MATHEMATICS LEARNING ENVIRONMENT AT HIGH ACHIEVER AND LOW ACHIEVER HIGHER SECONDARY SCHOOL

A

THESIS

BY

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FOR THE PARTIAL FULFILLMENT OF THE REQUIREMENT
FOR THE DEGREE OF MASTER OF EDUCATION

SUBMITTED TO
THE DEPARTMENT OF MATHEMATICS EDUCATION
CENTRAL DEPARTMENT OF EDUCATION
UNIVERSITY CAMPUS
TRIBHUVAN UNIVERSITY
KIRTIPUR KATHMANDU
2015

LETTER OF APPROVAL

Thesis

By

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Entitled

"Mathematics Learning Environment at High Achiever and Low Achiever Higher Secondary School" has been approved in Partial Fulfillment of the Requirements for the Degree of Master of Education.

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CERTIFICATE

This is to certify that **Mr. Surendra Kumar Yadav** a student of academic years 2067/68 with campus roll no.119 Exam Roll No.281428 . (.2068), thesis No. 825 and T.U Registration No.6-1-13-27-2003 has completed this thesis under my supervision during the period prescribed by the rules and regulation of Tribhuvan University, Nepal. The thesis entitled "**Mathematics Learning Environment at High Achiever and Low Achiever Higher Secondary School**" has been prepared based on the result of this investigation conducted during the period of 2069 to 2072. under the Department of Mathematics Education, University Campus, Tribhuvan University, Kirtipur, Kathmandu. I recommend and forward this thesis be submitted for evaluation as the partial requirements to award the degree of Master of Mathematics education.

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ACKNOWLEDGEMENT

First of all, I want to thank the Department of Mathematics Education, Central Department of Education, Kirtipur, Kathmandu, for providing me support and opportunity to carry out the research work.

I would like to express sincere appreciation to my respected and honorable supervisor Mr. Krishna Prasad Adhikari, Department of Education, T.U, Kirtipur for supervising my work and for providing me the co-operation, valuable guidelines, suggestions, encouragement and comments while preparing this study report.

Similarly, my sincere gratitude goes to Associate Prof. Laxmi Narayan Yadav Head, Department of Mathematics Education, Prof. Dr. Hari Prasad Upadhyay, Prof. Dr. Min Bhadur Shrestha and all the members of Department of Mathematics Education for their valuable comments, co-operation, support and suggestions during the whole period of this study.

Especially, I am very much indebted to the sampled teachers and school family for their kind co-operation and providing opportunity for collection of data.

At last not least I am thankful to my parents who helped directly and indirectly by giving different kinds of support and suggestions for my research from beginning to the present form of this final thesis report and also thankful to computer typing and printing by Durka Man Maharjan of Durka Computer System, Kirtipur, Naya Bazar, Kirtipur encouragement during my study.

Surendra Kumar Yadav

ABSTRACT

This is a case study related to the "**Mathematics Learning Environment at High Achiever and Low Achiever Higher Secondary School."** The objectives of this study were to explore the mathematics learning environment at high achiever and low achiever higher secondary school and to analyze the instructional strategies used in mathematics. This study followed case study design. The study was conducted with the sample of two different schools from Siraha district. The tools that were used to solve this problem were observation form and interview schedule. Face to face interviews were taken with mathematics teachers, Head teacher, school committee management, parents and students. The teachers were selected through proposive sampling procedure. It was found that the physical facility of the high achiever school were sufficient enough for the students to learn mathematics. The qualified and well experienced teachers of high achiever school contributed a lot to improve the student's achievement. However, the low achiever school had the lack of well qualified and experienced teachers. The parents of the students in low achiever school were also found to be not attentive towards their children's achievement.

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CERID	-	Research Center for Educational Innovation and Development
HT	-	Head Teacher
NCED	-	National Centre for Educational Department
SLC	-	School Leaving Certificate
SMC	-	School Management Committee
TU	-	Tribhuvan University
VDC	-	Village Development Committee

CHAPTER I

INTRODUCTION

Background of Study

Mathematics learning is a highly technical domain, developed over millennia, and characterized by the fact that the very entity that constitutes mathematics is idealized as mental abstractions. These entities can not be perceived directly through the senses. In Nepal, mathematics is a core subject in the school curriculum for both secondary and higher secondary schools. The primary aim of the mathematics curriculum is to enable pupils to develop their ability in mathematical problem solving. Higher secondary level mathematics curriculum tends to enable students to become creative citizens, appreciative of the beauty and scope of mathematics and of the part it plays in the modern world.

Even though mathematics is very complex subject, it is given a very important place in school education from the elementary level. During School Leaving Certificate Examination (SLC), majority of the students who could not get success in his exam fail in mathematics. Low performance of students may be the cause of different sectors prevailing in school environment.

In Higher Secondary school there are several factors which affect students learning. These factors may be school environment. These broadly include process of learning like as physical and mental health, economic status, maturity of learner, curriculum and content, interest and aptitude etc. Learning factors make learning smooth and meaningful. Meaning learning emphasizes on long term memory and makes learning orderly and systematic.

Generally, classroom learning environment refers to a space or a place learner/students and teachers interacting with each other and use of a variety of tools and information resources in pursuit of learning. The nature of the classroom environment and social interactions can make a difference in how students learn and achieve their goals. It has been revealed that learning outcomes and students' attitudes toward learning are closely linked to the classroom environment. Some studies conducted to determine the level of importance of classroom environment in the teaching and learning process suggested that achievement is improved by working in

a preferred classroom environment. The physical, social and psychological dimensions how people relate to each other is the first stage to improve it. Researchers have also reported that the classroom plays an important role in students' cognitive and affective development. On the other hand, some findings have argued that human behavior is determined by the complex interaction of an individual and his/her environment (Fraser & Fisher,1983). Lewin (1936) has introduced the formula B = (P.E.) where human behavior (B) a result of two independent influences, the person (P) and the person environment (E). He has argued that social environment like person could have qualities such as warmth and supportiveness or rigidity and restriction on number of instrument for studying classroom environment.

Studies of Classroom Environment have demonstrated that perceived classroom environment can help to predict students' learning. Walberg and Heartel (1981) have found that students' environment is improved in those classes, where students feel greater or less cohesiveness, proper satisfaction and goal direction and less disorganization and fraction. In order for effective mathematics learning, there is need of sound learning environment as well as an effective program instruction and assessment. These two elements must go hand in hand and are not necessarily distinguishable. This learning environment for Mathematics has many elements that will enhance learning.

An effective Mathematics Learning environment is an environment that:

a. make connections between the knowledge of the child, and their stands and actions of mathematics;

b. encourages, establish and communicate the mathematics learners.

c. focuses on important Mathematical concepts or big ideas,

d. explore mathematical problem through problem solving,

e. supported by strong roles of teacher, principal, senior administrators,

f. supported by home learning environment as community of learners ones who feel that their knowledge and thought are valued feel safe to take risk in

trying to solve problems and feel comfortable talking about understanding about mathematics.

Human beings are the unique creation of god. They can change the world by their innovation. In this changeable world, education system develops new skills and competencies to all students, and to function under increasing financial constraints brought by changing socio –economic status. The worldwide trends in education "Education for All", "Universalization of education" and the "access education" etc. are global issues in the world. The school has the challenges to achieve the world goals and gives education to all. This is only possible when a learner gets favourable learning environment in classroom.

