

2015

– DIPA TIMALSENA

LEARNING STYLES OF SUPERIOR STUDENTS IN MATHEMATICS

**A
THESIS
BY
DIPA TIMALSENA**

LEARNING STYLES OF SUPERIOR STUDENTS IN MATHEMATICS

**IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE
OF MASTERS IN MATHEMATICS EDUCATION**

**SUBMITTED
TO
DEPARTMENT OF MATHEMATICS EDUCATION
CENTRAL DEPARTMENT OF EDUCATION
UNIVERSITY CAMPUS
TRIBHUVAN UNIVERSITY
KIRITPUR, KATHMANDU
2015**

LETTER OF APPROVAL

A
Thesis
By

Dipa Timalseña

Entitled

Learning Style of Superior Students in Mathematics has been approved in partial fulfillments of the requirements for the Degree of Master of Mathematics Education.

Committee for the Viva-Voce

Signature

Asso. Prof. Laxmi Narayan Yadav

.....

(Chairman)

Prof. Dr. Hari Prasad Upadhyay

.....

(Member)

Mr. Dipak Mainali

.....

(Member)

LETTER OF CERTIFICATE

This is to certify that Mrs. Dipa Timalsena a student of academic year 065/066 with Campus Roll No. 1381/065, thesis no. 1003, Exam Roll No. 281095 (2066), T.U., Regd. No. 9-2-240-292-2004 has completed his thesis under my supervision during the period prescribed by the rules and regulations of Tribhuvan University, Nepal. The thesis entitled, **Learning Style of Superior Students in Mathematics** embodies the results of her investigation conducted during the period of 2014 to May 2015 under the Department of Mathematics Education, Central Department of Education, University Campus, Kirtipur, Kathmandu. I recommend and forward that her thesis be submitted for the evaluation for awarding the Degree of Master of Mathematics Education.

.....

(Mr. Dipak Mainali)

Supervisor

.....

(Asso.Prof. Laxmi Narayan Yadav)

Head

ACKNOWLEDGEMENTS

I, as a researcher of this study, would like to acknowledge the generous help given by my respective teachers and colleagues who were directly and indirectly involved to carry out this study. Firstly, I would like to extend my sincere gratitude to my respected guru and guide Mr. Dipak Mainali, Department of Mathematics Education, T.U. Kirtipur, from whom I have got invaluable suggestions, encouragement, insightful comments and appreciable guidance with constitute the foundation for this study.

I would like to offer my deep gratitude to my respected Asso. Prof. Laxmi Narayan Yadav, Head Department of Mathematics Education and Prof. Dr. Lekhnath Sharma, Department of Mathematics Education, T.U. Kirtipur for their inspiration and suggestions to complete this work. I would like to acknowledge to all teachers of Department of Mathematics Education.

I wish to acknowledge and express my profound gratitude to the head teacher and mathematics teacher of selected schools for their valuable suggestions, facilitating reference mathematics, advices and encouragement during my research work.

At last, I offer thanks to Durka Computer Center, Kiritpur, Kathmandu who helps me typing and printing out this paper and I cannot stay without giving special thanks to my family for providing me economic support as well as invaluable support.

June 2015

.....

Dipa Timalaena

ABSTRACT

This study focuses on the learning styles of superior students in mathematics. The main objective of this study was to explore the learning styles of superior students and to investigate the factors which contribute to be a super student in mathematics. To fulfill the intended objectives of the study, the researcher had developed the conceptual understanding of the study which was the theoretical framework for this study. Autonomous and self directed learning, relevancy oriented learning, goal oriented learning, bring life experience and knowledge learning, intra personal learning and inter personal learning styles were covered in the theoretical framework of this study.

This was case study research having qualitative and descriptive nature. Among all schools from Kathmandu district, only one school was chosen purposively. Finally, from the superior students (2 boys and 2 girls) were selected for the case study on the basis of mathematics score obtained by the students in the test taken by school. Tools for the data collection were interview schedule and observational note. Face to face interview with students, parents, Mathematics teacher & Head teacher were carried out and classroom observation was done. The collected information was analyzed descriptively according to the adult learning theory and VAK learning theory.

This study showed different learning styles of superior students. The findings were: superior students are autonomous and self directed, some superior students may be motivated by their set goal and life experience, superior students do not limit them in their course books, most superior students get involved in extracurricular activities and do better and most superior students are comfortable with the group learning and interacting with teacher, parents and friends.

TABLE OF CONTENT

<u>Chapters</u>	<u>Page No.</u>
Letter of Approval	i
Letter of Certificate	ii
Acknowledgements	iii
Abstract	iv
<u>Contents</u>	v
I. <u>INTRODUCTION</u>	1-10
Background of the Study	1
Statement of Problem	6
Objective of the Study	8
Significance of the Study	8
Delimitation of the Study	9
Definition of Key Terms	9
II. <u>REVIEW OF RELATED LITERATURE</u>	11-27
Review of Empirical Literature	11
Review of Theoretical Literature	22
Conceptual Understanding of the Study	26
III. <u>METHODS AND PROCEDURES</u>	28-32
Design of the Study	28
Selection of Study Area	28
Case of the Study	29
Selection of Case Respondent	30
Tools for Data Collection	30
In-depth Interview	30

Non-participant Observation	31
Data Collection Procedure	31
Data Analysis and Interpretation	32
IV. <u>ANALYSIS & INTERPRETATION</u>	33-55
Introduction to Case School	33
Introduction of Case Respondents	34
Learning Styles of Case Respondents	37
Autonomous and Self Directed Learning	38
Relevancy Oriented Learning	41
Goal Oriented Learning	43
Bring Life Experience & Knowledge Oriented Learning	45
Intra Personal Learning	46
Inter Personal Learning	48
Motivation Factor	53
V. <u>FINDING, DISCUSSION AND RECOMMENDATIONS</u>	56-58
Summary	56
Finding & Discussion	57
Conclusion	57
Recommendations	58
<u>REFERENCES</u>	

Chapter I

INTRODUCTION

Background of the Study

Super student's education is defined in different ways. It includes many aspects. These are abilities to handle the problem, ability to tackle the situation, ability to organize different functions/activities in the surrounding environment. Superior students are most preferred any time and everywhere either it be in school or college or in professional life. In mathematics, also super student is celebrated widely.

In relation to students' performance, job or task of the students means to obtain the high score in the class, regular attendance in the class and active participation in the class. Those who have such competence might appear as a high performer or super students in the class. Again, there is relationship between high performance of the children in everyday lives in home and school. Conditions that occur in their everyday lives can influence the children's performance. Some of the conditions are physical condition at home, child-rearing conditions of home and school (Anderson, 1995).

Learning styles encompass a series of theories suggesting systematic differences in individuals' natural or habitual pattern of acquiring and processing information in learning situations. A core concept is that individuals differ in how they learn. The idea of individualized learning styles originated in the 1970s, and has greatly influenced education.

Proponents of the use of learning styles in education recommend that teachers assess the learning styles of their students and adapt their classroom methods to best fit each student's learning style. Although there is ample evidence that individuals express preferences for how they prefer to receive information, few studies have found any validity in using learning styles in education. Critics say there is no evidence that identifying an individual student's learning style produces better outcomes. There is evidence of empirical and pedagogical problems related to the use of learning tasks to "correspond to differences in a one-to-one fashion". Well-designed studies contradict the widespread "meshing hypothesis", that a student will learn best if taught in a method deemed appropriate for the student's learning style.

Although learning styles will inevitably differ among students in the classroom, Dunn and Dunn say that teachers should try to make changes in their classroom that will be beneficial to every learning style. Some of these changes include room redesign, the development of small-group techniques, and the development of Contract Activity Packages. Redesigning the classroom involves locating dividers that can be used to arrange the room creatively (such as having different learning stations and instructional areas), clearing the floor area, and incorporating student thoughts and ideas into the design of the classroom.

Understanding of the brain and how people learn has been growing over the last 20 years. The role of the senses in learning, long appreciated as 'See it, hear it, do it' is now more formalized as visual, auditory and kinaesthetic learning styles. Howard Gardner's work on multiple intelligences has opened up our consideration of the many ways in which people learn. What does it mean for teachers of Mathematics? How can we help pupils access learning to develop their writing competences?

When reviewing our practice in teaching writing in the light of what we know about learning, it is reassuring to realize the range of techniques in use that draw upon different learning styles. None of the ideas proposed here is new, but reviewing our practice from the perspective of different styles of learning can bring back to the foreground practices that had slipped away, help us to systematically think about how all pupils might best access the writing curriculum and have a rationale for innovative approaches to enabling effective writing.

This overview of learning styles starts with ‘VAK’ (visual, auditory and kinaesthetic), but also has ‘interpersonal’ and ‘intrapersonal’ from Howard Gardner’s multiple intelligences because reflection and collaboration have always seemed so important to language development. This doesn’t aim to be a comprehensive guide; just a way in to thinking about learning and writing (Danskin, 2011).

