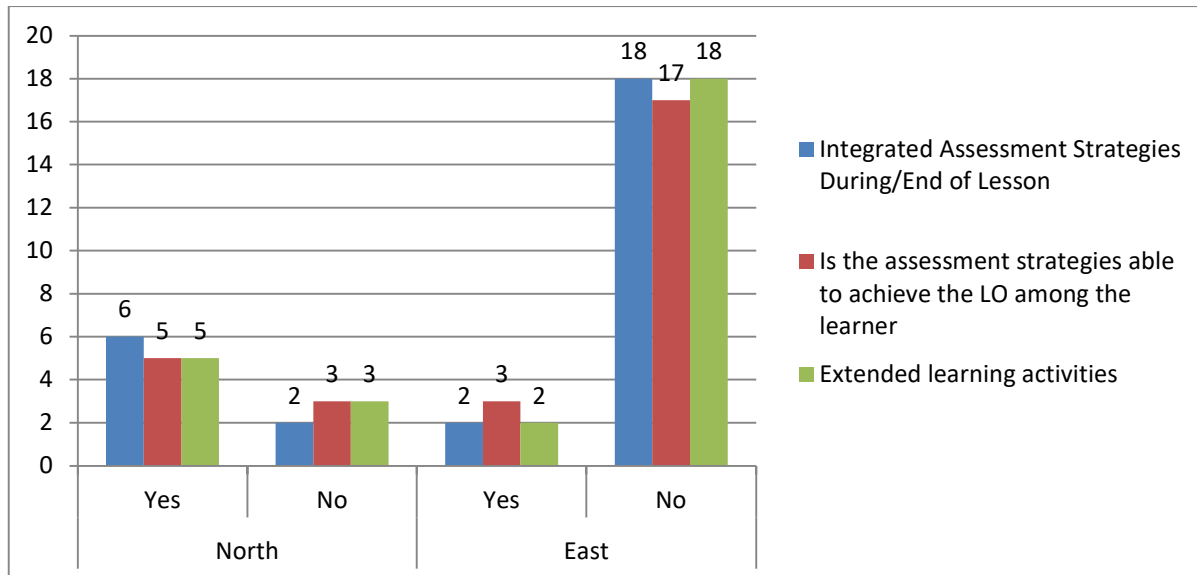


- a. Two teachers didn't have mastery over the content and didn't do any other activity to achieve the LO, 1 teacher didn't engage the learners and contextualize the lesson in North Sikkim.
- b. 13 teachers didn't have mastery over the content, 16 teachers didn't do any other activity to achieve the LO, 17 teachers didn't engage the learners and 16 teachers didn't contextualize the lesson in East Sikkim.

5. Indicator- Assessment alignment with Learning Outcome

Components	North		East	
	Yes	No	Yes	No
Integrated Assessment Strategies During/End of Lesson	6	2	2	18
Is the assessment strategies able to achieve the LO among the learner	5	3	3	17
Extended learning activities	5	3	2	18

Bar Graph Showing- Indicator- Assessment alignment with Learning Outcome

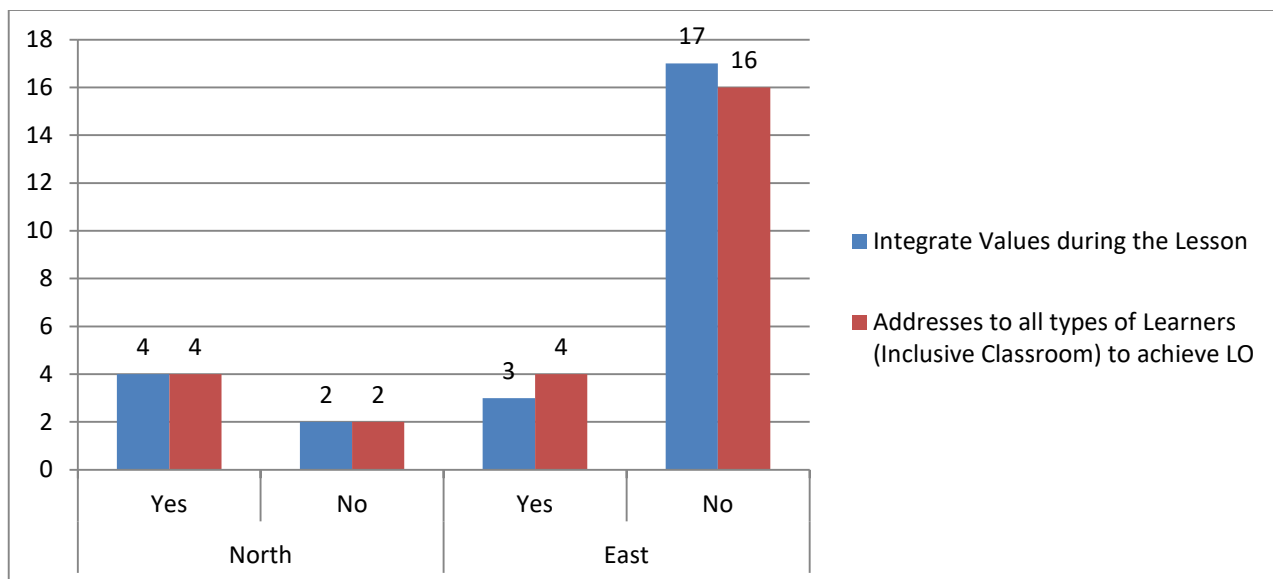


- a. Two teachers didn't integrate the assessment, three teachers assessment didn't align with Los and three teachers didn't give any extended learning activities in east Sikkim.
- b. 18 teachers didn't integrate the assessment, 17 teachers assessment didn't align with Los and 18 teachers didn't give any extended learning activities in North Sikkim.