The effective learning environment research has been an ongoing phenomenon in the world. The last three decades of 20th century have seen several major entities in the field of education reform. In late 1960s, researches into learning environment suggested that every school could improve educational quality for all students, for poor and minority children, by in co-operating a set of basic research identified characteristics presents in successful schools. The field of learning environment has undergone remarkable growth, diversification and internationalization during the past 30 years. At higher secondary level, the positive learning environment is an important factor. So learning environment at higher secondary level is most researchable issue in the case of world- wide globalization and decentralization. .

In the context of Nepal, the +2 result of students show that mere than 44 percent students have failed in examination. Among them, more students have failed in mathematics and maximum number of students has low score in mathematics than other subjects in public schools than private schools. This is always blamed that the school has used traditional method of teaching process, poor school environment, lack of proper planning and policies of school, lack of instructional leadership, limited qualified and trained teachers, lack of physical facilities and narrow psychological atmosphere in school. But there are some public schools with high and good results in +2 levels. So, these schools are high achiever and other schools are low achiever schools.

Child centered learning approach is more popular in mathematics education. The research on mathematics teaching shows that constructivism as a method of teaching mathematics is more effective. The constructivist theory acknowledges that the teacher is not a transmitter of knowledge rather a facilitator and provider of experiences from which learners will learn. Similarly, pupils are not absorbers of knowledge but rather active participants in constructing their own meaning based on strongly held preconceptions (Fraser, 2000, p. 26). According to constructivist theory, then, acknowledges is a social construct that is gained through interacting with other people. Constructivist assumes that knowledge is actively constructed by learner not passively transmitted by teacher. Thus, study has attempted to identify major factors involved in the learning environment in mathematics achievement at higher secondary level in the context of Siraha district.

Statement of the Problem

The role environment is crucial in teaching and learning of mathematics. As mathematics itself is complex in nature, it is highly demanding. There are many problems in learning mathematics. They directly or indirectly influence to determine the mathematics learning environment and its effect at higher secondary level. Learning environment and mathematics achievement are interlocking phenomena in mathematics. When the school environment is not good, learning automatically becomes poor. So, school environment plays a vital role in the determinations of mathematics achievement.

Thus, the study tends to answer the following questions:-

- What type of learning environment is provided to the high achiever students in learning mathematics at higher secondary school?
- What are the main factors causing the low achievement in mathematics at low achiever higher secondary school?

Significance of the Study

Mathematics is deemed as one of the important subjects at Higher secondary level. It is widely accepted as a means to solve daily life problems in society but

students often get scared from it and take it as a more complicated subject. The result of mathematics in the +2 level shows that most of students have low achievement in mathematics than other subjects. Large number of students fail in mathematics and most of them leave it in the middle and feel more difficulty to understand. This study has been concerned to find out the mathematics achievement of +2 level students and analyze the relationship between their learning environment and their mathematics achievement.

The study can have the following significances:-

(a) This study can provide guidelines to the administrative staffs of the school which has low result in basic mathematics to create environment for their effectiveness.

(b) This study can also help to build a sense of community among administrators, teachers and the stakeholders of the school.

(c) The textbook designers and teachers can have maximum benefits to prepare teaching materials and syllabuses.

Objectives of the Study

The present study had the following objectives:-

- To explore the mathematics learning environment at high achiever and low achiever higher secondary school.
- To analyze the instructional strategies used in the mathematics classroom at high achiever and low achiever higher secondary schools.

Delimitation of the Study

The study had the following limitations:

- The study was limited to Siraha district only.
- The study was limited to the role of mathematics teacher's, SMC members students, parents, school and environments towards school's environments.
- The study was limited to Public Higher Secondary Schools.

- Only two schools were selected for the persual of study.

Definition of Related Term

Some relevant and important terms related to this study have been presented below:

School Learning Environment

A school learning environment refers to the internal and external surrounding of the school which affects the students' mind and their attitudes.

Home School Relationship

The close bond between schools and homes yields good learning environment for the students. Home is the first learning source of students and school is the second learning source of students. Both home and school can be mobilized to make good learning environment.

Classroom Practice

Classroom practice is the main aspect for the improvement of students' learning habits'. Classroom practice includes the interaction between the teachers and the students, student's tasks and time, strategies used for teaching and the effect of classroom environment for the present topic.

Physical Facilities

Physical resources denote the physical facilities, such as; furniture, desks, benches, school buildings and class size.

High Achiever and Low Achiever

The students who got the marks above national pass percentage is labeled as high achiever whereas the students who got the marks under national pass percentage is labeled as low achiever**.**

CHAPTER II

REVIEW OF RELATED LITERATURES

Review of related literature is an essential part of all research studies. It is a way to discover what other researches in the same area of the study have been explored. A review of related literature is a source of the further study of research task. It takes the research task to be undertaken in a better perspective and is essential for guidance of research planning.

The main purpose of review of literature is to find out what works have been done in the area of study being taken. It helps to broaden the concept regarding the research topic. The review of the related literature is generally performed under two headings viz; Empirical literature and theoretical literature. Here, I have also presented some researches related to my study under two headings.

Empirical Literature

Here, I have made an attempt to present some of the related and relevant studies that have been carried out in the department of mathematics.

Shrestha (1993) did a research on "A psychological study on Environment in Education." His study concludes that the pupils' achievement in mathematics depends not only on the part played by the teachers but also on the parents awareness, interest, knowledge about handling and guiding their children at home. He further elaborated on the positive attitude of the learners towards teaching materials and classroom environment.

Poudel (2005) did a research entitled "Learning strategy of mathematical concept of school children of Dalit students". He found that most of the non schooling children from untouchable caste had negligible idea about mathematics on the basis of observations, interview and school documents information provided by them. From this research, he further revealed that they had some vision on the present existing mathematical world. He used the Vygotsky theory of social constructivism in his research. The researcher also found that non schooling children from untouchable caste learned mathematics through their everyday life in different ways. They learned by looking other's works, by hearing them and by repeating it. Even without formal

education, they learned many mathematical skills that helped them to perform their tasks easily. Mostly, they learned such mathematical skills form surrounding environment. Also, they learned such mathematical skills form their peers, parents and elders.

Thapa (2005) did a research on "A study of secondary level students' achievement in mathematics in private and public school at Butwal muniplicity of Rupndehi district." He collected data from eight private and eight public higher secondary schools. The mathematics' achievement was examined and compared among three hundred and twenty students. The statistical tools used in this study were mean score, standard deviation and two tailed t-test whether there was significant difference or not in the mean scores of students in mathematics studying at tenth grade. All the scores were tested at 0.05 level of significance .The mean score of private and public school students was respectively 40.45 and 33.38.The mean score of private school students was higher than that of the public school students. This shows a significant difference at public and private schools students in their achievement.

Subedi (2005) did his thesis on "Mathematics Learning Management in an Effective School". He concludes that the school environment was found to be mere stimulating for mathematics learning with adequate physical management, extra-curricular activity and material management for the students. School had provided more qualified and experienced teacher for mathematics training and for the professional development of participants in the mathematics training. The Head teachers of the school were also found to be a policy designer and implementer. School had developed a mathematics committee in which issue and problem of mathematics were discussed and shared. Teaching results and parents got students' progress in mathematics. Thus, the school management was the most supportive atmosphere for promoting math learning in the school.