It is a poignant time to be writing an article on learning styles. After the riots of August 2011, what can be said to colleagues around the country about the inclusive appeal of learning styles? How can we engage these angry men and women to believe in the transformative opportunities of learning and of mathematics? It is worth stopping for a moment to reflect on what we know; what our learners have already told us. ‘Good’ teachers know their learners; they stimulate a learning environment where it is safe to speak out, yet challenging enough to encourage new ways to look at, think about, and use math. So how can we achieve this ‘good’ practice without falling the trap of expecting, or being prescribed, a ‘perfect’ recipe for teaching, or for learning, mathematics? (Klein, 2003).

Achievement is determined by different variables such as school related variables, student related variables, and home environment related variables and so on. These variables are related to the achievement obtained by students. The school

related variables refers to the learning environment at school, the academic qualification of teachers, teaching experiences and ability of the teachers, class size, location of the school, types of instructional materials are used, student teacher's ratio, physical status and so on. Similarly, the student related variables refer to the factors such as gender, age, duration of the study at home and so on. And last one is the home environment related variables that refers to the factors such as family occupation, parent's education, mother tongue, learning environment at home, availability of the study materials at home and so on. All of these variables determine the student's achievement.

How do parental perceptions of their children's mathematics performance and parents' involvement in children's homework affect children's mathematics performance? The interaction of these three variables has not been examined in the research on mathematics performance. The focus here specifically on mathematics ability is important given the relatively poor math ability of U.S. children in the face of the relatively high level of parental satisfaction with children's mathematics achievement in America. The poor mathematics performance of U.S. children relative to children of other nations is well documented. In a study assessing the mathematical achievement of 13-year-olds in Korea, Spain, the United Kingdom, Canada, Ireland, and the United States, U.S. students had the lowest mean scores of any country in the study (LaPointe, Mead, & Phillips, 1989). Several studies comparing U.S., Japanese, and Chinese students have also reported the relatively poor mathematics performance of U.S. children (Stevenson et al., 1990; Stevenson, Lee, & Stigler, 1986; Stevenson & Stigler, 1992). And even within the United States, Huntsinger, Jose, Larson, Krieg, and Shaligram (2000) recently reported superior mathematics achievement among

second-generation Chinese American primary school children than among European American primary school children.

One of the surprising findings in the studies reported by Stevenson and his colleagues (Stevenson et al., 1990; Stevenson et al., 1986; Stevenson & Stigler, 1992) is the fact that despite the poor mathematics performance of U.S. students, parental satisfaction with their children's mathematics performance is relatively high in the United States and significantly higher than that reported by parents of children in Japan and Taiwan (Crystal & Stevenson, 1991). Further, when mothers of the fifth graders in this study were asked whether their child had problems in mathematics, only 37% of the U.S. mothers responded affirmatively in contrast to 62% of the Asian mothers. Crystal and Stevenson (1991) concluded, "our findings suggest that U.S. parents tend to evaluate their children's mathematics skills uncritically and that their lack of awareness of the frequency or severity of children's problems reduces their effectiveness as a source of help to their children" (p. 375).

In several studies, the ability of parents to predict their child's task performance has been assessed. Although parents' predictions of their child's performance are generally positively correlated with their child's actual task performance, parents consistently overestimate their child's task performance. This fact has been reported using a range of cognitive tasks with second and fifth graders (Miller & Davis, 1992; Miller, Manhal, & Mee, 1991) as well as with first graders on Piagetian tasks and IQ tests (Miller, 1986). In the present study, we specifically assessed the relationship between parents' predictions and children's actual performance on a comprehensive mathematics test and further assessed the role of parents' involvement in children's homework in this relationship.

But still there is still a small mass of students who have appreciated mathematics and demonstrated high performance in mathematics in school level. This high performance creates the questions like; Opposite to large mass of students what makes them to perform outstanding in mathematics? What could be the reason behind it? What is in school as well as at their home that lead them to demonstrate high performance in mathematics? How their school and home environment, teacher and parents facilitated them? To answer these questions in the Nepalese context I selected a case study approach to investigate and explore about high performing students currently studying in lower secondary level.

Obviously, the indicators of high performance in mathematics in different time and situation may be different. Mathematics educators also have a challenge to define what might be considered as high performance in mathematics. Some believe that being able to answer any mathematical problem quick and correctly is intelligent in mathematics. Other believe being regular, obedient and discipline and participate in every day classroom discussion are the basic criteria for high performance in mathematics. Many more accept high score as high performance in mathematics. Keeping in view of above beliefs and criteria the study has limited the meaning of high performance as scoring high marks in school exams and active participation in mathematics class activities for study purpose.

Statement of Problem

It has already been more than half decade that public schools started imparting the education in the country. Public schools are criticized for not being able to provide quality education (Timsina, 2008). Though in percentage terms, public schools constitute around 80 percent of these schools and private schools only 20 percent

(Thapa, 2011). But the quality or the performance of the public schools are still unsatisfactory. Many strategies, policies, plans have been changed for many times still the public schools are considered to be ineffective schools. Government is investing about 17% of total budget in education system (MOE, 2010) at present but the output is not good as enough as compared to the private schools. As compared to the private school, the public school could not produce desired results in academic achievement (The World bank, 2001 as cited in Timsina, 2008).

Along with government, other Non Government organization, community, parents, donor agencies and so forth have invested both money and efforts for the betterment of the public schools. However, public schools have not given the quality according to the investment done by various sectors. The gap between the pass rates in SLC between public and private is widening where private have the majority contribution. Recent SLC results of 2013 shows 72% of students from community schools failed in SLC around 65 billion NRS got lost while in comparison 86% students from private schools passed their SLC (Kantipur Daily, June 13, 2013).

On one hand the situation of educational achievement of students in Nepal is low as explained above and on the other hand, in the modern world, all the science and technologies are dependent on mathematics knowledge, so, mathematics is a major factor for every student to his/her career. The need of mathematics is apparent for everyday life as well as for higher studies in the field of science and technology.

In Nepalese context mathematics is taken as difficult and hard subject in school level and university level also. High failure rate in mathematics has become a headache for most of mathematics teachers, educators and for parents. Beside this there are some of students who enjoy mathematics and are showing outstanding

performance in mathematics. This study was mainly concerned with the personal factors of the students that lead them to super learn in mathematics.

In this study researcher tried to answer the following research questions:

- How is the learning style of superior students?
- How the school and home environment contributes to be a superior student in mathematics?

Objective of the Study

The main objective of this study was to find out the student's personal habits and behaviors related to the study, which are supportive to the student's better learning in mathematics. The objectives of this study were as follows:

- To explore the learning styles of superior students.
- To investigate factors which contribute to be a super students in mathematics.

Significance of the Study

As stated above, mathematics is one of a headache subject for most of teacher, parents, and students and superior failure rate has been a critical problem for the administrators and policy makers. But, this is not an inevitable problem because a small mass of students is still there enjoying mathematics and demonstrating superior learning in mathematics. So, this study is expected to be of great significance among those students, parents, teachers who are facing mathematics as a burning problem.

This study has the following significances:

- This study communicates to the teachers, students and parents about the factors affecting for better learning in mathematics.
- This study provides knowledge about how home and school environment may affect student better learning in mathematics.

- This study tries to enlighten teacher, parents, and students about their role for better achievement in mathematics.
- This study helps school administrator and policy makers to formulate school effective policies and strategies to produce super students on mathematics.
- It may help to decrease student's failure rate.

Delimitation of the study

Delimitation of this study was as follows:

- This study focused on the students of public schools of Kathmandu District.
- The study was done over the four super students in mathematics from the private schools at Kathmandu.
- This study has covered only the conditions that are related to student's home and school environment.
- Meaning of super student was limited to the super scores in examinations and active participation in mathematics classroom.
- The data for this study was taken from related school, students' home, mathematics teachers and students.

Definition of Key Words

Learning Style

Learning style refers to the collective answers of, how an individual perceives, interacts with and responds emotionally to the learning environment.

Super Students

Students who are able to show better learn in mathematics, above 90%. Super student is the state of super scoring in examination, taking active participation in mathematics classroom, and being regular in mathematics classroom.

Socio economic condition

Socio economic condition is the social status of the student's family & relations with the various social forces and financial ability of the parents and their occupation.

Social Status

Social status presents the family reputation which may have been recognized because of family member's good performances in various fields, e.g. economic, professional, social welfare, politics, academic, etc.

Home Environment

Home related factors, especially related with the physical facilities got by the student, which influence the student's mathematics achievement.

Teacher Student Relation

The level of interaction between teacher and students related to the mathematics learning.

Occupation

Occupation is taken as the principal area of working for earning money.

Pre-knowledge

Pre-knowledge means the knowledge earned in mathematics in previous class.

Practice of Mathematics

Practice of mathematics is taken as taking concepts from mathematics books by reading & doing, and solving the given problems repeatedly.

Chapter II

REVIEW OF RELATED LITERATURE

This chapter deals on the review of related literature, theories to this study and framework for the study. Literature review is the process of locating, obtaining, reading and evaluating the research literature in the area of the research. It helps the researcher to know the work carried out in the area of his/her research project. The main purpose of review of related literature is to develop some expertise in one's area to see what new contribution will be made and receive some idea for developing a research design. The review of related literature helps to make the concept clear for the study and also directed to analyze and interpret the data.

Review of Empirical Literature

Several types of related literature were reviewed in this study, which helps to make the concept clear for the study and also directs to analyze and interpret the data. With this assumption some related literature were reviewed as follows.

