Chapter-1
INTRODUCTION

Background of the Study

The verbal mathematics problems were derived from an ancient Greek and the development of "Mathematics" transmitted from ancient civilization up to the modern civilization one. Mesopotamia, Babylonian, Egyptian Roman and Greek civilization played central role in the development of current mathematics. According to oxford dictionary the term mathematics, is defined as the branch of human enquiry involving the study of numbers, quantities, data, shape and space and their relationships, especially their generalizations and abstractions and their application to situations in the real world. It means that it is a group of related science including algebra, geometry and calculus, concerned with the study of number, quantity, shape and space and their interrelationships by using specialized notations. Nowadays, mathematics is defined as science of the measurement, quality and magnitude. Also it can be defined as science of number and space". The term mathematics has been explained in various ways such as it is the numerical and calculation parts of man's life and knowledge. Mathematics as one knows today is the sciences of number and their operation, interrelation and collection of skills and method to solve verbal problems.

There are two types of mathematic they are pure mathematics and applied mathematics. Pure mathematic included algebra, calculus, geometry, numbers theory, topology and trigonometric knowledge in the area of science which has its own undefined terms. Definitions, axioms, postulates, theorem and it's structure consists of arithmetic, algebras, geometry and analysis. And applied mathematics is the applied nature of pure mathematics in real world.

Arithmetic is a branch of mathematics that deals with properties of counting, whole numbers, fractions and the basic operation applied to these numbers. And the common verbal problems are related to the periphery of the number systems and the application of their properties in real world. Since the verbal problems are key to understand the Arithmetic that is foundation of mathematics for higher study. In Nepal, Arithmetic is started with the elementary schooling. Primary education in mathematics often place as strong focus on algorithms for arithmetic of natural

numbers, integers, function and decimals using the decimal place value system which is known as Algorithm system. The difficulty and unmotivated appearance of these algorithms has responsible for education waste in mathematics teaching and learning in secondary level. However, mathematics educators raised questions in existing curriculum and by advocating that early mathematics learning should be practical rather than theoretical. This attempted to teach arithmetic in the axiomatic development from set theory on echo of the prevailing trend in higher mathematics with the advent of NESP (1971-1976) curriculum of school. The mathematics curriculum was systematized for the first time national level wise and subjective wise objectives were spelled out. To fulfill all the objectives and goals of college of education was restructured into the Institute of Education (IOE) which was responsible to attain the pre-services as well as in service teacher of all levels (Upadhyay, 2064).

In the context of Nepal, teaching and learning of Arithmetic in elementary level has been facing many problems. Most of the researcher shows that the examinee in Grade IV attempts very few questions from arithmetic section. Some students solve question and reach calculation with no reason or by using incorrect reasons. Whereas, most of them left more questions from arithmetic unsolved or partially solved. There might be many reasons behind such poor performance of student in arithmetic. Thus, this study is concerned to the identify what are the categories of errors made by the students in terms of Newman's classification, and what are the reasons behind it to make such errors frequently in the test.

Most of problem in mathematics are asked in the form of verbal problem. Errors occurred frequently in solving these verbal problems. This indicates the law of level of achievement. Verbal problems abound both on mathematics tests and in everyday life. A verbal problem tells a story. It may also present a situation in terms of constants or variable or both.

Introduction of Error

All learners make mistake in their daily activity. We often make mistake when we solve problem. Errors and mistake are synonymously taken in layman's sense. Technically speaking all mistakes are not errors. Errors occur as the result of lack of competence where as mistake occur due to psychological or physiological reason or

by carelessness. Mistakes may be occurred either at competence level or at performance level. Mistakes that are committed at competence level are called errors and mistakes that are committed at performance level are called mistakes or lapses. Errors occur because of lack of competence and they tend to occur time and again. So they are said to be systematic.

The mistake tends to occur due to carelessness. As such it doesn't appear repeatedly can be correlated by the performer himself. The term "error" can be defined as a systematic deviation from the norm of the code or a breach of the code due to inadequate knowledge of the code. Even if the learner's attention is drawn to the errors he/she cannot make correction rather there may be chance of committing of other errors. Coder(1973) points out the need to distinguish "error"(i.e. deviant sentence which are the result of lack of competence) from mistakes or lapses (i.e. deviant sentences which are result of psychological or physiological reasons).

By definition error is that mistake which occur time and again in a systematic way. So it is better to take in to consideration only those deviant as errors which occur regularly in the form of learner's performance.

The study of learner's error occurrence in solving word problem has a great importance in mathematics teaching and learning. Error analysis refers to the systematic study and analysis of error made by the learners. It is stepwise procedure to analyze the errors in the course of performance of learners. Error analysis is significant in three different ways. Firstly to the teachers to find out how far towards the goal the learner has progressed and consequently what remains for him to learn. Secondly, error analysis provides evidences to the researcher and course designers to know how mathematics is learnt, what strategies or procedures the learner is employing in his discovers of the mathematical knowledge. Thirdly, error analysis is indispensable to the learners themselves because we can regard the committing a errors as device to the learner which is used in order to correct their mistakes and learn efficiently.

Statement of the Problem

It is known that arithmetic is one of the important branches of mathematics and foundation for the higher levels. Both verbal and non-verbal problems are equally

important so as to understand mathematics, meaningfully. It is realized that students of primary level commit different errors in their solutions of verbal problems of arithmetic when they try to solve. However, teacher delivers necessary clues and knowledge to solve without errors. Thus, this study is mainly focused on the analysis of errors committed by the primary level students in solving verbal problems of Arithmetic addressing the following research questions:

- In what ways do students errors in solving verbal problems of arithmetic distribute over different types of errors categorized by Newman?
- Are the patterns of error similar in students from public school and institutional school?

Objective of the Study

The main objective of this study is to analyze the errors made by student in solving verbal problems of arithmetic. Then the researcher accomplished by the following specific objectives:

- To identify the types of errors made by primary level students in solving verbal problems of Arithmetic.
- To compare patterns of errors made by students from public schools and institutional schools.

Rationale of Study

The result of this study is beneficial to mathematical society considering the category of the errors that primary level students has made in solving verbal problems of Arithmetic and reasons behind it. According to Newman (1977) the errors occur because a person has to pass over a number of successive hurdles while going through the salutation and such hurdles occur in reading comprehension, transformation, process, skill and encoding. This study has the following significance:

- This study would help teachers to organize their experience and teaching strategies and to adopt suitable method on teaching mathematics.
- This study would be useful for the student of mathematics to minimize their errors.

) It made mathematics educators aware of the fact that category of error in solving verbal problems of Arithmetic and the process of minimization the error.

Delimitation of the Study

Any study cannot overcome the entire field. Each of them has some delimitation. This study also has some delimitation, which were as follow:

) The study concerned only in solving verbal problems of Arithmetic relating to primary level mathematics.
) The study was limited in Kanchanpur district.
) The study was limited only to the error made by students on solving Arithmetical problem.
) The mathematics achievement test and interview guideline was taken as primary data collection tools.

Definition of Key Terms

Error. In this study error was defined as the systematic deviation of student's performance while solving problems owing to the lack of sufficient knowledge (Misconception, misprint, oversight, slip, wrong, mistake)

Error Analysis. The systematic study and analysis of error committed by the students was considered as error in this study.

Verbal Problem. Verbal problems, also known as" word problem", present example situations involving numbers or quantities. Such problems ask students to apply their knowledge of mathematical operations to set up equation and solve them. When those problems involve unknown quantities, letters representing variable can be used.

Reading Error. Student has not been able to read the entire verbal's in the question such that he can't grasp all the information given in the question.

Comprehension Error. Student has not grasped the overall meaning of the verbal and therefore was not proceed along an appropriate problem solving path.

Transformation Error. If the students understand the question but cannot transform it in to mathematical expression this type of error is classified as transformation error.