6. Any Other

Components	North		East	
	Yes	No	Yes	No
Integrate Values during the Lesson	4	2	3	17
Addresses all types of Learners (Inclusive Classroom) to achieve LO	4	2	4	16

Bar graph showing- Any Other



- Two teachers dint integrate the value during the lesson and didn't address all types of learners North Sikkim.
- 17 teachers didn't integrate the values during the lesson and 16 teachers didn't address all types of learners in East Sikkim.

INDICATOR WISE OVERALL FINDING

a. Indicator- Knows and Understand Learners

The majority of teachers are addressing the learners with their names and taking politely with them whereas 13 teachers are lacking in listening and showing sensitivity and even not encouraging the learner.

b. Indicator- Plans for effective transaction of the curriculum to achieve the Learning Outcome

16 teachers are not sharing the learning outcome with the students and 12 teachers didn't even the previous knowledge of the students with the new topics.

c. Indicator – Aligning Pedagogy with learning Outcome

17 teachers class are teacher-directed, 18 teachers don't encourage group activity and 15 teachers are not giving hands-on work to the learners.

19 teachers' pedagogy is not aligned with the learning outcome for the class, 20 teachers pedagogy is not integrated, 17 teachers didn't engage students with dialogue, 20 teachers not using any additional resources and 17 teachers class was not sequenced and organize.

15 teachers do not have mastery over the content, 17 teachers dint do any other activity to achieve the learning outcome, 18 teachers failed to engage the learners and 17 teachers didn't even contextualize the lesson.

d. Indicator- Assessment alignment with Learning

20 teachers didn't integrate the assessment, 20 teachers assessment didn't align with the Los and 21 teachers didn't assign any extended learning activities.

e. Any Other

19 teachers didn't integrate the value component with the content and 17 teachers lack to address all types of learners.

CONCLUSION

The North Sikkim teachers have a more influence on the training compare to East Sikkim in most of the indicators. Teachers of both the districts are having challenges in aligning Learning Outcomes with assessment and integrated approach of pedagogy.

SUGGESTIONS AND RECOMMENDATIONS

1. A study on attitude of East /North district teachers towards their profession can be carried out.
2. A study on the influence of other such training upon teachers of East/North Sikkim can be done.
3. Teachers of both the district needs further training on assessment and integration of different pedagogical processes in science.
4. Teacher's needs to be re-oriented on learner centered pedagogy and inclusiveness in classroom teaching.
5. The BRCs and CRCs should carry out frequent school or classroom visit after such training.
6. Impact study of such training upon student's achievement can also be done.
7. Provision for science laboratory or supply of science kit in some schools.

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ANNEXURE

1. Annexure-1(Tools)

Research Tool

Part-1 (Profile) Interview cum Questionnaires

- a. Name of Teacher: b. Name of School:
- c. Male/Female: d.BAC and District:
- d. Class Observed: e. Total Strength of Students:
- f. Subject: g. Topic:
- g. Teaching Experience:
- h. Qualification:
- i. What are you currently teaching in your class?
- j. Do you plan/design your lesson to use any specific activity or resources to teach this lesson?
- k. What are the Learning objectives/ Outcomes for the lesson?

Part-2 (Classroom Transaction Indicators/schedule)

- Kindly tick (√) or cross (X) in the column against the indicators in the checklist as observed / not observed in the class.

No	Indicators	Tick (√)or	Remarks/Evidence
----	------------	---------------	------------------

		Cross(X)	
1	Knows and Understand learners		
	a. Addresses the Learners with their Names		
	b. Talk to learners politely/approachable		
	c. Listens and Shows Sensitivity towards Learners		
	d. Encourages Learner		
2	Plans for effective transaction of the curriculum to achieve the LO		
	a. Shares Learning Objective/Learning Outcomes with the Learners		
	b. Link the Previous Knowledge of the students with the new topic		
3	Pedagogical Processes to align with LO		
	a. Teacher-Directed and Authoritative Class		
	b. Encourages Group activity		
	c. Giving more Hands-on Work to Students for Developing science processing		

	Skills		
	d. Pedagogy aligned with the LO		
	e. Integrated Approach to Teaching		
	f. Did the pedagogy involved dialogue with the students to achieve the LO		
	g. Use of additional resources		
	h. Sequential and Organized Transaction of Lesson		
	i. Mastery over the Content		
	j. Actively Engages the Learners		
	k. Any other extra activity involved to make achieve the LO		
	l. Contextualization of the lesson		
	4. Assessment alignment with LO		
	a. Integrated Assessment Strategies During/End of Lesson		

	b. Is the assessment strategies able to achieve the LO among the learner		
	c. Extended learning activities		
5	Any Other		
	a. Integrate Values during the Lesson		
	b. Addresses all types of Learners (Inclusive Classroom) to achieve LO		

Part 3(Post-Assessment interview for Self reflection)

What were your strengths and weaknesses in the class?