Learning is defined as a knowledge or skill acquired through study or by being taught. Learning is reflected in the way a child responds to environmental, social, emotional and physical stimuli and understands new information (Collins Concise Dictionary & Thesaurus of English Language, 2002). The keys to better learning and better academic performance in schools are good teachers, good study environment, course of study, parents' cooperation, high quality books and, the most important, the study habits (Robinson, 2000).

Many students fail not because they lack ability, but because they do not have adequate study skills (Menzel, 1982). Study habit is the tendency of a student to learn

in a systematic and efficient way, when opportunity is given. It is also defined as the devotion of time and attention to acquire information or knowledge especially from books or in other words it's the pursuit of academic knowledge by a detailed investigation of a subject or situation (Oxford Dictionary & Thesaurus of English Language, 2003). Good students are not born but are made by constant and deliberate practice of good study habits, for which there is no substitute (Ames & Archer, 1988). Thus, in order to improve academic performance of students, it seems essential to improve their study habits without which desired outcomes cannot be achieved. Development of good study habits in children depends upon the combined efforts of parents and teachers (Kizlik, 2001).

Academic performance is a complex student behavior and underlies several abilities, e.g., memory, previous knowledge or aptitude as well as psychological factors such as motivation, interests, temperaments or emotions, to name a few (Deary, Whiteman, Starr, Whalley, & Fox, 2004). Educational psychologists and researchers have argued that there are many determinants of academic performance (Chamorro-Permuzic & Furnham, 2003). Danskin and Burnett (1952) found that students getting higher marks had more effective study habits as compared to students who had ineffective study habits and thus lagged behind in studies. Similarly, L. D. Crow and Crow (1963) found academically poor achievers to have less effective study habits as compared to academically high achievers. In the same context, Sorenson (1964) found that pupils who got more scholarships had better study habits than the pupils who did not achieve scholarships. For academic achievement, being smart is more important than being intelligent and hardworking and involves being practical, having common sense and using better organization and application of good study habits (Clark, 1996). In addition to study habits, researchers have demonstrated the

importance of parental involvement in their childrens' academic performance (Hannon & Jackson, 1987; Heller & Fantuzzo, 1993; Widlake & Macleod, 1985).

S.L. Chopra had studied the relationship of socio-economic factors with achievement of the students in the secondary schools. The investigation aimed at studying the relationship between socio-economic factors and academic achievement with measured intelligence held constant. Some of the important findings have been listed below; (Chopra, S.L. Ph.D. Education Lucknow university, 1964).

- i) The percentage of failures among the students from the professional, administrative, executive and managerial groups was twenty seven while that for the other groups ranged between fifty nine and sixty one.
- ii) On the basis of father's education and occupation, family income, types of lodging, size of the family, cultural level of home, students belonging to the higher qualitative group showed significantly higher mean achievement than students coming from lower categories.
- iii) The difference between the academic achievements of different castes was significant at 0.5 level. The groups of different castes matched for father's occupation did not show significant difference in achievement.

"An experimental study of the relationship between home environment and scholastic achievement" a relative study on home environment and scholastic achievement performed by S. Jain, the following findings have been noted:

- i) Home is one of the most important potential factors influencing a child's achievement. He found that the influence of home environment on

achievement was positive and significant (Jain S.K. Ph.D. Psycho Agra University, 1967).

- ii) Socio-Economic condition summed to have no relationship with School achievement.

Socioeconomic status is an economic and sociological combined total measure of a person's work experience and of an individual's or family's economic and social position relative to others, based on income and education, and occupation (Marmot, Michael, 2004) indicates When analyzing a family's social economic status, the household income, earners' education and occupation are examined, as well as combined income, versus with an individual, when their own attributes are assessed.

Lareau, Annette (2003) observes that Socioeconomic status is typically broken into three categories, high, middle, and low to describe the three areas a family or an individual may fall into when placing a family or individual into one of these categories any or all of the three variables income, education, and occupation can be assessed. Additionally, low income and little education have shown to be strong predictors of a range of physical and mental health problems due to environmental conditions may be the entire cause of that person's social predicament to begin with.

Amutabi, M.N (2003) discuss the impact of socioeconomic status on children's readiness for school:"The segregating nature of social class, ethnicity may well reduce the variety of enriching experiences thought to be prerequisite for creating readiness to learn among children. Social class, ethnicity, dictate neighbourhood, housing, and access to resources that affect enrichment or deprivation as well as the acquisition of specific value systems.

APA (2001) describe the relationship of family socioeconomic status to children's readiness for school, Across all socioeconomic groups; parents face major challenges when it comes to providing optimal care and education for their children. For families in poverty these challenges can be formidable. Sometimes, when basic necessities are lacking, parents must place top priority on housing, food, clothing, and health care. Educational toys, games, and books may appear to be luxuries, and parents may not have the time, energy, or knowledge to find innovative and less-expensive ways to foster young children's development.(Ominde, S.H 1964) observes that even in families with above average income parents often lack the time and energy to invest fully in their children's preparation for school, and they sometimes face a limited array of options for high-quality child care both before their children start school and during the early school years. Kindergarten teachers throughout the country report that children are increasingly arriving at school inadequately prepared.

Families with low socioeconomic status often lack the financial, social, and educational supports that characterize families with high socioeconomic status. Poor families also may have inadequate or limited access to community resources that promote and support children's development and school readiness. Parents may have inadequate skills for such activities as reading to and with their children, and they may lack information about childhood immunizations and nutrition. Lareau, Annette (2003) state that "low maternal education and minority-language status are most consistently associated with fewer signs of emerging literacy and a greater number of difficulties in preschoolers." Having inadequate resources and limited access to available resources can negatively affect families' decisions regarding their young children's development and learning. As a result, children from families with low

socioeconomic status are at greater risk of entering kindergarten unprepared than their peers from families with median or high socioeconomic status.

The home environments for children continue to change. Changes in the family culture affect the home environment. Studies (Baharudin & Luster, 1998; Featherstone & Cundick, 1992; Watkins, 1997) have shown that the home environment affects the academic achievement in children. Many people are raising children and looking to others for answers, whether it is day care centers, schools, evangelists, counselors, or the government. Shifting the blame for children's problems and decreasing parental responsibilities are becoming a societal norm. Traditionalists view these shifts as clear signs that we have lost our moral compass; that our society is doomed if we do not find our way back to what are called family values ("Decline and Fall," 1997).

Peak (1995) states that some of the children that are lucky enough to have a home, live in housing projects. The projects tend to be high in stress, violence and crime. They also have cramped living conditions and poor community resources, which in fact, are not conducive to a quality-learning environment. Many of these children simply come to school because they believe it to be a safe haven from the streets. They also know they will be warm in the winter and get a hot meal. Learning could be last on their list of reasons to come to school, if in fact, it even made the list.

Sandefur (1995) talks about the importance of spending quality time with children. Common sense tells us that single parents have less time to spend with their children. The responsibilities are overwhelming. They are accountable for the entire family income, maintaining a home, nutrition needs and child rearing. Many women are devastated with the conflict of working versus child rearing. Fifty million mothers

worry about placing their children in daycare, according to the national Institute of Child Health and Human Development ("Quality time counts," 1998). Whatever losses the children endure, from a working mother of a low-income family, are compensated for by the added paycheck. Therefore, the negative impact of working mothers may be limited to the middle class (Hawley, Rosenholtz, Goodstein, & Hasselbring, 1984). The consequences of "trying to do it all" are not only felt in the heart of the family, but also in the job performance and within the self.

Several studies (Baharudin, 1998; Gerris & Dekovic 1997; Harris & Liebert 1987; Hines 1997) show the role of the family and the specific interactions between a child and parent have been determined to be powerful indicators of development. Some specific interactions include regular family discussions, encouragement, limit setting, warmth, daily routine, praise, and intellectual stimulation. These studies have shown all of these connections to produce an impact on academic achievement.

Individual differences in children's achievement were studied by Baharudin & Luster (1998) relative to differences in the home environment. They found the quality of the children's home environment to be positively related with achievement. Children with higher test scores came from more supportive homes. The parents of preschool children were asked about conveying positive feelings, answering child's questions, taking trips to the museum, eating meals as a family, requiring the child to keep play area clean, conversing with the child, and encouraging the child to develop and sustain hobbies.

Diaz, a teacher and psycho pedagogy expert in Spain who wrote a paper titled 'Personal, family and academic factors affecting low achievement in secondary school', indicates that among family factors of the greatest influence are the

educational levels of parents (Castejon & Perez, 1998). The learner's perception of family support directly affects performance, while the mother's level of education does so indirectly. Those learners whose parents are not adequately literate are disadvantaged because these days' parents are required to assist their children with their assignments and projects that are supposed to be done at home.

The level of educational attainment of parents could influence the academic achievement of their children. According to European Union Monitoring Report (2013), those students whose parents have a tertiary level of education perform, on average, significantly better in tests of science, reading and mathematical ability than do those whose parents have only basic schooling. In a family where both the father and mother are educated, their children are always taken good care of in their academic activities. Such parents know the importance of getting educational materials for their children is school. They may go through their children's exercise books after school, or even employ a private teacher to teach them after school. By so doing, their academic performance will be improved; whereas in the case of illiterate family, the need to supervise the children's exercise books is not there, hence their children's low academic performance in school. Educated parents may also have library at home, stocked with novels, encyclopedia and other educational books and educational audio visual tapes. When children make use of these materials, it will enhance their intellect.