Bakely (2006) carried out a research on "The role of psychological environment in mathematics learning." A psychological study report examined that home environment is the most important factor in learning mathematics in the context of children. The activities and materials facilitate in learning at home. The main

factors at home are family size, parents income, family structure and socio-economic which had direct bearing on the mathematics achievements of the students.

Pearl (2007) did the research entitled "Household Environment association with math and reading test score in Ghana". The researcher concluded that mathematics achievements of students were affected by various factors such as household, socioeconomic status, family structure and physical environment which became the main cause in learning mathematics.

Devkota (2007) did her research entitled "A comparative study of the achievement in mathematics of +2 level students from public and private higher secondary school" with the objectives to compare achievement scores of +2 levels students in mathematics of different campuses who had graduated the secondary education. He selected sixty students from different faculties from three different campuses of Kaski district. Study was also based on secondary data depending on official records from the controller of examination of five consecutive years. The t-test was applied to conclude that averages scores of public and private school students, It was that the scores of public school students were significantly better than that of private schools students.

Melhunish (2010) did the research entitled "Impact of Home environment on child cognitive Development". The researcher concluded that effect of the various socio-demographic factors upon the cognitive outcomes were the effect of father education, household socioeconomic status and household income. He also found that mother's education was strongly linked to children's cognitive development in the early years.

Theoretical Literature

Theoretical literature explores on the knowledge of theory related to the study. Here, I have also made an effort to present some learning theories associated with mathematics learning and teaching.

Social Constructivism

Social constructivism is a variety of cognitive constructivism that emphasis on the collaborative nature of mathematics learning, developed during Russian

Revolution. It was developed by L.S. Vygotsky. He argued that learning is not simply the assimilation and accommodation of new knowledge by learners; it is the process by which leaner gets integrated into a knowledge community. Vygotsky's theory is one of the foundations of constructivism. It asserts on three majors themes:-

1. Social interaction plays a fundamental role in the process of cognitive development. In contrast to Jean Piaget's understanding of child development in which development necessarily precedes learning Vygotsky advocates that social learning precedes development. He states that every function in the child's cultural development appears twice: first between people (interpsychological) and then the child (intrapsychological).

2. The More Knowledgeable Other (MKO) refers to anyone who has a better understanding or a higher ability level than the leaner, with respect to a particular task, processes, or concept. The MKO is normally thought of as being a teacher, coach, or older adult, but the MKO could also be peers, a younger person, or even computers.

3. The Zone of Proximal Development (ZPD). is the distance between a student's ability to perform a task under adult guidance and /or with peer collaboration and the student's ability solving the problem independently. According to Vygotsky, learning occur in this zone.

Vygotsky has focused on the connections between people and the socio-cultural context in which they act and interact in shared experiences. According to Vygotsky, people use tools that develop from a culture, such as speech and writing, to mediate their social environments. Initially, children develop these tools to serve slowly as social functions, ways to communicate needs. Vygotsky believes that the internalization of these tools lead to higher thinking skills.

Many schools have traditionally held a transmission's or instruction's model in which a teacher or lecture 'transmits' information to students. In contrast, Vygotsky's theory promotes learning contexts in which students play an active role in learning. Role of the teachers and students are therefore shifted, as a teacher has to collaborate with his or her students in order to help facilitate meaningful construction. Learning therefore becomes a reciprocal experience for the students and teachers.

Conceptual Understanding of the Study

This case study has made an attempt to draw the model of learning environment for the mathematics learning environment and its relation with achievement. This case study was based on the low achiever and high achiever school environment. The conceptual model of learning mathematics in both schools has been presented as follows.

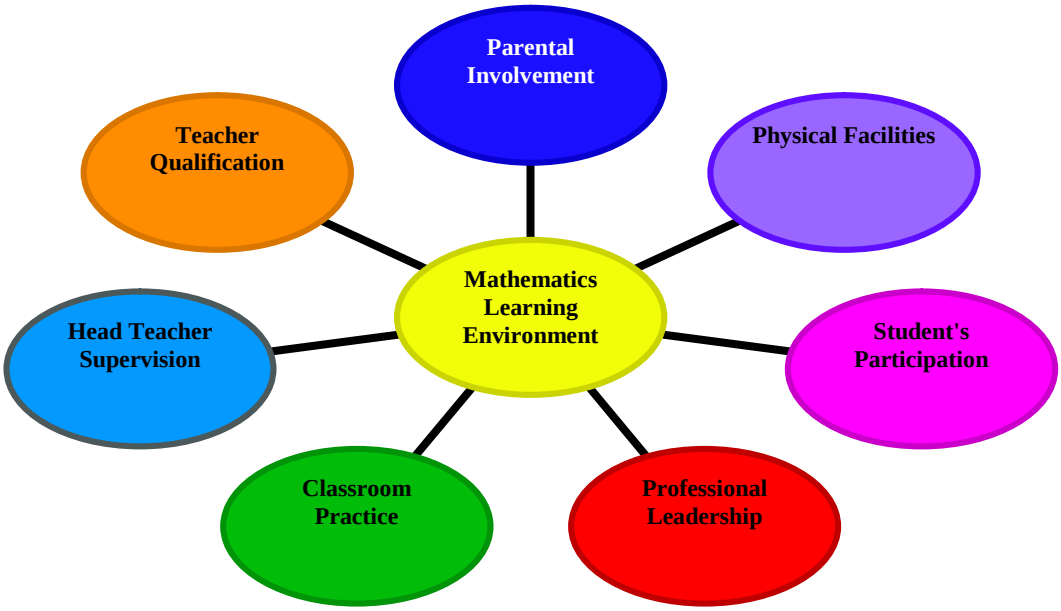

Figure -:2.1 Conceptual Understanding of the Study

This case study has tried to find out whether effective school's mathematics learning environment has good impact on the learners' achievement. Furthermore, this study has intended to explain and interpret what and how the framed environment – friendly elements work for mathematics learning environment.

CHAPTER III

METHODS AND PROCEDURES

This chapter presents the procedure of the study that was used to find out the objectives of the study and get the answer of research questions. This chapter includes design of the study, selection of case schools, rational of selection of study area, tools for research, data collection procedure and data analysis and interpretation.

Design of the Study

Research design is a way and path of the research that would guide the researcher to reach the goal of the research and find out the solution of problem. Case study had been used as a design for this study. It was the case study about mathematics learning environment at higher secondary level. This research was descriptive and qualitative in nature.

Rationale of Selection Study Area

Researcher selected this area where the physical atmosphere of the school was not well arranged, unqualified professional staff, lack of well experienced teachers and poor results in +2 level examinations. In this area, researcher selected one high achiever and another low achiever school so as to compare their level of achievements.

Sampling of Case School and Respondents

The school which had physical facilities, experienced teachers, qualified and professional staffs, more talents students with good performance and better result in+2 levels and another school where the physical facilities of the school was not well arranged, unqualified professional staffs, lack of well experienced teachers, low achievements in mathematics and poor results in +2 level examinations were selected through purposive sampling procedure.

Tools for Data Collection

To collect the primary and secondary data for this study, the researcher used the following tools:

Observation Form

The class observation form was developed by the researcher with the help of already described conceptual framework. To get the required information, the researcher observed the schools overall as well as key respondents individually and collected the data at school on the basis of physical facilities, students participation, classroom practices, parental involvement, professional leadership, head teacher's supervision and teachers' qualification. Then the researcher conceptualized the similarities and differences between low achiever and high achiever school environment.