2. Annexure-2 (Photographs)

North Sikkim



GJHS, Rangrang

GSS,Passingdong



GSS,Singhik

GSS,Tingchim



GJHS, Namok



GSS, Phensong



GJHS, Tumlong

**IMPEMENTATION OF CONSTRUCTIVIST APPROACH IN TEACHING LEARNING
PROCESSESS AT PRIMARY LEVEL OF GOVERNMENT SCHOOLS OF NORTH AND EAST
DISTRICTS OF SIKKIM**

SUBMITTED TO SCERT, SIKKIM

BY

DHAN HANG SUBBA LECTURER

IN SOCIAL SCIENCE

DIET EAST, GANGTOK

APRIL, 2019

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IMPLEMENTATION OF CONSTRUCTIVIST APPROACH IN TEACHING LEARNING PROCESSES AT PRIMARY LEVEL OF GOVERNMENT SCHOOLS OF NORTH AND EAST DISTRICT OF SIKKIM

1.0. INTRODUCTION

Constructivist learning is a student-driven process in which students develop or construct their understanding of information. The learners incorporate their own experiences and perspectives as well as those of others to develop their own experiences and perspectives as well as those to develop their own understanding of concepts rather than only receiving information from the instructor.

NCF 2005, states that constructivism is a philosophical position which holds a view that every learner constructs her/his knowledge and it has a centre stage of learning. Knowledge is something which cannot be passed on from the teacher to his student, while what gets transferred from a teacher to a student is only the information. Mere information does not satisfy these conditions of knowledge and hence does not become knowledge. Therefore, teacher has the responsibility of providing suitable learning opportunities and experiences by design. Through these opportunities and experiences, she/ he is expected to facilitate learners to construct knowledge.

Constructivism has been understood from cognitive perspective as well as from social perspective. The cognitive constructivist, Jean Piaget, articulated mechanisms by which knowledge is internalized by learners. He suggested that through processes of *accommodation* and *assimilation*, individuals construct new knowledge from their experiences. When individuals *assimilate*, they incorporate the new experience into an already existing framework without changing that framework. This may occur when individuals' experiences are aligned with their internal representations of the world, but may also occur as a failure to change a faulty understanding. *Accommodation* is the process of reframing one's mental representation of the external world to fit new experiences. Accommodation can be understood as the mechanism by which failure leads to learning: when we act on the expectation that the world operates in one

way and it violates our expectations, we often fail, but by accommodating this new experience and reframing our model of the way the world works, we learn from the experience of failure, or

others' failure. The influence of social constructivism in education is also quite prominent. The contribution of Vygotsky in articulating the concept of Zone of Proximal Development (ZPD) has indeed been an important contribution in understanding where does learning take place. This has enabled in understanding how each learner has to be understood as a learner with different ability.

The goal of learning is not to store piles of information but to engage children's minds by constructing powerful and useful concepts. The behaviorist approach to learning focuses only on the behavior that can externally observed without considering the influence of the unconscious mind. The constructivist approach to learning can facilitate individuals by providing meaningful and relevant information, by giving opportunities to discover or apply ideas themselves and by teaching them to be aware of and consciously use their own strategies for learning. Here, the learners must be capable of discovering basic skills and knowledge to solve complex problems or transform complex information into convenient and suitable information. Jean Piaget viewed children as discovering or constructing virtual all knowledge about their world based on their cognitive levels. According to Vygotsky, the socio-cultural context also profoundly affects children's learning (Koijam Sobita Devi, 2019).

2.0. REVIEW OF RELATED LITERATURE

Padmananabhan and Rao (2011) conducted quasi experimental pre-test post-test design to explore "Effectiveness of constructivist approach on the student's problem solving ability in Science". The main objective of this study was to assess the effectiveness of constructivist approach on the problem-solving ability in science subject. The study found that, (i) the students of constructivist preformed higher in problem-solving ability test than the students in the control group.(ii)Experimental group has differentially gained more scores for problem solving ability and constructivist approach has improved the ability of problem solving of the experimental group.(iii) There was no significant difference among low, average and high achievers of those students taught by constructivist approach than those taught by conventional method in problem solving ability test.(iv) Constructivist approach found equally effective for both boys and girls in improving their problem solving ability in science and also they liked new approach.

Nayar and Senapaty (2011) undertook a study on "the effect of constructivist approach on student's creative ability". The study developed the constructivist approach based on 5 E

instructional model as an instructional material and CAT (Creative Ability Test) as a measuring tool assess the Creativity Ability at pre and post-test level. In excrement process experimental group was taught through constructivist approach and control group with traditional method by the researcher. The findings of study were (i) Creativity score of constructivist approach group was higher than the control group. There was significant effect of constructivist approach on creativity. (ii) Constructivist approach was more effective than traditional approach in enhancing the various dimensions of creativity viz. fluency, flexibility and originality.(iii) Overall constructivist approach is an effective strategy than traditional method of teaching for developing fluency, flexibility and competency.

Muhanty and Zubair (2012) carried out a study on “a comparative study on constructivist model and behaviorist mode of teaching in achievement of mathematics”. The findings of the study were (i) Constructivist model of teaching was more effective than behaviorist model of teaching. (ii) There was no significant difference between boys and girls in experimental group by constructivist model of teaching and it was interpreted that sex has no effect on the achievement of the students.

Rajendran (2012) adopted qualitative case study to investigate “A study on constructivist approach to environmental education among primary pre-service student teachers”. The findings of the study were: better understanding on environmental concepts was developed among students in constructivist environment, student changed their ideas in the light of evidences, student teacher belief on constructivist approach and found that organization of learning resources was important for successful constructivist classroom.

Agarwal and Adepu (2013) conducted a comparative study on “ Effectiveness of Activity Based Learning with traditional teaching method”. The study found that: Activity Based Learning group and control group was statistically significant wiyh respect to post-test scores. Group work in Activity Based Learning class motivated, stimulated the students and increased their involvement and achievement in class. Activity Based Learning approach created joyful learning among the 4th class students compare to traditional approach.

