

DETRIMENTAL FACTORS FOR POOR SKILLS OF MATHEMATICS STUDENTS

A

THESIS

BY

SUSMITA PATHAK

IN THE PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE

DEGREE OF MASTERS OF EDUCATION

SUBMITTED

TO

DEPARTMENT OF MATHEMATICS EDUCATION

CENTRAL DEPARTMENT OF EDUCATION

UNIVERSITY CAMPUS

KIRTIPUR, KATHMANDU

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Date :.....

LETTER OF CERTIFICATE

This is to certify that Ms. **Susmita Pathak**, a student of academic year 068/69 with campus Roll No.13, Thesis No 1042, Exam Roll No. 281867 and T.U. Registration No. 9-2-29-2213-2006 has completed this thesis under the supervision for the period prescribed by the rules and regulation of Tribhuvan University, Nepal. The thesis entitled “**DETRIMENTAL FACTORS FOR POOR SKILLS OF MATHEMATICS STUDENTS**” embodies the result of her investigation conducted during the period of Sep 2015 to Feb 2016 at Department of Mathematics Education, University campus Kirtipur, Kathmandu. I recommend and forward this thesis for the evaluation as partial requirements to award the Degree of Master of Education.

.....
(Associate Prof. Dr. Eka Ratna Acharya) (Associate Prof. Laxmi Narayan Yadav)

Supervisor

Head

Date: 17th April 2016

Date :.....

Letter of Approval

A

Thesis

By

Susmita Pathak

Entitled

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has been approved in partial fulfillment of degree of Master of Education.

Committee for Viva-Voce

Signature

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Date: 17th April, 2016

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.....
Susmita Pathak

ABSTRACT

This is a qualitative research. The design of this research is case study. This research intended to identify the detrimental factors for poor skills in mathematics and strategies used by teachers to improve it especially in geometry. For this, six low achiever students, two teachers, two parents, one principal, one Department head and one stakeholder were selected on the basis of their economic condition, parents' love towards students, interest in mathematics, ages, home environment and prior knowledge. Different tools such as observation notes, interview schedule and school documents were applied to identify detrimental factors for poor mathematical skills in primary level. Detrimental factors for poor skills in mathematics are poor generalization power of the students in mathematics, lacking on the willingness to learn new concept in mathematics, not following new teaching techniques while teaching mathematics, material related as aspect and the evaluation tools.

This study found that foundation of the instructor and the learner is not in the level of satisfactory. Students have poor generalization power in mathematics and interest of the students to improve their level is no more towards mathematics. To promote the achievement level of the students; emphasis on mathematics learning should be given. In the similar manner contextualization of learning and change from the traditional way of teaching to interactive way of teaching is required to change the level of mathematics in school level.

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List of Abbreviation

CERID: Research Centre for Educational Innovation and Development

FGD: Focus Group Discussion

ICT: Information communication and Technology

SLC: School Leaving Certificate

ZPD: Zone of Proximal Development

GEMS: Graded English Medium School

Chapter – I

INTRODUCTION

Background of the Study

Mathematics is only “useful” to the extent to which it can be applied to a particular situation, and it is the ability to apply mathematics to a variety of situations to which we gave the name ‘problem solving’. However, the situation of mathematical problem cannot begin until the problem has been translated into the appropriate mathematical terms. This first and essential, step presents very great difficulties to many pupils which is often too little appreciated (Hughes; 1986).

Also basic skills of mathematics help an individual to be an independent person who can take care of himself or herself. Hughes (1986) states some important basic skills of mathematics in our daily life. These include to pay for purchase and to give change, to weigh and to measure, to estimate and approximate and to understand straight forward time tables. In this sense, if one fails to grasp the simple basics of mathematics that person may face difficulties in the above realities.

Pupils with low mathematical skills have deficit of some of the skills mentioned as above. Riesman (1972) argues that pupils with low mathematical skills are those under achieving in mathematical subject. Pupils in primary schools normally perform better in other subjects except in mathematics. This study concedes the problem of low mathematical skills with an inclusive education paradigm, investigating the teaching method used by teachers in primary schools to meet the needs of pupils with low mathematical skills.

Government has taken different initiatives towards mathematics subjects through workshops, seminars buying more mathematical textbooks and teaching aids to provide teachers with methods and other resources. However, despite these efforts

students' poor performance and low mathematical skills has long been a subject of discussion among parents, teachers, educators, political leaders and students themselves. There is a problem of low mathematical skills among the primary school pupils; this is caused by many reasons such as: Unqualified teachers, few teaching methods, unsuitable of teaching and learning environment, shortage of textbooks and teaching aids and low awareness of pupils towards mathematics.

In nine years teaching career, the researcher have come across students with different mathematical skills. The researcher found it especially difficult to teach mathematics in the classroom when there are students with different levels of competence in mathematics. It was difficult to bring all the students in the same platform in their mathematics skills. The researcher had used generally traditional methods of teaching which was not fruitful enough. So, the researcher became inquisitive about different methods to teach in a class with different mathematics skills. Overtime, researcher has started teaching them by using teaching materials.

After that researcher had applied play way method, all the students got engaged in their own small group for playing different types of games related to different exercises of mathematics. Obviously the children have fun playing these games. If they do not get clear ideas and rules of the game they ask either to the teacher or their friends who are in their own group. The smarter students encourage the weaker ones to make their own group win. Through games students who are weak in mathematics would become day by day interested in mathematics and starts learning the subject.

The researcher got a good feedback by using play way method which inspired me to search more strategies used by teachers to improve skills in mathematics especially in geometry and identify the detrimental factors of poor skill in

mathematics. Nowadays many private schools of Kathmandu valley are claiming to teach the students by using many modern techniques and equipments also. The researcher is really interested to learn research on detrimental factors of low mathematical skills and find out the strategies used by teacher to improve on it.

Researcher is really convinced by that Nepalese school is facing the problem of low achievement in Mathematics. Not only that the students are suffering from the confusion of the basic concept of the mathematics. Poor achievement means none other than the low achievement in Mathematics. It means below the standard score. My concern is why actually some students can't build their insight on mathematical skill. On my teaching career, I had faced many more problems on these aspect which just demands basic interest of pupils.

Statement of the Problem

In the teaching and learning of mathematics personally the researcher has felt too difficult for its application and comprehension. Being a mathematics teacher researcher never been satisfied by himself towards my teaching. Especially while we see the unseen different theorem and different verification type question we can't get any ideas to teach and even for its proper solution method. Also my colleague of mathematics has share same problem in the teaching and its different concepts. The poor performance of students in mathematics and geometry in particular has been a thing of concern to mathematics educators, parents and government. The S.L.C. exam Annual reports in mathematics are good testimonies of those facts.