Interview Schedule

The researcher prepared interview questions based on the observed class according to the differences between low achiever and high achiever school environment. Interview is a two way interaction between researcher and respondents as in the form of interviewer and interviewee in which interviewer creates situations that could attract the attention of respondents for a enough period of time in asking questions and answering the questions. Researcher developed the interview guideline after analyzing the data obtained from observation.

School Documents

School documents were collected to get school related information like physical facilities, environmental condition of the school, the behaviors of students, teaching technique in details and teaching materials for mathematics. Achievement of school was collected from +2 levels results of last four years exam and also from use the school level test examination of Higher Secondary level.

Data Collection Procedure

The researcher visited the selected schools to make a friendly rapport with the students to collect the data. Then he observed the classes and filled up observation form. Being based on that observation form, researcher developed interview questions according to the differences between low achiever and high achiever school environment.

The researcher took an interview to the respondents with help of developed questions. Answer of interview was noted down in the diary.

School documents related to the study of school such as teacher's profile, physical facilities of school, student's attendance, achievement of last exam, +2 levels results of last four years exam and also school level test examination were taken from school administration for the purpose of data collection.

Data Analysis and Interpretation Procedure

The collected information was categorized according to category of the respondents and their different responses gaven in the text of interview and observation note. They considered as a code. The similar code version of the respondents was collected together and explained. Cross match and triangulation process were adopted to maintain the validity and reliability of the results of the study. The data were analyzed and interpreted by the researcher according to the literature review.

CHAPTER IV

ANALYSIS AND INTERPRETATION OF DATA

The chapter deals the analysis and interpretation of the collected data from the selected schools. The researcher used classroom observation form to observe the class for 10 days. Observation was regularly for ten days done to observer the classroom and the classroom behavior carefully by looking at the setting of higher secondary level classes. With the help of interview schedule, the data were taken from the respondents. The interaction with the respondents was carefully listed and noted. The student's regularity, attendance, classroom practice, head teacher's supervision, teaching technique and other behaviours were noted by reviewing the school files and records. The school environment and other details were obtained through observation of the school environment, interview with head teacher and analysis of the school's document. The collected data at first were categorized according to the category of the respondents and then different themes were given in the text of the interview or the observation note with the help of conceptual understanding of the study. These themes were considered as codes. The similar code versions of respondents were collected together and explained in their perspective.

The data from the case schools were analyzed and discussed in terms of location, history of school establishment, physical facilities, +2 result of past four years, demography of teaching and non-teaching staffs students' participation, professional leadership, classroom practices, teaching techniques. The case school Shree Janta Model Higher Secondary Goal Bazaar was high achiever and another case school Shree Ram Janki Janta Higher Secondary School Vidhyanagar Chhajana-05 was found to be low achiever higher secondary school. The collected information have been analyzed and discussed under the following heading.

Introduction about Case School

Shree Janta model Higher Secondary School Goalbazaar is a large public model higer secondary school in Goalbazaar Asanpur-06 in Siraha district. It is situated 1 km south from Mahendra highway at Goalbazar. It is 20 km west from Lahan and 28 km north from Siraha Bazaar. Now-a-days, a large number of students

have migrated from different parts of district into the metropolitan city. In schools, the students of different carts like Yadav, Chamar, Mandal, Paswan, Mahato, Muslim, Sah, Shreshta and Bishwakarma, etc. are found in the school. Thus, the school community is multicultural and multiethnic in social composition. They have different cultural and economic backgrounds.

Initially, the school was established as a primary school in 2008 B. S. The school was developed as a lower secondary school in 2015B.S and it turned into secondary level in 2019 B.S. The school was developed as a higher secondary level in 2048 B.S.

The low achiever School is in Vidhyanagar -05 in Siraha district. It is situated 15 K.M. south from Mahendra highway of Chhajana Village. It is 30 K.M far from Lahan Bazzar and 18 K.M from Siraha Bazzar. The school community has multiethnic composition as well as multi-classes with varying economic condition. Most of the people of this community are uneducated and belong to remote area.

Initially, the school was established as a pre-primary school in 2020 B.S. with 20 students with no building. The school became a primary school in 2025B.S. The school had very poor condition with little number of students without building at that time with the joint effort of Mr. Ram Chandra, the leader of Village development committee and principal Mr. Umesh Kumar Sah, the school was upgraded upto secondary level in 2059 B.S. On the academic year 2064, the school was registered as a higher secondary school. The community played an important role to establish the school in the present condition.

There are some economic and cultural differences between low achiever and high achiever school. In the high achiever school, the parents of the students are businessmen and job holders and economically sound in different sectors in Siraha district. There are so many possibilities for earning money for them because they have so many opportunities to foster their business. The area of the community is also highly productive. However, some people of this community are economically weak. For their live-hood they have been engaged in teaching, Nepal police, Nepal army, Indian army and industrial sector.

In the low achiever school, the parents of students are uneducated. Most of them are farmer. They hardly produce food for sixth month by working the whole year. They do not have any job opportunity because there is no any industrial place. Most of people are of backward cast. The parents of students visit the school only one time when they admit their students. If they visit next time, then parents tell the teachers to leave their child to work in field. Child marriage is also one of the greatest problems of this place which has increased dropt out rate of the students.

Post Result of Both Schools

The result of the past four years of the both schools has been presented in the following tables:

Table 1:- +2 Result of the Past Four Years of the High Achiever School

Year	No of students appeared in an exam	No of failed students	No of passed students	pass %
2066	30	6	24	80
2067	32	7	25	78.13
2068	27	4	23	85.69
2069	22	8	14	63.64

(Source: School Report 2069/2070)

The above table shows that result of the +2 in the year 2069 was the lowest one, but it was not less than national pass percentage of that year. So the +2 level results of the school was very high in terms of achievement and its infra-structure. Hence, the school became high achiever in the context of Siraha district. Similarly, the table given below shows the condition of the low achiever school.

Table 2:- +2 Result of the Past Four Years of Low Achiever School

Year	No of students appeared in an exam	No of failed students	No of passed students	pass %
2066	20	9	11	55
2067	23	13	10	43.47
2068	18	12	6	33.34
2069	14	10	4	28.70

(Source : School Report 2069/ 2070)

The above table shows that since 2066, school's result is very poor. School's result is decreasing yearly compare of ancient national result.

From the above both table, it was found that high achiever higher secondary school had got good result according to national pass percentage and low achiever higher secondary school had got poor result with regards to national pass percentage, classroom practice, teacher qualification and head teacher supervision the result of the +2 seems to be difference according to the school environment. This has mainly been caused due to the physical facilities, perhaps involvement, students' participation.

Condition of Physical facilities of both schools

The overall environment and prevailing management system of the school seem to be most crucial factors for positive achievement. School environment play ground, garden, building, classroom management, library and lab etc. They obviously motivate the teachers and students to expose their knowledge in the teaching learning process. The physical facilities of the school foster good learning environment. The positive relationship between school learning environment and school outcomes such as student academic achievement, attendance, discipline, completion rate and teacher turnover rate develop the school academically sound.

The Case of High achiever School

The school is located within area of 3-05-02 nearly forty five ropanies of land and the compound surrounded by four building walls. Two plastered building and another two unplastered building have 45 rooms. The rooms are middle sized, well ventilated and airy fan. There is a programme hall, two library rooms, two science labs, four office rooms, one head teacher's room, four store rooms and thirty teaching rooms. Play-ground is not big enough. There is a facility of basketball, volleyball court, pure drinking water, toilet for both girls. However, the toilet for boys are not sufficient for the students.