Process skill Error. Student does not know the procedure to carry out this operation correctly.

Encoding Error. The students correctly worked out the solution to the problems but express the solution in the solution is an acceptable written form.

Carelessness Error. The child attempts the questions for the first time he/she gets the incorrect answer and after the interviewer has listed to the Newman requests, the interview conceived that the child originally made a careless slip. These errors may occur in any level.

Paper pencil test.A test consisting four items from arithmetic section of grade IV mathematics text book which were used to identify errors made by students on solving arithmetic problems.

Chapter II

REVIEW OF RELATED LITERATURE

A literature review is the summary of previous researchers, journal articles, books, and other documents based on the topic which is going to be studied. It provides information to the researcher including the topic of the study, existing information, findings of the study, sources of the data, tool and its validity and reliability coefficient. For the research in any field, review of related literatures is necessary because it helps to eliminate the unnecessary duplication of what has**Review of Empirical Literature**

Review of empirical studies have been made to broaden knowledge in the related area so as to eliminate the duplication of what already been done. It also provides helpful suggestion for significance of investigation. While writing the review of literature three paragraphs out line should be followed. First paragraphs should describe what was coming, second paragraph should describe all about it and third paragraph summarize what was reported (Best & Kahn, 2003), some of related empirical studies are reviewed below.

Upadhayay (2007) studied on "The types of error mostly done by the student of grade V in Janakpur municipality." He found that

1. Students duel use primitive method (additional operation). The mostly elementary method. So far as the higher concept (multiplication and division) in mathematics are concerned they did not come easily.
2. Students were observed using their own method with confusion.
3. Students did use their methods but could not supply enough reason while putting down in examination paper.
4. Most of students could not understand the situation given in language form.

Roberts& Davit (1968) studied the failure strategies of their grades and identified four types of errors. These include wrong operation obvious computation errors, defective algorithm and random responses.

Marinas and Clements (1990) studied on grade seven student of Penang and found that over 90% initial errors made by the student were of the comprehension or transformation types.

Faulkner (1992) has used Newman techniques in research investing the errors made by the nurse undergoing a calculation audit she found the majority of errors the nurses made were of comprehension or transformation type.

Marahatta (2002) conducted a master thesis entitled "A study on computational errors on fraction by grade VI students in Chitwan district". He conclude that the mean errors occurring the addition and subtraction of fraction were the same. He also be concluded that the grade VI students had the same difficulty in addition of fraction and subtraction of fraction .He concluded that the location of school i.e. rural or urban didn't play significant role in committing error. And there is no effect of sex to commit the errors in areas of operation of fraction considered in this study.

Bhatt (2009) conducted a study entitled "The error analysis on the problem solving of area of triangle and quadrilateral's so as to identify the error committed by the students in knowledge, skills and application geometric problems. The findings of that research indicates that students made significant errors in geometric verbal problems due to the various reasons such as content centered learning phenomena in mathematics and lack of the transfer of knowledge and skills in applications part.

As same way, a study carried out by Kafle (2006) in order to find out the errors and causes of errors that students could do on theorem proving of Grade X in geometry. The finding indicates that students have still lack of basic knowledge in theorem proving that they should know in lower classes and as a result students have insufficient experiences in theorem proving.

Quaiyam (2003) did the research work on "A study of students problem solving methods in mathematics at secondary level of Nepal" with the aim to determine the difference between boys and girls of secondary school. He applied problem solving approach and to assess the difference between boys and girls of secondary school with regard to attitude towards mathematical problem solving. Multi stage stratified random sampling has been used in the selection of districts, schools

and students from central development region of Nepal. The sample consists of 250 boys and 182 girls of grade IX from five districts. The t-test was applied and concluded that there was significance between boys and girls regarding applying problem solving approach to mathematics and found with regard to attitude towards mathematical problem solving. He concluded that boys seemed to be more capable in comparison to girls.

Likewise, **Kandel (2007)** did a research on "Effectiveness of problem solving approach in arithmetic at lower secondary level" with the aim to explore the effectiveness of problem solving approach in addressing genders in learning arithmetic at grade VII. In 130 students, 25 students were selected for experiment and 25 were selected for control group. Statistical tools were mean and standard deviation and t-test was used to compare the achievement at 0.05 level of significant. He concluded that problem solving approach of teaching was better than the traditional approach of teaching.

Similarly, **Yadav (2008)** did a research on "Effectiveness of problem solving method in teaching algebra at lower secondary level" with the aim of prior use of experiment verification by teaching algebra with problem solving method. Among 56 students 42 were randomly selected with 21 students for experimental and 21 for control group. The data obtained from final achievement test was analyzed and interpreted by using t-test at 0.05 level of significance and concluded that the experimental verifications have significant effect on teaching algebra.

By supporting above views,**Parajuli (2009)** did an experimental research on "A study on the effectiveness of teaching mathematics by using problem solving method at lower secondary level mathematics" with the aim of prier use of experimental verification by teaching arithmetic with problem solving method. Among 60 students, 30 students were selected randomly with 15 students for experiment and 15 for control group. The data obtained from final achievement test was analyzed and interpreted by using t-test at 0.05 level of significance and concluded that the experimental verification have significant effect on teaching mathematics.

As the same way, **Subedi (2010)** did his research on "A study on effectiveness of problem solving method in teaching mathematics at secondary level" He chose the

pre test, post test, equivalent group design to conduct this study. 26 students of Shree PurnaHigher Secondary School were selected as experimental group and 24 students of Saraswati Higher Secondary School were selected as control group on fire coin toss. Achievement test and teaching modules were the main tools for the study.Mean, standard deviation, variance and t-test at 0.05 level significance were used as statistical tools for the study. After the obtained data, it was concluded that boys and girls were similar in learning mathematics and problem solving method of teaching has better achievement then that of the traditional method of teaching.

Like, **Dewan (2011)** did an experimental research on "Effectiveness of problem solving method in teaching arithmetic at grade VI" with the aim to compare the achievement levels of students taught by experimental problem-solving approach to the achievement of students taught by traditional approach. A post test equivalent group design was adopted to conduct the experiment in grade VI. The researcher selected carried out this experiment in two schools of Dhankuta district. Among the population of the study, 46 students were randomly selected with 21 for experimental and 25 for control group. Mean, standard deviation and t-test were used to compare the achievement level of students. She concluded that problem-solving approach of teaching mathematics was better than the usual traditional approach of teaching mathematics.

Similarly Pant (2005) studied on "computational error of grade IV student on operation of fraction in Chitwan district." That study used quantitative research design with sample of 50 students. He developed the test paper as a tool of study. He also used t- test to analyze the data under the 0.05 level of significance. The main findings of this study were:

- Students generally committing more errors in interdiction of fraction that in addition of fraction.
- Students commit more error in subtraction of fraction than in the addition of fraction.
- Errors were higher in the subtraction fraction than in the addition fraction.
- There is no effect of sex to commit the error in areas of operation of fraction considered in her study.

⟩ Students commit more errors comprehension process of addition than in subtraction of fraction

Poudel (2002) concluded in the Master Degree thesis entitled;"The Occurrence of Errors while solving word problems in Mathematics by the Lower Secondary Pupils". He also used Newman techniques in that research by using test paper with sample of 20 students, and he found that:

⟩ There were 4.88% reading, 6.37% comprehension errors, 52 .44% transformation errors, 11.89% process skill errors and 24.42% encoding errors.

⟩ Boys committed less then error then the girls.

Panthi (2009) Studied on An error analysis in equation of grade VII students." She used Newman and Hall technique to identify the errors that study was as a qualitative research with sample of 40 students. She used test paper and interview as a qualitative research with sample of 40 students. She used test paper and interview as a tool of study and she found that:

- Total number of errors committed by the students on verbal problems and on numerical problem were 102 and 52 respectively.