Kusmaryono and Suyitno (2015) conducted a study titled “Mathematical power’s description of students in grade 4th based on the theory of constructivism”. The study reported that: students have understood how to learn and they were delighted to learn math’s pictures. Students were able to construct knowledge related to mathematical ideas by their own. Students were

successfully building their mathematical strength little by little through process of assimilation and accommodation. Students were able to accommodate mathematical knowledge with assistance of teacher. Constructions of mathematical power of students have influenced the thinking of students in problem solving.

3.0. RATIONALE OF THE STUDY

According to the principal of constructivism, for our classroom practices, we should remember that the information may be shared by the teachers but knowledge generation or understanding is the primary responsibility of the individual student. The teacher's own role in children's cognition could be enhanced if they assume a more active role in relation to the process of knowledge construction in which they are engaged. A child constructs her/his knowledge while engaged in the process of learning. Allowing children to ask questions that require relating what they are learning in school to things happening outside, encouraging children to answer in their own words and from their own experiences rather than memorizing. In Sikkim, SCERT, DIETs and Resource persons at Cluster level frequently conduct training based on Activity Based teaching which is one of the important bases of constructivist approach of teaching. This study also focused on whether the teachers teaching at primary level are applying the strategy of constructivist approach in their school or facing still problems of applying it.

4.0. STATEMENT OF THE PROBLEM

Based upon the rationale, the problem of the study was stated as "Implementation of Constructivist Approach in Teaching Learning Processes at Primary Level of Government Schools of North and East Districts of Sikkim".

5.0. OBJECTIVES OF THE STUDY

- i. To study the teaching competency of primary school teachers in relation to constructivist approach.
- ii. To study the implementation of learner centered strategies of teaching at primary level.

iii. To know the training needs in constructivist teaching approach.

6. 0. DELIMITATIONS OF THE STUDY

The following were the delimitations of this study:

- i. This study covered two districts of Sikkim i.e. North and East taking 120 teachers from 7 BACs with 40 schools.
- ii. This study is Survey type study i.e. de facto for teachers teaching at primary level.

METHODOLOGY

In order to achieve the objectives of the study primary teachers teaching classes I to V were selected from different schools of north and east districts of Sikkim through purposive sampling. The study was delimited to 120 primary teachers of 40 Government Schools of East and North Districts of Sikkim from 7 BACs, taking 30 schools from east district and 10 schools from north district. Questionnaire prepared by investigator and Classroom Observation Schedule of IGNOU D.El.Ed. Course “Teaching Assessment Battery (TAB)” was administered to sample primary school teachers for the study (See Appendix-I and II).

Sampling

The sampling distribution is schematically presented in Table 1 and 2.

Table: 1. Distribution of Sample of East District

Sl. No.	BAC	No. of Schools	Sample Population
1	Nandok	6	3x6=18
2	Martam	6	3x6=18
3	Pakyong	6	3x6=18
4	Rehnock	6	3x6=18
5	Regu	6	3x6=18
TOTAL	5	30	90

Table: 2. Distribution of Sample of North District

NORTH DISTRICT			
Sl.No.	BAC	No. of Schools	Sample Population
1	Kabi	4	3x4=12
2.	Mangan	6	3x6=18

TOTAL	2	10	30
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Analysis and Interpretation

Based upon the questionnaires filled by the sample teachers, the analysis and interpretation was done by using simple descriptive statistical tools.

Teaching Competency in relation to Constructivist Approach of Teaching.

Educational curricula and teaching methods are changing from transmission curriculum to a transactional curriculum in which students are actively involved in their learning to reach new understanding. Constructivist teaching fosters critical thinking and creates active and motivated learners. This approach be used to create learners who are autonomous, inquisitive thinkers who question, investigate and reason and frees teachers to make decisions that will enhance and enrich students' development. In a constructive classroom, by contrast, the teacher and the student share responsibility and decision making and demonstrate mutual respect. The democratic and interactive process of a constructive classroom allows students to be active and autonomous learners. Using constructive strategies, teachers are more effective. They are able to promote communication and create flexibility so that the needs of all students can be met. The learning relationship in a constructive classroom is mutually beneficial to both students and teachers.

Table.3. About how often teacher do each of the following in Constructive teaching?

Sl. No.	Questions/statements	Responses			
		Strongly agree	Agree	Disagree	Strongly disagree
1	As classrooms are cognitive theatres. So, teacher should use manipulative materials and hands on activities to discover relationship in classroom.	56 (46.67)	39 (32.50)	15 (12.50)	10 (8.33)
2	As teacher is responsible for teaching, so I direct classroom as per my desire and should not employ whole classroom discussions on topic.	25 (20.83)	31 (25.83)	29 (24.17)	35 (29.17)

3	Interaction is necessary for learning. Students learn better when they are engaged in dialogues with other students and teachers.	62 (51.67)	34 (28.33)	13 (10.83)	11 (9.17)
4	Learners have predispositions, in which modification for an individual is not possible due to shortage of time. So, I don't consider the beliefs and attitudes of learners.	43 (35.83)	37 (30.84)	25 (20.83)	15 (12.50)
5	As learner learns most from his environment by passing maximum time in community, so, I acknowledge the critical role of experience in learning.	73 (60.83)	29 (24.17)	12 (10.00)	6 (5.00)
6	I teach what students want to learn and not what I want to impart irrespective of boundaries of curriculum.	68 (56.67)	23 (19.17)	19 (15.83)	10 (8.33)
7	Teacher is transmitter of knowledge not facilitator.	23 (19.17)	14 (11.66)	47 (39.17)	36 (30.00)
8	Teacher is a guide in cognitive learning classroom and should help students to construct their own concepts.	56 (46.67)	49 (40.83)	10 (8.33)	5 (4.17)
9	Personal presentations of works are good tools for evaluation than unit tests.	63 (52.50)	37 (30.83)	12 (10.00)	8 (6.67)
10	Concept mapping should be used as evaluation tool at the place of traditional homework.	47 (39.17)	38 (31.67)	19 (15.83)	16 (13.33)
11	Formative assessment is more necessary for concept clarity.	78 (65.00)	23 (19.17)	13 (10.83)	6 (5.00)
12	As learning is individual, social activities should be avoided for better learning.	12 (10.00)	21 (17.50)	54 (45.00)	33 (27.50)
13	Learning is not contextual and is predetermined.	33 (27.50)	41 (34.17)	28 (23.33)	18 (15.00)