Mathematics educators have put in effort aimed at identifying the major problems associated with secondary school mathematics. Despite all these noble efforts, the problem of poor achievement in mathematics has continued to rear its head. It is based on this fact that this research identified mathematics as a core

difficult area where student's performance has always been low. This is the reason why the researcher took up a research project of the following research questions.

- What are the detrimental factors for poor skill of mathematics students?
- How can the low performer be promoted in mathematics?

In order to focus on the phenomena of investigating teaching methods which teacher's use when teaching the pupils with low mathematical skills, this is the reason why the researcher took up a research project with the following research questions.

How are the teaching conditions and the use of teaching methods for teachers teaching mathematics to pupils with poor mathematical skills in the inclusive classrooms? Including this researcher have concern on the following; instructions that teachers use when teaching mathematics to pupils with low mathematical skills; activities those teachers give to pupils with poor mathematical skills and teaching materials which teachers use in teaching pupils with poor mathematical skills.

Significance of the Study

This study is completely aimed to find those factors that are related to the difficulties in the instruction of geometry. Not only to point out the factors; it will also suggest the ways to minimize the problems and what to be done this aspect. In the field of mathematics education this research is a step to analyze the effective way of instruction strategies and to take the action over its obstacles. Nowadays mathematics especially geometry is the most hazardous to learn and teach. Thus in this circumstances my study is a supportive documents to teach math and geometry in the effective and productive manner. This study may be fruitful to concern individual for the following aspects.

- To provide a database relating to teachers problems in teaching mathematical skill.
- To make appropriate instructional strategies to teach mathematical concept.

- To make a favorable curriculum for the mathematics

In the present situation, great agenda is, “making participate in school to all children”.

This research is more applicable to policy maker for the following points.

- To make mathematics subject interesting
- To increase students confidence level towards the mathematical knowledge

Also, “education for all” is the rising slogan of the today’s world and the international commission for mathematical education has emerged the agenda, “mathematics for all” so the present study would help in the achievement goal of mathematics for all as proposed by ICME.

Objectives of Study

The goal of doing this study is to investigate the teaching methods used by teachers when instructing pupils who have mathematical difficulties in Nepal with the aim of finding proper intervention strategies to increase the number of pupils who will have high achievement in mathematics. The specific objectives of this study are:

- To identify the detrimental factors for poor skills of mathematics students.
- To find out the strategies used by teacher to improve skill on mathematics especially in geometry.

Delimitation of the Study

In our country Nepal, there are nearly 3, 00,000 primary level students (HSEB magazine). It has been in the increasing phase per year. Kathmandu is the capital city where 30% of total pupils can be found. Learning and teaching style are different in different school as well as different class in same school. Among all the primary level students, researcher has used as below.

- The researcher had selected the study area in accordance with researcher’s convenience so the result of the study can be no more generalized.

- This was only a micro level study of GEMS school, Lalitpur.
- Only six students, two teachers, two parents, one stockholder and one department head had chosen.
- Among them researcher has chosen according to their mark obtained, interest on geometry, ages for the students.
- Among all teachers the researcher has chosen according to their experience, training, opinion, feeling for the teachers.
- Among all the parents the researcher has chosen on the periphery of student's capacity towards geometry.
- Data were based on the pupils with low mathematical skills (having their marks less than 32 in final exam) in the primary level (i.e. Grade V) are the focuses of the study.
- This study was planning to be finalized in two months due to the delay of permission.
- Due to the time and resource limitation, the case study had conducted only GEMS School.
- The researcher had selected the study area in accordance with researcher's convenience so the result of the study can be no more generalized.

Operational Definition

Primary school

Primary school refers to a school in which children receive primary or elementary education from grade I-V.

Private School

The schools which are established by the individual or by the community and do not receive regular government logistic and financial support.

Poor Achievements

The achievements which is unable to meet the minimum requirements or simply below the standard score less than 32 as pass marks in 100 full marks.

Standard Score

The minimum score which is require passing the level. Like the minimum score are 32 for the full marks 100 at S.L.C.

Detrimental Factors

The detrimental factors refer to the factors that affect the poor achievement in mathematics.

Stakeholders

Those persons related to school directly or indirectly. Specially, here on this research former Head master of the school, former Subject teacher, former parents of the respondent students are the Stakeholders.

Mathematical skills

Mathematical skill can be broadly interpreted as something a person does when he solves problems in real life situation. It includes the role of intuition, fluidity of mathematical conceptualization, open-endedness and nature of proof and many more. Low mathematical skills- In this research the researcher use low mathematical

skill which means those children who are with low proficiency i.e. in literacy, numeracy and problem solving.

Reading literacy

Reading literacy refers to an individual's capacity to understanding, use and reflects on and engages with written texts, in order to achieve one's goals, to develop one's knowledge and potential and to participate in society.

Mathematical literacy

Mathematics literacy refers to the individuals understanding on the role of mathematics and the capacity to engage in this discipline in ways that meet his/her needs. This puts the emphasis on the capacity to pose and solve mathematical problems rather than to perform specified mathematical operations.

Chapter II

REVIEW OF THE RELATED LITERATURE

The review of related literature deals with the theories of research studies which have been conducted earlier. It helps to conduct the new research in systematic manner by providing the outline of the research study and avoid the unnecessary duplication. Review of related literature is an essential part of research for the researcher because literature helps and guides research to meet theoretical way for the study. Literature provides authentic and strong knowledge. Mainly the literatures are previous thesis, books and journals; different sources use to site literature. To make the research effective and truly new Researcher had studied the different research found in the Mathematics education Department. On his topic Researcher has found some of the research which just indicates the problem but Researcher had tried to research on the strategies that can be taken as a remedial tools. In this regard the following were the related literature in this study.

Empirical Literature

John L. Sims (1996) did a research improving mathematics, reports of inadequate teaching, poor curriculum design and low performance on standard test. He used experimental group design. His main purpose was to investigate the influence of teaching methodology on student achievement, to determine the effectiveness of research-based teaching methods using this output. Such as poorly trained teachers, lack of supports, insufficient instructions programs, focus on low level skills, low expectations, over whelming workloads, poor work condition all contribute to the inferior level of instructions received by students in these schools. This thesis takes a look what is taking place in these schools. A demanding curriculum, implementation of problem solving, continued reworking of curriculum using varied instructional

practices, building relationship and teacher leadership. This investigation is related to improving mathematics instructions, which is useful to my research.

Mike Askew (1997) did a research in examining the links between teachers' practices, beliefs and knowledge and pupil learning outcomes in the development of numeracy with pupils aged 5 to 11. He applied case study method to investigate teachers' knowledge and understanding backed up by classroom observation to examine actual practices. The finding of the investigation provides some insight into the mathematical and pedagogical purposes behind particular classroom practices and may be as important as the practices themselves in determining effectiveness. Moreover other teacher may find it helpful to examine their belief system and think about where they stand in relation to these three orientations.