The physical facilities in the high achiever school were sufficient for the students to meet their academic pursuit. School had sufficient rooms, desks benches, blackboard and teaching materials etc. However, they had the lack of other game materials and instruments. Some of the views collected from the informants regarding physical facilities of school have been presented below:

"The school has sufficient teaching materials for mathematics and science laboratory"

(View of head teacher)

"Our school looks beautiful because there is a garden. We can play basketball and volleyball during interval time. Desks and benches are sufficient enough for classes. There is a canteen inside the school".

(View of students)

In this way, the researcher found that high achiever school had sufficient rooms, desks and benches and building with adequate play ground. There were sufficient teaching materials with regards to physicals facilities. The school had congenial environment for mathematics teaching and learning.

The Case of Low Achiever School

The school is located within the area of 25 ropanies of land having two plastered building with thirty rooms. There is one programme hall, one library room, two office rooms, two store room, one head teacher's room and twenty rooms for teaching and learning purpose. The playground is small between the buildings. The school has few students but in the interval time of the school when all students come out in the ground, it could be seen almost covered. Drinking water is available but toilet facility is not so good for both boys and girls.

The physical facilities in the low achiever school indicate that the school had sufficient rooms but it had the lack of adequate play ground, court and teaching materials.

Thus, from above discussion, it was found that the physical facilities of both schools were not the same. The physical facilities of high achiever school were more sufficient than low achiever school. The high achiever school had science lab, program hall, teaching material computer and other facilities like as comfortable desks and benches were more appropriate than low achiever school.

The low achiever school had not much teaching material for mathematics and science laboratory although the school future plan was to manage required materials. They didn't have sufficient play grounds and toilets.

Demography of Teaching and non- teaching staff of both school

Teacher's number, qualification, training and experience are the important factors for better performance in the school and in the classroom teaching and learning activities. Teacher is an important input and other inputs include the things such as physical facilities and educational materials.

Table 3 Demography of teaching and non teaching staffs of high achiever school

S No	Name of Teacher	Post	Qualification	Training	Experience	Remarks
1	Mo.Jamal Ahamad	Head teacher	M.Ed/M.A	yes	23 years	permanent
2	Bhakt Bhadur Rai	Ass. Head teach.	M.Ed	yes	22 years	permanent
3	Surendra Singh	Teacher	B.A/B.Ed	yes	19 years	permanent
4	Rameshar Kamti	Teacher	B. Ed	yes	19 years	permanent
5	Birendra Yadav	Teacher	B.sc	yes	20 years	permanent
6	Ram Narayan Sah	Teacher	M.sc	yes	17 years	permanent
7	Nawraj Gautam	Teacher	B. A	yes	18 years	permanent
8	Bhesh Raj Gelal	Teacher	M.A	No	17years	permanent
9	Gaurishankar Yadav	Teacher	M.Sc	yes	15 years	permanent
10	Chandradev Yadav	Teacher	M.Ed	yes	14 years	permanent
11	Rajendra Yadav	Teacher	MBS	No	13 years	Temporary
12	Rajeshwar Yadav	Teacher	M.Ed	yes	13 years	Temporary
13	Phuleshwar Thakur	Teacher	MBS	No	15 years	permanent
14	Gangalal Sah	Teacher	B.Ed	yes	9 years	Rahat
15	Dilip Kumar Yadav	Teacher	BBS	yes	8 years	Rahat
16	Sunil Kumar Yadav	Teacher	M.Ed	yes	6 years	Rahat
17	Kumar Kamlendra Yadv	Teacher	M.Ed	yes	3 years	Temporary
18	Anil Sah	Teacher	B.Ed	yes	2 years	Temporary
19	Sanjiv Ku Yadav	Teacher	B.Ed	yes	1 years	Temporary

Regarding the qualification, most of the teachers teaching at secondary and higher secondary level were master's degree holder with full and partial trainings. Head teacher had completed master's degree in Education and Humanities and Social Science from T.U and other teachers are also Master's degree with well experience.

For the profession development of the teachers school provides the following works for teacher:

- Provide salary in time
- provide textbook, teachers guide and necessary extra materials
- send teacher to SEDU programme to participate in training
- provide extra salary for teacher

(According to head teacher of the school)

"I got graduation in M. Sc. in physics and I have 17 years of experience in teaching profession so, I know how to teach and how to satisfy the student".

(View of mathematics teacher)

The above table exhibits that the qualification of teacher is good for secondary and higher secondary level. However, some teachers were not trained, they had experience of many years in teaching and they knew how to improve learning and achievement of students in subjects matter from their experience. Comparatively, the teachers having education background were found to be more skillful and trained in using techniques than the teachers of science background. However, the maturity and experience equally made all the teachers competent enough to handle the course in a friendly user way.

Table 4: Demography of teaching and non teaching staff on low achiever school

S No	Name of Teacher	Post	Qualification	Training	Experience	Remarks
1	Ran Pratap Yadav	Head Teacher	M.Ed	Yes	15 years	Permanent
2	Swatantra Karn	Ass.Head teac.	M.Ed	Yes	13 years	Permanent
3	Ram Umesh Yadav	Teacher	B.Ed	Yes	12 years	Temporary
4	Ram Narayan Yadav	Teacher	B.Ed	Yes	10 years	Temporary
5	Raj Kumar Yadav	Teacher	B.Ed	Yes	13 years	Permanent
6	Jitendra Yadav	Teacher	M.A	Yes	09 years	Permanent
7	Shivram Mandal	Teacher	B.A	Yes	14 years	Permanent
8	Jay Narayan Yadav	Teacher	MBS	Yes	12 years	Temporary
9	Mo. Masid Rain	Teacher	B.Sc	Yes	11 years	Temporary
10	Phul Kumari Yadav	Teacher	B.Ed	Yes	09 years	Rahat
11	Ram Naresh Yadav	Teacher	B.Ed	Yes	05 years	Rahat
12	Dipendra Dahal	Teacher	B.Ed/M.A	Yes	04 years	Temporary
13	Prabha Yadav	Teacher	M.Ed	Yes Yes	01 years	Temporary
14	Hiralal Yadav	Teacher	B.Ed	Yes	01 years	Temporary
15	Mantun Yadav	Teacher	B.Ed	Yes	02 years	Temporary

Regarding the qualification, most of the teachers teaching at secondary level were found to be bachelor degree holder with full and partial training. Head teacher of school was Master's degree holder in Education from T.U and other teachers who were teaching at higher secondary level were master holder, but not well experienced teacher.

From the above both table it was found that mathematics teacher was M.Ed. in mathematics with 17 years of experience and other teachers were Master and Bachelor's degree holder with full and partial training. So, they taught their students by using student centered methods so that students understood easily. Therefore, high achiever schools had high result in mathematics.

But in the low achiever school the most of the mathematics teachers were M.A. in mathematics having less experiences. They were not well experienced and usually they used teacher's centered methods. Students were not satisfied well. The students were passive in the classroom.

Students' Participation in Both Schools

Students' participation has many components like sitting management, peer group discussion, small group discussion, readiness, desires, etc. To participate the students, these components are very important. Students' participation is important for collaborative learning activities. The active participation of the students in peer group or in small group help them find the solutions of problem. Thus, participation in these activities broaden their mind to easily tackle the problem.

