

Chapter - I

INTRODUCTION

Background of Study

The word "mathematics" comes from the Greek words, which means "science, knowledge, or learning" means "fond of learning". With abstraction and logical reasoning, Mathematics evolved from counting, calculation, measurement, and the systematic study of the shapes and motions of physical objects. Practical mathematics has been a human activity for as far back as written records exist. Rigorous arguments first appeared in Greek mathematics, most notably in *Euclid's Elements*. Mathematics continued to develop, for example in China in 300 BC, in India in AD 100, and in the Muslim world in AD 800, until the Renaissance, when mathematical innovations interacting with new scientific discoveries led to a rapid increase in the rate of mathematical discovery that continues to the present day.

There is debate over whether mathematical objects such as numbers and points exist naturally or are human creations. The mathematician *Benjamin Peirce (1809-1880)* said mathematics as "the science that draws necessary conclusions". *Albert Einstein (1879-1955)* on the other hand, stated, "as far as the laws of mathematics refer to reality, they are not certain; and as far as they are certain, they do not refer to reality". In the view of *Niels Abe (1802-1829)*, Mathematics is commonly defined as the study of patterns of structure, change, and space; more informally, from these might say it is the study of "figures and numbers". Mathematical knowledge is constantly growing, through research and application, but mathematics itself is not usually considered a natural

science. One reason is that mathematical knowledge is revised and updated in a different ways, though arguably founded on experiment in some manner; it is not comparable to the natural sciences in this respect.

It is believed that the mathematics developed simultaneously with the development of human civilization. The origin and development of mathematics was from the need of organized society of people. From the beginning, people have been utilizing mathematics to solve the difficulties, arisen due to natural calamity, political purpose, economic planning and other social events as can be perceived from the early history of mathematics of different civilization. In course of solving the social problems, ancient people gradually built up the mathematical structures, rules, formule. Through the empirical observations and experiences.

Mathematics has its own language, definitions, symbols and principles. So it is like a language, which is basic tool of communication which is essential for everyday, to everyone on his/her life. Also the base of higher study not only in the field of science and technology but also in the fields like economics, management, industry, psychology. In general, Mathematics learning helps people to understand and interpret the very important quantitative aspects of living and natural phenomena. In the present curriculum system, mathematics is taken a core subjects to 1-10 grades.

The development of mathematics education in Nepal goes for back to the Vedic period. Rigved is a branch of Veda, which deals about mathematics. After Vedic period, the Gurukul education system contributed. In that period, the mathematics was concerned with

astronomy. In Nepal mathematics is developed according to their necessity.

The Rai, also known as the Khambu, is one of the Nepali cast is most ancient indigenous ethnolinguistic groups. The Rai belong to the Kiranti group or Kirat confederation that includes the Limbu and Sunuwar ethnic groups. The traditional homeland of the Rai extends across Solukhumbu, Okhaldhunga (the Bahing, Wambule subgroups), Khotang, Bhojpur and Udayapur districts in the northeastern mountains of Nepal, west of the Arun River and northeast, the Sunkosi River watershed. Rais are also found in small numbers in the Indian state of Sikkim and the northern West Bengal towns of Kalimpong and Darjeeling.

They were *Raia* meaning king. Once some one was recognized as a ruler then Hindu used to award Raja, Rai, Raia and Malla. When Kirant kings were defeated by Prithibina Raian Shaha then in B.S. 1832 given the title of Rai instead of Raia to all kirant people who used to live in wallo kirant and majh kirant for the particular reason. The Rai are divided into many different sub-groups by there cast Bantawa, Chamling, Sampang, Dumi, Jerung, Kulung, Khaling, Lohorung, Mewahang, Rakhali, Thulung, Tamla, Tilung, Wambule, Yakkha, Yamphu, Jero (Jerung). Some groups number only a few hundred members. The languages together with the traditional religion of the Rai are known as Kirant.

The traditional *Kiranti* religion, predating Hinduism and Buddhism, is based on ancestor-worship and the placation of ancestor spirits through elaborate rituals governed by rules called Mundhum. Sumnima-Paruhang are worshipped as primordial parents. A major *Rai* holiday is the harvest festival, Nwogi, when all share fresh harvested

foods. The Bijuwa and Nakchhung (Dhami) or Priest plays an important role in *Rai* communities.

They do not truly belong to the Caste, system or race. The majority of *Rai* have never accepted casteism and never adopted a caste. The Nepal Federation of Indigenous Nationalities and the Nepal government have recognised this fact.

Because of the fiercely independent nature of the *Rai* community and its location at the eastern end of the consolidated Nepalese nation-state, they were given by exceptional rights of Kipat autonomy and land ownership in their homeland of Majh (middle) Kirant.

Subsistence agriculture of rice, millet, wheat, corn and cotton is the main occupation of the *Rai* although many *Rai* have been recruited into military service with the Nepali army and police, and the Indian and British Gurkha regiments and Singapore Police Force.

Rai women decorate themselves lavishly with silver and gold coin jewelery. Marriage unions are usually monogamous and arranged by parents, although "love marriage", bride capture in the past and elopement are alternative methods. Music with traditional drums and string instruments such as yele, binayo, murchunga, dhol and jhyamta, dance such as Sakela or Sakewa dance, and distilled spirits (alcohol) called aaraakha, ngashi, or waasim are central to *Rai* culture. Sakela or Sakewa dance is the greatest religious festival of Kirant *Rai* people in Nepal.

By religion, Kirats were originally nature worshippers. They worshipped the sun, the moon, rivers, trees, animals and stones. Their primeval ancestors are Paruhang and Sumnima. Hinduism was introduced to and imposed on the Kirats only after the conquest of Gorkhali rulers

whose root was in India. Kirats were quite tolerant and liberal to other religions. That was why Buddhism flourished during the Kirat rule in Nepal. Buddhism had rekindled a new interest and attitude among the people. Kirats had also built many towns. Shankhamul, Matatirtha, Thankot, Khopse, Bhadgoan and Sanga were prosperous cities with dense Population. Thus, it can be safely said that the Kirat period had paved the way for further development and progress of Nepal in all sectors in future.

The houses of Bung, and of most other *Rai* villages in this particular area, invariably have two doors, one to the east and a second facing south. The *Rai* houses found along the upper Arun River and built on wooden piles raised about five feet from the ground with access by a notched wooden ladder to a front side veranda. The walls are of bamboo and the roofs of bamboo matting, beneath the piling, on the ground level, pigs, chickens and sheep are kept. The Tibetan-speaking Lhomi people living to the north use a larger version of this same house pattern.

Most of the *Rai* people are farmers and most of the time they spend on farming. *Rai* children admit at school but some of them do not go school except the terminal and final examination. There are many secondary and lower secondary schools in Khotang district. In addition, educational status of *Rai* students is not satisfactory. *Rai* children have to help their parents by helping on farming, by collecting firewood, look after cattle and small children. They also have to collect grass. They are required to help harvesting works. These requirements pull the students away from school. Which means they go to school on there leisure time. They disparity between daily life needs and schooling needs badly influenced the enrollment percentage and dropout rate of *Rai* students.

The Rai find it is more difficult to adapt to math and English class than classes than classes in other subjects.

Statement of the Problems

In this modern age, mathematics is essential for human life. If anybody wants to make his life a success, he/ she must have resource to mathematics. The need of mathematics is apparent for everyday life as well as for higher studies in the field of science and technology. Mathematics achievement is major factor for every student to there career.

Nepal is one of the multi-communal and multi ethnical countries. There are no equal asses to education for all the castes and ethnics due to their interest, possibilities and geographical situations. Some castes possessing many opportunities and possibility also are not aware and conscious towards the education. Rai students are weak in mathematics and most of them feel difficult too understand.

The main statements of the problems are as follows:

1. What is the achievement level of Rai students in Mathematics in Khotang district?
2. What are the factors that influence the achievement of Rai students in Mathematics at Khotang district?
3. What type of learning environment to be provided to Rai students in Khotang district?

Significance of the Study

The slogan 'education for all' is only for saying. It is not being applicable in reality on the ground. Educational asses are more or less

available in the surrounding of village. However, most of the indigenous people are still enlightened on education. The main problem of this study is that why they are still in backward in mathematics education.

Mathematics has continuously developed and changed with changing needs of human being. Therefore, everybody needs the basic knowledge of mathematics to solve his or her daily life problem. Mathematics is an important component of school curriculum. Therefore, mathematics is included in school curriculum from primary level to secondary level as a compulsory subject. Therefore, every student should strive for a better achievement, because of the importance given to it. Without better academic achievements, the students can neither study further nor do they get entrance in any job- market. So mathematics curriculum should be related to the need and interest of student, culture, and castes, ethnic, religious, languages and groups of student.