Suresh (2003) did a research on different methods for giving the concept of solid figures, beliefs toward its knowledge and pupil learning. His main objective was to identify the methods to teach solid figures. He has taken seven schools and teachers who taught geometry. He applied case study method and descriptive in nature. The study found that to give the concept of solid figure it will be better if we use real solid figure which is known as visualization method. So the finding of the investigation was especially visualization and real life practice method. This investigation is related to general teaching method and it is very helpful for my research. It helps me to find the different teaching strategies.

Luitel (2005) on his Dhulikhel Experience states that there are mainly three issues in teaching and learning geometry in reference to Nepalese Schools. These are: emphasis on learning geometry, contextualisation of learning geometry and change from the traditional one-way classroom to two-way interactive one. Firstly, the curricula do not have a focus on "communication". Importance and use of

communication in mathematics classroom, is necessary to increase students' reading, writing, discussing, representing, and modelling mathematics, because, when students communicate their ideas, they learn to clarify, refine, and consolidate their thinking. Secondly, the curricula also lack an emphasis on “spatial reasoning”. Spatial reasoning helps develop the understanding of everyday applications. The second issue of geometry learning is contextualisation. The term “contextualisation of learning” infers that learning can be promoted by meaningful contexts and relating instruction to the real-life situation. The learning in Nepalese schools is totally based on textbooks, which have been prepared according to the school curriculum. It is important to identify the extent of contextualisation of the curricular contents. The third issue is related to the ways of teaching. In most of the Nepalese schools students have less chance to interact with their peers and teachers. They have to listen to the teachers’ idea. The crowded classroom is one of the major problems of implementing interactive teaching and learning situation.

Chaulagain (2005) had indicated on his research “A Study of problems Faced by Secondary School Mathematics Teacher in Teaching Geometry” geometry teaching and learning activities in Kathmandu district is not satisfactory level. It was the survey among the government and privet school teachers. Among the 30 teachers questionnaire had presented and asked them to give their response on different questions. He had made the conclusion that most of the teachers are facing the following problems: a). Students’ evaluation techniques; b). Geometry instruction; c). Teachers professional development and d). Constructing and using instructional materials, students’ background and curriculum related factors.

Pande (2008) did his thesis on “Causes of low Achievement in Maths” at Rupandehi district. It was a case study of six students of Nayagaun secondary school,

Butwal. By using the school documents, observation note and interview he made the conclusion that traditional type of teaching is one of the major causes.

Bhatta (2011) conducted the research on Causes of Failures in Maths at Grade-VIII. For the study of this case he did survey with using the tools questionnaire, FGD and interview among the 40 failures students of Kavre district. His conclusion was different variables like teachers training, home environment, socio-economic status of family, material used in teaching learning activities are responsible to this less achievement in mathematics.

Johnson, B., & Cristensen, L. (2012) did a study for the impact of teaching approaches on students' Mathematical Proficiency. His main target was to examine the effects of two differently structures methods, traditional and problem solving of teaching children mathematics the first five years in schools as well as differences between boys and girls achievement depending on teaching approaches. The finding of the investigation tradition method and problem solving approaches has equivalent impact on students' procedural knowledge. Boys and girls who have been taught will similar methods perform equally in both tradition and problem solving method.

Theoretical literature

This chapter deals the theoretical discussion which is needed for the interaction of the finding of the study. Many theories have been developed about the children learning and development, some are cognitive, some are behaviorist, and some are humanist while the next is social learning theory and so on. In my research I have used Vygotsky's theory.

Vygotsky has developed "socio-culture theory" and believe that children are active seekers of knowledge. In this theory knowledge is being constructed in social situation of negotiation, rather than being the reflection of the object reality. Vygotsky

argue that the child's development cannot be understood by studying that it needs to examine the external world. Children are socially associated which is present right from the beginning arriving in to the complex world of the social relationship and culture. The culture itself has historical development. In my research the socio-culture theory is fitted to observe the how the children gain the knowledge. As the student has the different family backgrounds they have the different abilities. Vygotsky has focused of scaffolding to gain knowledge, evaluate through the zone of proximal development. Mainly his focused is at "from which society and culture the child has been grown".

Children gain knowledge, where they born, which culture they follow and which society and environment they get, peer group, adults to make believe to lead development forward so this theory is fit my research to g according to socio-culture theory of Vygotsky

Socio - Cultural Theory

Socio cultural theory is an emerging theory in psychology that looks at the important contributions that society makes to individual development. This theory stresses the interaction between developing people and the culture in which they live. Socio culture theory grew from the work of seminal psychologist Lev. Vygotsky who believes that parents, caregivers, peers, and the culture at large were responsible for the development of higher order functions.

From a contemporary constructivist perspective of mathematics education, personal experiences and previously learned knowledge and skills are encouraged as components for understanding (Rosser, 1988). Social constructivism focused on learning through co-operative group learning. It emphasizes on importance of culture

and context in understanding what occurs in society and constructing knowledge based on this understanding (Rosser, 1988).

Vygotsky's Theory

According to Vygotsky, infants are endowed with basic perceptual, attention and memory capacities that they share with other animal. These develop during the first two years through direct contact with the environment. Then rapid growth of language leads at a profound change in thinking. It broadens preschooler's participation in social dialogues with more knowledgeable individuals, who encourage them to master culturally important tasks. Soon, young children start to communicate with themselves in much the same way they conversed with others. As a result basic mental capacities are transformed in to uniquely human higher cognitive processes.

Vygotsky believed that through play has an important role in learning. Through the play development relationship can be compared to the instruction-development relationship, play provides a much wider background for changes in needs and consciousness. In play, a child always behaves beyond his average age, above his daily behavior; in play it is as though he was a head taller than himself. The above theoretical discussion reveals the psychological perspective and describes about the inside of the individual. This theory gives account about to learn from society, peer groups, and adults and to make belief to lead development forward. And, in the similar manner other concepts/ theories from Vygotsky's social culture, ZPD and scaffolding are useful to generalize the human behavior about their mathematical concepts.

As the theory deals with different aspect of social development of child it plays vital role in mathematics teaching learning activities. Teachers generally suffer

by the heterogeneity among students and their cognitive level. This Vygotsky's theory helps teachers to contextualize the mathematical understanding of the students according to cognitive level and social phenomena (Rosser, 1988). So for my case study this theory is essential.

The zone of proximal development (ZPD)

An important concept in socio cultural theory is known as the zone of proximal development. According to Vygotsky, the zone of proximal development is the distance between the actual developments level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaborating with more capable peers. Essentially, it includes all of the knowledge and skills that a person cannot yet understand or perform on their own yet, but is capable of learning with guidance.

In mathematics teaching-learning activities ZPD simply refers as the peak of potentiality of the learners. Teachers must build the habit of leaving some quarries to students to think from the out of autonomous activities. Generally students have their own interest to solve the problems but if it is not in their level then obviously ZPD can play the role (Rosser, 1988).