⟩ Total number of errors committed by students showed that about two third of the errors were committed by students on solving verbal type problem.

⟩ Girls committed more errors then boys.

⟩ Students committed more error at comprehension level and which solving problem by the terms on the terms on the problem which may due to less practices.

⟩ Students committed more error while switching the addends and using number line operation too.

Angdambe (1997) Explained in his master degree thesis entitled " A Study on Computational Errors of Grade V students on operation of fraction in Terathum district "That ;

⟩   There is no effect of sex in committing errors in areas of operations of fraction.

⟩   Students commit more error in comprehension of process of addition and subtraction.

Ellerton and Clements (1996) carried out 116 students of eight years in twelve classes of five school in new south Wales and Victoria . They found that 80% of the errors occurred at the process skill state. They also reported that different questions produced quit different error patterns. Thus for example ; for the following questions ,forty percent of the error were the process skill variety and only fifteen percent were in the reading or comprehension or transformation categories . Ice-cream cost 85 cents each and apple cost 45 cents each, how much altogether would 7 ice-creams and 5 apples.

Bhat (2003) studied on "An error analysis in quadratic equation at grade ten". This study was mainly focused on the identification and comparison of errors committed by grade ten students in quadratic equation. The main findings of this study were:

⟩   There is no effect of location i.e. rural and urban school students committed equal numbers of errors on understanding, knowledge of solving and application of quadratic equation.

⟩   The role of gender is less important to commit error in understanding knowledge of solving and application of quadratic equation.

⟩   The types of school (Private and Public) are one of the causes to commit less or more error in knowledge of solving and application of quadratic equations.

⟩   Students commit more errors in simplification process and comprehension.

⟩   Students commit more errors in formulation rather than solving the quadratic equation.

been done provide helpful suggestion for significant investigation and brooders the knowledge of researcher in related area (Best and Kahn 2003). In this study, the following theoretical and empirical literatures are reviewed in the following ways.

Theoretical Literature

The review of Theoretical Literature has been made to provide the theoretical basis of study. Theoretical basis of the study plays vital role in the field of research because it helps researcher to describe, different concepts considered in research and to prepare research design. The following theoretical literature was reviewed by the researcher related to the research topic.

Newman's Procedures for Error Analysis

Newman (1977) an Australian language educationist who in the mid 1970's developed systematic procedure for analyzing errors made by students responding to written mathematic tasks. The finding of this study has been sufficiently different from those produced by other error analysis procedures to attract considerable attention from both the international body of mathematics education researcher and teacher of mathematics.

In particular, analysis of data based on the Newman procedure has drawn special attention to

) The influence of language factors on mathematics learning.

) The appropriateness of many remedied mathematics programs in school in which there is an over emphasis on the revision of standard algorithm.

) The importance of developing learning environment in which students learn to "Mathematize" that is to say be able to determine which boundary conditions apply.

According to Newman(1977) , when one wishes to obtain a correct solution to verbal problems like this must ultimately proceed according to the following hierarchy:

Read the problems

Comprehend what is read carry out a mental transformation from the worlds of the questions to the selection of an appropriate mathematical strategy.

Encode the answer in an acceptable written form

Newman used the verbal hierarchy because failure at any level of above sequence world prevent problem solvers form progressing towards a satisfactory solution (unless by change they arrived at a correct solution by faculty reasoning)

Newman (1983) recommended that the following questions or requests be used in interviews which are carried out in order to classify students' error on written mathematics tasks.

- Please read the question to me (reading)
- Tell me what the question is asking you to do (for comprehension errors)
- Tell me what a method you can use to find answer to the question (transformation)
- Tell me what a method you can use to find an answer to the question explain to me what you are doing as you do it (Process skill)
- Now, write down you answer to the question (encoding)

If an incorrect response is given to question then error's are classified according to where the first "break down" occurred in the attempt to get a solution. If pupils who originally get a question wrong got it right when asked by a interviewer to do it once again the interviewer should still make the fine requests in order to obtain information on whether the original error could be attributed to carelessness or motivational factors.

Reading error (R)

An error is defined as reading error if the students hadn't been able to read all verbal's in the question such that he can't grasp all the information given on the question.

Comprehension Error (C)

An error would be classified as comprehension error if the students had been able to read all the questions but hadn't grasp the overall meaning of the words and therefore was not proceed along an appropriate problems solving paths.

Transformation Error (T)

An error was classified as transformation error if the students had understood what the question was asking about but unable to identify the operation sequences of operation needed to solve problems or unable to transform in mathematical expression.

Process Skill Error (P)

An error classified as process skill if the students made the mathematical expression but could not identify the correct operation and did not know the procedure to carry out the solution.

Encoding Error (E)

An error was classified as encoding if the student correctly worked out the solution to the problems but express the solution in the solution is an acceptable written form

Carelessness Error (Ce)

An error is classified as careless error if when the child attempts the questions for the first time he/she gets the incorrect, the interview concaved that the child originally made a careless slip. These errors may occur in any level.

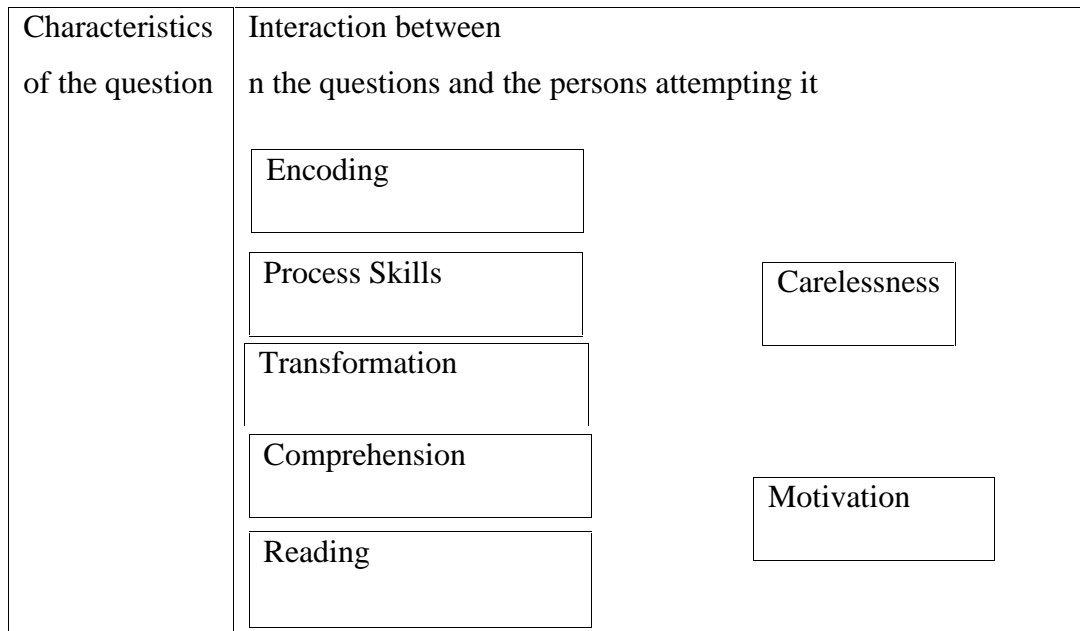This process of the error analysis is summarized in the following diagram.

Characteristics of the question	Interaction between n the questions and the persons attempting it
	Encoding
	Process Skills Carelessness
	Transformation
	Comprehension Motivation
	Reading

Fig -1:Source: the Newman hierarchy of error causes (from Clements, 1980)

Conceptual Framework

A conceptual framework is representation, either graphically or in narrative form of the main concepts or variables and their presumed relationship with other. A conceptual frame work covers the main features (aspects, dimension, factors, variables) of a research and their presumed relationship. To conduct the research on error analysis in solving verbal problems in arithmetic at grade IV,the researcher has read several other thesis, research articles and journals and was performed the study on the basis of following framework.