The children of Rai community seem few in higher education in the comparison to the school education. They are famous for mountaineering. Braveness in their characteristics. Rai is the main inhabitant of the Khotang district district. In school mathematics, the performance is poor. Most of the researcher had compared mathematics achievement of students based on ethnicity, parent's education, occupation, and income. In addition, they had found their effect on mathematics achievement. So this study would be helpful to determine the influencing factors and correct those factors to maximize achievement level of Rai students in mathematics. So researcher wanted to find the cause of low achievement in mathematics of Rai students. In that sense the result of this study will be significance in the following aspect

The followings are the main significance of the study:

1. It uplifts the performance level of Rai students.
2. It recurrents the teaching learning activities of teacher which focuses the ethnic students study.
3. It helps the volunteer co-ordinates organizations /institute to diagnose the problems.
4. It helps the policy makers and local curriculum designers /makers in their works.
- 5 This study would inform mathematics teachers that mathematics achievement could improve with the knowledge of each ethnic group.
6. It supports to success the policy of "education for all"

Objectives of the Study

The main objectives of the study were as follows:

1. To find out the current achievement level of Rai students in Mathematics at Khotang district.
2. To find out the influencing factor that determines achievement of Rai Students in mathematics in Khotang district.
3. To find out the learning environment of Rai student at Khotang district.

Research Hypothesis

Khotang district is popular by the name of 'Ooloo kirat'. Most of past & areas of important services are leading by them. They contributed a lot to develope it properly.They played vital role to replace panchyat system as well as establish democracy or republic Nepal. The rsearcher

is being local teacher of this area. He has found no good performance in this subject /mathematics. However, there is contribution of the local people in different fields I have hypothesized that the achievement level of their children is also good in mathematics.

Hypothesis of the Study

In Order to test the research hypothesis, the following hypothesis were developed and tested as follows:

Null Hypothesis

$$H_0: \mu_1 = \mu_2$$

i.e., it is assumed that there is no significance difference between mean achievement of Rai student and other student in Bhojpur district.

Where μ_1 and μ_2 are the corresponding parametric mean achievement of Rai and other student respectively.

Alternative Hypothesis

$$H_1: \mu_1 \neq \mu_2$$

i.e., it is assumed that there is significance difference between mean achievement of Rai student and other student in Khotang district.

Where μ_1 and μ_2 are the corresponding parametric mean achievement of Rai and other student respectively.

Delimitation of the Study

Followings were the delimitations of the study:

1. This study was limited on only two schools of rural area of Khotang district.

2. This study was conducted only for the subject of compulsory mathematics in grade x.
3. This study was carried out within cluster of Ratanchha area. Therefore, the findings of the result can be generalized only in Rai communities in the eastern hilly region of Nepal.

Definition of the Related Terms

In this study to make the meaning clear the following words are defined very much carefully

Achievement: It was defined in terms of the score obtained by the student on achievement test prepared by the researcher.

Public school: Government school, which runs along with the help of local people.

Rai students: The students whose parents are Rai and are under the every activities, cultural behaviour, norms etc. of Rai society is adopted.

Other students: Student other than Rai student in Khotang district.

Rural Area: Government has declared village development committee as the rural area.

Cause: The term 'cause' indicates the educational, economical, social and cultural mathematics achievement.

Environment: Factors physically external to the person; Provides opportunities and social support

Chapter - II

REVIEW RELATED LITERATURE AND CONCEPTUAL FRAMEWORK

The main reason for a full review of research in the past is to know the outcomes of those investigations in the study areas where similar concepts and methodologies had been used successfully. Completely new and original problems are rare, however a previous study should not be exactly replicated unless the techniques used facilitate to trace out the doubtful conclusions or some new sources of information had been discovered to shed light on the problem. The literature survey thus provides researcher with the knowledge of the status of their field or research.

Literature a “Stock taking” of available literature in one’s field of research. The literature review thus provides the students with the knowledge of the status of their field of research.

The purpose of reviewing the literature of the past research is to find out what research studies have been conducted in one’s chosen field of study and what remains to be done. It provides the foundation for developing comprehensive theoretical framework from which hypothesis can be developed for testing. The literature survey also minimizes the risk of pursuing the dead- ends in research.

The researcher had presented some literature after long reviewing some books, journals, reports, other published sources and previous research.

Empirical Literatures:

Regmi (2004) did a research on "A study of achievement in mathematics of Gurung and Kumal students at primary level". The researcher selected eight public schools and 128 students as a sample. The main objectives of the study were to find out the difference in mathematics achievement of Gurung and Kumal students. His finding is that the mean achievement between Gurung and Kumal is significantly different. The mean achievement between Gurung and Kumal boy students was not significantly different. On the other hand, the achievement of Gurung girls differed significantly from that of Kumal girls.

Another crucial aspect of the study was that the mean achievement of nonmother tongue speaking Kumal students differed significantly from that of Mother tongue speaking Kumal students. Similar finding was found regarding the case of the Gurung students.

Neupane (2001) had conducted a research on "Mathematics achievement of primary school children of various ethnic group in Nepal" including 500 grade five children and their parents from five ethnic groups of western development region in Nepal. The researcher found that mathematics achievement of the children varies by ethnicity, location. Parent's involvement and some biographical factors affect the mathematical achievement of children. Achievement level of hill area's children in mathematics was superior to that of the Terai area's children.

Berends, Lucas, Sullivan, Briggs (1972-1992) did a research on "Examining Gaps in Mathematics Achievement among Racial-Ethnic Groups". The main research questions were

- How did the test scores of blacks, Latinos, and whites change between the early 1970s and early 1990s?
- To what extent were changes in these measures associated with the convergence

of the black-white and Latino-white test score gaps that occurred during this period?

To answer these questions posed about trends in test scores, family and school characteristics, and achievement gaps between racial-ethnic groups, we analyze three cohorts of high school seniors in nationally representative data sets that cover the experiences of secondary school students in the United States between 1972, 1982, and 1992. The data sets are:

- NLS of the high school class of 1972 (NLS-72).
- HSB senior cohort of 1982 (HSB-82).
- NELS senior cohort of 1992 (NELS-92).

Their finding was the patterns spanning the early 1970s to the early 1990s show a narrowing of the black-white and Latino-white differences in mathematics achievement. In both the LS senior cohorts and NAEP data, we see a significant reduction between 1972 and 1992 in the black-white (from 1.09 to 0.87 standard deviation unit difference, or a 20 percent reduction) and Latino-white (from a 0.88 to a 0.60 standard deviation unit difference, or a 32 percent reduction) mathematics test score gaps. Over the past 30 years, minority students made substantial progress toward closing the minority-non minority test score gap in both mathematics and reading. In 1999 black students scored 13 points higher (or 14 percentile points) on the NAEP mathematics test and about 27

points higher (or 21 percentile points) in reading than black students in the early 1970s. Similarly, Latinos made large improvements in achievement. Between 1973 and 1994 Latinos gained 16 points (16 percentile points) on the NAEP mathematics test, and between 1975 and 1994 Latinos gained 11 points (or 17 percentile points) in reading.

Pandey (2007) conducted a research on topic "Factor influencing mathematics achievement (A case studies of ineffective secondary school of Kailali district)". This case study was done in on of the secondary school of Kailali district. Only 20 students each from effective and ineffective schools were choosen as sample. Interview schedule, observation, survey form and school documents were used as a tools to collect data and information. This case study was focused on multiple factors and its influence on mathematics results. Personal and environmental factors such as gender, age, prior knowledge, attendance, motivation, study at home, parental support, quality of teacher, class size, studentteacher interaction, physical and environmental condition and school leadership were in consideration.

The major findings of this study were that student's achievement was mostly affected by both their personal and environmental factors. Gender discrimination was one of the key factors that caused the girls achieve low marks and boy high. Home environment, school environment, teacher's quality, students self motivation has made student's achievement high in mathematics. Less knowledge on instructional strategy, less teaching experiences and lack of teaching materials have led student's mathematics achievement towards low percentage. Another physical factor like school surrounding environment was seen as an influencing factor. Teacher's laziness and school's leadership have close link to student's performance and achievement.

Poudel (2007) did a research on "A study to compare the student's achievement in mathematics between Kami & Gurung students at grade VIII". He selected only Syangja district 120 students where chosen for sample by purposive sampling method. Boys and girls students were selected proportionally from each school. His findings were that the mean achievement of Kami students in mathematics is equal to the mean achievement of the Gurung students i.e. there is no variation is seen in mathematics achievement of Kami & Gurung students.

Sahi (2010) did a research on topic "Factors affecting achievement of Dalit students in mathematics, a case study in Doti district". From the case school only six Dalit students who were failure in mathematics and their parents and six peer groups were chosen for the study. He took observation and interview method as a tool for research. His finding shown that participation of Dalit students is less than non-Dalit students. Irregularity is one of the causes being Dalit students fail in the mathematics subject.

Poudel (2007) did a research on "A study to compare the student's achievement in mathematics between Kami and Gurung students at grade 9". He selected only Syangja district. 120 students were chosen for sample by purposive sampling method. Boys and girls students were selected proportionally from each school. His findings were that the mean achievement of Kami students in mathematics is equal to the mean achievement of the Gurung students. I.e. there is no variation is seen in mathematics achievement of Kami and Gurung students.