Also, hereditary factor could also influence a child's academic performance in school. This happens when a child inherits poor gene from either the mother or the father; such a child will not be able to achieve much even if the environment is conducive for effective learning. On the other hand, a child who inherits a very high

gene from parents may perform very well even if the environment is not stimulating (Community Development, Sound Education, Good Health and Social Life Initiative, 2013).

Educated parents give early independence training and achievement training. Atkinson and Feather (1966) argued that successful parents tend to provide early independence training which is necessary in the development of achievement motivation. In independence training, parents insist on the child's self-reliance and autonomy in decision making situations. While in achievement training, they insist on high achievement through imposing high standards of excellence in tasks, setting high goals for the child and expecting the child to show competence in doing tasks well.

Illiteracy of parents could have a negative effect on the academic performance of their children. Children whose parents are illiterates have been seen to lack home encouragement. This implies that as some illiterate parents refuse to provide their children with needed textbooks, they are discouraging them from learning. David (2007) stated that textbooks aid studies after normal school teaching. Students from illiterate parents lack assistance because of parents' illiteracy and ignorance such parents fail to motivate, reinforce, give reward or punish their children on their academic performance which might have forced them to be serious in learning. On the other hand, literate parents have interest in their children's academic performance. They struggle to provide them with needed materials and give adequate encouragement. Having known the importance of education, they draw a reading time-table for their children and also arrange for part-time teachers to teach their children and check their workbooks from time to time. They provide adequate motivation and reward when the children perform better in class assignments tests and

examinations. Taking care of children and making provision for their needs, especially educational needs, are very important in determining the academic performance of children. Academic achievement motivation is used to mean the pupil's need or drive towards the achievement of success in academic work (Amalaha, 1975).

According to Slavin (2006), motivation is what gets one going, keeps one going, and determines where one is to go. Motivation is one of the factors that contribute to academic success. It is important for both parents and educators to understand why promoting and encouraging academic motivation from an early age is very important. Motivation is crucial to a student's academic success at any age. Because students form self-concepts, values, and beliefs about their abilities at a young age, the development of early academic motivation has significant implications for later academic careers. A great deal of research has found that students high in academic motivation are more likely to have increased levels of academic achievement and have lower dropout rates (Blank, 1997).

Eventually affect his/her motivation for success in school work. Muola (2010) stated that the urge to achieve varies from one individual to the other. For some, the need for achievement is very high while for others, it is very low. He adds that achievement motivation is learnt through the socialization process. Those who have high achievers as their role models in their early life experience would develop a high need for achievement while those who have low achievers as their role models will hardly develop the need for achievement. The family is obviously a major socializing agent and therefore important in determining the child's motivation to achieve success. The motive to excel in academic work is an activating force, a drive or an

urge to achieve good results and recognition which accounts to good academic performance.

Children have an unbelievable thirst for knowledge. If parents do not tap into that drive in early childhood it could be lost before the children even enter the school system. The parents that do not foster learning are easily identified. It is truly amazing how little children mention their parents. Parents' encouragement to achieve and interest in school performance are significantly related to student motivation and student achievement (Hawley et al., 1984).

It has been proved that teachers have an important influence on students' academic achievement. They play a crucial role in educational attainment because the teacher is ultimately responsible for translating policy into action and principles based on practice during interaction with the students (Afe, 2001)

School climate is closely linked to the interpersonal relations between students and teachers. According to Crosnoe et al. (2004), school climate is the general atmosphere of school. Trust between students and teachers increases if the school encourages teamwork. Research shows that students who trust their teachers are more motivated and as a result perform better in school (Eamon, 2005).

The important role of the teachers in the teaching-learning process is unquestionable. Teachers have a lot of influence on their classroom practices. Teachers should have and apply specific abilities without which their influence may not be reflected in their students' performance in their subject. Teachers must use appropriate and effective instructional methods so that students can easily transfer what is taught in school and apply it to solve problems in real life. On the contrary, Kara and Russell (2001) comment that there has been no consensus on the importance

of specific teacher factors, leading to the common conclusion that the existing empirical evidence does not find a strong role for teachers in the determination of academic achievement. The study therefore sought to investigate the influence of teacher characteristics on students' performance: whether teachers give assignment, mark and revise on time and reward or motivate the students' to learn.

Review of Theoretical Literature

There are so many theories which can be used to understand the learning process. The theoretical discussion is needed for the interaction of the finding of the study. Many theories about the learning and development of children such as cognitive, behaviorist, humanist, social constructivism of which constructivism is one of the theories to analyze and interpret the data of mathematics or resolve the problem. To analyze and find the suitable solution in the area of learning style in mathematics; constructivism becomes one of the possible theory to solve specifically the problem on the topic of "learning style of superior students in mathematics". Every child learns from society from social contact with home, family and universe. According to them, knowledge can be constructed from society. This kind of thought is given by constructivism.

From this study and the work of Morrow (1996) and Becker (1996) a different picture of mathematics teaching is starting to emerge, where teachers encourage students to make connection with their own experiences and the experiences of others. Morrow (1996) contends that many connected knowers (particularly girls) in mathematics spend much of their time listening to the ideas of others. She suggests that if connected knowers are to gain a sense of their own voice in mathematics then teachers need to give them opportunities to verbalize their mathematics knowledge. It

is through such discussion that students form, modify and develop their thoughts into ideas. For students who prefer to learn as connected knowers, the support of small groups and the role of hypothetical and tentative talk is important, almost essential, in the development of their ideas and understanding.

Such work is grounded in the ideas proposed by Belenky et al., (1986). To encourage more connected knowing in mathematics by both connected and separate knowers, topics need to begin from a context which provides relevance through real world application and needs. In order to promote appropriate student talk, this should be done in small groups to provide opportunities for students to interact and verbalize their understandings as they develop. The emphasis needs to be on problem solving and problem posing, with the teacher modeling the problem solving and posing process. Mathematics needs to be modeled as not always being completely known, but that there are alternative paths to the same solution, also that not all problems have neat and clinical solutions. In the real world many problems have no solutions, and approximations are required. Teachers need to show students that they make mistakes, take wrong paths, back track, create assumptions, analyze and evaluate their work, check assumptions alter them and continue.

Constructivism

As constructivism becomes related to educational theory to deal with the problem of mathematics. It is a theory based on observation and scientific study to deal the problem of learning. It asserts on forming the understanding and knowledge of the world through experiencing things. When we encounter something, our mind perceives the things and reconcile with previous ideas which has already existed or reconciled with pre exist idea. It means our mind becomes active creator to reach and

act with present surrounding. In the similar way constructivist idea of learning can point towards number of different teaching practice. It encourages the student to involve themselves actively and use techniques of learner centered, group work discussion, learning by doing , use outside tools to be more practical and gain high achievement in mathematics rather than classroom. It focus on real life learning environment, social interaction and use of complex idea share with others outside of classroom easily. Constructivism transforms the students from passive receipting of information to active participant in teaching process. Constructivism based on three axioms that are as follows.

- Learners learn knowledge from their active participation
- Learners gain knowledge while reflecting on their own action.
- Learners gain knowledge when they try to convey their solution to others.

VAK Learning Style Model

When considering preferred styles of learning, it is probably more helpful to think of learning as a range of styles we all have to some degree ‘having a strength in auditory learning’, for example, rather than ‘ being an auditory learner’. The notion of a person having only one learning style is inappropriate, especially as our knowledge of learning styles is not complete by any means. We need to consider ways of accessing the full range of pupils’ learning strengths. Howard Gardner has identified the following learning styles: 1. Visual Learning, it includes visualizing the content, drawing, visualizing the writing process, pictures & real objects, concept mapping, plans & diagrams, film, video & computer images, etc. 2. Auditory Learning, it includes hearing writing read aloud, collaborative writing, role playing, interviewing & telephoning, hearing the voice, talking about words, etc. 3. Kinaesthetic Learning,

it includes practical investigations, feeling the meaning of words, moving around to collaborate with others, moving ideas physically, etc. 4. Interpersonal Learning, it includes collaborative working, collaboration to develop reasoning, etc. 4. Intrapersonal Learning, it includes knowing learning objectives, feedback, reflection of opportunities, etc.

Adult Learning Theory

Educators who have had the greatest impact on their students may not necessarily be the most knowledgeable in their field. Rather they may have understood how best to facilitate student learning. Adult learning theory suggests that adults have particular requirements as learners and that they learn best in an environment that is problem based and collaborative.

While not all students may be at the adult learner stage, it is important that they are encouraged to take on more characteristics of adult learners.

Malcolm Knowles (1980, 1984) - a pioneer in the field of adult learning - identified the following six characteristics of adult learners:

Autonomous and self-directed

- An adult learner prefers to be actively involved in their own learning, and in directing their own learning goals. Therefore, it is important that, as an educator, you actively involve students in setting goals for the placement and in the learning process. The student should be assisted to assume responsibility for their workload rather than be supplied with facts.