14	Content should be spirally arranged rather than traditional branching arrangement.	32 (26.67)	44 (36.67)	28 (23.33)	16 (13.33)
15	Understanding and performance should be favored over information	46 (38.33)	39 (32.50)	25 (20.83)	10 (8.34)
16	It is better when students themselves decide what activities are to be done in classes.	21 (17.50)	32 (26.67)	39 (32.50)	28 (23.33)
17	As every learner is different but teacher has to choose a path for teaching by considering average mental abilities. So, I don't consider learners' mental model into consideration.	32 (26.67)	30 (25.00)	28 (23.33)	30 (25.00)
18	It is teacher's job to provide resources and assistance to construct concepts but not to state concepts.	23 (19.17)	20 (16.67)	48 (40.00)	29 (24.16)
19	Content is the focus and should be completed in specified time favoring over learner.	78 (65.00)	21 (17.50)	15 (12.50)	6 (5.00)
20	Teacher is cognitive supporter to challenge creativity and encourage independent learning.	73 (60.83)	33 (27.50)	8 (6.67)	6 (5.00)
21	Learning is better without active involvement of learner as they cause disciplinary problems by providing wrong answer. So, I avoid students' engagement in dialogue with others on topic.	36 (30.00)	24 (20.00)	31 (25.33)	29 (24.17)

The above responses given by the sample teachers and portraits the current situation of constructivist approach of teaching. As mention earlier, constructivist instructional strategy suggests that students should participate in experiences that accommodate the way of learning

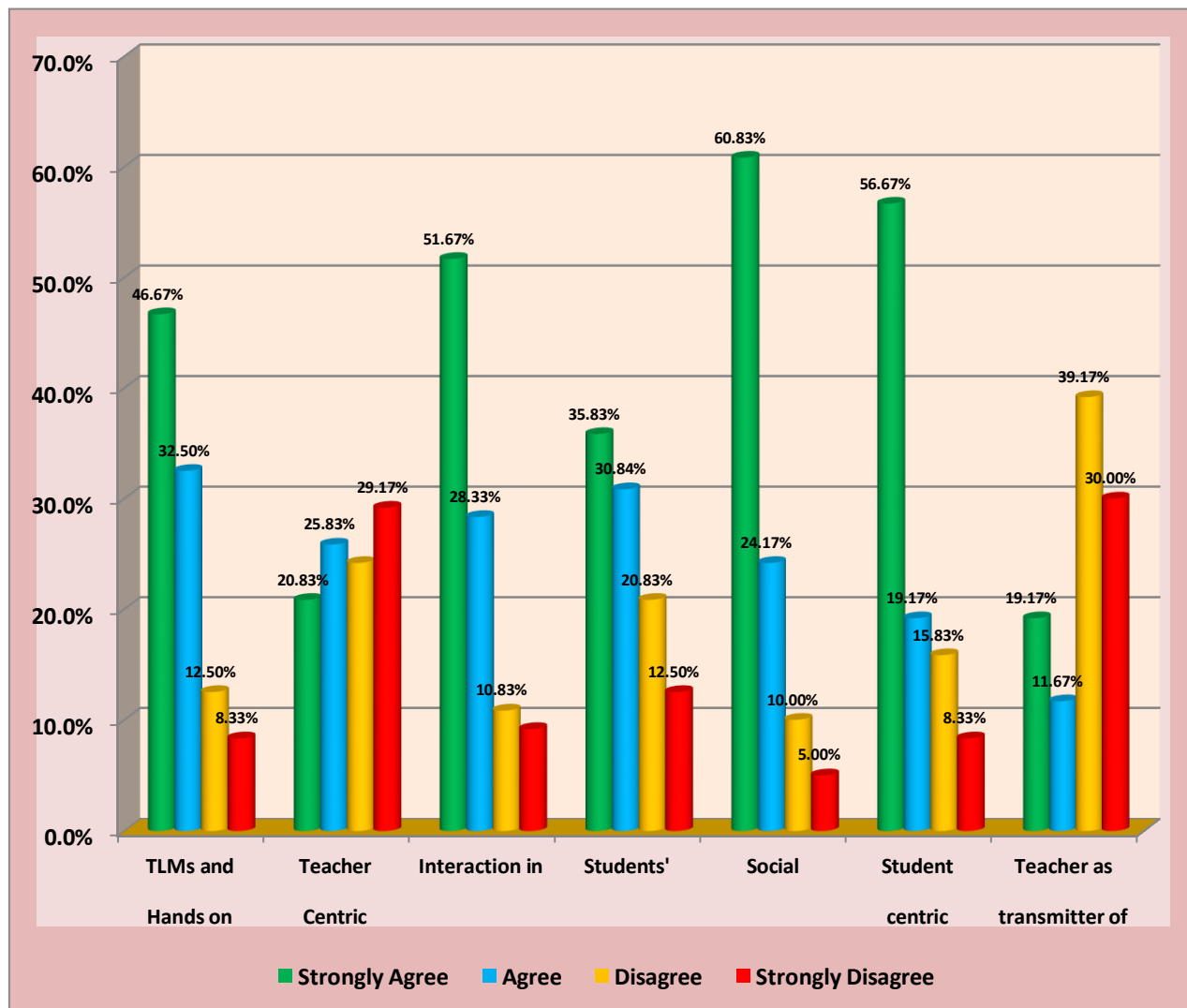


Figure: 1. Parameters of Constructive Teaching Strategy (First 7 parameters)