Fig: 2 method of analysis error committed by students

The above conceptual framework depicts that the types of error committed by students in solving verbal problems. Among them reading error refers whether students read the questions or not. Comprehension refers can student understand the meaning of questions? Transformations refer how students use their prior knowledge in the contacts. Process skill is the skill in which students are able to perform correct mathematical operation accurately. Encoding level is the highest level where students can not resents the verbal problem into correct mathematical output.

As shown in the conceptual framework, the researcher investigate the errors as in the framework then the variables are compared to is other and finally the information will be analyzed.

Chapter III

METHODS AND PROCEDURES

This chapter presents the logistics of the study. It describes the design and procedures of the study, which are to be carried out, achieve the objectives of the study. The chapter explains design of the study, the population, the method of sampling and sample of the study and instruments used to collect data, the statistical procedures used in analysis and interpretation of the results.

Design of the Study

This research was survey followed by qualitative study. A quantitative technique is also used to analysis the data in this research. This study was based on descriptive survey design. It is descriptive because it aims to describe the events or situation addressing the present activities of students. The researcher used Newman techniques as the theoretical base of the study and on the basis of them, result were analyzed.

Population of the Study

All students studying in grade IV of public school and institutional school of Kanchanpur District were considered as the population of this study.

Sample of the study

Many limitations such as time, energy, and money can not allow the researcher to widen and extended the area and scope of this study. Therefore the researcher selected only two public school and two institutional school of Kanchanpur District by random sampling methods, and 10 students from each school including equal number of boys and girls as the sample of this study.

Data Collection Tools

The data collection tools depend on the research design. The relevant data collection tools help to draw more accurate conclusion based on findings of the study. In order to collect relevant data, the following data collection tools were used in this study.

Mathematics Achievement Test (MAT)

This study was closely related to the descriptive survey design in order to analyze the errors made by the students who were studying at grade IV on solving verbal problems of Arithmetic. The researcher developed mathematics achievement test based on the national mathematics curriculum of grade IV by the help of the supervisor. Specifically, the test items were verbal problems of Arithmetic. A set of ten questions were administered, after ensuring validity and reliability of it, within the sample of the study for the purpose of collecting relevant data.

Interview

The interview is a face to face interpersonal role situation in which one person, the interviewer, asks to a person being interviewed, the respondent, question designed to obtain answer pertinent to the research problem(Kahn 2003). The semi-structured interview was used to explore the students' difficulty in solving verbal based arithmetic problems. In this interview same group of students were selected for the purpose of answering the questions. The interview procedures were based on the Newman's interview schedules and questions of the interview were also in the same format.

Reliability and Validity of Data Collection Tools

The content validity of the test was established by its approval from the school teacher and thesis supervisor.

For the reliability, the test questions were carried out from the government prescribed book of Nepal. Those test questions were included for exams time and again. Before making the question researcher had consulted with the subject expert. After making question, test question were observed by the subject expert and thesis supervisor. The reliability and validity of the test was ensured performing Cronach'sAlpha by using SPSS 21.0.The reliability calculating   was performing the value of Cronach's alpha is 0.85, which is very good validity. And the validity of the test was insured by subject expert and national curriculum.

Refinement

The questions were refined by modifying and canceling some of its items according to subject expert and thesis supervisor.

Similarly, to ensure the reliability of the interview, the interview questions were conducted on 16 students that included in pilot study but not sample of the study. The validity of interview becomes grater when the interview is based on a carefully designed structure this ensuing the significant information is elicited. The critical judgment of experts in the field of inquiry is helpful in selecting essential questions (Best and Kahn, 2003).

Data Collection Procedure

The researcher visited the sample schools in order to take permission from mathematics teachers and principals to conduct the study. Then MAT were administered within a number of sample students for the purpose of analyzing the errors committed by students in solving verbal problems of Arithmetic. Then, the answer sheets were scored to categorize different types of errors as mentioned by Newman.

To collect the qualitative data, the interview was conducted in the same group of students. The interview was based on Newman's procedure that categorized caused of errors and some particular responses were noted. The interview process was as follows:

- Please read the question to me (reading)
- Tell me what the questions asking you to do (comprehension)
- Tell me the method you can use to find the answer. (Transformation)
- Show me how you worked out the answer to the question (Process skills)
- Now tell me your answer to the question (Encoding)
- Other similar question was also asked to students so as to obtain more and more information which helped the researcher to analyze the errors more efficiently.

Data Analysis Procedure

Data collected from answer sheets were arranged in the form of tables. Analysis was made in terms of two separate reading. The analysis of the data was started with comparing percentage of frequencies of students under different errors on each of the 10 questions. And then, on the whole, the data was analyzed by comparing percentages of frequencies of students' different errors from institutional schools and public school.

Data collected form interview (On Newman's procedures) was analyzed qualitatively by interpreting response given in the time of interview. The interview data was analyzed based on thematic approach which involves data reduction, data display, and drawing and verifying conclusion. Then finally, the triangulation of the data was proceeded to determine cause of different errors on the whole and to compare causes completion of different errors made by student of institutional and public school. The students gave incorrect response and analyzed as;

) Reading error if the students hadn't been able to correctly read all the words in the question.

) Comprehension error if the student hadn't understand the over all meaning of the question.

) Transformation error if the student's hadn't successes in developing and changing appropriate mathematical expression.

) Process skill errors if the students didn't know the procedure to carry out the operation correctly.

) Encoding error if the students could not express the solution in an exceptionable written form.

The research question of the study was to identify the computation error made by student in the area of knowledge, skill and application and problem of solving verbal problems in Arithmetic. The distribution of error was presented according to percentage. Similarly the distribution of two area of error with respect to school was presented to calculate percentage and analysis them.

Chapter- IV

ANALYSIS AND INTERPRETATION OF DATA

This chapter deals with the analysis of data and interpretation of the result. This is descriptive research related to the mathematic of grade IV students in Kanchanpur district has focused on the analysis of students error in solving verbal problems of Arithmetic at grade IV. The objective of this study were to find the error of grade IV students in solving verbal problem of Arithmetic and to compare this error made by students of public school and private school in different levels of error's in solving verbal problem. Also it intends to find the way of minimizing the error of solving verbal problem of arithmetic.

There were 40 sample students of grade IV which were selected randomly from public school and institutional school equally. The researcher was administered test paper of sample students in these school, the researcher selected 10 questions from the set of questions made by researcher. After taking test, eight answer sheet from the group of institutional school and eight from the public school were analyzed detail. Eight students from institutional schools and eight students from public schools were selected for the purpose of interview. After analysis the answer sheet researcher selected eight student from institutional schools and eight from public schools for in depth interview by Newman procedure. The researcher asked five questions in each student which were related to the mistakes made by students in their answer sheet. The errors committed by the students in their answers sheet were identified. Lastly, such errors were categorized by five types such as process skill error, transformation error, encoding error, comprehension error and reading error.

Classification of Error According to Newman

Students had to follow various steps to solve the problem. Several error might be committed in these steps. According to Newman while solving verbal problem, error might be committed in five steps. For this purpose Newman was categorizes error into reading error, comprehension error, transformation error, process skill error and encoding error, Error found in question while implementing. Errors were collected from interview too. The errors were kept in reading error when the students

were unable to read the question properly. This error was found by giving them to read the question. The error when they were unable to receive what the question asked. It was finding through answer sheet and interview. The error was kept under transformation error when the students were unable to change verbal problem into mathematical expression. The error was categorized under process error when the committed error in processing the answer. At last, the error was kept in encoding error when they committed the error in verbal answer. In this way the errors are categorized in the following table:

Table no. *1 Classification of error on solving verbal problem.*

	Reading error	Comprehension Error	Transformation Error	Process skill	Encoding error	Total
No. of error	0	63	54	47	31	195
Percent	0	32.3%	27.69%	24.20%	15.89%	100%

The above table shows that there were40 sample students in this study out of 80 students, the researcher selectedequal number of students from institutional school and public school.