Bista (2013) concludes in his this that Parent' education, inappropriate environment of the family, social belief and tradition, household work load, lack of motivation are the major factors affecting

the mathematics achievement of Rai students. To improve the Rai students' achievement, they should be motivated to be regular in class, necessary educational material should be provided, there should be interaction between their parents and teachers, they should be motivated from their parents and teachers, appropriate environment should be provided should be afforded for tuition and extra classes to improve in mathematics.

Bhagat (2007) did a research on "A study on mathematics achievement of primary level students of Rai and Tharu casts in Udaypur district". The researcher selected nine public schools and the purposive sampling method was followed in the selection of sample. He selected 216 students (108 from Rai and 108 from Tharu students). The main objective of this study was to find out the difference in mathematics achievement of Rai and Tharu students. For this, t- test with two tailed was used to test the research hypothesis at 0.05 level of significance. His conclusion was the achievement of Tharu students is higher than Rai students.

Yadav (2008) did a research on "a study on achievement in mathematics of scheduled caste students at primary level". To find out the differences in mathematics achievement of Chamar and Musahar students was the main objective of the study. For these 124 students of 5th grade from ten public schools of Siraha district was chosen for the sample. Item analysis was used as a main tool for research. His finding was that the achievement of Chamar students were high than that of Musahar students.

Education Development Service Center (**EDSC**) (**1997**) studied on the topic "National achievement level of grade 3 students". After studying EDSC, found that achievement scores of private school students were

found more than public school students. EDSC also found many other influencing factors in the student's achievement. Those factors were students, teacher, parents influenced positively in the better achievement of their children.

The above researches show different comparative and non-comparative studies about student's achievement. Many of these researches were done about socially and economically backward community. Only few numbers of researches were done about casts or ethnic groups whose economic and social status is not low. Although no researches were held to find out the factors affecting achievement of Rai students. So researcher was intended to study about the factors affecting mathematics achievement of Rai students in Khotang district.

Theoretical Construction

There are many theories about learning and development of children such as classical conditioning, operent conditioning, and trial and error and so on.

Social Cognitive Theory

The social cognitive theory explains how people acquire and maintain certain behavioral patterns, while also providing the basis for intervention strategies (Bandura, 1997). Evaluating behavioral change depends on the factors environment, people and behavior. SCT provides a framework for designing, implementing and evaluating programs.

Environment refers to the factors that can affect a person's behavior. There are social and physical environments. Social environment include family members, friends and colleagues. Physical environment is the size of a room, the ambient temperature or the availability of certain

foods. Environment and *situation* provide the framework for understanding behavior (Parraga, 1990). The situation refers to the cognitive or mental representations of the environment that may affect a person's behavior. The situation is a person's perception of the place, time, physical features and activity (Glanz et al, 2002).

The three factors environment, people and behavior are constantly influencing each other. Behavior is not simply the result of the environment and the person, just as the environment is not simply the result of the person and behavior (Glanz et al, 2002). The environment provides models for behavior. *Observational learning* occurs when a person watches the actions of another person and the reinforcements that the person receives (Bandura, 1997). The concept of behavior can be viewed in many ways. *Behavioral capability* means that if a person is to perform a behavior he must know what the behavior is and have the skills to perform it.

Somes terms related on Conceptual Model of the Social Cognitive Theory

Environment: Factors physically external to the person; Provides opportunities and social support

Situation: Perception of the environment; correct misperceptions and promote healthful form

Behavioral capability: Knowledge and skill to perform a given behavior; promote mastery learning through skills training

Expectations: Anticipatory outcomes of a behavior; Model positive outcomes of healthful behavior

Expectancies: The values that the person places on a given outcome, incentives; Present outcomes of change that have functional meaning

Self-control: Personal regulation of goal-directed behavior or performance;

Provide opportunities for self-monitoring, goal setting, problem solving, and selfreward

Observational learning: Behavioral acquisition that occurs by watching the actions and outcomes of others' behavior; Include credible role models of the targeted behavior

Reinforcements: Responses to a person's behavior that increase or decrease the likelihood of reoccurrence; Promote self-initiated rewards and incentives

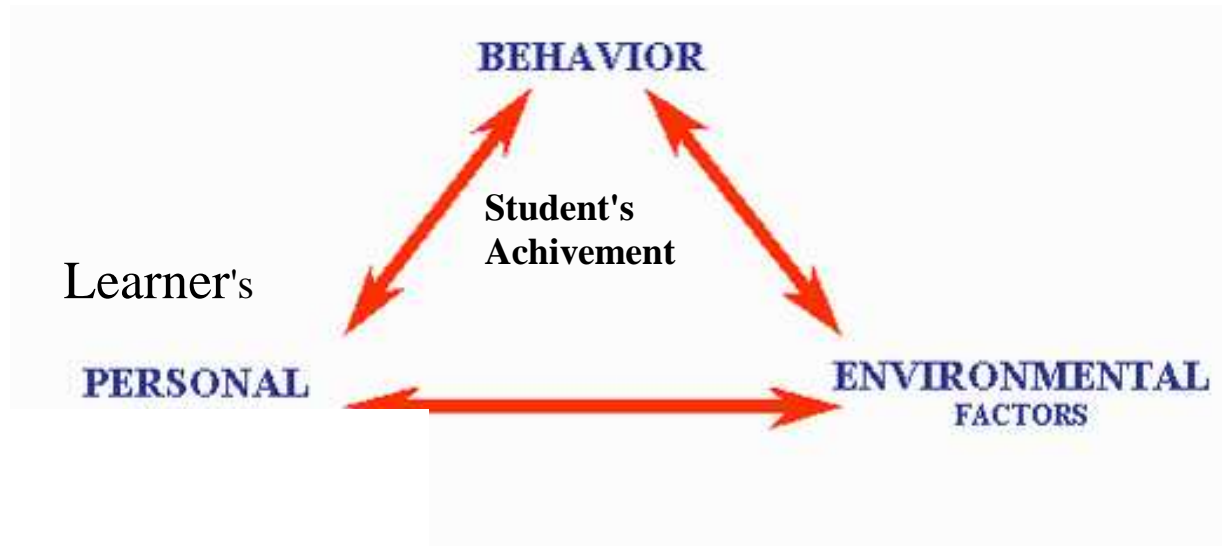
Self-efficacy: The person's confidence in performing a particular behavior;

Approach behavioral change in small steps to ensure success

Emotional coping responses: Strategies or tactics that are used by a person to deal with emotional stimuli; provide training in problem solving and stress management.

Reciprocal determinism: The dynamic interaction of the person, the behavior, and the environment in which the behavior is performed; consider multiple avenues to behavioral change, including environmental, skill, and personal change.

From the above points we can summarize by the following diagrammatic representation. Learner's



On the regard on school, learning activities there are different models. Here a model of Carroll's on school learning was taken as the conceptual framework of the study, which is describe as bellow:

John Carroll's Model of School Learning

Most current models that categorize the variables or explanations of the many influences on educational processes today stem from Carroll's (1963) seminal article defining the major variables related to school learning. Carroll specialized in language and learning, relating words and their meanings to the cognitive concepts and constructs which they create (Klausmeier & Goodwin, 1971). In his model, Carroll states that time is the most important variable to school learning. A simple equation for Carroll's model is:

$$\text{School Learning} = f(\text{time spent/time needed}).$$

Carroll explains that time spent is the result of opportunity and perseverance. The classroom teacher determines Opportunity in Carroll's model; the specific measure is called allotted or allocated time (i.e., time allocated for learning by classroom teachers.) Perseverance is the student's involvement with academic content during that allocated time. Carroll proposed that perseverance be measured as the percentage of the allocated time that students are actually involved in the learning process and was labeled engagement rate. Allocated time multiplied by engagement rate produced the variable Carroll proposed as a measure of time spent, which came to be called engaged time or time-on-task.

Carroll (1963) proposed that the time needed by students to learn academic content is contingent upon aptitude (the most often used measure is IQ), ability to understand the instruction presented (the extent to which they possessed prerequisite knowledge), and the quality of instruction students receive in the process of learning. Carroll proposed that these specific teacher and student behaviors and student characteristics were the only variables needed to predict school learning; he did not include the influences of family, community, society and the world that other authors discussed below have included.

The principles of this model can be seen in Bloom's (1976) **Mastery Learning model**. Bloom, a colleague of Carroll's, observed that in traditional schooling a student's aptitude for learning academic material (IQ) is one of the best predictor's of school achievement. His research demonstrated that if time is not held constant for all learners (as it is in traditional schooling) then a student's mastery of the prerequisite skills, rather than aptitude, is a better predictor of school learning. Mastery Learning's basic principle is that almost all students can earn A's if

- 1) Students are given enough time to learn normal information taught in school, and
- 2) Students are provided quality instruction.