Case of high achiever school

Students' participation is one of the important aspects of learning mathematics. According to given episode I, we can find out how students participate in mathematics learning.

Episode I

The teacher went to the class with chalk, duster and textbook. Then the researcher also entered the class and all students stood up and said "good morning sir" then teacher told them to sit down. Teacher simply opened the textbook and asked the question to the students. "Did you finish the problem given yesterday?" Most of the students answered "yes." After that the teacher wrote a topic of matrices and determinant and reviewed the previous lesson about 5 minutes.

At first teacher wrote an example of determinant and discussed about it. He also defined determinant and introduced how to find the determinant of given matrix. After one demonstration, he discussed about some problems and how to solve them easily. He divided students gave a problem to them to solve in the group. The teacher just walked around the classroom and guided them. At that time the classroom was seen little bit noisy and more students did not solve the problems. Then the teacher came to the blackboard and explained the problem and how to solve it. At last, he

gave some homework and told to the monitor to collect yesterday's homework and bring to the staffroom. The teacher took the whole period for discussion in the class. At last the class teacher told researcher" If I checked the homework in the classroom I couldn't get much time to teach course. So, I will check homework at leisure period in staffroom.

Hence, from the observation class, it was found that teachers mostly used discussion method in teaching mathematics. The activities indicated that the classroom environment was reasonable and interactive because of this method in teaching and learning mathematics.

The above text of class observation shows that teacher solved one problem for the class then teacher provided maximum amount of time for class work. This indicates that students were actively participated in mathematics learning.

At the end of the period, the researcher asked some questions related to exam and class activities with case respondents. The responses provided by them are as follows:

> *"We usually take terminal, half yearly and yearly exam to evaluate students programs. We also hold monthly test in the school at class time."*
>
> (View of head teacher)

> *"I always emphasis on class work but I never take any unit test in mathematics."*
>
> (View of math teacher)

> *"We regularly do the homework and class work".*
>
> (View of students)

The above view indicates that the learning environment at school is also an important part for the students. Although, the school doesn’t examinations, teacher and students give emphasis on home work and class work for better achievement in mathematics with this regard, a view has been given below.

"We provide a lot of time for child to read at home and guide them regularly if they can not solve their problems. If they cannot solve, we encourage our children to ask this questions with the teacher".

(View of parents)

"When we ask questions from books our mathematics teacher gives answer easily also he use discussion method and we are satisfied with him."

(View of students)

"If the students fail in any subject, then we invite to the parents in the school in order to make a plan for the weak performance of students to participate in the extra mathematics classes."

(View of head teacher)

From the above episode mathematics teachers of high achiever school were found to use discussion method to actively participate students to solve the problems in the classroom. Parents sometimes guided them in their homework, too.

The students solved homework and class works every day. Mathematics teachers were more responsible toward students' work. The school held many exams like monthly and terminal test for better achievement of the students.

Case of low achiever school

Here, an attempt has been made to present an episode of classroom behaviour of low achiever school.

Classroom Reality of the Low Achiever School

Along with the class teacher, the researcher also entered the class. All of the students greeted the teachers by saying "good morning sir". The students looked curiously to another teacher. The class teacher introduced the researcher as a teacher. After that, students greeted the researcher with the word "good morning sir." it showed that the school environment had taught them about the respect for the teacher and other. Teacher started teaching mathematics. At first, he reviewed the previous

lesson of polynomial equations, then wrote a problem from text book on the blackboard and explained the problems step by step.

First of all, students and teacher discussed about the quadratic equation. After that teacher proved this theorem explaining step by step. After one demonstration, he gave more problems to solve. After some time, 3 or 4 students solved these problems but other could not solve any problems. The teacher came on the blackboard and solved the problems which he had given. Next teacher gave the similar problems to the students which was not solved already. Then the teacher checked their copies most of the students could not solve and they had made simple mistake and missed step for solving problem.

Hence, in the observed classes, the teachers were mostly found to use lecturer method strategies teach mathematics. This activity indicated that the classroom environment was completely controlled by teachers. The students were not found to be active participants in the classroom.

In the observed class, more students couldn't solve the given problems. So researcher found that student's pre- knowledge in mathematics was weak.

At the end of the period, researcher asked some question to the case respondents. Their views on these questions are as follows:

> *"We usually take terminals half yearly and yearly exams to evaluate students' progress. We also take monthly test in the school but could not get good result".*
>
> (View of head teacher)

> *"I focus on class work and home work but students did not solve actively and completely. Some students are active and do complete the homework and class work. However, some students are very weak in mathematics".*
>
> (View of math teacher)

> *"Our parents are very weak economically so we work at home to help my family and we can not give enough time for homework".*
>
> (View of some students)

"Our mathematics teacher teaches very well. He gives answer easily when we ask questions from text book but we feel hard to solve problem".

(View of students)

"We have passed S.L.C in Nepali medium so we feel hard to know in English medium".

(View of some students)

The above view indicates that the school held examination within a year such as terminal, half yearly and yearly and other unit exams were held but result of the students was not good. Similarly, parents were economically poor so students can not take extra classes and other extra activities. With regards to extra class, a view has been presented below:

"After consultation with parents the school manages extra classes or coaching for the students according to their desires and needs".

(View of head teacher)

Above view indicates that most of parents are not careful about their children learning activities and it could be seen that the home environment of the child is not good.

From the above observed classes it was found that high achiever school parents, teachers and students were fully cooperative with each other. Parents provided enough time for their children to do homework. Mathematics teacher was trained teacher who gave more time in the classroom activity. High achiever school's parents were good economically good and educated. If the students failed in terminal exam of mathematics, Head teacher made a plan for weak students to give a extra class of mathematics. Then students participated in the extra class of mathematics and solved their class work and homework actively and passed their final exam. So the high achiever school seemed to have good outcome.

Low achiever schools, on the other hand, was found to be poor. Teachers and students were not cooperative with each other. Parents did not provide time for their children because they were uneducated and had low economic condition. Students

could not give enough time for their homework. Although, head teachers called the parents in school to make a plan for their children they were not present and didn't come to know the condition of their children. In this school mathematics teachers were trained teachers. He encouraged towards mathematics learning. However, some students seemed active and more students didn't show interest to learn mathematics. So, low achiever school's outcome was not so good.

Professional Leadership

Professional leadership is the most important aspects of school which plays vital role in teaching and learning environment in the school. Effective leadership can run an institution successfully, seeking help and contribution from the stake holders. The head teacher, as the chief executive officer of the school, is responsible for the process that would bring out the development of an appropriate school policy utilizing the best information and the best methods of development at the school's staffs. They are responsible for ensuring that policies be implemented in such a way that it could also facilitate best possible chance of success. Some views on leadership have been presented below:

> *"School staffs have a unity, they make decision about academic task and school's policy, I am just the leader of this team and I always encourage building team spirit. The school community has concerned with this policy".*
>
> (View of high achiever school head teacher)

> *"While teaching mathematics, school provides textbook, teacher's guide, geometric instruction etc as the minimum requirements for teacher."*
>
> (View of high achiever school math teacher)

> *"We supervise the work of teacher regularly and encourage them to construct lesson plan, unit plan and annual plan etc for their subjects and also we discuss on the staff meeting about the problems, issues and methods of teaching without supremacy."*
>
> (View of high achiever school SMC)

The above views indicate that the head teacher had a great role in the development of school policy and keeping the environment conducive as well as in the development of teaching learning environment in the school. Supervision is another important aspect of professional development of the school. Also SMC shows that there is a democratic environment in the school as well as in the school meeting. The team of school also shared the vision and goals of the school and there was good tradition for discussing the issue and techniques of learning process with staffs during meeting.