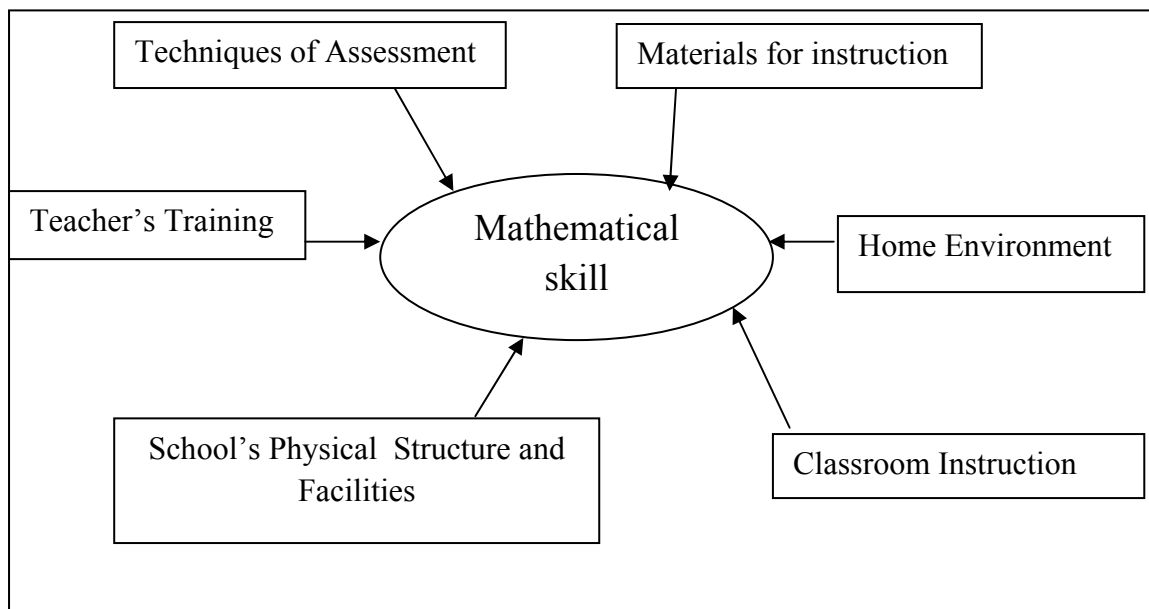
Scaffolding

Scaffolding is the metaphorical concept used to describe the interactive verbal support provided by adults to guide a child through the ZPD and enable them to carry out task that they would be unable to do without help. In the same way as Vygotsky's theory and the ZPD, the concept of scaffolding is discussed in detail in a wide range of educational and child development literature. Scaffolding refers to the particular kind of help, assistance and support that enables a child to do a task which brings them closer to a state of competence that will enable them to carry out other similar

tasks independently in the future. Children can catch the knowledge through the elders, culture especially from the game which they used to play.

Conceptual Framework of the Study

The conceptual understanding is established on the basis of research topics. Possible areas to fulfill the objective and theoretical framework. The main target of the study is to find out the teaching methods for pupils having low mathematical skills in Primary schools. This is the complete map of my study depending on the study “Improving mathematics instructions in school that serve the poor” (John L. Sims; 1996).



Source: John L. Sims; 1996

The different research and investigation has shown that the learning is affected by different variables. The knowledge gained by students can differ as the presence of facilities, school and family environment, teacher's perception & training, evaluation techniques etc. students needs more support or scaffolding to get the optimum level of the knowledge as they have the ability to get it. So the research was under these circumstances.

Mathematical skills are not only the aspect of how students accept it but it is the matter how the teachers deliver it to learners. Teachers training and classroom instruction including schools facilities are really those things which plays vital role to develop their skills. The foundation of all the pupils are made by their home environment and it is also the matter to see in this study. The framework deals these key components on the skill learning of child it was examined by cultural theory.

Socio-cultural theory believes that children are active seekers of knowledge. In this theory, knowledge is being constructed by situation, environment of negotiation. Socio-cultural theory grew from the work of seminal physiologist who believes that parents, colleagues, peers and the culture were responsible for the development of higher order function.

Chapter III

METHODS AND PROCEDURES

Methodology plays the vital role in research. The methods and design is the main guidelines for the researcher. Research methodology presents the logical way of study because it determines how the research becomes complete and systematic. This is a case study so the researcher had followed qualitative method. Qualitative research is a form of inquiry that explores phenomena in their natural setting and uses multi methods to interpret understand explain and bring meaning to them.

Qualitative research involves the studies and collection of a variety of empirical materials – case study, personal experience , life history , interview, observation, historical interactional and visual texts- that describe routine and problematic moment and meaning in individual's lives are its tools for data collection. Since the qualitative research is about person's life, stories and behavior, it is a non mathematical analytical procedure. The basis meanings of gathering data are observation and interviews including the field notes, documents, books, tape records, diaries and so on.

The researcher is intended to study and explore the learning mathematical skills of the child with low mathematical skills and how to control the impact of these factors to promote students for higher skills in mathematics.

Research Design

The design of this research is case study among primary teachers, students, stockholders from GEMS schools. This research is qualitative research as well as descriptive in nature.

Selection of the Case Respondents

The research was concerning to teaching and learning of Mathematics. The researcher had taken two teacher, two parents, six students, department head, one stakeholder. The study was depending on the one of the popular private school (GEMS School). Researcher is working at this private school in Lalitpur and researcher had found many more problems on theses school on the teaching mathematical skill. Also before researcher study researcher hasn't found the research done in private school on this case.

Mainly the low scorer six students had taken from the grade V of this school, the mathematics teacher from the different sections, the mathematics teacher of each section as per need.

From the section of grade V respondent students were one/one from each class section C to H as they were at least scorer and simply two teachers were there so they are also respondent units. Two parents who were near to as school area as their child were low scorer. Head of the department of mathematics and stock holder were final sample. The researcher took them by observing their economic condition, parents love towards them, factor of not interesting in mathematics and ages.

Data Collection Tools

To collect the data for the case study researcher had taken School documents, class observation note, interview schedule etc.

School Documents

All the required documents like student's achievement records, teacher's details, Mark's ledger, extra-curricular activities etc. were studied.

Class Observation

The data from observation consists of detailed description of the people activities, behavior, action and personal experience. The direct observation has the advantages of putting researcher into first hand contact with reality it is usually possible to observe only a small individuals of groups. The observation note had prepared to observe classroom activity and educational environment. For this researcher had followed participatory observation and prepared observation notes.

Interview Schedule

The interview consists of question to the children, Parents, teachers and stakeholders about their experiences, opinion, feeling and knowledge. It also helps to understand participation perception or relation, views and ideas towards certain subject matters situation, context and phenomena by her/ his facial expression. So, at first researcher had taken informal conversation interview them used a set of open ended question to them.