There is no any error committed by student in reading the question, its shows that all students are able to read question properly. There were 63 comprehension errors out of 195 errors which is about 32.3%. There were 47 process skill errors out of 195 errors. It is about 24.20% and there were 31 encoding error, it is about 15.89%. There were 54 transformation errors it is about 27.69%. This shows that comprehension error committed more than other errors.

a) **Reading Error**

An error was classified as reading error if the students did not recognize key words or symbol given on the question for this the investigator said to student "please read the question to me"? All the sample students were able to read the question easily. It means in this research, researcher does not get any error in reading skills.

b) **Comprehension Error**

An error was classified as comprehension error if the students can read the problem properly but cannot understand the meaning of key words or symbol of the

problem. If the occurrence of error were in comprehension for this the researcher used the question "Tell me what the questions asking you to do?" To find this type of error the researcher asked this type of question for students, If the cost of 10 pens is 50 what is the cost of 17 pens?

The comprehension error was found in this type of question. Most of the responses students give wrong answer. There were 63 errors out of 195 errors. It is about 32.3%. This was the highest errors. Some of the comprehension errors committed by the students are illustrated below.

Student had solved the above question as:

After the student had read the question correctly to the interviewer the following conversation took place (R: Researcher S: student)

R: Tell me what the question asking you to do?

S: It is asking me to find the cost of 17 pens.

R: Well, do you know about unitary method to find the cost of 17 pens?

S: To find the cost of pen, we multiplied the cost of pen by the number of pen.

R: Write down your answer of this question.

S:

The interview was continued beward this point, but it was clear from what had been said that the original error should be classified as a comprehension error because the students were able to read all the words in the question correctly but had not grasped the overall mining of the question.
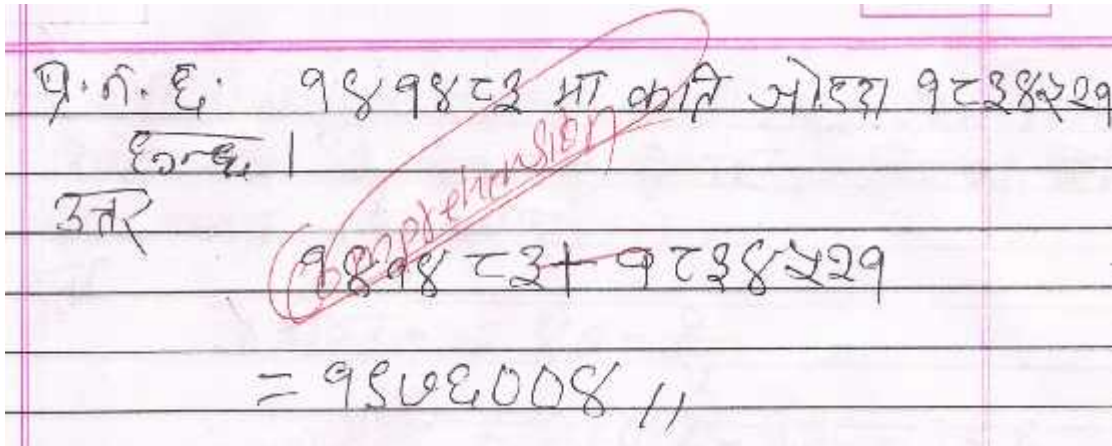
And on another question the solving process of students can be processed as follows:

After reading the question correctly by the students the interviewer adopted the following dialogue (R: researcher, S: Student)

R: Tell me what the question asking to do.

S: It is asking me to find the sum of given number.

R: Now write dawn your answer to the question.

The interview continued beyond this point, but it was clear from what had been said that the original error should be classified as a comprehension error because the student was able to read all the question. He had not any idea to find the number which he had to add.

c) Transformation error

An error was classified on transformation error if the students cannot translate the word problem in to mathematical form. When the researcher used the question "Tell me the method you can use to find the answer'" To found this type of error the researcher asked this type of question for student's there are 45 students in class IV. Among them two out of five are boys. How many numbers of boys and girls are there?

The transformation error was found in this type of question most of the response of the students were correct. There were 54 errors out of 195 errors. It is about 29.69%. This number of error is second highest error of other errors. Some of the errors committed by the student are illustrate below.

Student C had solved above question as.

After reading the question correctly by the student the interviewer adopted following dialogue. (R: Researcher: S: Student)

R: Tell me what the question asking to do?

S: It is asking me to find the number of boys and girls. If there are 2/5 of 45 students are boys are rests are girls.

R: Well, what operation do you work out to find the answer?

S: Using addition.

R: In which numbers do you add each other?

S: 10, 2 and 12.

R: Now write down your answer to the question.

The interview continued beyond this point but it was clear from what had been said that the original error should be classified as a transformation error because the student had understand what the question was asking about the didn't succeed in developing an appropriate strategy.

Similarly the solution process of one another question by students D is presented as fallows.

After the student had read the question correctly to the interviewer the following dialogue took place. (R: Researcher, S: Student)

R: Tell me what the question asking to do?

S: It is asking me to find the number of girls.

R: Well, what operation do you work out to find the question?

S: Umm.

R: Ok now write dawn the operation to the question.

The interview continued beyond this point, but it was clear from that had been said that the original error should be classified as a transformation error because the student has understood what the question was asking about, but didn't succeed in developing an appropriate strategy.

d) Process skill error

An error was classified on process skill error if the student can choose appropriate operation but cannot complete the operation correctly. It is mostly related to 'BODMAS' rule but not only this. In the fourth category if the concurrency of error were in process skill. For this the researcher used the question. Show me now you worked out the answer to the question. To find this type error the researcher asked this type of question for students

The process kill error was found in this type of question process committed by the student. Most of the responses of the students were correct. It is about to 27.63%. Some of the errors committed by the students are illustrate below.

After the student read question correctly to the interviewer, the following

dialogue took place. (R: Researcher, S: Student)

R: Tell me what the question asking to do?

S: It is asking to me to find the quantity of fruits.

R: Well do you know what operation apply in this question?

S: Adding these.

R: Well, write dawn your answer to the question.

The interview was continued this point, but it was clear from what had been said that the original error should be classified as a process skill error because the student had been able to read all the question and had understood what the question asking also select an appropriate strategy but did not know the procedure to carry out the operation correctly.

Similarly the solution process of one another question by student is present below:

After the student had read the question correctly to the interviewer, the following dialogue took place. (R: Researcher S: Student)

R: Tell me what the question asking to do?

S: It is asking me to find the profit percent.

R: Well, what operation do you work out to find the answer?

S: Subtract first then other…..

R: Well, write dawn your answer to the question.

The interview was continued beyond this, but it was clear from what had been said that the original error should be classified as a process skill error because the student had been able to read all the question and had understood what the question

asking also select an appropriate strategy but did not know the procedure to carry out the operation correctly.

e) Encoding error

An error was classified on encoding error if the students can choose appropriate operation and complete the operation correctly but write the answer incorrectly. In the fifth or last category if the occurrence if error were in encoding. For this research used the sentence "please write your answer in acceptable written form"? e.g. find the profit percent if C.P.=300 and S.P.=450.

In this way the researcher found the encoding errors. Most of the responses of the students were correct. There were only 31 errors out of 195 errors. It is about to 15.89%. Some of the errors committed by the students are illustrate below:

Student G had solved above question as:

After the student had read this question correctly to the interviewer, the following dialogue took place. (R: Researcher, S: student)

R: what does the question asking to do?

S: It is asking me to find the profit percent.

R: well, do you know how to find the profit percent?