Bring life experiences and knowledge

- An adult learner will have past experiences, knowledge, opinions and learning that they bring to the placement. This includes previous work experience, family responsibilities and previous education and academic knowledge. They need to

connect their placement experiences to their existing knowledge and experience base. As an educator you can help the student to draw out the knowledge and experience that is relevant to the practice area, and assist them to relate the theories and concepts acquired in university to their current practice.

Goal-oriented

- Students are motivated to learn when they can see the need to acquire knowledge to address a real life problem or situation. If you have clearly identified learning goals (e.g. Intended Learning Outcomes) for the placement and you structuring learning activities to relate to those goals, this will assist in maximizing the adult students' learning experience.

Relevancy oriented

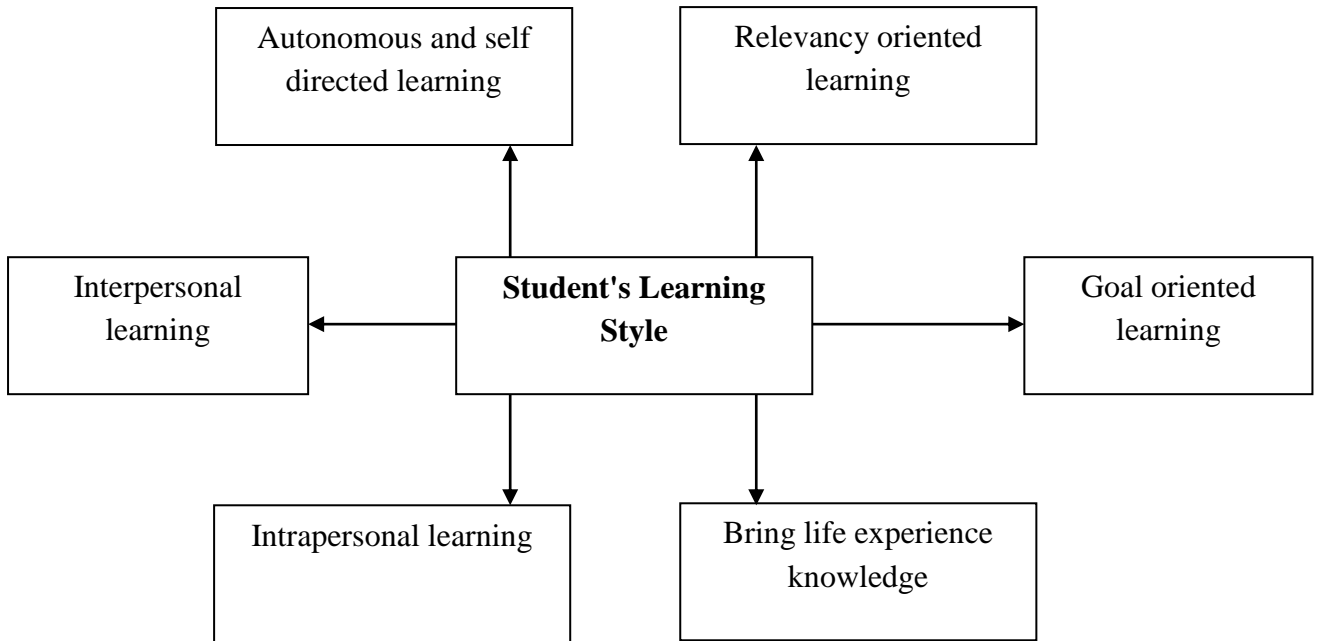
- An adult learner will learn best when they can relate the learning task to their own goals and what they want to achieve. Providing some choice in placement experiences, such as choosing a project to work on, will assist with this.
- Practical - Placement allows students to apply theory learnt in the university context to real life experience and settings. Identifying the link between what students have learnt and the application of that knowledge to practice is important in facilitating learning.
- Like to be respected - An adult learner will prefer to engage in a collaborative relationship where they are treated as a colleague and acknowledged for what they bring to placement.

Conceptual Understanding of the Study

This research study will be a case study subject being the causes of super student in mathematics. In the above paragraphs the research topic related literatures and theoretical perspectives have been already described. For constructing the model of research the researches of the Rabinson, 2000, Menzel, 1982, S.L. Chopra, 1964,

Jain, S.K., 1967, Lareau, A. 2003, Bahuradin & Luster, 1998, E.U.M.R., 2013, Slivin, 2006 and Eamon, 2005 have been considered. The research objectives and conclusions of their researches have been already discussed. Following theoretical model for this research study will be used which is the framework for this case study.

Figure 1: Learning Styles of Students



It is generally, considered that all the components of environment around a student affect his/her academic performance. Further, how a student reacts to the environmental factors is the prime concern. Student's personal factors which are habits and behaviors determine the level of efforts applied to a learning process. These habits are called learning styles.

Chapter III

METHODS AND PROCEDURES

The Method of the study describes the basic research plan. This is really the heart of the study here the activities that use to complete the proposed study should be described in detail. Research method and procedure is a plan, which determines how to complete the research systematically. This chapter describes the design of the study, rationale of selection of study area, site selection, selection of sample school, selection of case respondent, instrument for data collection, data collection procedure and data analysis and interpretation.

Design of the Study

The study was essentially qualitative in nature. The research was a descriptive case study research. A case study is defined as research method which investigates the condition or status of a person or group in the past and present and is designed to increase understanding as it exists in real life setting (Bell, 1978).

Selection of Study Area

The researcher selected students located at because of the poor educational status and backwardness in every aspect of their life. Some of their children are still not attending any educational institution. If attended only a few number of students make successes. Those successful students who seem to be exceptional in the area are, therefore, the subject of interest. This study focused on superior learner in mathematics. Most of the population residing in the selection area is accessible to the researcher. Therefore, it is the appropriate study site for this research study.

The researcher selected purposively Jana Jagriti Gyanrashmi Public School. The researcher has convincing reason for selecting the school that it is located in the area, which is educationally backward and accessible to the researcher. There are number of students who have not completed lower secondary level due to superior learner in mathematics and other major subjects. And it was relatively easy for the researcher to collect the data compared to other areas and also has received good response for the researcher request.

Case of the Study

Case study is a process or record of research into the development of a particular person, group or situation over a period of time (Oxford Dictionary). Case study research excels at bringing us to an understanding of a complex issue or object and can extend experience or add strength to what is already known through previous research. Case studies emphasize detailed contextual analysis of a limited number of event or conditions and their relationships. Researchers have used the case study research method for many years across a variety of disciplines. Social scientists, in particular, have made wide use of this qualitative research method to examine contemporary real life situations and provide the basis for the application of ideas and extension of methods. (Yin, 1984)

Four case studies were included. The cases were the super learner students in mathematics subject. The purpose of selecting the cases was to find out the factors contributing better learn in mathematics. This case study has tried to understand the complex relationship between the student's super learning in mathematics and student's learning styles. Basically, the case study has pointed out the super student's perception, interaction and response towards learning environment and a conclusion

has been drawn on the basis of the case study indicating the level of effect of those environment factors.

Selection of Case Respondent

The respondents of this case study were students, their parents, mathematics teacher of related grade and head teacher. Those respondents were selected purposively to find out the reason of super student in mathematics. From the sample school, only four superior learner students on the basis of score of achievement test were chosen. The parents of case students, head teacher, and mathematics teacher were also the respondents of the case study for study purpose.

Tools for Data Collection

Data collection is the most important part of the study. On the basis of data collection techniques we can study and analyze every aspect of the study. The consequences of the study depend on technique of data collection. To collect the primary and secondary data, the following tools were used.

In-depth Interview

The researcher developed the interview under the various guidelines. With the help of those interview themes, researcher carried out the interview with key students, mathematics teacher, head teacher and corresponding parents to collect primary data. On the basis of objectives, the researcher developed the interview theme in semi-structured form. The themes were categorized into individual perception, and interaction and response towards environment.

Non-participant Observation

The already established semi-structured observation form was used to fulfill the intended objective of the study. The researcher observed activities of the key respondents in their school/home using the pre-established form. The researcher observed regularity of students/teacher, learning environment, friends' behavior, etc. The different outlook of student's behavior in the classroom and the activities of mathematics classes was carefully observed and noted by non-participant observation.

Data Collection Procedure

To collect the qualitative data, class observation was carried out regularly for 20 days during teaching learning activities. Researcher saw, listened, interacted and recorded the essential data and the information in a natural setting through using non participant observation. On the basis of observation form the researcher observed mathematics class in grade VIII of the school and behavior of the students in the classroom. On this observation form student's behavior, they feel in mathematics learning and other essential information was careful observed and noted every day.

With the help of unstructured interview schedule, the interview was taken with focus children, their parents, head teacher and mathematics teacher. The interaction with the above respondents was with proper careful listen and noting of required data properly. The student's attendance, regularity and other behavior or activities were noted from school record. The school environment and other details were obtained by observing the school environment interviewing with head teacher and document analysis of school. The learning environment of the home and other details were obtained by taking interview with the parents of students. Also, interview and observation were conducted to focus parents in their own houses.

Data Analysis and Interpretation

In this study, the analysis of data was descriptive. The collected information at first was categorized according to the category of the respondents and then different themes were given in the text of interview and observation note. These themes were considered as a code. The similar code version of the respondents was analyzed and interpreted by using the framework the researcher developed in literature review. Cross-match and triangulation was adopted to validate the information and hence the conclusions were drawn.