Primary & Secondary Data Sources

Data was quantitative as well as qualitative in nature. Both types of data were collected from them the field by using appropriate methods, techniques and tools of data collection. Primary data was collected from the field. Secondary data was collected from the published and unpublished documents like school documents, mark sheet, books, journals, bulletins, reports and papers of various organizations and institutions.

Data Collection Procedure

For the data collection procedure researcher had collected the data by visiting the Head of mathematics department and then making relation with mathematics teachers. I had studied the ledger of the student of Grade -V and six low scorers had

selected for interview. The different documents as mentioned above, had studied properly. Classroom activities had observed as the teacher wants with all the required condition. The observation notes had written. The students and parents interviewed and the response had recorded with audio- visual device. Some of the open ended questions were asked to know their attitude and expectation from mathematics circumstances, about their experience, opinion, feeling and knowledge of mathematics.

Data Analysis Procedures

This is qualitative research, Hence the major part of data analysis was based on descriptive analysis. Qualitative research relates personal life, experiences, behavior emotions, feelings, social movement as well as cultural phenomena and interaction between the notions. The collected information from the class observations, interviews and schools' records were categorized according to the category of the respondents and their theme. Cross match was adopted to maintain the validity and reliability of the results of the study. The researcher had also tried to ensure the internal validity by observing the same phenomenon repeatedly to clarifying the biases. As the conceptual framework deals all the components, analysis had been done by the triangulation method and constant comparison.

Ethical consideration

Ethical consideration is most important issue for the research. Here researcher need to strongly ethical about this own work and for the respondents personal issues. So, for data collection researcher had never force for participants to give the answer. What answer researcher had got from them researcher had uses these things for research purpose. Researcher had not disclosed these data outside without the permission of them. All information has been secretly maintained. Here the researcher also respondents through nick name as A, B, C, D, E and F to the students. T1 and T2 to the teachers. P1 and P2 to the parents, H to the head of department, S to the stakeholder.

Chapter IV

ANALYSIS OF DATA AND INTERPRETATION OF THE RESULT

This chapter deals with the analysis and interpretation of the collected information. The researcher had minutely studied the schools' documents such as teachers' profiles, marks ledgers, attendance as well as the records of respondent students as per need. Researcher had observed the 8/8 classroom teaching learning activities of both the sample teachers of Grade – V. By the observation of the natural setting classroom teaching-learning activities observation note was prepared. On the observation note each key activities and its affect had mentioned. On the similar manner the researcher had visited the parents of sampled students to conduct the interview. To get the required information there were different conversation which was formal/ informal both between the researcher- students; researcher-teacher and researcher- parents had occurred. Here researcher has used the method of triangulation and the constant comparison method to analyze the data according to the conceptual framework presented previously.

Introduction about Case School

Among the three district of Kathmandu Valley Lalitpur is one of the districts. It is partially develop district. On this district here are many popular private schools located. Out of those popular school “GEMS School, Lalitpur” is one where the research had took place. It is in the prime location of Valley. Nearly about the 3500 students are studying on this school. As Nepal is the multi-cultural, multi-religious, multi-lingual and the country of diversity on this school many more differences among the students. The locality is the combination of Newar, Madhesi, Gurung, Rai, Limbu, Tamang, Sherpa, Magar, Chhetri , Brahamin etc. The parents of the students

are involved in different jobs like business, government service holder, private job, farming and many more. This area is prime location and popular area for the business and mainly popular by the name of different renowned private schools.

This research is encompassed with in detrimental factors of poor mathematical skills and strategies used by teacher to improve skills on mathematics. These issues are thus analyzed and interpreted under the different heading and follows.

- Physical facilities of the school
- Classroom composition
- Classroom instruction
- Teaching and learning environment and reality
 - Beginning of the class
 - Content delivery
 - Use of materials
- Different teaching- learning strategies
- Evaluation and closing of the class
- Teaching of assessment and extra-activities
- School policy
 - Achievement in mathematics
 - How can low performer be promoted?

Physical Facilities of the School

The physical facilities and infrastructure of the institution plays the key role on its well-functioning. As the school is the place of gaining and sharing the knowledge. For the ideal teaching and learning activities different aspect are essential. Among those aspects physical aspect is the major one. Talking about the GEMS school it has eleven different buildings. School has managed the Well playground, canteen, toilets,

taps, and the fresh room for laboratory activities. As each class has about 320 students, eight sections have been divided on each. Most of the classrooms are well ventilated and shining room, according to the physical development of students desk and benches has been made. The research had taken place on the Primary Block among the 11 Blocks of the school.

On Primary there are near about 100 staff including non/teaching staff. Each class is under a supervisor to make the systematic teaching learning activities. The research has sample from the Grade-V in which 12 teachers were there for same class to teach different subject. From Grade-V two maths teachers were respondent of study. Following were the statements said by the different personalities on the question given to them from respective (Appendix-B) for students, C for mathematics teacher, D for head of the department and E for parents.

“The physical facilities are in the level of satisfactory”

‘Head of Mathematics Department’

“There is no any facilitator for us who can help us for the use of ICT in the classroom teaching about the geometry”

‘Mathematics Teachers T1and T2’

For this question three students gave similar meaning answer,

“There is one way traditional teaching and boring theorems in the geometry class.

‘Students A, E’

There is no any sufficient multimedia and books about the geometry and mathematics”

‘Students A, B’

“The infrastructure of the school is in the satisfactory level still there are problems in the summer season due to fan.”

‘Parents P1, P2’

“Not transparent room and wind blowing windows to show them geometrical instruments.”

‘Stakeholder’

As the teachers and students told there is lacking the modern techniques of the teaching in geometry. Not on geometry only these problem is being faced by all the teachers. In the summer season the placement of fans in the classroom was not so good and students were suffered by hotness. For the Extra Curricular Activities most of the facilities had provided by the school which is the point to be mentioned.

Classroom Composition

Classroom is the small composition of society. Every student different are in cultural, ethnicity, religion and economic background. Classroom is the place where teacher execute his/her plan of teaching and student achieve the knowledge. To instruct the lesson classroom must be appropriate and well facilitated. Classroom environment is an important area of study in education. It has been identified in contributing factor in child educational development. Classroom environment provide a network of social, physical and intellectual forces which affect the students mathematics achievements. Likely wise different family environment includes supportive atmosphere, supervising homework, providing supplementary reading materials and tutor and if possible facility of computers.

Classroom Instruction

Mathematics is the core - contend subject of our schooling practice. In the all level of schooling Mathematics is the major one subject. The teaching and learning

situation is not the same in all schools of Nepal. On the one hand, the majority of government schools have been facing the problems of quality in teaching. On the other hand, some private schools have been implementing student-centred teaching strategies in mathematics teaching. As a result, geometry teaching and learning situations vary accordingly. As we know teaching is art and talent of the instructor how he/she deliver the content to his/her students. Mathematics is one of the core subjects to be offered by all students till the tertiary levels of education. This compulsory nature of mathematics carries with it the assumption that the knowledge of the subject is essential for all members of our society.