Professional development of mathematics teacher in low achiever school mostly emphasized on lecture cum practice method in mathematics learning. Some of the views of the staff of this school are as follows:

> *"There is a lack of teaching materials and teacher enter the class room without any formal lesson plan in the school."*
>
> (View of low achiever school SMC)

"The staff has a unity but the parents have negative attitude towards school so I feel very hard to work on the school management".

(View of low achiever school head teacher)

From the above view, the researcher has found that the high achiever and low achiever school's leadership is different. In the high achiever school management committee, head teacher and students are co-operative, so the school has moved on the high achievement. On the low achiever school, school management committee, parents and head teacher are not co- operative. So the school could not get high achievement.

Parental Involvement in Both Schools

The recent view of mathematics learning is that the active participation of parents in school activities improves students' achievements. Naturally, this increases school's attendance and decreases students drop out and delinquency. This research indicates that the strong bond between parent and school usually occurs in school where there is extra time for teachers. The teacher needs to know about the cultural

and family background of the students. This can be known from making closer relationship between parent and teacher. So, parent and family members are the child's first teacher. Their participation in learning can improve student's achievement. There may be many ways of parents' involvement in the children's learning mathematics for facilitating school activities and guidance at home. In this section, researcher explains the phenomena of both schools in term of involvement. Some views on parental involvement are as follows:

> *"Some parents meet me and consult about their child's mathematics learning. I always provide them encouragement about the success of children and also request them to make their children do more practices at home for mathematics learning".*
>
> (View of high achiever school mathematics teacher)

> *"School needs to provide extra classes for poor students and also we can manage proper environment at home then automatically our children can learn mathematics.*
>
> (View of high achiever school parents)

> *"We advise to the parents to come school to know about their children education but some parents are not interested about children's education."*
>
> (View of SMC of high achiever school)

> *"We feel mathematics is more difficult subject than other subjects, our families also guide us in mathematics and they give emphasis to take extra classes for mathematics. We must practice mathematics at home".*
>
> (View of high achiever school students)

According to parents and teacher, it was found that they were actively involved in school to make learning process effective which greatly influenced their students' achievement. Hence, it could be seen that there was interaction between school members and parents for better overall achievement. Therefore, parent involvement is one of the most influencing factors in learning mathematics.

However, the educational background of the parents of low achiever case school was found very low. The case school was in remote area. Parents were engaged in working as labours. So their awareness towards education and their children performance were very low. In this school, students of uneducated parents were poor because they were culturally, economically, educationally very back. Some other views of parents are as follows:

"The school sends letter to the parents by their son /girl's academic report and other extra opportunity but they do not come in the school."

(View of low achiever head teacher)

"We can not get enough time to do home work from household work".

(View of low achiever school students)

"We are farmer, we can not present at school when head teacher calls us"

(View of low achiever school parents)

"School invited to the parents every exam such as first term, second term, half yearly exam but parent's involvement in the school was very low in number".

(View of low achiever school head teacher)

"We must practices mathematics at home because we feel mathematics is more difficult than other subject. We are very weak in mathematics I want to learn mathematics but our parents are uneducated and they help us. So we feel difficulty".

(View of low achiever school students)

"Teacher is responsible toward students but parents and parents and students are not co-operative. So, the school has not got good result of +2 levels".

(View of low achiever school S. M. C)

In the high achiever school, the researcher found that parents were more educated and economically sound. So the students got more facilities like as extra

classes, using teaching materials and other materials. The high achiever's parents visited school from time to time and they took academic report. But in the low achiever school, the parents are not present did not visit school to know about the progress of their children. Most of the parents had low economic condition and uneducated. So, their children did not get facility. Most of the students worked and collected money for their study and could not get good result.

Classroom Practices

Classroom practices are the main aspects for the improvement of students' learning habit. Classroom practices include the interaction between teachers and students, student's response, student task on the time, strategies used for teaching and the impact of classroom environment for the presented topic.

In this study, the researcher studied the classroom practice factors in arrangement of classroom, student's response, student-teacher interaction, feedback status, activity management in classroom and confidence in teaching learning.

In case of High achiever school

The teacher and the researcher went to the classroom. All the students stood up and said "Good morning sir." The researcher told them to "sit down." Usually teacher opened the textbook and he wrote a topic of that day. He asked the questions to the students that they had previous day. Then he reviewed about the previous topic five minutes. Then he went to the new topic "Properties of 3x3 determinants." Then teacher introduced the given property.

Teacher did four properties on the blackboard by explaining step by step. Student showed interest in teaching learning process and they solved the problem according to given properties. Students actively practiced and teacher provided the environment to compose their class work towards daily lesson. Homework was given from the textbook at last.

At the end of the period, researcher asked some questions with case respondents and they answered as follows:

"The teacher recognizes the worth of all students' response to questions and their ideas are respected and explored. As a result students will be more willing to share their idea in class."

(View of high achiever school teachers)

"We all support to make the classroom practices more influential and effective. For this, we have experienced and professional teachers and well managed classroom and more teaching learning materials.

(View of high achiever school head teacher)

"We are interested in classroom practices because we ask about confusions in problems and we are confident on how to solve the mathematics problems.

(View of high achiever school students)

Above view indicates that in the high achiever school students are interested in classroom practices, math teacher is respected, and willing to share their ideas to each other and head teacher also encourage the students in the classroom practices.

In case of low achiever school

Researcher and teacher entered the class room. All of the students respected the teacher saying "Good Morning Sir." Teacher started to teach mathematics. At first, he reviewed the previous lesson of polynomial equation then teacher taught "relation between roots and co-efficient" explaining step by step.

Students were not interested towards practices in the classroom because teacher could not give a clear concept. Also students were from Nepali medium school and they couldn't clearly understand the problem in English medium. Some views of respondents on it are as follows:

"A large number of students are weak in mathematics, teaching period is short and as we have to finish the course on time it is difficult to make them do more classroom practices".

(View of low achiever school math teacher)

"Teacher always gives emphasis on bookish knowledge and not gives many examples for classroom practices".

(View of low achiever school students)

"We all support for the classroom practices but all students are not interested because some students do not have clear concept about basic topics and they can't discuss in classroom practices".

(View of low achiever school head teacher)

All the above views indicate that in the low achiever schools a large number of students were weak in mathematics and teacher did not use modern method. Also he didn't give so many examples for students. So the low achiever school's outcome was poor.

In the high achiever school teacher, students were found to be co-operative and shared their ideas to each other also head teacher encouraged the students in the classroom practices so their outcome became good but in the low achiever school, are large number of students were weak in mathematics and math teacher was also not well experienced. So student and teacher didn't share their ideas to each other. So classroom practice was not meaningful and low achiever school outcome was poor.