From above graph, it shows that 46.67 % teachers strongly agreed that TLMs and hands-on activities are important in constructive teaching learning process. Again, 51.67% teachers strongly agreed that interaction in the classroom is needed, 60.83% teachers strongly agreed social interaction among students and teachers are important, 56.67% teachers strongly agreed that student centric teaching is crucial and beneficial for the construction of knowledge.

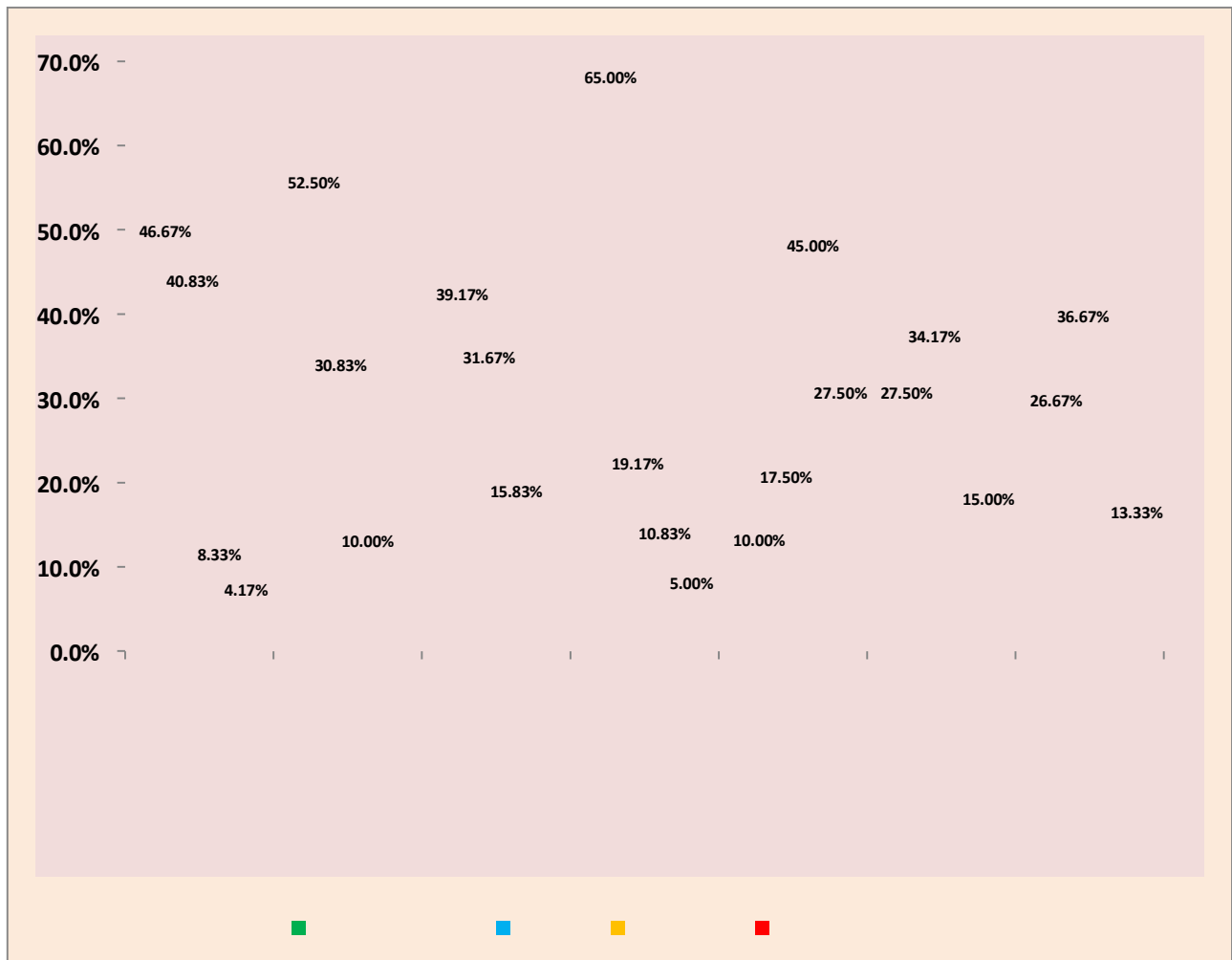


Figure: 2. Parameters of Constructive Teaching Strategy (Second 7 parameters)

Above graph shows that, 46.67% teachers strongly agreed that teacher should be as a guide or the facilitator of the students in the construction of knowledge. Further, 52.50% teachers strongly agreed that presentation of the students is good tools of evaluation of their learning process, 39.17% teachers strongly agreed concept mapping should be used as evaluation tool in place of traditional homework, 65% teachers strongly agreed formative assessment is more necessary for concept clarity during teaching learning process and 26.67% strongly agreed that content should be spirally arranged.

Further, 45% and 27.50% teachers disagree and strongly disagree that social activities should be avoided for better learning, that means social learning is important in constructivist teaching

learning process but 27.50% and 34.17% teachers responded that learning is not contextual and believed that it is predetermined.