Mathematics competence is a critical determinant of the Post-secondary educational and career options available to young people. Mathematics is a compulsory subject at the primary and secondary levels. About the classroom environment and instruction of mathematics; following were the statements said by the different personalities on the question given to them from respective Appendix-B for students, C for mathematics teacher, D for head of the department and E for parents.

“We have the students from different ethnic and main stream groups. Most of the students are from the middle-class and few from the upper class as well. There is co-operative environment in classroom.”

‘Head of Mathematics Department’

“In Class-V section has been divided according to their admission, which has created the heterogeneity in the level of students. This is the main cause of difficulties to make them understand the different topics of math.”

‘Mathematics Teacher T1’

Section should be dividing according to their performance; this is the main cause of difficulties to make them understand the different topic of mathematics.

‘Mathematics Teacher T2’

“We have good relationship among our friends but the smarter students they have made their own groups and they won’t involve in our team.

‘Students A, C and D’

Teachers give their focus to the good students who are talent in math.”

‘Students B’

In the same question two students reply as,

Teacher only interact with front desks.

‘Students B and E’

“My child is positive about the classroom environment and with his/her friends.”

‘Parents P1’

My son said to me that, he cannot see to the board clearly by sitting in the last benches.

‘Parents P2’

Classroom for mathematics is not good and not sufficient space for their materials use.

‘Stakeholder’

By the observation and the informal conversation researcher had got good environment and social harmony among students-students and students-teachers. This must be helpful for the teaching learning achievements.

Teaching and Learning Environments and Reality

In my classroom observation researcher had got different reality about the teaching-learning activities. The teacher with the content and with the skill to deliver

it is really two different aspects. School has provided 40 minutes for each class. Researcher had visited the class of two different teachers of Grade-V. Here it had presented the realities under the following headings:

Beginning of the Class

Usually teachers used to teach the continue chapters by connecting with previous lesson. There wasn't any such interesting beginning and simply the traditional instruction and no any extra way of starting the classroom. Researcher got at once the teacher came with different solid shapes and he asked to students to identify different things and fact existing on it. At that day Researcher asked to respondent students and they replied it was quite interesting and he/she knows about the lesson which was taught.

Content Delivery

As the standard of the content in geometry both teachers were interested about the topic. In comparison of teachers students were not that much interested about the new lesson. Once Researcher asked to respondent why you all are not interested to today's topic, he answered me the lesson which was going to be taught they didn't have the basic concepts. The way how they taught it was generally centered to the fast learners. Slow learners were just the passive learners. Use of different teaching materials in geometry plays the essential role to make the clear the concepts.

Use of Materials

Except few lesson teachers were no more interested to use the materials. While the chapter was about the calculation of the area and volume of solid both the teachers were using the solid materials.

Different Teaching - Learning Strategies

Researcher got that most of the classes were just teachers centered and lecture. Both the teachers were Non-Education teachers and they have listened about the teaching methodologies and they had wiling of knowing about it. Researcher asked them to use the co-operative method and other many more but they were felling uneasy to do so.

Evaluation and Closing of the Class

Usually classroom evaluation used to be done by both the teachers. Researcher got while asking question they focused on the confusion of smarter students not that of the slow learner. Once teacher asked to respondent to identify the axiom by what the given two triangles were Congruent. Case respondent couldn't reply and teacher told to ask the second girl of the classroom. He didn't try to make her clear about it. This was the thing to be noted. When concluding the lesson they used to explain all the important point which can be the required for the further lesson. Generally they addressed the confusion of first few benchers and used to give the Home-works from textbooks. Those task were just about the lesson not that much creative and fruitful for respondents.

Techniques of Assessment and Extra-Activities

Evaluation is the process of assigning the activities according to the rule. On the teaching-learning activities assessment is the key process of addressing the feedback. Traditionally the paper pencil test was popular but nowadays there are many more alternative tests are in practice. To evaluate the different abilities of the student's alternative tests must be actively execute. On this school there is the systematic unit test of each subject. Especially one thing Researcher got for the mathematics and science two unit test system has been implemented. For the math

Arithmetic and Geometry has divided in two unique subjects for each examination. Continuous evaluation for the slow learner (for the failure) was there. Giving homework and different task is also a tool of continuous evaluation.

Teachers were actively working on the aspect of homework and project types works but the students were not that much satisfied by these activities of the teachers. Talking about extra-activities, students with the extra talent were identified from the joiner classes and they got the chance to participate on those activities. Following were the statements said by the different personalities on the question given to them from respective Appendix-B for students, C for mathematics teacher, D for head of the department and E for parents.

“School conducts the examination four times and each Sunday there will be unit test of one subject to measure the learning achievements of the students. Especially for the mathematics we do have double exam as a separate subject Arithmetic and Geometry which can be effective on to identify the difficulties of the students on the specific subject.”

Head of Mathematics Department’

“We have regular exam on each Sunday. For the weak students we have to conduct the re-exam time and again until they improve on the specific subject. This academic year we took 10 re-exam of mathematics.”

‘Mathematics Teacher T1’

Project types activities makes them interesting clear knowledge about geometry but only genius students find out the meaning why should we do this, on the other hand project based activities poor students can make clear figure and its description but they don't know use it in proper place where the similar type different question asked.

‘Mathematics Teacher T2’

“Regular examination is there so it is quite boring and boredom for us. If it is like terminally we can do better due to what we can get more time to study.”

‘Students C, and E’

“About the homework teacher gives us but they won’t check it properly just they checked it did/or not but not how student did.

‘Students A, B’

“Evaluation system is very nice in GEMS School. Questions are set by head of department and it is very standard. Generally my kid is not serious during exam he/she seems doing his/her ordinary activities. Extra activities are not in practice what we can feel. It is just in the name of co-curricular but in reality GEMS doesn’t have the system of extra activities in particular subject matter like mathematics.”

‘Parents P1 and P2’

Evaluation system look likes traditionally so here should be not only do re-exam but also give them clear concept by suing materials to the related topic and it in our daily bases life also play way method more effective to them where all can get interesting by game.

‘Stakeholder’

The evaluation system is really good but it is not been developed as the collection of feedback and the tool of identifying weaknesses. Lack of the feedback collection and focus on the weakness it can be just in the name of examination only. Extra activities must be included to the harmonious development of the child. I got many complain about the extra activities which is very far from the system of this school to address each student.

School Policies

A school can have its own motto. According to the leader of school there can be the different policies on the aspect of relation of teaching, students demand, parents' views and all the related stake holders. School is the place where all-round development of students starts. In one sentence school is the next home where we start our socialization and step of skill gaining. According to the different success story of the students does the administration provide some response to the individual or not, it plays the role in the positivity of each of them. Likely wise the participation on different social activities games, incentives to teacher staffs and response to parents/stake holders plays the role in the success of a school. I got good impression of GEMS on these aspects. Only few parents were unhappy that it is quite expansive and less focus on the social activities.