By quality instruction, Bloom meant that teachers should:

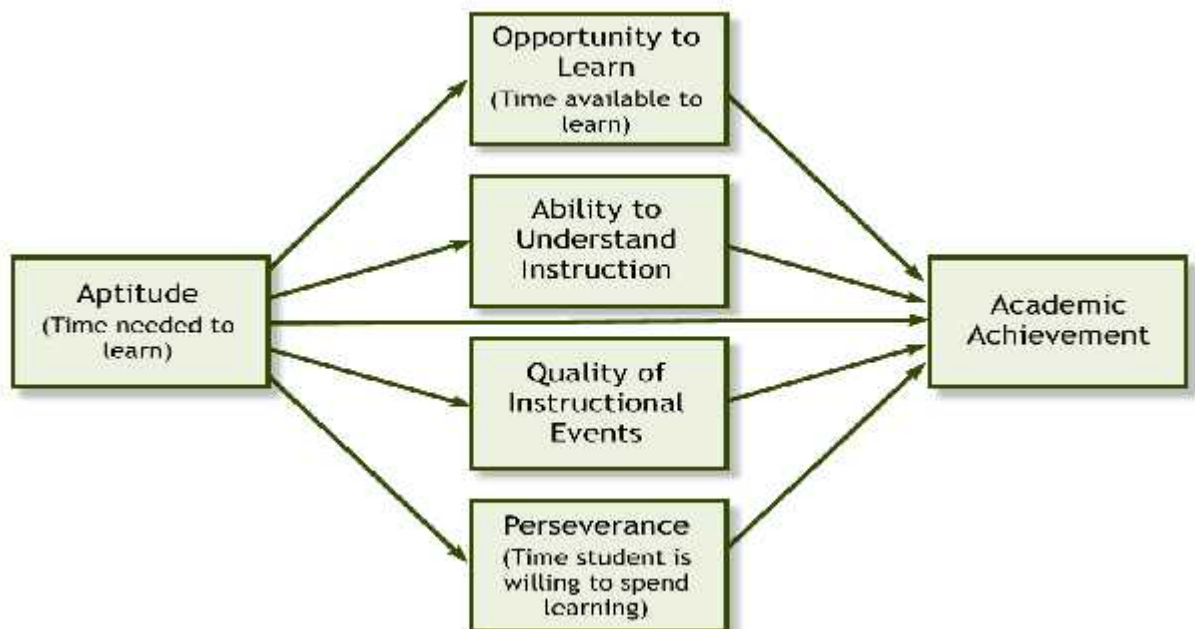
- (1) Organize subject matter into manageable learning units,
- (2) develop specific learning objectives for each unit,
- (3) develop appropriate formative and summative assessment measures,
- (4) Plan and implement group-teaching strategies, with sufficient time allocations, practice opportunities, and corrective reinstruction for all students to reach the desired level of mastery.

The Model

According to Reeves (1997) Carroll's model, include six elements with one output variable, one input variable and 4 intermediate variables.

- J **Academic Achievement** is the output (as measured by various sorts standard achievement tests)
- J **Aptitude** is the main explanatory variable defined as the "the amount of time a student needs to learn a given task, unit of instruction, or curriculum to an acceptable criterion of mastery under optimal conditions of instruction and student motivation" (Carroll, 1989: 26). This definition of aptitude very much reminds the principle behind mastery learning. "High aptitude is indicated when a student needs a relatively small amount of time to learn, low aptitude is indicated when a student needs much more than average time to learn" (Carroll: 1989: 26).

- J **Opportunity to learn:** Amount of time available for learning both in class and within homework. Carroll (1998:26) notes that "frequently, opportunity to learn is less than required in view of the students aptitude".
- J **Ability to understand instruction:** relates to learning skills, information needed to understand, and language comprehension.
- J **Quality of instruction:** good instructional design, e.g. like it is usually defined in behaviorist frameworks like **nine events of instruction**. If quality of instruction is bad, time needed will increase.
- J **Perseverance:** Amount of time a student is willing to spend on a given task or unit of instruction. This is an operational and measurable definition for motivation for learning.



There is a wide variety of ways to think about important classroom processes. Many of these are expressed in models that derive from research based on John Carroll's (1963) model of school learning. His

major premise was that school learning is a function of time. To be more specific, Carroll proposed that

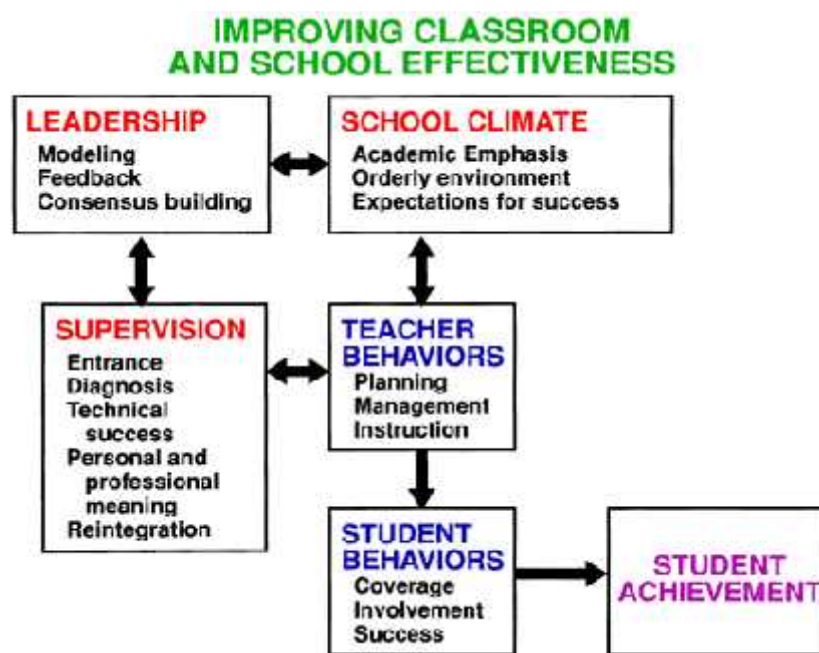
School Learning = f (time spent/time needed)

Carroll defined time spent as a function of (i.e., resulting from or composed of) opportunity and perseverance. The measure he proposed for opportunity was allocated time or the amount of time the classroom teacher made available for school learning. The measure Carroll proposed for perseverance was engagement rate or the percentage of the allocated time that students were actually on task. Allocated time was multiplied by engagement rate to produce engaged time or time on task that is defined as the number of minutes per school day that students were actually engaged in schoolwork.

Carroll defined time needed as a function of aptitude, ability to understand instruction, and quality of instruction. By aptitude, Carroll meant the ability to learn academic material. One measure of this variable would be IQ. By ability to understand instruction, Carroll meant the preparedness of the student for understanding the specific material to be learned. Bloom, a colleague of Carroll's at the University of Chicago, later proposed a measure of prerequisite knowledge as the best measure of ability to understand instruction. Carroll proposed a wide variety of instruction methods and techniques that he believed should be present in quality instruction. Later research identified a system of instruction labeled "direct instruction" as the best definition of quality instruction when the desired outcome is scores on standardized tests of basic skills.

Carroll's model was the basis for a number of other attempts to identify and organize the primary variables associated with school learning. Keeping the concept that educators should focus on variables

under their control, Squires, Huitt, & Segars (1981) proposed that both classroom- and school-level variables should be addressed. They adopted Carroll's student behavior variable of "Perseverance" and relabeled it "Involvement." However, they added Coverage (the overlap of content taught to content tested) and Success (the rate at which students were successful on assigned academic tasks). Carroll's teacher behavior variable of "Quality Instruction" was used as a subcategory within classroom processes and the subcategories of "Planning" and "Management" was added. While planning was not addressed by Carroll, management incorporates the variable "Opportunity" in that one aspect of Management is to use all available classroom time for instruction purposes.