Chapter IV

ANALYSIS & INTERPRETATION OF DATA

This chapter is mainly concerned with the analysis and interpretation of the data. The data collected from the informants were analyzed and interpreted to find out the learning styles of superior students. The researcher had observed the case students behavior, activities and interaction with teacher in this research. The students' home environment his behavior was evaluated by the researcher with the help of interview schedule. The researcher had interviewed with the researcher had also noted the case students per class documents, their regularity, behavior etc from school documents. The required data was collected by using interview and observation tools. The students, parents, math teacher and head teacher were interviewed. Regular 20 math classes were observed for the collection of required data on the basis of pre-determined observation form. The data of the study are analyzed under the following headings. The data of the study are analyzed under the following headings:

Introduction to Case School

Jana Jagriti Gyanrashmi Public School is located at in Kathmandu district. It was established in 2030. The school started with 125 students in 2030 and an intake 1000 students. The school was moved up to class 10 in 2056 B.S. The school stands with in a premise of 1 Ropani of land. According to the head teacher of his school, it was established on 1st Magh 2030 B.S. It was established with the great efforts of local people without getting any fund from the government. After one year the school building was constructed with the help of villagers financial and labor donation. The school society is formed by different caste Newar, Bhraman, Chhetri, Mmagar and Kumal etc. So the students from different case have been studying in this school.

Introduction of Case Respondents

Respondent I is a female student studying in grade VIII in Jana Jagriti Gyanrashmi Public School. Her records in school show she is excellent in all subjects and carries first position in her grade. She belongs from medium class family. In her family there are five members, father, mother and two brothers. Her father and mother work as farmer. They have enough land to cultivate crops for their living. Her brothers are elder than her. They both are in college level. Their house is made of mud and wood. It is small to live freely. It seems they have staying happily in their family and no exceptionally big problems are there. She is a brilliant child since their childhood. In her village people take her as a role model student. She behaves other people well. She is laborious and hard working. She seems shy and little bit introvert. She says about her "I think people should respect each other. Many people may have different problems. Family members should help and love each other. With the resources we have we should make our life beautiful. There must be continuous effort." From the above saying it can be said that she has positive thinking and loyal to individual relations. Her mother says "She is my right hand. She helps me in all house works. I am very much satisfied with her study. She has making our prestige higher in our society."

Respondent II is a male student studying in grade VIII of Shree Jana Jagriti Gyanrashmi Public School. His school records show he is an average student. However, he has proved him excellent in mathematics subject. He is from educated family. His family consists 4 members including father, mother and one elder sister. All members of his family are literate. His father is graduate in mathematics and his mother is SLC pass. His sister is studying in master's degree in management. His

parents have managed good physical facilities. They have a beautiful house made of rod and concrete. All family members can use separate rooms. His father is a teacher in another school. His mother operates a shop of daily consumable items. They earn good money. His parents are fulfilling most of his demands. They have earned good social recognition in their society.

As per his father he had not excellent academic background. However, they are satisfied with his previous academic achievements.

His father says "He is an average student. I think being an average student is not wrong. However, he shows his excellent performance in mathematics subject. I sometimes guide him in mathematics."

He is free for his academic decisions. In his home he has not any restrictions. His parents do not compel him to study. He can choose at which time to study and at which time to do other things & go outside with friends. He is extrovert in nature and to some extent talkative. Generally, he does not need to help his family members in household works. His hobbies are playing football and listening music.

Respondent III is a male student studying in Shree Jana Jagriti Gyanrashmi Public School. He is excellent in mathematics subject. Even, his is good at other subjects. He is among the brilliant students in his classroom.

He is from a marginal class family. His father was died when he was five. His mother cared him from his childhood with his younger sister. Being only 3 members in the family they struggled very much. He has a very small cottage type house. Even his clothes were seemed old and torn. During our observation the researcher did not find any facilities in his house needed for a student. He only

possessed a roof. He studies in his bed. The people in the society respect his mother. Being single parent since long time she has grown his children with enough care and they are making their mother happy with great achievements in their study.

He is a laborious student. He seems sincere. In this young age his sensitivity and mature behavior impresses others. In his family he does most of the farming works. His mother helps him in his farming work. He is active in the village welfare club. The club is established with the objective of increasing awareness on the social issues of education, health, child labor, etc. He was excellent in his study since the childhood. He never got first position in his class but his school records showed his consistent academic achievement.

His mother says "I am very much satisfied with his study. He is an orphan. His father died when he was 5. He takes care me and his sister. I could not give him any facilities. He never asks me about the things he wants. His friends enjoy good facilities and free time. However, because of him we have able to live."

He listens radio frequently. Reading is his hobby. He reads everything he gets, newspaper, literature, etc. He sometimes writes poems and participates in the competition in his school and district level competitions.

Respondent IV is from Gurung family. She is excellent in mathematics subject. Her academic background is good. She secures high marks in most of the subjects. Her father works in British army. Her father comes once in a year for some time to visit family members. She has 8 family members including her. Her family is a joint family. Her family members are of traditional type. In her home they speak own language - Gurung language. Her tone is mixed when she speaks Nepali language. Her father has fulfilled their basic facilities. Her family is counted among

the rich family in her village. She has got single room with facilities required for a student, table, chair, bed, bookcase, etc.

She rarely helps her family members in their household works. Bring a joint family she has got enough love from her family members. She is extrovert in nature. She can ask anything from anybody if needed.

Her mother says "She is not concerned with many things. She studies if she wants. She has got good results yet. However, her study is not regular at home. Keeping in view of her study we have not involved her in any family related responsibilities." She enjoys travelling. Her hobby is to listen songs and play guitar.

Learning Styles of Case Respondents

In Nepal achievement ratio of school level students in mathematics subject is very low. Mathematics subject is considered to be the most difficult subject and there is lack of teaching manpower in rural areas. Different students may have the different learning strategy and learning styles. According to the variety of learning styles achievement level may also vary. On the other hand low achiever students may have different learning styles than the high achiever students. And, within the high achiever students there may be variety in learning styles. This study focuses to answer the major question "what is the learning styles of high achiever students & whether the learning styles of high achiever students is same or materially same?" On the basis of previous scores of the students, 4 students were selected to conduct this study.

The learning style of the students depends on the teaching learning method adopted by the teacher, school environment as well as home environment.

Learning style is a biologically and developmentally imposed set of personal characteristics that make the same teaching (and learning) methods effective for some and ineffective for others. Dunn described learning style as the way each learner begins to concentrate, process, and retain new and difficult information. She also highlighted that “To identify and assess a person’s learning style it is important to examine each individual’s multidimensional characteristics in order to determine what will most likely trigger each student’s concentration, and cause long-term memory”.

A growing body of research suggests that increased learning gains can be achieved with adult learners when instruction is designed with learning styles in mind. The adoption of any type of new teaching and learning approach has the potential to require a good deal of valuable institution time and energy. In this context, there should be study of individual student's learning style and the outcomes must be reflected in the teaching-learning process to improve their learning. This study is only concentrated to the super learner's learning styles and the dynamics of individual learning process. The various learning styles are presented below:

Autonomous and Self Directed Learning

Students spend a considerable time acquiring information and learning new skills. The rapidity of change, the continuous creation of new knowledge, and an ever-widening access to information make such acquisitions necessary. Much of this learning takes place at the learner's initiative, even if available through formal settings. A common label given to such activity is self-directed learning. In essence, self-directed learning is seen as any study form in which individuals have primary responsibility for planning, implementing, and even evaluating the effort. Most

people, when asked, will proclaim a preference for assuming such responsibility whenever possible.

Man can be active, energetic, free, and aware. He often chooses his goals, direction, and behavior; he is not always pushed and pulled by his environment and by unconscious inner forces. (Tough, 1979)

During the study, researcher had taken interview with students, parents and math teachers. In a question asked by researcher "Are you internally directed to mathematics learning or you are influenced by someone in your mathematics study?" case student's reply:

"I generally wake up at 4 AM and study two hours daily in the morning. I try to make equal focus on all the subjects. I have no big deal with mathematics subject. From the childhood I am curious on the study. I did efforts continuously. I am always first in my classroom. Mathematics was my favorite subject". (Student View)

"I study at home generally 4-5 hours in the evening. After returning home I meet my friends and we play football at nearby society playground. I generally study at night. Sometimes I stay till the midnight exercising my study materials. I wake up late in the morning. In the morning I rarely study except to finish my homework." (Student View)

"I myself have decided my learning goals and selected suitable resources, materials and timing of learning mathematics. I practice and practice mathematics until I become confident on the issue." (Student View)

"I was not excellent in mathematics since my childhood. In the early school days I was aware that mathematics subject is a fantastic subject and improvement in mathematics subject can be helpful in improving the other subjects. I cannot study regular at home. I need to be fresh after some study. I had improved my mathematics with great effort. From class V I started to use extra materials. I attended tuition classes and exercised much in home. After the hard practice I felt improvement in mathematics. Now I am very much comfortable with the mathematics problems."

(Student View)

The answer the researcher got shows that case students are autonomous and self directed. They are motivated internally for the mathematics study. Influence of other persons is less important for them for their high achievement in mathematics.