I. Achievements in Mathematics

Since few years the result is not in the level of satisfactory. Out of 40 students on each section about 20-25 % of them failed in math and especially in geometry. It was found that in comparison of other subjects more students were failed in maths in the 'Evaluation Term' (which was held in Magh first week -2072). Following were the statements said by the different personalities on the question given to them from respective Appendix-B for students, C for mathematics teacher, D for head of the department and E for parents.

“In this evaluation test out of 320 students in Class-V, about 20% of the students were failed in mathematics which was the serious mater once again for us. We are making plan to execute the other training program to all the math teachers of primary level on mathematics teaching.”

‘Head of Mathematics Department’

“Question was quite difficult so more students were failed. One thing is there in our students they lack the basic concepts. Few of them must not be upgraded in upper class. There was continuous exam before the exam of Geometry but previously there used to be minimum one day gap for mathematics. Now I have started the extra effort by working Work-Sheet to the failure. Let’s hope they will do well in final exam.”

‘Mathematics teachers T1’

Question were more practically which they do not find in exercise. Most of the questions were from daily bases life to make them more practically so that the result was near about 80% pass. So make it 100%i have plan to teach all question related to our daily bases life i.e. area of rectangle, for this I will take them in canteen and give them meter scale to find themselves answer.

‘Mathematics teachers T2’

“Result was not good in Mathematics. We couldn’t prepare as well as we can due to the continuous exam but previously there used to be gap before the exam. All the questions were out of the textbook just concepts were matching so we couldn’t do better.”

‘Students A, E, and F’

Questions were more practically I.e. to find the area of rectangle we should self-draw the figure and self-measure it and self-solve which was a little bit difficult. Teacher gave us in class only $L=5$ cm. $B=6$ cm and find the area, which only matches the concept not to like exercise.

‘Students B, and C.’

“In the Evaluation Test my kid didn’t do better. I was expecting there can be something better but it was not like that. As before my child did and failed once again.

‘Parents P1’

In the text exam, there was not caring to the students either he/ she did or not? To play with friends student left the question in exam time due to all teacher are engaged in their duty.

‘Parents P2’

In the text exam, all questions and answer were not checked either he does or not even it might wrong during the related subject exam. So all duty teachers should check and then collect the answer sheet for primary level students.

‘Stakeholder’

By these circumstances we can ensure that there is big problem in instruction. We can see (Appendix- F) to observe the result and can analyze that for the mathematics new good plan must be implemented to improve these conditions. My entire sampled / respondent children were failed by the first term. Most of respondent less than pass marks, I n 100 full marks test. Not only less out of my eight respondents four of them got below 20 marks; which is really the topic for study.

II. How can Low Performer be Promoted

There is problem in all the logical subject matters for the slow-learners. Generally they have the habit of learning seriously during the last week of examination, which cannot be fruitful for each subject. Mathematics needs the continuous practice. According to the interviewed done previously; Following were the statements said by the different personalities on the question given to them from respective Appendix-B for students, C for mathematics teacher, D for head of the department and E for parents.

“We have plan for training for the teachers this year. Next thing is that we will make the section according to their performance such that the students with same level can be together and they feel easy to be together. Extra- Class will be continuing

for whole the academic year for the weak students. We will implement this plan from the beginning of the academic year 2072.”

‘Head of Mathematics Department’

“We will use different teaching methods to teach not only this lecture method. As I have listen collaborative approach, co-operative method and many more which can be effective those we will use. We will make the homogeneous group and section of the students. As there will be training for us in last of this academic session, which can be fruitful for us. We are ready to use teaching material, different teaching training if administration will provide but we cannot force them.”

‘Mathematics Teacher T1’

“Most of my friends they have tutor at their home to share the difficulties on any subjects. My parents are not able to teach me and if I couldn’t do home-work, I just use to copy from the friends. If teachers give focus to us not only the good students while teaching we can be the good one. Teachers don’t use enough teaching materials in geometry.”

‘Students A, B and C’

Teacher should follow the interesting methods like as play way method to teach in each chapter. And also make as clear about basic concept of geometry and mathematics also should give us two periods mathematics if it needed in especial topic.

‘Students D, and E’

“Teachers must focus to weak students not only good. I am sending my child to the extra-class but there is no change. I am thinking to keep Home-Tuition.”

‘Parents’

Especially geometry questions are in the last of the question paper so, they left it by thing almost I have done, so, promote in performance , question should keep by categorizing i.e. one arithmetic one algebra, and one geometry so on respectively there for they do not left geometry.

‘Stakeholder’

By the above views we can make conformation there would be change in upcoming academic year. There are lots of ideas to improve this level of students. The administration has made the plan for training for the teachers that can be the one good remedial measure. Teachers he /she must be aware of different teaching techniques and information technologies to instruct.

Chapter V

SUMMARY, FINDINGS, CONCLUSIONS AND RECOMMENDATION

On this section major findings of the research and its conclusion will be listed. From this study we have got different types of ground realities of the Private School as well as all the schooling practice of Nepal. Here by the topic researcher had mentioned findings on different factors. It is only concerning about to identify the detrimental factors of poor skill and its remedial measure in mathematics. Summary, findings, conclusion and recommendation will be listed one by one.

Summary

Especially this case study is under the case of poor mathematical skill. It had tried to seek the detrimental factors of poor mathematical skill and its measure. As the purpose of the study is to identify the detrimental factors for poor mathematical skill, here researcher has got many points on it. Not only to identify the causative factors of poor mathematical skill, it was concerning on its remedial measure too.

The study has been done in a popular Private school which has the good result in each subject but by 2/3 years it is facing the poor mathematical skill. For the study data had collected by visiting the Head of mathematics department and mathematics teachers. Firstly the respondents were selected by the ledger of the student of Grade – V and six low scorers had selected for interview. After that where ever those students were studying those Classroom activities had observed as the teacher wants with all the required condition. The observation notes had written. The students and parents interviewed and the response had recorded with audio- visual device. Some of the open ended questions were asked to know their attitude and expectation from mathematics circumstances, about their experience, opinion, feeling and knowledge of mathematics.

After collecting the data it was categorized according its theme and answered. Whatever the clue given by teachers, students, stockholder and parents those were coded and kept together on different topics as the response about examination, result, facilities, extra-curricular activities and many more. Some of the theme of teaching style and use of techniques what had been got from the classroom observation of two teachers of 10/10 days, those were also categorized in different subheadings. After these triangulation and Constant Comparison had been done by what following findings has been listed.