<http://www.edpsycinteractive.org/papers/modeltch.html>

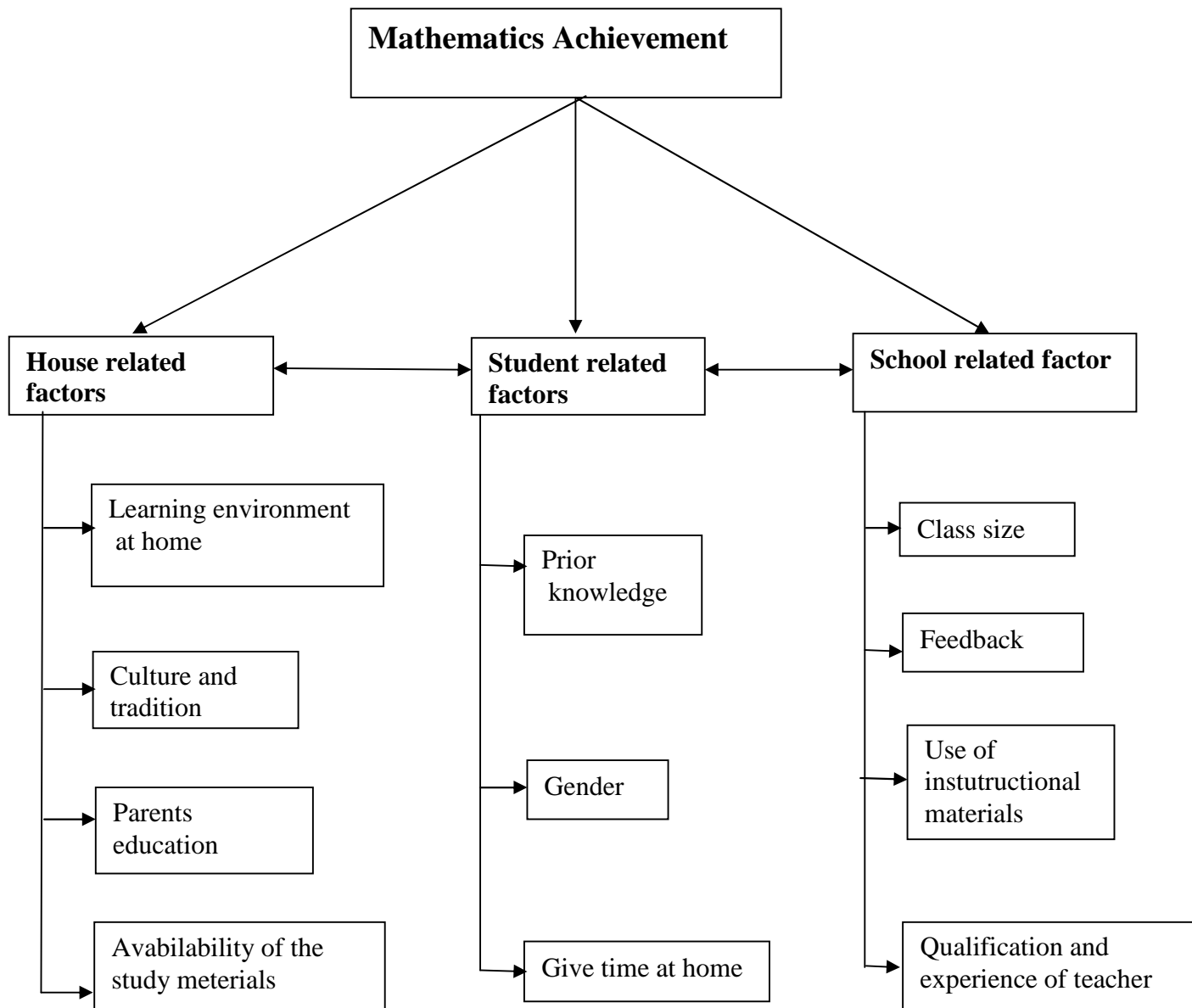
(Bista2013)

A significant addition in the Squires et al. model is the inclusion of school-level processes. These were classified in three categories: Supervision (direct interaction with teachers to improve classroom practice), School Climate (developing the ethos of the school), and

Leadership (setting direction and maintaining focus on important issues). These and other variables were later incorporated in models of school learning developed by Proctor (1984) and Cruickshank (1985).

Framework of the Study

From the above empirical, research and conceptual framework of the factors affecting achievement of the Rai students are categories in the diagram as below:



(Bista 2013)

House Related Factors

There are some house related factors, which directly or indirectly influence the achievement of Rai students in mathematics were: learning environment at home, culture and tradition, parent's education and availability of study materials.

Student Related Factors

There are some student related factors, which directly or indirectly influence the achievement of Rai students in mathematics were: prior knowledge, gender, given time at home and peer group.

School Related Factors

There are some student related factors, which directly or indirectly influence the achievement of Rai students in mathematics were: class size, feedback, use of instructional material, qualification and experience of teacher.

Mathematics Achievement

Mathematics achievement means performance or output of students in mathematics.

Chapter - III

METHODS AND PROCEDURES

The chapter methodology presented the scheme/design of the plans and procedures of the study. It intended that the size of samples and the method of sample selection, the definition of problem, the method of sampling, the sources and method of collecting the data and the source of the data, the reliability of instrument selected, the instrument used to collect the data, the researcher used to collect the data and method of data processing, statistical procedure used for analysis and interpretation of the data, analysis and comparing the data to achieve the objectives of this study the following methodology was considered for the study.

Research Design of the Study

In a study the researcher collected, the data in numerical and verbal form so this study has used the qualitative and quantitative method that is also can be said mixed type method. The researcher collected data with survey method and the data was analyzed by descriptively and interpresentively based on conceptual framework. Using the statistical tools t-test at 5% level of significance and the factor caused to the result are analyzed qualitatively.

Source of Data

The research was mainly based on primary data. The researcher visited the school and collected the data himself. Secondary data was also collected from published and unpublished sources like different literatures from desertations and internat, school records, different newspapers and government records.

Population of the Study

There are several lower secondary and secondary schools in the Khotang district. The population was taken all the students of grade x of Khotang district.

Sample of the Study

In order to carryout the researcher, two secondary schools were chosen purposively. The sample of this study was included 100 Rai students from grade 9. As far as possible boys and girl, students were included equally for the sample. After taking achievement test, 10 low achiever students were taken to find out the cause of factors affecting achievement in mathematics of Rai students.

Instruments/Tools

There are many tools for the quantitative descriptive research to get the information from the people. The researcher used questionnaire, interview guideline, school register and achievement tests after piloting it

a) Questionnaire

A questionnaire is a research instrument consisting of a series of question and other prompts for gathering information form respondents. A questionnaire the list of questions pertaining to the investigation is the most widely used research tool while collecting data. This study was related to influence of home related, students related and school related factors. Therefore, for the collection of data from the related areas questionnaire was developed based on these areas. The questionnaire for related schools, related person, parents are asked form the domain of the conceptual framework of the study.

b) Interview

The purpose of interviewing is to find out the perspectiveness of their views in relation to their action and activities towards mathematics learning. Interview is the most effective method, which is too used in collecting primary data. It is media to express internal thoughts, interests, concept, thinking of a person. It is tool to find out the internal thought of person according to their looking, activities, facial expression. According to Kerlinger "The interview is the face to face interpersonal role situation in which one person, the interviewer, ask a person being interviewed, the respondent, questions designed to obtain answers pertinent to the research problem.

Researcher was used interview schedule to find out the information from respondent student, teachers, friends and parents.

c) Achievement Test

The first objective of the study is to find out the level of achievement of Rai students in mathematics. Achievement test was prepared by making 30 multiple choice questions accordingly the area of content and domain covered by the specification chart of grade 9 mathematics.

Item Analysis

The researcher administered the test among 30 students of Shree Manakamana Ratna Ambika Higher Secondary School Khandbari-13 Tumlingtar, Sankhuwasava for the pilot testing of the achievement test. Before administering the test paper, researcher instructed the students how to respond the test. To finalize the item of the test, researcher himself did item analysis. Level of difficulty (D) and power of

discrimination of each item was calculated from 27% of higher scores i.e. 8 students from higher scores and 27% of lower scores i.e. 8 students from lower scores.

The table of item analysis shows the level of difficulty (P%) and power of discrimination (D) of each items. After item analysis, some questions were modified and some were cancelled. The items having D value above 0.20 and P value between 30% and 70% were accepted. The items having D value less than 0.20 were modified and the items with P value above 80% and below 30% were cancelled. 10 items of a pilot study were cancelled and 3 questions were modified. Finally 30 questions were included for the final achievement test.

Reliability and Validity of the Data

To ensure the good quality of the test, the validity and reliability should be checked of the test. To establish the reliability of the test, every test item was piloted before it was administered. In present study, the split half method of reliability of the test was determined .The reliability of the test was found 0.73. It indicates that test was reliable. For the validity of the questionnaire, questions were established by expert opinion. At last questions were refined by modifying and cancelling some of its item according to subject expert and thesis supervisor more over the questionnaire of interview ,questionnaire are developed on the basis of domains of conceptual framework of the study keeping the affective domain of the B.S.Bloom Texonomy(1973).

Data Collection Procedure

The researcher visited the sample schools with achievement test paper to collect the data and information. Researcher explained the purpose of the visit to the head teacher. Students were given achievement

test paper. Researcher explained and clarified any confusion that arose in understanding the questions.

After taken achievement test, the researcher also visited the sample schools with questionnaire and guideline for interview schedule. Low achiever 10 students were given questionnaire and mathematics teacher, head teacher were interviewed. Parents of ten low achiever students were also interviewed.

Data Analysis and Interpretation

- The collected data through achievement test were tabulated and analyzed with the help of t-test. The data were analyzed and interpreted based on t-test. Formula of t-statistics is given in Appendix
- The collected data through questionnaire were tabulated and analyzed.
- The collected data through the interview were analyzed and interpreted in a descriptive form.

Control express on the research:

Correlation variable: one teacher checked the answer paper.

Regional variable: This study was limited on hilly reason.

Time variable: The variable was taken on one academic year.

Student variable: The achievement was taken on same cast.

Controlling variable: All questions are asked from compulsory mathematics of grade 9. They are studying in grade 10.

Chapter - IV

ANALYSIS AND INTERPRETATION OF THE DATA

This is a study related to the factors affecting mathematics achievements of Rai students in khotang district. The objectives of this study were to analyze the level of mathematics achievement and to find the causes of the achievement of Rai students. This chapter is divided into several sections in order to make the presentation systematic and understandable.