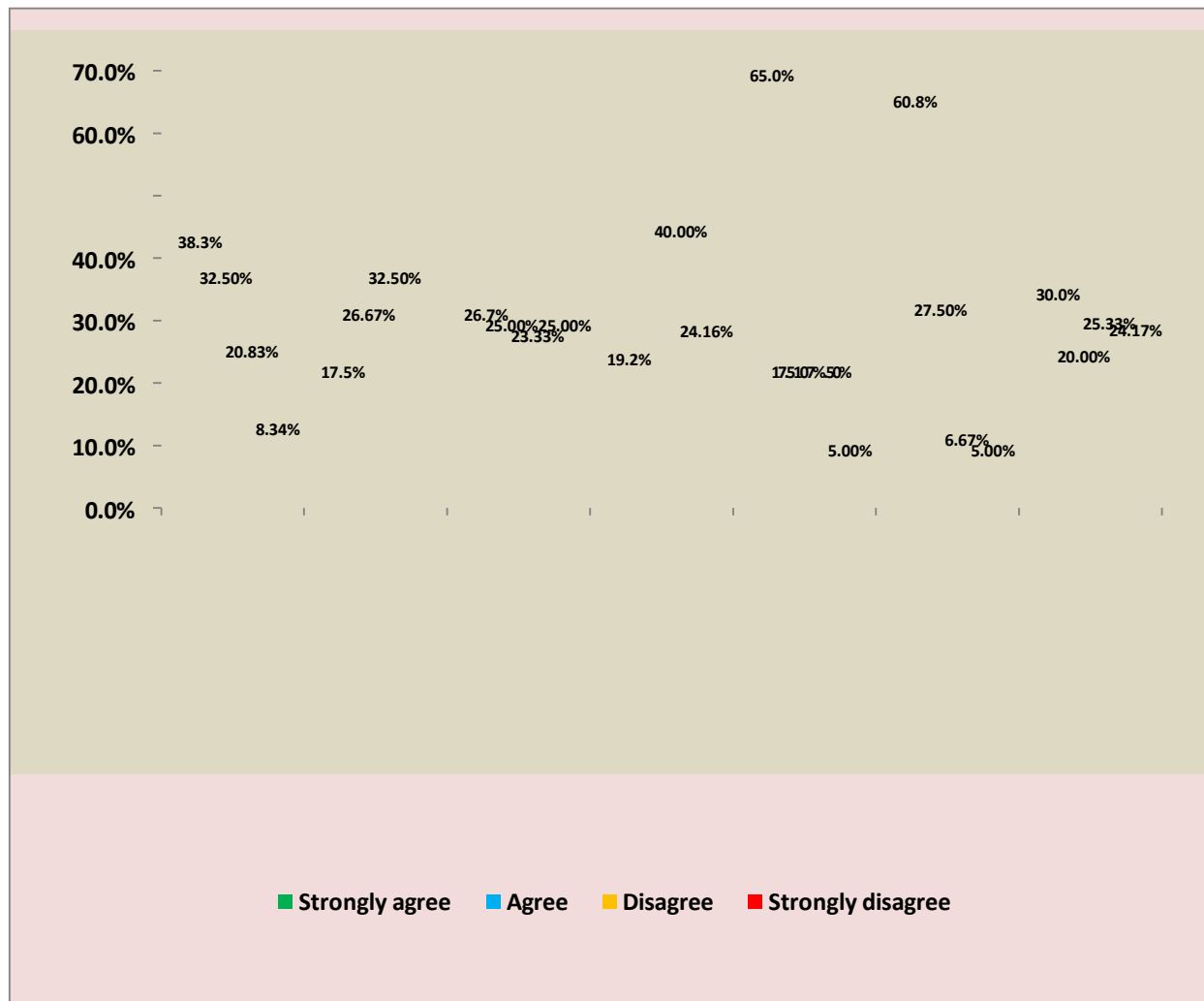


Figure: 3. Parameters of Constructive Teaching Strategy (Third 7 parameters)

Above responses were given by the sample teachers and revealed that 38.83 teachers strongly agreed that understanding and performance of the students should have importance in achieving competency in learning but 32.50% teachers disagreed that it is better when students themselves decide what activities are to be done in classes as it revealed that teacher wants to decide what type of activities are to be done in the classroom.

Again 65% teacher strongly agreed that content if the focus and should be completed in specific time favoring over learner and 30% teacher strongly agreed that they avoid students' engagement in dialogue with others on topic which cause disciplinary problems by providing wrong answer.

Implementation of Learner Centered Strategies of teaching and Training Needs

Learner centered strategies of teaching is very crucial in constructivist classroom where teacher is a facilitator of teaching learning process. For this purpose, classroom observation schedule tool of IGNOU D.El.Ed. course "Teaching Assessment Battery (TAB)" had been used for the study.

Table.4. Implementation of Learner Centered Strategies of teaching and Training Needs