S: yes, profit%= profit/C.P. X 100

R: Now write down your answer to the question

S:

The interview was continued beyond this point, but it was clear from what had been said that the original error should be classified as a encoding error because the student had worked out the solution correctly to the problem but couldn't express the solution in an acceptable written form.

Similarly the solution process of one another question by student

H presented below:

After the student had read the question correctly to the interview, the following dialogue took place. (R: Researcher, S: student)
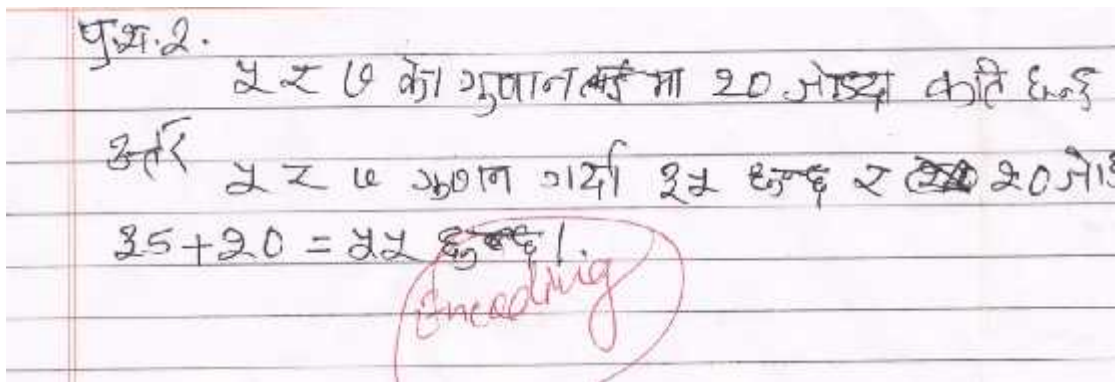
R: tell me what the question asking you to do?

S: It is asking me to find the number multiplying 5 and 7 then adding 20.

R: well, tell me what method you can use to simplify this problem?

S: first multiplying 5 and 7 then adding 20.

R: Now write down your answer to the question.

The interview was continued beyond this point, but it was clear from what had been said that the original error should be classified as an encoding error because the student had worked out the solution correctly to the problem but couldn't express the solution in an acceptable form answer correctly.

Comparison of Errors Committed by Institutional & Public School Students

The second objective of this study was to compare errors made by public school student and institutional school students in different level of error in solving verbal problem of mathematics. Most of the students take mathematics as a difficult

subject. Out of other branch of mathematics the difficult. To find the error committed by the public school student and institutional school student, the researcher selected 20 students from public school and 20 students from institutional school. Among them eight public school student and institutional school student were selected forms each sample school. The researcher took interview with these students of find the no of error and level of error and the percentage of errors, which are presented in table below:

Table no:2*Comparison of public & institutional school errors by error type*.

Types of Error						
	Reading	Comprehension	Transformation	Process	Encoding	Total
Public school	0	40(63.49%)	29(53.7%)	26(55.31%)	28(58.06%)	123
Institutional	0	23(36.51%)	25(46.29%)	21(44.68%)	13(41.93%)	72
Total	0	63	54	47	31	195

The above table 2 shows that, students of public school were committed 123 errors out of 195 errors. It was about 63.03%. And the students of institutional school were committed 72 errors out of 195 errors which is 36.92%. It shows that in whole there is more difference between error committed by the students of public school and the students of institutional school in solving verbal problems.

In the reading error, there is not any error committed by the students of public school and institutional school, it shows that all students are able to read question properly.

The second error was comprehensive error, the students of public school were committed 40 errors out of 63 errors. It was 63.49% and the student of institutional school students were committed 23 errors out of 63 errors. It was 36.51%. It shows that in comprehension error the student of public school committed more errors then the students of institutional school.

The third error was transformation error, the students of public school were committed 29 errors out of 54 errors. It was 53.71% and the students of institutional

school were committed 25 errors. It was 46.29%. It also shows that the students of public school committed more transformation error than the students of institutional school.

The forth error was process skill error; in this case the students of public school   committed 26 errors out of 47 errors. It was 55.31% and the students of institutional school committed 21 errors out of 47 errors. It was 44.68%.It shows that there is little bit difference between the error committed by both of public and institutional school students.

The last error was encoding error, in this error the student of public school committed 21 errors out of 31 errors. It was 58.06% and the institutional school students committed 13 errors out of 31 errors. It was 41.93%. This shows that the student of public school committed more encoding errors then the institutional school students.

In conclusion, there is significant difference between the error committed by the students of public school and the students of institutional school in different levels. The student of public school committed more errors than the students of institutional school in every level of errors classified by Newman.

The Ways Minimizing Error in Different Stages

The third objective of this study was to find the way of minimizing errors in solving word problem of grade IV students. Errors were identified through the test. And to find the error in different level, researcher took interview by Newman's procedure. Next, researcher had to find the ways to minimize such type of error. To find the researcher found the conclusions which are bellow in different topic. Errors/mistakes are seemed in simple in solving the verbal problems. In this research, the researcher discussed to their respected class teacher in related on regarding that have to minimize the error in different stage/level to solve the verbal problem in mathematics.

Way to Minimize Reading Errors

In this research, researcher would not find the reading error. If this kind of errors seemed, it is necessary to develop reading habit on students. In some cases, the

lack of students careless and motivation, this kind of error seems where the students may give rapid answer. This error may reduce by concentrating students while reading the questions.

At the time of discussion with the teacher we find these ideas may follow to reduce reading error.

) Give the knowledge of mathematical symbols in learning mathematics.
) Teacher should focus for reading question on classroom.
) Some of the cases it may bring the problem because of sound, so help them to clear pronunciation.

In conclusion, poor background of language, misconception of mathematical terms, symbols, mother tongue of students, voice of respondent were the responsible causes of reading errors. To minimize this error teacher should try to minimize these cause, in addition, to minimize the error, teacher needs to encourage the students to read question correctly. Teacher should pay special attention to the language.

Way to Minimize Comprehension Errors

This error was kept under the comprehension error when students were unable to receive what the question asked or student were unable to give the meaning of typical word. Students were committed 63 errors out of 195 errors. It was about 32.30%. At the time of discussion with teacher way comprehension error may be reduced. These errors appear almost students and we cannot remember the pre requisite knowledge and environment of the classroom where the students can't learn one by one. For this following ideas are helpful for reducing comprehension error in students.

) Give the knowledge before starting the lesson.
) Teach them by dividing their ability, interest and wishing.
) Involve them actively in class not only listening.
) Create reading environment at home.
) Try to improve his level in which level he/she is poor.
) Check homework and class work regularly and improve the error in comprehension individually.

) Make attention to teacher's explanations.

) Try to improve classroom management.

) Involve them to mathematical quiz, which to remember to pre request knowledge.

In conclusion, comprehension error occurred due to monotonous environment, own meaning, lack of knowledge of technical terms and symbols, lack of attention to the teachers' explanation. To minimize the comprehension error teacher should try to minimize these causes. To minimize the comprehension error the mathematics teacher need to give fundamental knowledge about the topic before starting the new chapter. Opportunity should be given to the students to express the question in their own words after reading. Also these errors can minimize by applying mathematical games and quiz in teaching learning process.

Way to Minimize Transformation Errors

An error was classified on transformation error if the students had understood what the questions ask but was unable to transform sentence into mathematical form and unable to choose appropriate operation. In this level students committed 54 errors out of 195 errors. It was 27.69%. At the time of discussion with teacher we find if we follow the following way transformation errors may be reduced.

) Clarify the students about the mathematical words' concept and meaning.

) Practice them as many as about choosing appropriate operation,

) While teaching in the classroom teacher should careful how to use operation and where.

) Check and find about student's pre knowledge of pre class, and give suitable feedback and motivation.

) Focus meaning of question and which operation is used for this, then solving the problem.

) Make students to discuss actively on classroom.