This chapter deals with analysis and interpretation of the data obtained from the 100 students of six different schools, the data were obtained after the first administration to them. The collected data were classified, tabulated and analyzed according to the objectives of the study and test the hypothesis of the study. The obtained data were statistically analyzed and interpreted by using the statistical tools, standard deviation and t-test at 5% level of significance.

Achievement Level of the Students

To determine the achievement level of grade 9 students in mathematics, the mean and the standard deviation of the total sample were computed. The following tables shows the mean and standard deviation of the test.

Achievement Level of the Rai Students in Mathematics

Number of Students	Mean	Standard deviation	Co-efficient of Variation
100	12.75	7.03	55.14%

Table shows that the mean achievements level of x grade Rai students of Khotang district is 12.75 and standard deviation is 7.03 and the co-efficient of variation is 55.14%, which shows that there is more variability in x grade students achievement score on Khotang district.

Comparison of Other Students and Rai Students Achievements

Compared Group	Number of Students	Mean	Standard deviation	Mean Difference	t-value
Other students	30	14.5	4.04	1.87	-2.08
Rai students	30	13.03	3.91		

Table value $t_{0.025} = -1.645$ (two tailed test), where $\alpha = 0.05$ and $df = n_1 + n_2 - 2 = 58$

The above table shows that mean scores of other students and Rai students are 14.5 and 13.03 respectively. That is the mean score of other students is higher than the mean score of Rai students by 1.87. The calculated t-value is -2.08 and tabulated t-value is -1.645 at 0.05 level of significance i.e. $-1.645 > -2.08$.

Hence, the null hypothesis is rejected and concludes that the achievement of Rai student is less than to other student in Khotang district. Other Students have better achievement than Rai Students in mathematics in Khotang district.

After this, the researcher has intended to seek the reason behind the low achievement of Rai student and found the following factors (based on up on the conceptual framework) are describing as follow:

Major Factors Affecting Mathematics Achievement of Rai Students

The factor affecting on the achievement were catogaroize in three heading and analyzed separately as bellow:

1. Influence of home related factors in Mathematics Achievement
2. Influence of Student related factors in Mathematics Achievement
3. Analysis of the Influence of School Related Factors in Mathematics Achievement

1. Influence of home related factors in Mathematics Achievement

This part deals with the home related factors that affect the student's achievement .Learning environment at home, culture and tradition, parent's education and availability of study materials that directly affect the mathematics achievement have been taken as home related factors and influence of each of them have been analyzed.

a) Learning environment at home

It has found that most of the parents have not created proper environment to their children for their study. Children have to care their small brother & sister instead of doing homework .So they do not do their homework regularly. On the other hand, their seniors (brother & sister) are also not concerned to help their Youngers in their study

Head teacher and maths teacher claimed that *for the better performance, the study environment at home must be peaceful.*

b) Culture and tradition

Rai have their own culture & tradition so they are highly affected by them .Teenagers who are physically well they focus to join in force in 'India Army, UK Army' as well as to labour in foreign countries for

earning .As a result their mathematics achievement is highly affected. They give more emphasis in their culture and tradition.

One of the Rai parents said “*what to do by study person like them, if we send in Indian or UK army it is better to us.*”

c) Mother Tongue

The study area of this research is north side of Khotang district particularly 'Ratanchha' area. It has mixed casts & culture local Rai love their mother language too much. However, it has founds that mother language has not effected in mathematics study.

d) Parent's education and availability of study materials at home

About the fifth statement 72% agreed that achievement is better whose parents of students are literate, only 18% undecided and rest 10% disagreed about this statement. So suggested that literacy of parents of Rai students directly influence in mathematics learning of their Childs.

Most of the Rai parents are illiterate and they are not aware educationally. Therefore, they could not give the attention to their children's education. In addition, they are care less in making the studying environment in the home. They could not help their children to make up the suitable family environment to study for their children. They could not help their children in their subject matter. It is also found that they were not interested in their children's education. Even they do not tell their children to study at home. One of the Rai parents said that what to do by study person like them.

“I have no answer when my parents ask me the possibility of getting job after my study”. (Students)

The above view shows that the Rai students not sure for their future. However, some of the parents said they have to bear this backwarded condition due to the lack of their education. Therefore, they would educate their children anyhow. This shows that parent's education affects their children's education.

e) Household Workload

About the fourth statement, 100% students agreed that they have workload at home. So suggested that household workload directly influence in mathematics learning of their Childs.To conduct the daily life they have to work on land. Because of the household workload they could not involve in directly productive work, Rai female have more workload at home then male. According to them they have to help their parents in cooking, washing clothes, cleaning pots, cutting grass, caring animals etc. generally Rai male are busy in collecting wood for cooking and grass for domestic animals.

“My sister cooked food and I used to go for grass in the morning”.
(Students)

The above view shows that Rai students should be help their family for work. According to them, they could not get enough time to practice on the mathematics problem. Mathematics is hard subject so they need enough time to practice. However, they could not get time. Therefore, their performance in mathematics is not good. Therefore, household workload is the main factors to affect their achievement.

“They did not practice at home and always engaged in playing and household work”. (Teacher)

“In that all time in which they stay at home, they have to help us. They study in school time.” (Parents)

The above view shows that Rai students were not do homework at home.

2. Influence of Student related factors in Mathematics Achievement

This part deals with the student related factors that affect the students' achievement .Prior knowledge, gender, given time at home that directly affect the mathematics achievement have been taken as student related factors and influence of each of them have been analyzed.

a) Favorite Subject

About the eighth statement 10% of respondents agreed with the statement while 38% undecided and rest 52% disagreed about the statement “mathematics is my favorite subject from childhood”. So suggested that it influence the achievement of Rai students in mathematics.

“They feel mathematics difficult and leave it to study. They are not interested in marhematics.” (Maths Teacher)

b) Gender

Obtained Marks of Rai boy and girl students

No.	Boys		Girls	
	Name of student	Obtained marks	Name of student	Obtained marks
1	Lilahang Rai	15	Rabina Rai	14
2	Deukumar j Rai	11	Bandana Rai	12
3	Ram bahadur Rai	13	Kabita Rai	9
4	Bahadur Rai	17	Battu Rai	14
5	Himal Rai	19	Punam Rai	14

The above table shows that, the obtained marks Rai boy students are higher than the Rai girl students are.

Both math teacher and head teacher agreed that boy's achievement is better than girl's achievement in mathematics. Therefore, the mathematics achievement very much depends upon gender difference.

c) Prior knowledge

Prior knowledge is the base for the further study. Learning process is always stepwise. If students have prior knowledge, they can easily learn next step. From students work it was seen that they did not have prior knowledge in mathematics. 40% agreed that statement while 20% undecided and rest 40% disagreed about the statement. So suggested that prior knowledge directly influence in mathematics achievement and showed that Prior knowledge is also an important potential determinant of performance in mathematics.

Head teacher said, "*if students have prior knowledge of subject matters, teacher can be taught easily them.*" Math teacher also agreed with this statement.

d) Age of Students

14-16 is a proper age for secondary level , however Rai students fail in this level and repeat the same class so their ages are the above the proper age group. Age plays effective role in teaching learning activities similarly the research shows that effects in mathematics achievement of the students.

Head teacher and math teacher said, *“For understanding mathematics it is necessary that the students have the appropriate age.”*

e) Given time to practice at Home

About the 12th statement 56% students responded that for practicing mathematics, exercise in home time is sufficient, 25% student’s undecided and remaining 19% students disagreed that for practicing mathematics exercise in home time is sufficient. Maximum guardians of the Rai students are uneducated so they do not give chance to practice to the Rai students. Although all the students are weak, some expectationd students are good in maths. Homework and practice at home ply very vital role in mathematical achievement.

Head teacher and math teacher said, *“if the students give more time to practice mathematics, mathematics achievement would be better.”*

f) Regularity in the Mathematics Class

According to this study, 40% of the total students are irregular in school so it directly affects in mathematical achievement of the students.

“Rai students did not give enough time to practice at home. They are irregular in class. Their irregularity makes more difficult to pass in exam.” (Head teacher)

It suggested that present regularly in a maths class influence high Achievement in mathematics.

g) Consult to the Friends

About the 15th statement 20% students supported, 20% students were undecided and rest 60% students disagreed with the statement “I consult to the friends and learn the missed classes’ subject matter from them if missed the classes”. So suggested that consulting with the friends to learn missed classes subject matter directly influence the achievement of students in mathematics.

Math teacher and head teacher said, “*Students were not consulting with friends to learn mathematics.*”

So consulting with the friends to learn missed classes subject matter directly influences the achievement in mathematics.

h) Consult to the Teacher

The student does not ask any mathematical problems to the teacher in any moments. The students do not try to keep contact to the mathematical teacher so it chances gradually to reduce the mathematical interests of the students. So suggested that consulting with the teacher to learn subject matter directly influence the achievement in mathematics.

i) Takes -Time to Solve Mathematics

About the 19th statement “ I don’t like to solve mathematics because it takes more time to solve” 57% students supported, 23% students undecided and rest 20% students disagreed. It shows that generally do not want to practice or solve mathematics.

j) Practice of Previously Learned Subject Matters

About the 18th statement 10% students supported, only 20% students undecided and rest 70% students disagreed with the statement “I used to practice previously completed exercise time to time”. So suggested that practice of previously learned subject matters in mathematics improves the intelligence level hence it directly influence the achievement.