During the study, researcher had taken interview with parents of the case students. In a question asked by researcher "Do your children take self decision on their mathematics study?" the replies were:

"She always decide whether to study or not. We do not interfere her in her study. She selects the materials she needed and asks for. We are satisfied with her self-decision making level and success in mathematics subject."

(Parent View)

"We never make any pressure to him for his study. All parents become happy with their children's high academic achievement. He decides his learning schedule and sequence. He is average but good in everything. His extra-curricular activities are good. He plays football and interested in other physical games." (Parent View)

The answers the researcher got shows that the case students decide their schedule for their mathematics study and they need not be guided by their parents.

From the above conceptual criteria and quotes from the words of the case respondents and their parents it can be concluded that all four case respondent students are autonomous and self directed.

Relevancy Oriented Learning

Students may be relevancy oriented. Learners want to know the relevance of what they are learning to what they want to achieve. To support learners in their quest for seeking and identifying relevancy, content leaders should ask learners at the beginning of the learning experience what they expect to learn, check for meaning, understanding and relevance throughout the learning experience, identify what skills, knowledge or expertise learners gained as a result of participating in the learning experience and determine how learners might apply what they learned in the future.

During the study, the researcher had taken interview with students about their future plan and their preparation for their future plan in relation to mathematics study. The question asked was "Whether you have set your future plan and are you aware of role of mathematics on your set plan?" The answers by case students were:

"I want to become doctor in the future. I want to know the application of mathematics in the doctor study. If possible, I will have focus on the important mathematical chapters." (Student View)

"I want to be a mathematician in the future. My father is a mathematics teacher. I know the value of mathematics. I want to learn in detail

everything included in our course book. I want to be a well reputed professor." (Student View)

"My seniors and teachers say if we are good at mathematics it helps us for the study of science stream after the SLC. If we study science we can choose various fields in our higher study. So, I want my mathematics study better. " (Student View)

"I have not set a clear goal for my future. However, mathematics is my favorite subject." (Student View)

From the answers given by the case students it can be said that superior students set their future plan in their high school level and they are aware of the role of mathematics in their future plan. And, they want to be prepared and study mathematics relating to their set plan.

A question "Whether the superior students want to relate their mathematics study with their future plan?" was asked to the mathematics teacher during the research. The answer was:

"Most high achiever students have set their goal. However, this is not the stage of determining a concrete goal. We may not be in the position of saying how mathematics is used for their goal study and whether they can be prepared from this stage for the set goal." (Mathematics Teacher View)

It was found from the mathematics teacher's version that the students are aware of the role of mathematics in their future plan and they want to study mathematics relating to their future plan.

From the above discussion we can conclude that the case respondents are relevancy oriented learners except one.

Goal Oriented Learning

Learners may be goal oriented. Learners become ready to learn when they experience a need to learn in order to cope more satisfyingly with real-life tasks or problems. To facilitate a learner's readiness for problem-based learning and increase his or her awareness of the need for the knowledge or skill presented, teachers should provide meaningful learning experiences that are clearly linked to personal/professional goals, share real-life case studies that connect the dots between theory and practice and ask questions that motivate reflection, inquiry and further research.

Goal orientation is desire to develop the self by acquiring new skills, mastering new situations and improving one's competence. Persons with learning goal orientation seek feedback on past performance to evaluate current performance. These individuals focus on improving skills and acquiring knowledge, and are less concerned with making mistakes. (VandeWalle, 2003)

During the study the researcher had asked a question relating to their present goal of mathematics study to the students. The question asked was "What is your present goal which is fulfilled by your high achievements in mathematics subject? And the answers were;

"I think we should be master in all subjects in the school level. We are making our lives by gaining the fundamental knowledge. So, my goal is to

perform well in exam and get confidence in the subject matter." (Student View)

"My goal is to earn prestige in my society. Mathematics has contributed to my goal with the prospects of my good future." (Student View)

"My goal is to get higher marks in examination. I think if we get higher marks in exam people appreciate us. In every field we get priority if we have got higher marks in examination." (Student View)

"I think perfection must be our goal. My goal is to learn more and more in every subject." (Student View)

The answers given by the case students show that the case students have fulfilled some goals set by them in relation to the mathematics study. They are satisfied with their high achievement in mathematics.

A question "What goals the superior students achieve from their high achievement in mathematics?" was asked by the researcher during the interview with mathematics teacher and the answer was:

"In my view, high achievers get appreciation in school, society and within friends. Apart from expecting bright future, in everyday life they can spend a good social life and are satisfied more than the low achiever students. So, they become motivated to study more." (Mathematics Teacher View)

The mathematics teacher focuses on the student's appreciation by the society and good social life as a cause of great efforts on their mathematics study.

From the above discussion we can conclude that our case respondents are goal oriented. Even if the students are not in actual real life working other set goals are there and they are after them.

Bring Life Experience & Knowledge Oriented Learning

Students may bring life experiences and knowledge to learning experiences. Students like to be given the opportunity to use their existing foundation of knowledge and apply their various life experiences to their own professional development. Therefore, teachers should welcome opportunities for learners to share their interests and experiences, draw correlations between past experiences and current problem-solving challenges, facilitate opportunities for reflective learning and examine existing biases or habits that may influence future learning or skill development.

Teachers should facilitate reflective learning opportunities which can also assist the student to examine existing biases or habits based on life experiences and move them toward a new understanding of information presented. (Fidishun, 2000)

During the research the researcher had asked a question with the students "Whether your mathematics study is useful in your daily life works and whether you want to focus in any area of your mathematics study?" The answer was:

"My mother runs a small glossary shop. I sometimes help her in running the shop. We need to know numeric calculation to ease our transactions. So, I prefer to study arithmetic." (Student View)

In the course of answering the question only one case student related his mathematics study with his daily work. Other case students could not relate their mathematics study with their daily life workings.

Relating to the answers given by the case students on the matter of bring life experience and knowledge oriented learning the researcher tried to find out the reason for the same from the mathematics teacher. The question asked was "Why the students could not relate their mathematics study with their daily life workings?" The answer was:

"In this level students rarely have material life experience demanding the teaching learning process to be reactive to their needs of real life and providing feedback and correcting their views. However, Sometimes students ask very practical questions impressively." (Mathematics Teacher View)

The answer of mathematics teacher indicates the lack of real life working experience of the case students as a reason of their inability to correlate their mathematics study with their daily life working.

It can be concluded from the above discussion that high school level students rarely use 'bring life experience and knowledge oriented learning'. The situation has come because of lack of real life working experiences.

Intra Personal Learning

If a student uses intra personal learning he/she is more private, introspective and independent. In this learning method student can concentrate well, focusing on thoughts and feelings on current topic. Student can be aware of his/her own thinking,

and can analyze the different ways to think and feel. Students spend time on self-analysis, and often reflect on past events. Students take time to ponder and assess their own accomplishments or challenges. Students may keep a journal, diary or personal log to record the personal thoughts and events.

The researcher had asked a question relating to the intra personal learning style to the case students. The question asked was "Are you a lone mathematics learner?" Only one case student answered positively as:

"I do writing practice regularly to make my subjects better. I sometimes use extra materials for the study of mathematics subject. My father is a mathematics teacher. Sometimes, he brings extra materials for me and I practice mathematics using extra materials. I never do combined study with my friends. I have never consulted with my teachers except the class time. In need, I take the help of my parents." (Student View)

The researcher tried to confirm the answer of the case respondent with mathematics teacher with a question "Whether he is comfortable with the mathematic learning without the help of teachers and friends?" The answer was:

"He finishes his class works in time. He does not complain about school facilities and teacher qualification. He seems quite motivated in school. However, he seems less concerned with feedback provided to him by his teachers and friends." (Mathematics Teacher View)

From the above answer of the mathematics teacher it was confirmed that the case student was using intra personal learning.

From the above analysis and description it can be concluded that very few student use intra personal learning strategy.

Inter Personal Learning

Student with interpersonal learning styles learn best when they are permitted to use their people senses as part of the learning process. They often prefer direct involvement with others in group works in school or within the larger community. They are stimulated by dialog with students and adults and seem to have a strong sense of intuition regarding others' opinions and preferences. Interpersonal learners are good at reading people and are good at getting to the root cause of communication problems. Interpersonal learners love to interact and prefer learning through interpersonal communication and interaction.

The researcher had asked a question regarding the inter personal learning style of the case students during the course of interview with case students. The question asked was "How often you visit to your friends and teachers for your mathematics study?" The answers were:

"Most of the time of evening, I perform the homework provided by the teachers in school. I always finish my homework in time. Sometimes I visit my friends to discuss about the study. With friends I discuss about the difficult problems of the course. If the discussion with the friends cannot provide the solution then I sometimes visit my mathematics teacher."

(Student View)

"I generally study in the evening at home. I rarely study in the morning. Sometimes I stay till the midnight doing home works and revising the previous chapters. However, my study is not regular. I have many friends."

Being frank in nature, I can make friends in short time. I frequently visit my friends and we often discuss about the study. In my home, there is no-one to guide. My family members often inspire me to be laborious and hardworking like my father." (Student View)

The answers given by the case students show that the case students frequently visit to their friends and teachers apart from their school time in relation to their mathematics study. The case students use inter personal learning style.