Findings

By this case study of the Detrimental Factors Poor Mathematical Skill following are the major findings:

- i. In comparison of other subjects there were more students who failed in Mathematics.
- ii. The infrastructure of the school is okay. Each class is well ventilated and sunny rooms. For the summer no proper management of fans.
- iii. Qualifications of teachers were good but they were not well trained. Some of them were newly appointed.
- iv. Difficulty is there in the teaching of mathematics due to the randomness of students in their levels. Specially some of the students were without their basic knowledge.
- v. There is problem in permanence of geometrical knowledge, skills, relations and concepts learnt by students.
- vi. No any success story in the development of mathematical reasoning by the students. There was rote learning on the logical reasoning.

- vii. Teachers were unsuccessful to work with low achievers in the part of maths. Even there focus is not on the failures but they denied to accepting that there is lacking from their sides too.
- viii. Some of the topics in mathematics are out of reach of low achiever. Students should be made to work extra-hard to improve their poor foundation.
- ix. Lacking is there about willingness to learn from the student's side and they should be involved in more practical works than theoretical.
- x. Lacking is there for the teachers to participate on the interactions, workshops and training related to the subject matter.
- xi. No more knowledge about the new techniques and teaching aids.
- xii. Evaluation system is central and one-way system, the tools of evaluation has been taken as a paper pencil test only.
- xiii. Some of the curriculum related factors which is also the causative agents of the poor mathematical skill.
- xiv. There is problem in sitting style and not sufficient space to use materials.
- xv. There is lack of interesting teaching method.
- xvi. There is problem during exam period, duty teacher should check each student before collecting the answer sheet whether he/she attempt all question or not?
- xvii. In all exams, question should make by categorizing.

Conclusion

A finding of this case study has shown that mathematics teaching- learning is not in the level of satisfactory at GEMS. Even there is lacking from both students and teachers to overcome from the problems in Mathematics. In short conclusion can be made as below:

- Foundation of the instructor and the learner is not in the level as it has to be in mathematical skills.
- Students have poor generalization power in mathematical skill, as such cannot solve problems even when similar example given in textbook and in teaching periods by teachers.
- The interest of the students to improve their level is no more towards mathematics, lacking on the willingness to learn new concept in mathematical skills.
- Lacking is there to search new teaching techniques, material related aspect and the evaluation tools.
- It was found that if the necessary provisions are made and proper monitoring are made on the students and teachers, these problems and factors would be the things of the past.
- Chance should be given to all students to use materials.
- Use more play way method to make it interesting to do geometry.
- Check all the question and answer done by students in exam by duty teacher in primary level.
- Each student should keep them in round table with sufficient light and space for materials use.
- Question should be kept by categorizing i.e. one arithmetic, one algebra, and one geometry. So they do not left question of geometry by doing from the beginning to the end.

Recommendations

This is only the micro level study in the detrimental factor of poor skill in mathematics. In our context we must give emphasis on learning of mathematical skill. In the similar manner contextualisation of learning and change from the traditional one-way classroom to two-way interactive classrooms is required to change the level of mathematical skills in school level.

It was just a micro case study of a private school so this result can't be generalized in all the situations. To make the adequate conclusion we must do same study in mass sample. There can be the different queries about it as below

1. Is our curriculum is good in the perspective of mathematical concept?
2. Is it in the level of learning difficulties of child in mathematics?

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Appendix-A

Classroom Observation Notes

The classroom observation notes were prepared on the basis of different indicators. Notes were prepared on the natural class setting along with the permission of the subject teacher. Under the teacher's convenience, classroom teaching learning activities were studied on the following basis.

Teacher's Name:

Topic:

Grade:

No. of students:

- a.) Beginning of the class: creating and maintaining the physical setting and friendly environment that maximize the learning achievements and minimize the discouragements.
- b.) Setting the learning stage: communicating the objectives appropriately; linking the connection of previous learning, current and future learning; delivery of the content on the level of the students through link.
- c.) Acquisition of Learning: combining auditory explanation with visual references and students involvement; use of motivational techniques to maintain interest and involvement of student; encouraging on discussion and group activities; co-operative learning; peer teaching, project works, working with worksheet; independence practice etc.
- d.) Collection of instructional materials: collecting audio-visual materials, different solid objects, construction and use of local resource as a teaching materials which can facilitate the teaching learning of geometry.

e.) Completion of class/ lesson: relating the lesson with objectives; sharing of confusion and different queries of students; connecting with upcoming lesson; encouraging the students to collect the same concept on different topic and to showing their talent; providing assignment and project works.

Appendix-B

Guidelines for interview with students

Name:

Class:

Roll No.:

Sex:

Address:

1. Views on facilities of school.
2. View about mathematics.
3. Views on his/her achievements on mathematics.
4. Views about his/her teacher and classroom practice.
5. Views on the causes of his/her failure on mathematics.
6. Views on how he/she can be promoted and family supports.
7. External needs and his/her views on the education and its practices.
8. Views on evaluation on mathematics.
9. Do you feel mathematics is different than other one? How?

Appendix-C

Guidelines for interview with Mathematics Teachers

Mathematics teachers were interviewed under the following topics.

Name:

Qualification:

Sex:

Teaching experiences and Training:

Address:

1. Views on facilities of school.
2. View about mathematics teaching and learning.
3. Views on students achievements on mathematics.
4. Views about his/her teaching and classroom practices to students.
5. Views on the low achievement of mathematics.
6. Views on teachers training on mathematics.
7. Views on how low performer can be promoted in mathematics.
8. Views on the relation of low achiever and their family/parents.
9. External needs and his/her views on the education system and its practice.
10. Views on evaluation system on mathematics.
11. Do you feel mathematics is different than other one? How?

Appendix-D

Guidelines for interview with Head of Department of Mathematics

Head of Mathematics Department were interviewed under the following topics.

Name:

Qualification:

Sex:

1. Views on facilities of school.
2. View about mathematics teaching learning.
3. Views on students achievements of mathematics teaching.
4. Views about mathematics classroom practice.
5. Views on the low achievement of mathematics and policy on remedial measures.
6. Views on teachers training on mathematics.
7. Views on how low performer can be promoted in mathematics.
8. Relation with staff, students and parents.
9. View on the education and its practice.
10. Views on evaluation system on mathematics.
11. Do you feel mathematics is different than other one? How?

Appendix-E

Guidelines for interview with Parents and Stake-holders

Parents and Stake-holders were interviewed under the following topics.

Name:

Address:

Qualification:

Sex:

Occupation:

Family Size:

No. of Educated/ Uneducated Members in Home:

Annual Income (Approximately and Optional):

1. Views on facilities of school.
2. Views on achievements on mathematics of his/her child.
3. Views on how low performer can be promoted and family supports in Mathematics.
4. View on policy of remedial measures to improvement on mathematics.
5. Relation with teacher and staff regarding mathematics.
6. View on the education and its practice for mathematics as major subject.
7. Views on evaluation system on mathematics.
8. Do you feel mathematics is different than other one? How?