Students were not practicing previously learned subject matter time to time so they forgot the subject matters. (Head and maths teacher)

3. Analysis of the Influence of School Related Factors in Mathematics Achievement

This part of the analysis deals with the school related factors that affect the student’s achievement. Learning environment at school, teachers attitude ,qualification of teachers, teaching experience and ability of the teachers, class size, location of the school, types of instructional materials used, students teacher’s ratio that directly affect the mathematics achievement have been taken as home related factors and the influence of each of them have been analyzed.

a) Environment of School

About the 21th statement 80%, students supported 10% students undecided and 10% students disagreed. So suggested that school situated in the peaceful environment.

b) Blackboard

About the 22th statement 50% students agreed, 22% undecided and 30% disagreed with the statement size of the blackboard is

appropriate on the basis of class size. So suggested that appropriate size of the blackboard should be accordingly the class size directly influence in achievement of mathematics.

It suggested that appropriate size of the blackboard should be accordingly the class size directly influence in achievement of not only Rai students but also other students in mathematics.

c) Desk and Benches

According to this study, desks and benches in the classroom are not properly managed with the age, size and number of students. It is concluded that the furniture which are not managed with the students age, size and class it affects the mathematics achievement of the students. It shows that good facility for sitting in a desk and benches directly influences in achievement.

Math teacher and head teacher said that *“appropriate size of the blackboard, availability of desk and benches should be accordingly the class size directly influence in achievement of not only for Rai students, for other students also.”*

d) Teacher Biasness

In the statement, ‘teacher biases all the races of students during the teaching of mathematics’ 30% agreed, 20% undecided and 50% students not supported the statement. So suggested that biasness of teacher towards the different caste students directly influence in the achievement in mathematics.

“Teacher does not discriminate in the class, but do not give the special attention to us.” (Rai students)

f) Teaching Materials

In the statement ‘teacher used teaching material in the mathematics class’ 10% student supported 25% students undecided and 65% students disagreed. So suggested that the use the teaching materials while teaching mathematics by the teacher directly influence in achievement of Rai students in mathematics.

g) Extra Classes

There are not any extra classes and tuition classes to the Rai students in the it school by the subject teachers. This study shows that if there are extra and tuition classes it is chance to increase and improve the mathematical achievement of the Rai students .In the statement ‘for a Rai students school provided extra classes’ no one supported this statement, 10% undecided and 90% disagreed. So that the extra classes for Rai students were not provided by school. Therefore, it is an influencing factor in mathematics achievement.

About this statement, Head teacher said, *“We don’t provide extra class for Rai students only. But yes, we provide extra class for all the students before the final examination.”*

h) Facility of Playground

In the statement ‘there is a good facility of playground’, 80% students agreed, and 20% disagreed with the statement. So shows that the availability of playing ground in school was good.

About this statement head teacher said, *“We have good facility of ground. Students want to play more and do not want to take class nicely because of tiredness. So that we give time to play only in Tiffin not in before and after school time.”*

i) Lack of Motivation

Motivation is a factor, which plays important role in the learning of the children. According to the respondents guardian to encourage the Rai students for study they need motivation. In the school, there is not special program for Rai students.

“Motivation does not foster learning however they receive from home nor have we given.” (Teacher).

The above view shows that nobody gives any suggestion and motivation for Rai students.

Summary and Finding

This is a study "A Study on factors affecting mathematics achievement of Rai students in Khotang district" was aimed to identify and analyze the achievement level and cause of low achievement. The objective of this study was to analyze mathematics achievement of Rai students and to find out the cause of low achievements of Rai student at grade x. The major tools used for this study were interview, questionnaire and achievement test.

This is a quantitative descriptive research. To fulfill the objectives of the study researcher purposively selected 2 schools from secondary schools of Khotang district. In total 100 Rai, students from 2 school were taken as sample students.

An achievement test paper was prepared with the help of specification grid, curriculum and textbook. The pilot study was administered to establish the reliability and validity of test paper. After that, the achievement test was administered to the sampled students by researcher himself. The mark obtained from the achievement test was analyzed statistically by using mean, standard deviation and t-test at 0.05 level of significance.

Major Findings of the Study

This study was a research study to find the factors influencing the achievement of Rai students in mathematics of khotang district. The researcher found the following findings in the study:

1. Finding Based on Achievement Test

Mean achievement of Rai students was 13.0, the mean difference of two groups Rai and Other students was 1.87. It seems that the achievement of other students were higher than the achievement of Rai students. The calculated t-value was -2.08 at 0.05 level of significance with 58 degree of freedom which lie outside the critical region -1.96 (table t- value) in one tailed test at 0.05 level of significance. This indicates that there is a significant difference between the mean achievement of Rai students and other students in mathematics.

2. Findings Based on Home Related Factors

-) Parents, sister and elder brother did not guide to learn in mathematics so it was not easy to study math at home.
-) Due to mother tongue, it is not difficult to understand mathematics learning.

-) Most of the parent's occupation affects the study of their children's.
-) Parent's higher education directly influences their child's achievement in mathematics.
-) Due to the drinking wine and quarrel at home, it is difficult to study mathematics at home.
-) The Rai students do not get opportunity to learn mathematics at home.
-) The student does not afford for tuition classes to improve in mathematics.

3. Finding Based on Student Related Factors

-) Mathematics achievement very much depends upon it is favorite subject or not.
-) Mathematics achievement very much depends upon gender difference.
-) Prior knowledge is the bases for the further study in mathematics, the students having the prior knowledge of subject matters, can be learning mathematics easily.
-) Presented regularly in math class influence high achievement in mathematics.
-) Consulting with the friends and teacher to learn missed classes subject matter directly influences the achievement in mathematics.

) Time to time practiced of previously learned subject matters in mathematics improves the intelligence level hence it directly influenced the achievement in mathematics.

) Each problem of mathematics takes time to solve it hence students were not like to solve the problems.

4. Finding Based on School Related Factors

) Noised and crowded environment of school directly influenced in achievement.

) Higher education of the subject teacher directly influenced achievement of students in mathematics.

) The entire mathematics teachers from primary level to secondary level were trained.

) Almost all the mathematics teachers were found qualified and experienced.

) Extra classes for backwards students were not provided by school.

) Math teacher take cares the student's influences the achievement in mathematics.

) The do not get encouragement and motivation at home and school.

) Rai students and their teacher relation do not seem to be dependable and cooperative to each other.

) Biasness of teacher towards the different caste's students directly influence in the achievement in mathematics.

) They fail because they cannot attain the class regular.

) The children of Rai community become shy to ask any question about the problem.

Chapter - V

CONCLUSION AND RECOMMENDATION

Conclusions

-) The researcher concluded that there is low achievement of Rai students in Khotang district.
-) The researcher concluded that there is a significant difference between the mean achievement score of Rai and Other students in mathematics in Khotang district.
-) The motivation that play another role to learn mathematics but they do not get motivation from their parents and teachers.

Recommendations

According to the finding and conclusion provided by the study, the Recommendation for the Rai students can be presented as:

-) They should be motivated to be regular in class.
-) Necessary educational material should be provided.
-) There should be interaction between their parents and teachers.
-) They should be motivated from their parents and teachers.
-) Appropriate environment should be provided.
-) They should be afforded for tuition and extra classes to improve in mathematics.
-) In the school, Rai students should be given special attention.

Recommendation for the Further Study

-) The study was limited within khotang district; similar researches can be done by covering the large area and large number of samples.
-) A study can be done on the effect of parent's education in their mathematics achievement.
-) This study is done within the limitation and particular area. A broad and general study may be done for overall Rai community.
-) A similar study can be done for the primary and secondary level and also in other subject.
-) As there are very limited, number of these kinds of researches in Nepal and recommended that the concern authority can conduct and apply enough of this researches to make the curriculum effective.
-) To help economically by improving their educational status.
-) To provide appropriate environment to achieve educational goal.
-) Special remedial package should be provided to Rai students to boost up their achievement.
-) It is recommended to study the home environment, and extracurricular activities of students as well as parental education.

Recommendation for the Further Researcher

-) Many ways to other students to study since this study only has studied on Rai students and on khotang District only.
-) The conclusions of this study will be use as literature for other study.
-) This study also helps the teacher to use in teaching learning activities in an effective way.

Recommendation for the policymaker

-) To develop the effective police.
-) To conduct the effective training programmers.
-) To conduct the workshop and seminars.

Recommendation for the stockholders

-) To prepare and develop the material to the students and other related personsthis study gives the guidelines.

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Appendix-i

Guidelines for interview with math teacher

Name : Sex :

Qualification : Religion :

Training :

Experience :

The interview with mathematics teacher will be taken on the basis of the following main points.