In conclusion, transformation errors are occurred due to incomplete explanation, un clarifying the problem, lack of mathematical concept, cannot choose appropriate operation, skill and more emphasis on calculation part on mathematics. So minimize the error teacher should focus above point. To minimize the transformation

error the teacher should give clear concept about mathematical terms which are used in respective topic.

Way to Minimize Process Skill Errors

An error was classified as process skill error when students were unable to identify the correct operation and did not know the procedures to carry out these operations accurately. In this level, students were committed 47 errors out of 195 errors. It was 24.10%. At the time of discussion with respective teacher, if we can follow the following way, we can minimize process skill errors.

) To focus the student in BODMAS rule.

) To learn the problems having mathematical operation according to rule.

) Teacher should focus the practice than explanation.

) To keep students out of bore/tired, it is better to use different techniques.

) To construct the good environment for students actively practice to their interested subject.

) Teachers should avoid lack of teaching material and should use properly teaching material which helps students to construct the conceptual structure vary easily.

) To care about process skill error while checking homework and class work and give suitable feedback.

) To direct students where this error occurred.

In conclusion, process skill is occurred due to mix-up of rules, lack of thinking alternatively, not concentrate teachers' explanation properly, less practicing mathematical word problem, less careens in solving word Problem. So the minimized this type of error teacher should care these point. To minimize the errors teachers must force the students to solve the problem time and again.

Way to Minimize Encoding Errors

An error was classified as encoding if the students correctly choose operation and correct process but could not express the solution or answer in acceptable written form. In this level, students were committed just only 31 errors out of 195 errors. It

was about 15.89%. At the time of discussion with teacher we find if we follow the following way encoding errors may be reduced.

⟩ Teachers and students only think that how to find out answer but this errors seems without thinking the causes that how answer has come and to solve it, make the habit of attention.

⟩ To discourage the students habit to write fast answer.

⟩ To knowledge the students while solving the word problem, the answer should also write in word.

⟩ To focus in giving answer to join part answer of the question.

⟩ To focus the proper utilization of time.

⟩ Focus on the class work and homework.

In conclusion encoding error is occurred due to carelessness, importance is given to finding the answer and less important to arranging the procedure. Can't utilize time properly. So the minimized this type of error should care these point.

Chapter- V

SUMMARY, FINDINGS, CONCLUSION AND RECOMMENDATIONS

This chapter deals with the summary, finding, conclusion and recommendations concerning the analysis of error on solving verbal problem at primary level. This chapter is divided into four sections, summary with finding conclusion recommendation and suggestion for further study.

Summary of the Study

The study is related to the error analysis of grade IV Students in solving verbal problems of mathematics. All the students of grade IV studying in kanchanpur District were the population of this study. All the students of grade IV studying in selected four schools situated at urban area of kanchanpur District were sample of this study. The researcher selected 40 students in these four schools. Among them 20 were from public school and 20 were from institutional school. The researcher took an exam at whole class. After checking answer sheet the researcher selected 8 students from public school and 8 students from institutional school in each school which were committed maximum errors for in depth interview. The objective of the study wereto find out the error of grade IV students on solving word problem in of mathematics, compare error made by students from public school and institutional school in different level of error in solving verbal problem of mathematics and find the way of minimizing the error of grade IV students on solving verbal problem of mathematics. This study was based on descriptive survey design.

Finding of the Study

From the analysis and interpretation of data following findings were

) The total numbers of error committed by students are 195. Out of 195 errors no any error was found on reading, 63 on comprehension, 54 on transformation, 47 on process skill and 31 on encoding.

) In solving verbal problem, any error were not found in reading level and most of the errors were found in comprehension, transformation, process skill and encoding respectively.

) Students have difficulties to give meaning of mathematic terms like as: meaning of unitary method, profit and loss etc. So comprehension errors were occurred highly.

) Some students confused on the meaning of the mathematical words used in verbal problem by attaching their own meaning to them.

) Maximum numbers of students were unable to choose appropriate operation. So transformation error was highly occurred.

) Students from public school and students from institutional school committed different types of error in solving verbal problems.

) The errors committed by public &institutionalschool students are different in each aspect.

) Comprehension error were appeared by the lack of pre-requisite knowledge, lack of knowledge of mathematical term, less emphasis on explanation and less participant in class. So to minimize this error teacher should aware these causes.

) Transformation errors were appeared by the lack of concept and meaning of mathematical terms, less emphasis on explanation and less participant in class.

) Process skill error were appeared by the lack of solving skill, lack of careless and motivation, not listening teacher's explanation, lack of thinking alternative, not listening teachers' explanation and less participant in class. So to minimize this error teacher should try to reduce these causes.

) Mostly, encoding errors were appeared by the cause of carelessness and cannot manage time. So to minimize this error teacher should care these causes.

Conclusion

After analysis and interpretation of data the study of student committed maximum error in comprehension after that transformation; process skill and encoding are respectively. Students didn't commit any error in reading level. The role of type of ownership is important for committing the errors in whole. Students were taken as difficult to solve verbal problem. Students were unable to give meaning of mathematical term properly and unable to choose appropriate operation to solving verbal problem. Lack of pre-knowledge, not to participant actively in class, carelessness, can't choose appropriate operation, socio-economic status of students, large class size, study habit of students are cause of error occurrence. To minimize the error, teacher should focus on why and how students make mistake, teach individually and discussion with necessary, try to improve classroom management, to participant in mathematical game and quiz, to help the make home environment for study etc.

Recommendations for Educational Implication

On the basis of finding the following recommendations for the educational implication were made.

) Before starting the chapter, the teacher has to give the fundamental knowledge about the topic.

) Teacher should teach by use material with game and quiz.

) Teachers of mathematics should be aware of the language they use in the classroom. They should use simple language and are mathematical concept should be explained with material with necessary illustration.

) Teacher should use diagnostic test and most identify the area of difficult and most use remedial teaching to avoid the errors.

) Classroom management and teaching material should be managed to minimize the error.

) The teacher should try to find out the reason about committing the errors

) The teacher should discuss with other teacher how to minimize the errors.

) School Administration should gather students, teachers and guardians for open interaction so that problem could be identified easily.

) Teacher always aware about following questions.

- What should be effects of error analysis in the teaching learning of mathematics in the classroom?
- How to errors committed by students can be minimized?
- What will be the impact of individualized instruction in reducing the error committed by students?

Suggestion for further study

The researcher had tried to make some suggestion for further research in this field. Further interested researcher will be benefited from the following suggestions:

) The study area study are of this research should be extended like other development region and other part of country. This type of study can be extended to lower secondary and secondary level including different topics.

) Further, can be comparison other's country and our country to error occurrence of students in different level.

) What will be the impact of individualized instruction in reducing the error committed by students?

) What are the helpful factors to reducing the error committed by students?

REFERENCE

Angdembe, T.R. (1997*). A study on computational errors of grade V students of fraction in teharathun district*, an unpublished Masters' Thesis T.U. Kirtipur.

Best, J.W. & Kahn, J.V. (2003).*Research in education*. New Delhi: PHL Learning Pvt.Ltd.

Bhatt, D.R. (2003)*. Anerror analysis in quadratic equation at grade - X. An unpublished MasterDegreeThesis, Department of Mathematics*Education,T.U.

Bhatt, H.B. (2009). *An error analysis in the problem solving of areas of triangles and quadrilateral at grade X*. An unpublished Master's Degree thesis, Tribhuvan University, Nepal.

Dewan, Y. (2011). *Effectiveness of problem solving method in teaching airthmetics at grade VI.* An unpublished M.Ed. thesis, TU, Kathmandu.

Kafle, B.B. (2006). *An error analysis in proof of the theorem in geometry at grade IX students in Chitwandistrict*.An unpublished Master's thesis, Tribhuvan University, Nepal.