No .	Item	Specification	Unsatisfactory (1)	Satisfactory (2)	Good (3)	Very Good (4)	Excellent (5)	Average Score
1	Appropriateness of Instructional Objectives/Learning Outcomes	Clarity, relevance to the content, adequacy with reference to the domains and levels of objectives, attainability in items of pupil outcomes	43	40	21	12	4	254/120 (2.11)
2	Proper organization of content	Logical organization according to content and psychological organization as per need of the pupil	37	44	28	8	3	226/120 (1.88)
3	Creating situation for introducing the lesson	Greeting, accepting greeting, securing attention and giving rapport, ensuring facilities like chalk, duster, aids, apparatus, etc.	41	35	20	19	5	332/120 (2.77)
4	Effective introduction of lesson	Linking with past experiences, link between introduction and main parts properly formed, use of appropriate techniques like questioning, examples, exhibits, etc.	37	42	31	6	4	258/120 (2.15)
5	Questions properly structured	Structuring questions at different levels, which are grammatically correct, unambiguous, precise and relevant to content	49	37	20	8	6	245/120 (2.04)
6	Questions well delivered and distributed	Questions delivered with appropriate speed, with proper intonation and pitch allowing pause for thinking	38	41	30	9	2	256/120 (2.13)
7	Pupil responses properly handled	Handling pupil responses techniques like prompting eliciting further information, refocusing and asking critical awareness questions	45	30	27	10	8	266/120 (2.22)
8	Explanation clear concrete	Clarity, continuity, relevance to the content using beginning and concluding statements covering essentials points	31	37	33	12	7	287/120 (2.39)
9	Used appropriate examples for illustrations	Simple, interesting illustrations and relevant to the point being explained	51	30	23	10	6	250/120 (2.08)
10	Used appropriate teaching aids for illustrations	Relevant to content, appropriate to the pupil's level, properly displayed and appropriately used or handled	50	39	20	9	2	234/120 (1.95)
11	Varied stimuli for securing and sustaining pupil	Appropriate body movements, gesture, change in notation and pitch, change in sensory focus, change	48	51	12	7	2	224/120 (1.87)

	attention	in interaction pattern and pausing, aural-visual switching and encouraging pupils physical participation						
12	Used appropriate verbal and non-verbal reinforces	Use of praise words, statements, accepting and using students, ideas use of pleasant and approving gestures and expressions, writing pupil answers on board	47	30	29	11	3	263/120 (2.11)
13	Appropriate pacing of the lesson	Adjusting the speed of the lesson to the level of the pupils	37	47	30	4	2	237/120 (1.98)
14	Innovations	Providing novelty in teaching approach, student activities, lesson structure or teaching aids, ICT Integration, Art Integration, etc.	58	41	17	3	1	208/120 (1.73)
15	Conclusion of the lesson/Recapitulation/Assessment/Extended Learning	Giving the lesson a logical closure with asking adequate recapitulation question, assessment and giving extended learning	30	27	21	30	12	327/120 (2.73)
Total			642 (35.67%)	571 (31.72%)	362 (20.11%)	158 (8.78%)	67 (3.72%)	3867/1800(2.14)

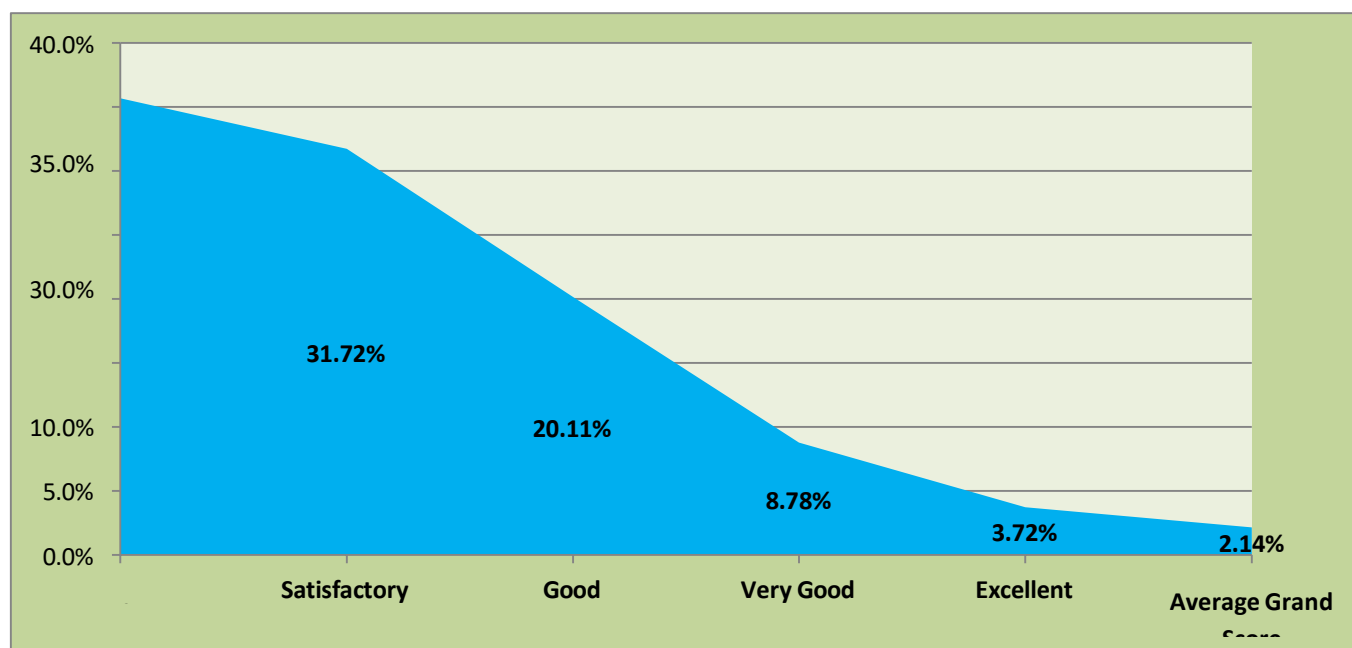


Figure: 4. Classroom Observation Score of teachers in 5 point Rating Scale

From the above figure, investigator understood that 35.67% sample teachers did not have satisfactory implementation of child centric strategy of pedagogy of teaching in the classroom and their score was 1 point in 5 point rating scale. In the same way, 31.72% teacher had