-) Teacher-student interaction
-) Teacher-parents interaction
-) Reinforcement provided with the teacher
-) Encouragement of the student at their learning
-) Presents of students towards mathematics form from the view of job

Appendix-ii

Achievement test Paper

Student's Name : Full Marks :

Roll No. :

Pass Marks :

School's Name :

तलदिईएकाप्रश्नहरु राम्रोसँग पढि प्रत्येक प्रश्नको चारओटा संभाव्यउत्तरहरु मध्ये एउटा सहिउत्तर छानेर (\checkmark) चिन्ह लगाउनुहोस् ।

1. $n(A \cap B) = n(A) + n(B) - \dots$ यो खालि ठाँउमा कुनचाहिँउपयुक्त छ ?

क) $n(A \cup B)$ ख) $n(A \cap B)$ ग) $n(A \cup B)$ घ) $n(A \cup B \cup C)$

2. कुनै राशिको 20% बराबर दृछ हुन्छ भने उक्त राशिकतिहोला?

क) 130 ख) 120 ग) 125 घ) 150

3. कुनै वस्तुको C.P = रु 150, S.P. = रु 180 भएनाफाप्रतिशतकति हुन्छ ?

क) 30% ख) 20% ग) 25% घ) 35%

4. सुनिताले नमितासँग २ वर्षको लागिवार्षिक 10% व्याजका दरले रु 550 सापटि लिईन् भने व्याजकतीहोला?

क) रु 600 ख) रु 80 ग) रु 550 घ) रु 110

5. यदि 18 वटा कापिको मूल्य रु 198 भए 12 वटा कापिकिन्न रुपैयाँचाहिएला?

क) रु 100 ख) रु 80 ग) रु 140 घ) रु 132

6. लम्बाई L र चौडाई B भएको जग्गाको परिमितकति हुन्छ ?

क) $P = L \times B$ ख) $P = 2(L + B)$ ग) $P = (L + B)$ घ) $P = L^2$

7. एउटा आयतकार जग्गाको क्षेत्रफल 400 वर्ग मि. र लम्बाई 25 मि. भए चौडाई कतिहोला?

क) 2 मि. ख) 20 मि. ग) 16 मि. घ) 8 मि.

8. अर्धव्यास 14 cm भएको वृत्तको क्षेत्रफलकति हुन्छ ?

क) 616 cm^2 ख) 661 cm^2 ग) 610 cm^2 घ) 630 cm^2

9. दिएकोचित्रमा रंगाएको भागको क्षेत्रफलकति हुन्छ ?

क) 108 m^2 ख) 120 m^2 ग) 300 m^2 घ) 192 m^2

10. अंकित मूल्य रु 220 भएको कुनै वस्तु रु 209 मा बेच्दाकतिप्रतिशत छुट हुन्छ ?

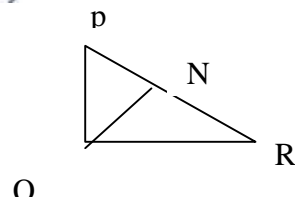
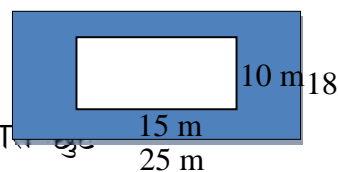
क) 10% ख) 15% ग) 5% घ) 11%

11. $(a + b)$ र $(a - b)$ को गुणनफल कति हुन्छ ?

क) $(a^2 - b^2)$ ख) $a^2 + b^2$ ग) $(a - b)^2$ घ) $(a + b)^2$

12. तलको चित्रमा $\angle PQR = 90^\circ$ भए कर्ण चाहि हो ?

क) PR ख) PQ ग) QR घ) QN



13. एउटा वृत्तका दौडने ट्याकको अर्धव्यास 21 m भएत्यसको परिमितकतिहोला?

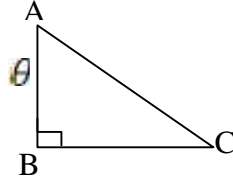
क) 132 m ख) 142 m ग) 312 m घ) 214 m

14. $x + y = 12$, $y = 3x$ भए x को मान कति होला ?

क) 3 ख) 4 ग) 5 घ) 2

15. दिएको चित्रमा $\sin \theta$ को त्रिकोणमितीय अनुपात कति हुन्छ ?

क) $\frac{AB}{AC}$ ख) $\frac{BC}{AC}$ ग) $\frac{AC}{AB}$ घ) $\frac{AB}{BC}$



16. 21, 22, 25, 23, 24, 27, 26 दिएको तथ्याङ्कको मध्यिका कुन हो ?

क) 25 ख) 23 ग) 24 घ) 26

17. x^2 र x^3 को साझा गुणनखण्ड कुन हो ?

क) x^2 ख) x^3 ग) 1 घ) x

18. तलको कुनभिन्नको व्युत्क्रम (Reciprocal) हुदैन ?

क) $\frac{5}{3}$ ख) $\frac{1}{1}$ ग) $\frac{a^0}{b^0}$ घ) $\frac{0}{2}$

19. $\frac{27a^3b}{63ab^2}$ को लघुत्तम पद कुन हो ?

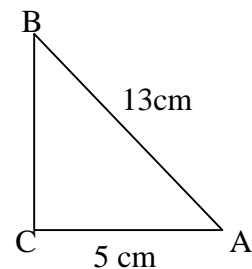
क) $\frac{3a^2}{7b}$ ख) $\frac{3a}{7b}$ ग) $\frac{7b}{3a^2}$ घ) $\frac{9a^2}{21b}$

20. $4(x^3 - 8)$ र $6(x - 2)$ को H.C.F. कति हुन्छ ?

क) $4(x - 2)$ ख) $2(x - 2)$ ग) $4(x^2 - 4)$ घ) $6(x^2 + 2x + 4)$

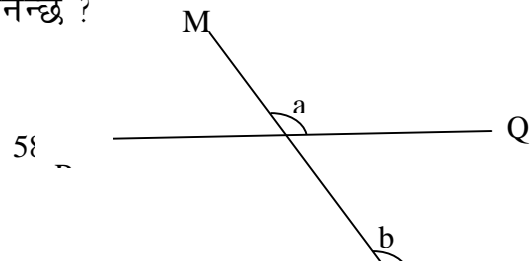
21. दिएको चित्रमा $AB = 5\text{cm}$, $AC = 13\text{cm}$ भए BC को लम्बाई कति होला ?

क) 11 cm ख) 9 cm
ग) 12 cm घ) 13 cm



22. चित्रमा PQ र RS समानान्तर रेखाहरूलाई छेदक MN ले काट्दा बन्ने

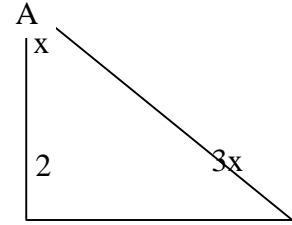
कोणहरूको कोण a र b लाई के भनिन्छ ?



- क) संगत कोण
- ख) एकान्तर कोण
- ग) विपरित कोण
- घ) आसन्नकोण

23. दिएको चित्रबाट x को मान् कति होला ?

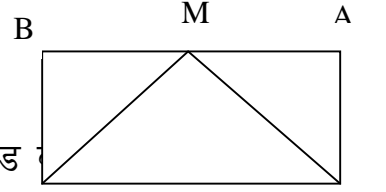
- क) 40° ख) 30°
- ग) 50° घ) 60°



24. यदि त्रिभुज DMC को क्षेत्रफल 30 m^2 भए स. च. ABCD को क्षेत्रफल कति हुन्छ ?

क) 60 cm^2 ख) 15 cm^2

ग) 30 cm^2 घ) 90 cm^2



25. $p^2 + 3p - 4$ को गुणनखण्ड

क) $(p - 4)(p - 1)$ ख) $(p + 4)(p - 1)$

ग) $(p + 4)(p + 1)$ घ) $(p - 4)(p + 1)$

26. तिन वटै भुजा बराबर भएको त्रिभुजलाई के भनिन्छ ?

क) समद्विबाहु त्रिभुज ख) विसमबाहु त्रिभुज

ग) समबाहु त्रिभुज घ) समानपाद त्रिभुज

27. $2 \sin \theta = 1$ भए θ को मान कति होला ?

क) 60° ख) 30° ग) 45° घ) 90°

28. तलकामध्ये कुनतथ्य ठिक हो ?

क) मध्यकले केन्द्रियमान देखाउँछ ।

ख) मध्यकले सबैभन्दा ठूलो मान देखाउँछ ।

ग) मध्यकले विचरणशिलताको मापन गर्दछ ।

घ) मध्यकले चौथाई देखाउँछ ।

29. यदि $n(A) = 50$, $n(B) = 40$ र $n(A \cap B) = 15$ भए

$n(A \cup B)$ को मान कति हुन्छ ?

क) 80 ख) 90 ग) 75 घ) 105

30. 120 मिटर परवाट एउटा खम्बाको टुप्पोमा हेर्दा दृष्टि रेखाले

जमिनसँग 45° को कोण बनाउँछ भने उक्त खम्बाको उचाई कति होला ?

क) 100 m ख) 150 m ग) 45 m घ) 120 m

समाप्त