CHAPTER V

SUMMARY, FINDING, CONCLUSION AND RECOMMENDATIONS

Summary of the study

The purpose of the study was to describe and analyze the mathematics learning environment in a school. The main objective of the study was to focus on learning environment for the mathematics learning in a high achiever and low achiever school, to analyze the instruction and strategies used in the mathematics classroom in the high achiever school and low achiever school. According to the objectives, the researcher used observation as tool for data collection. To collect the qualitative data, the class observation was done by the researcher for 10 days. The researcher participated with students and teacher in the classroom everyday. On the basis of observation form, the researcher observed the mathematics class of grade eleven of the school and noted down on the observation form. Classroom behavior was carefully observed with different outlook of setting. The researcher also collected data with the help of interview schedule. The interview was taken with students, teachers, Head teacher and parents and maintained a note diary. The required primary and secondary data were collected from the case respondents and researcher also used the school documents related to the study. The collected data were analyzed and interpreted in a descriptive way.

Findings of the Study

On the basis of the analysis and interpretation of the data, the researcher has come to the following findings. The findings of the study have been summarized under two headings:

Findings of the study of high achiever school

- The school community was found to be multicultural and multiethnic in social composition as well as heterogeneous multi classes in economic condition.
- The physical facilities of the school were sufficient for classroom desk, bench and blackboard but it had lack of good library, teaching materials and computer.

- The school had good +2 results in the past four years.
- Subject wise qualified and the experienced professional teams of teachers were found to contribute to better performance of student.
- It was found that the rule of sit planning was rotational which made all students change their position front and back bench by turn.
- School provided a variety of opportunity for the teachers to develop their professional careers.
- Students were found to be more enthusiastic to share their ideas and they didn't have fear from wrong answer.
- The head teacher acted as a leader of the school who always encouraged the team sprit. In the case of mathematics, he had supervised mathematics classes and encouraged teachers and students for mathematics learning.
- Students and teachers were found to be regular in the mathematics classroom. However, teacher had mostly used lecture cum practice method in mathematics teaching. He encouraged more class work in the classroom.
- In the case school, there was a mathematics committee in which teachers always discussed about the issues and problems related to mathematics. The mathematics teachers encouraged the parents in the school to know about their children's progress. So, there was maximum parental involvement in children learning.
- The mathematics teacher emphasized more on class work and home work for mathematics practices.
- School environment and classroom practice always encouraged the students to do practice teacher also provided feedback which acted as reinforcement for the students.
- School had child friendly rules and regulations that created conducive environment for the learners.
- There were provision of extra classes for slow learners.

Finding of the Study of Low Achiever School

- The physical facilities of the school, like as desk, bench, blackboard and other things were sufficient for classroom.

- Classroom was properly arranged with clean and peaceful environment. School had library but there were not sufficient books.

- The school had not got good +2 results compared to the national pass percentage in the past four year.

- Teachers were found to be qualified according to the qualification but the teachers were not well experienced because most of teachers had currently passed the master's level.

- There was not regularity of the students in mathematics classroom.

- The parental involvement was found to be very low. They never visited schools to know the progress of their child.

- The environment of the community was not good because they were economically, educationally and culturally backwards. So, there was not good mathematics learning environment.

- Students weren't found to share their ideas openly. They had fear for the wrong answer.

- In the classroom practice, students were not found to be participant actively.

- There were provision of extra classes for low performance in learning but students did not participate in extra classes because they were busy in household work.

- Rule of sit planning isn't rotational.

CONCLUSIONS

Based on the above major findings the conclusions can be drawn under two sub-headings:

In case of high achiever case school

- School has qualified and experienced teachers but they are not fully trained.
- The school should provide extra classes of tuition in small group for low performance in mathematics learning.
- School should provide opportunity for teachers participate in different types of mathematics trainings school should also organize discussion and seminar among mathematics teachers solve their mathematics problems and improvement of mathematics teaching and learning programme.
- Mathematics teacher should apply the suitable methodology which motivates and arises the interest in students to learn mathematic.
- Teacher should create the meaningful mathematics environment in the class.
- Parent involvements help their students by organizing necessary materials and also give suggestions to the study out home.

In the case of low achiever school

- Students are not interested to develop their qualification because the concepts of the parent are to send them foreign country and join army in low achiever school.
- Parents were uneducated, economically poor. They were not interested in tuition and extra classes of their child.
- The mathematics teacher wanted to give enough time for extra class and tuition for low achiever students but they did not participate in the classroom.

- Most of students had passed S.L.C in Nepali medium. So they felt uneasy to study in English language.

- Although some students were from boarding school they could give a lot of time to practice on mathematics.

RECOMMENDATIONS

This is the case study of mathematics teaching and learning environment in a high achiever and low achiever higher secondary schools of Siraha district. This research is limited to only high achiever and low achiever higher secondary schools with reference to teaching and learning environment. So, the findings and conclusions drawn from the study cannot be generalized in all the schools.

Observing the above findings and conclusions, the researcher has presented the following recommendation which will benefit to the concern authority to bring further improvement in the mathematics teaching.

Standing over the foundation of this study. The following suggestions and recommendations have been extracted out:-

- Government of Nepal should supply the essential teaching materials and should encourage the school administration to purchase such teaching materials.

- School needs to make mathematics laboratory.

- The teacher should motivate the weak students and praise them to participate in learning actively.

- The class should be well arranged that students can equally and easily participate in the classroom activities.

- Innovative, workshops, refreshment training and orientation and supervision should be provided to the teachers time to time.

- The school administration should interact with the students, teachers, guardians and other related persons.

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OBSERVATION FORM

Name of Teacher :- Gender :-

Name of School :- Qualification :-

Class :- Lession :-

Date :- Period :-

Teaching experience :- Subject :-

Observation Area

1 Arrangement of the Physical facilities

- Area of School
- No. of Building
- No. of rooms
- No. of teaching rooms
- No. of Library room, science lab and office room
- No. of desk and bench
- No. of Table, lung chair and daraj

2 Students Participation in the classroom

- Student Regularities
- Class work and home work
- Interaction between teacher and students

3 Demography of Teaching and Non- Teaching staff

- Name of Teacher
- Post
- Qualification
- Experience

4 Classroom Practices in the classroom

- Interaction between teacher and students
- Student's task on time

- Strategies used for teaching
- Student response

5 Parent Involvements in learning environment

- Increase student attendance
- Provide guidelines in home
- Emphasis to take extra classes for mathematics
- Encouragement about the success of children

6 Professional Leadership development of mathematics teacher

- Training
- Workshops
- Resource management

7 Teaching Method in the Classroom

- Teacher centered method
- Interaction method
- Student centered method

8 Other materials

- No. of micro-scope
- No. of blackboard
- No. of globe
- No. of maps
- No. of flatten boards

INTERVIEW AREA FOR HEAD TEACHER

Name :- Date :-

Qualification :- Religion :-

Experience of Principals Gender :-

Experience of Teacher :-

Interview Guidelines

- Existing condition of school ; Physical facility, Number of teacher, Qualification, number of students, success/ failures of the school, community participation.
- Ways of planning and decision making
- Education activities of student and teachers
- Professional development of Mathematics teachers
- Supervision, Monitoring and evaluation of the teachers

INTERVIEW AREA FOR STUDENTS

Name :- sex :-

Adress :-Permanent

Temporary

Age :- Religion :-

Roll No. :-

Interview Guidelines

- Personal history
- Family background
- Reading opportunity at home
- Parent support in learning
- Mathematics learning style
- Homework and class work
- View about peer group
- Teaching method

INTERVIEW AREA FOR THE PARENTS

Name :- Qualification :-

Address :- Occupation :-

Name of his/her child :-

Monthly income :-

Interview Guidelines

- Expectation from school
- Support for their child learning
- Opportunity provided for learning to their child
- View about school and teachers
- Awareness towards their child learning