The researcher had asked a question to the mathematics teacher and parents during the interview regarding the case student's study in group and interaction with different people. The question asked was "Whether the students are extrovert and comfortable with the group work?" The answers were:

"He reaches school in time. He rarely becomes absent in his school. He is not the backbencher in the class. He carefully listens the teacher lecture. He notes the teacher lecture if he thinks it can be useful. He does his class work in time. Sometimes he asks questions in the class. He is not hesitant to ask the things in which he is confused." (Mathematics Teacher View)

"She acts as curious in her course contents. She listens the lectures curiously. She finishes the class works in time. She is little bit talkative in class. She often asks questions in the classroom. She prefers to study in group. She does not take much time to make her decisions. Her relationships with the school teachers are good." (Mathematics Teacher View)

"He has not attended the tuition classes yet. He has not used extra material to study his math course. Some time he takes advice from his

teacher. He frequently visits his friends and math teacher in extra time. He has got many medals in writing competitions of poems and essays. He often listens radio. He rarely listens songs in the radio. He listens the news and social issue related programs." (Parent View)

The above answers show that the case students are extrovert and comfortable with group work.

From the above discussion we can conclude that the three respondents use inter personal learning style.

Due to the lack of educational awareness the parents couldn't maintain the home environment to study for students. They want that their children should help in their work at home. In the school students come from different ethnic group, caste and culture. The teacher should teach the students in different method according their necessity. But the teacher in the class taught the students their traditionally way. They want to use materials. Teachers are not able to teach them according to student's individual difference which should have been the main work of the teacher. In the school, teachers are to guide students, provide extra-activities to encourage and motivate the students in mathematic learning.

The researcher observed twenty classes in the school. Three episodes are presented below:

Episode First

In the first class observation the teacher went in to the classroom along with the researcher. All the students stood up and said good morning. Then the teacher told them to sit down. This showed that the students were well disciplined and the schools have taught them to respect the teacher. There were 30 students. In the class the desk and bench were sufficient in the class. The white board was kept at the right place. The teacher started to teach simple interest. Teacher wrote down a problem and formula on the white board and started to solve each step. He asked then whether they understood or not, fifty percent students said yes sir. The students on the first bench were active. Most of the students were seemed passive. Again the teacher wrote another problem explaining step by step asking them at least he did the problem in the white board. Then, told them to do the exercise at home.

In this case episode, the researcher found that most of the students were present the students of the class were not so active. The teaching method was a lecture and practice. The teacher behaved commonly to all the students. Our case students seemed active in the classroom. Some students asked questions. Teacher answered the questions with good manner. The teacher did not focus the particular students.

Episode Second

There were 32 students in the class. The class was well managed. The white board was placed on the right place. All students present in the classroom were quiet. The teacher was lecturing on the unitary method. Then he asked the students what they know about unitary method. The student responded without any hesitation after then he defined the unitary methods. Then he wrote a problem from the exercise book and solved it explaining step by step. The teacher gave a simple class work. Most of the students performed the class work correctly. In the last he gave homework from the exercise book.

In this episode the researcher found the class was well managed. It was not fully participative. However, the teacher seemed to be aware of the importance of student participation in the classroom. Some of the students seemed very enthusiastic in mathematics class. There was no differentiation between the back benchers and other students. Teacher behaved equally but he did not give special attention to anyone.

Episode Third

There were 35 students in the class. There were about 16 girl students among them. The class was well- managed. The white board was kept in the right place. The teacher started to teach the factorization. He started the class connecting previous lesson. Then he wrote a problem on the white board and solved it explaining. Then he gave a same kind of problem to the student to do without guiding. He solved the given question after completion by the students in the class in the board explaining each step. At last he told them to do all the exercise of the text book which was too much for the students for one day.

In the episode the researcher found that the teaching method used by the teacher was lecture and practice. The class was well managed. Only the little number of students was seen to be participated in the classroom. Most of the students were silent and asked no questions. Only two students inquired about the subject matter. Teacher was busy explaining the problem. He did not ask students questions about the subject matter.

Motivation Factor

Motivation is the encouragement to do anything. Motivation in the case of high school students is related to the student's efforts to do the best for the high achievement in the subject matters. So, globally all the educators and government agencies focus on the motivational factors of the students.

Virtually all students are motivated in one way or another. One student may be keenly interested in classroom subject matter and seek out challenging course work, participate actively in class discussions, and earn high marks on assigned works. Another student may be more concerned with the social side of school, interacting with classmates frequently and attending extracurricular activities almost every day. Still another may be focused on athletics, excelling in physical education classes, playing or watching sports most afternoons and weekends, and faithfully following a physical fitness works.

"We think our students are well motivated. We often set different programs to motivate them. Sometimes well recognized persons in the locality visit our school and we arrange their meeting with our students. We say them the success stories." (Head Teacher)

"Our students are good in mathematics. Parents must make efforts to make their children motivated to their study. Most high achiever students are self motivated. In any circumstances if student thinks he can do better, he will. Some students set the target and go for it. They plan everything in their life." (Math Teacher)

In the course of our interview with the head teacher and math teacher it was apparent that school does fewer efforts to encourage their students. They try but the efforts are occasional. Motivational efforts are not systematic and incorporated in school program.

"My father has completed higher studies in mathematics. He is well respected mathematics teacher in our area. I think mathematics is one of the best subject for which we can get good career with high respect."
(Student)

"I want to become doctor in future. My teachers say that without good mathematics I cannot study science and go for doctor. So, I am working hard for the improvement of my mathematics. I am among the highest scorers in our classroom. However, I have to still improve my mathematics." (Student)

"I am good in mathematics from my childhood. I study hard all the subjects. I have not set any target for my study and future. We have to do our best what we are doing currently." (Student)

"My parents always encourage me to do better in my study. They have managed all my needs with their best efforts. We students have to fulfill our parent's dreams." (Student)

The case students seem to be autonomous and self directed, goal oriented and learned from life experience. The motivational factors are there of every successful students in the mathematics subject.

"I think my daughter is self motivated to her study. We rarely encourage her for her study matters. She is honest and wise in her study and household works also." (View of Parent)

Chapter- V

FINDING, DISCUSSION AND RECOMMENDATIONS

Summary

Student's high achievement is the prime focus of all the stakeholders of student education. All have accepted the fact that learning style and level of motivation has a great effect on the achievement level of the high school students. Different students may have different learning styles. And they may be equally effective to different students. This study has concern with the learning styles and factor of motivation of the high achiever students in mathematics subject.

The researcher took interview with case students, parents, math teacher and head teacher and observed 20 mathematics classes. After detailed analysis and interpretation following findings has been drawn from this study: Most superior students are from low class and medium class family. Superior students are normally do household works regularly. They do not want any interference even in their daily routine. Superior students are autonomous and self directed. Some superior students may be motivated by their set goal and life experience. Superior students do not limit them in their course books. Most superior students get involved in extracurricular activities and do better. Superior students in mathematics also get high achievement in other subjects. Superior students use visual learning style. Additional learning styles may be used by them like auditory and kinaesthetic learning styles. Most superior students are comfortable with the group learning and interacting with teacher, parents and friends. They use interpersonal learning style. Teachers use lecture method in classroom. Classes are less participative.

Finding & Discussion

In our society low achiever students are discriminated. They feel humiliated most of the times. Adversely, superior students feel free in their daily life. They take their decisions themselves. To narrow down this discrimination effective learning styles must be developed in the students. Following findings were drawn from this study:

Superior students are autonomous and self directed. They take their daily life decisions themselves. Superior students do not accept interfere from others in their study. Only few students use relevancy oriented learning. However, most superior students set their learning goals and try hard to achieve. Finally, they do achieve their goals. In high school level, because of lack of real life experience students cannot relate their life experience with their learning. Most superior students like to study in group. They interact with different personalities and co-learners during their learning process. Only few super learners use intrapersonal learning style in mathematics learning.

Conclusion

This study focuses on the learning styles of the superior students. The key factors which make difference to the superior students in comparison to low achiever students have been studied and concluded. Following conclusions were drawn from this study:

Autonomous and self directed students who take their decisions themselves do better in mathematics. Low interference in student's daily life with proper guidance motivates students do better in their study. Students with self set learning goals work

hard to achieve their goals in comparison to the students who study to fulfill the goals set by others. Real life experience contributes the achievement level of the learners; however, in high school level students cannot relate their life experience with their learning. Group learning with enhanced interaction with different personalities and co-learners during the learning process makes students easy with their environment and they have greater chances of sharing and learning.

Recommendations

The school is situated in the peaceful area; there are sufficient building and physical facilities in the school. Teachers are qualified. Students are interactive. On the basis of the study of the field and findings, the followings conclusion has been drawn.

Student's learning styles must be studied. The outcomes on the study of student's learning styles must be incorporated in school program. Students should be focused on visual learning style. Student with self decision capacity do better in classroom. Autonomous and self directed learning is important for gaining high achievement. So, students must be free for their academic decisions. Relevancy oriented and goal oriented learning makes learning better with practical insight and students feel the content easy. Students must be promoted to speak their plans, goals and experiences. Teachers can provide their need based information's to the students. Interpersonal learning is important for the students. Group work and extracurricular activities increase the achievement level of the students. Students good at extracurricular activities generally are superior students in mathematics subject.