Kandel, K. P. (2007). *A study on effectiveness of teaching problem solving approach on mathematics achievement at grade seven*. An unpublished M.Ed. thesis, T.U, Kathmandu.

Marahatta, B.P. (2002). *A study of computational error on fraction by grade VI students in Chitwan district*. An unpublished Master's thesis, Tribhuvan University, Nepal.

Newman, M.A. (1977). *An analysis of sixth-grade pupils' error on writtenmathematical tasks*. Victorian Institute for Educational Research, 39, 31-43.

Newman, M.A. (1983). *Strategies for diagnosis and remediation.*Sydney: Harcourt, Brace Jovanovinch.

Pandit, R. P. (2007). *Teaching Mathematics in Secondary level*. AnantaPublication Nepal.

Pant, K. (2005). *A study on computationalerror of grade IV students on operation offraction in Chitwan district*. An unpublished Master's Thesis, Tribhuvan University, Nepal.

Panthi, G. (2009), *Studies on "An error analysis in equation of Grade VII students"* An unpublished Master thesis, Submitted CDME, thesis, T.U.Kirtipur.

Parajuli, M.(2009). *Effectiveness of teaching mathematics by using the problem solving method in teaching mathematics at secondary level.* An unpublished M.Ed. thesis, TU, Kathmandu.

Paudel, S. (2014). *Effectiveness of problem solving methods in teaching mathematics in Syangja district*. An unpublished M.Ed. thesis, TU, Kathmandu.

Poudel, D.(2002).*The occurrence of errors while solving word problem in mathematics by the lower secondary pupils*, an unpublished Master's Thesis T.U. Kirtipur.

Quaiyam, A. (2003). *A study of students problem–solving behavior in mathematics atsecondary level of Nepal*. (Unpublished Doctoral dissertation) Institute of Advance Studied in Education, University of Lucknow, India.

Robert, L.E. & Davit, A.F. (1968).*Essential of educational measurement*. New Delhi: Prentice Hall of India Pvt. Ltd.

Subedi, R. (2010). *Effectiveness of problem solving method in teaching mathematics at lower secondary level*. An unpublished M.Ed. thesis, Submitted to CDMET.U., Kathmandu

Upadhyay, H. P. (2007). The *type of error mostly done by the students of grade V in Janakpur Municipality*. An unpublished Master's Thesis T.U. Kirtipur.

Upadhyay, H. P. (2064). *New trends in mathematics education*. Kathmandu; VidhyarthiParkashan Pvt. Ltd.

Yadav, P. (2008).*Effectiveness of problem solving approach in arithmetic at lower secondary level.* An unpublished masters thesis T.U.Kirtipur.

Appendix:1

Time:- 1:30   Full Marks:- 28

Class:- 4   Pass Marks:- 10

Attempt all the questions?

"Group - A" 6× $2 = 1$

1. If the cost of 10 pens is, 50. What is the cost of 17 pens?
2. What is the value when 20 is added to the product of 5 and 7?
3. If sample bought $\frac{2}{3}$ Kg mango and $\frac{1}{2}$ Kg apple. How much fruits did he buy altogether?
4. Gopal got 68 marks in mathematics and 55.3 marks in social. Find his total marks.
5. Hari bought a chair for Rs. 520 and sold it for Rs. 600. Find his profit.
6. How much number must be added to get 1834521 from 1717803?

"Group - B" Long Question $4 \times 4 = 1$

7. Roshan had Rs. 65. If he spent Rs. 15.45 to buy copy and Rs. 20.25 spent to buy fountain. How much money was let with him?
8. There are 45 students in class 4. Among them $\frac{2}{5}$ are boys. How many numbers of boys and girls are there?
9. Shyam bought watch at price of 300 and sold it for 450. How much percent of profit has he gained?
10. Sachin spent 30% of his monthly income Rs. 5500. How much rupees he spent?

"End"

Best of Luck

Appendix:2

सबै प्रश्नहरु हलगर्नुहोस् ।   ६ × २ = १२

१. यदि १० वटाकलमको मूल्य ५० पर्न जान्छभने १७वटाकलमको मुल्यकतिहुन्छ?

२. ५ र ७को गुणनफलमा २० जोड्दा कतिहुन्छ?

३. यदि समिपले $\frac{2}{3}$ के.जी. आँप र $\frac{1}{2}$ के.जी स्याउ किन्यो भने उसले कुल कति फलफुल किन्यो ?

४. गोपालले गणित विषयमा ६८ र सामाजिकमा ५५.३ अंक प्राप्त गर्‍यो भने उसले जम्मा कति अंक प्राप्त गर्‍यो ?

५. हरिले रु. ५०० मा एउटा कुर्सी किनेर रु. ६०० मा विक्रि गर्‍यो भने उसलाई कति नाफा भयो ?

६. १४१४८३ मा कति जोड्दा १८३४५२१ हुन्छ?

७. रोसनसँग ६५ रुपैयाँ थियो । यदि उसले सो रुपैयाँ मध्ये १५.२५ मा कापी र २०.२५ मा कलम किन्यो भने रोशन सँग अब कति रुपैयाँ बाँकी रह्यो ?

८. कक्षा ४ मा कुल विद्यार्थी संख्या ४५ रहेछ । यदि तिनीहरु मध्ये $\frac{2}{3}$ केटाहरु रहेछन् भने केटीहरुको संख्या पत्ता लगाउनुहोस् ।

९. श्यामले एउटाघडी रु. ३०० माकिनेर रु. ४५० मा विक्रि गर्दा उसलाई कति प्रतिशत नाफा हुन्छ?

१०. सचिनले आफ्नो एक महिनाको आम्दानी रु. ५५०० को ३०% खर्च गर्छ भने उसले कति रुपैयाँखर्च गर्दछ ?

समाप्त

Appendix - 3

S.N.	Name of students	Comprehension	Transformation	Process	Encoding
1	Hari Joshi	1	0	1	2
2	Keshab Bam	2	2	2	1
3	Mahesh Chaudhary	3	1	2	1
4	Purnima Chand	2	2	1	2
5	Renu Bhatt	3	1	1	2
6	MuskanChaudary	3	2	1	1
7	Menuka Nepali	2	1	2	0
8	RupaChaudhary	1	2	2	2
9	Kopila Pant	1	1	1	2
10	Bashant Joshi	3	2	1	2
11	Narendra Bhatt	1	2	2	1
12	BImala Pant	2	0	0	1
13	Anujanepali	2	1	1	1
14	ShikhaChaudhry	3	2	2	1
15	SmarikaChaudary	2	2	1	2
16	NirajTharu	2	1	2	1
17	Mina Panday	2	1	1	2
18	RupeshTharu	1	2	1	2
19	Manju Bhatt	2	2	1	1
20	RukmaTharu	2	2	1	1
	Total	40	29	26	28

Appendix - 4

S.N.	Name Of Student	Comprehension	Transformation	Process	Encoding
1	Puja bist	0	2	1	0
2	Rekha Bhatt	1	1	0	0
3	Sunil Bhatt	1	0	1	1
4	Ashok Panday	2	1	1	1
5	Kopila Joshi	0	1	0	0
6	Suresh josshi	1	2	1	1
7	Yuvraj Joshi	2	1	0	0
8	Mahesh Joshi	0	0	2	1
9	RupeshChaudhary	1	2	1	1
10	Rupa Pant	2	1	1	1
11	Ram Bist	2	1	2	2
12	Ramesh Bist	1	1	1	0
13	Mahesh bhatt	1	0	2	0
1`4	NamunaPanday	1	2	1	1
15	Rahul bhatt	2	2	0	0
16	Durga Pant	0	1	2	1
17	PawanChaudhary	2	2	1	1
18	Kushal Bam	1	1	2	0
19	Sandip Bam	1	2	1	1
20	PuspaChaudhary	2	2	1	1
	Total	23	25	21	13