# ERROR ANALYSIS OF GRADE V STUDENTS IN SOLVING MATHEMATICAL WORD PROBLEM

**A**

**THESIS**
**BY**
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*Letter of Approval*

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**"Error Analysis of Grade V Students in Solving Mathematical Word Problems"**

has been approved for the partial fulfillment of the requirement for Degree of Masters of Education.

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***Letter of Certificate***

This is to certify that Mr. Huma Raj Laudari, a student of academic year 2065/067, with campus Roll No. 1928 /065, Thesis number 930, Exam Roll Number 281259 (2068) and T.U Registration No. 9-2-288-43-2004 has completed this thesis under my supervision during the period prescribed by the rules and regulations of Tribhuvan University, Nepal. This thesis entitled, **"Error Analysis of Grade V Students in Solving Mathematical Word Problems"** has been prepared based on his investigation conducted during the period of Prescribed by the Department of Mathematics Education, Central Department of Education, University Campus, Tribhuvan University, Kirtipur, Kathmandu. I recommend and forward that his thesis be submitted for the evaluation as the partial requirements to award the Degree of Master of Education.

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|---|---|
| …… | ……. |
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…….

Huma Raj Laudari

## ABSTRACT

The study was focused on error analysis based on Newman Error Analysis. The purpose of this study was to identify the error, compare the error msde by boys and girls and find the causes of error way with to minimize these errors in solving word problems at primary levels.

The research design of this study was small survey. The sample for this study consisted 40 students by random sampling and 4 teachers for interview. The researcher developed two types of instruments, test item and interview schedule for students and only interview for teachers. Researcher classified errors on five heading: reading, comprehension, transformation, process skill and encoding. Then frequencies, percentage of error were taken. From this study researcher extended the following conclusion:

- Students committed maximum errors in transformation after that comprehension, process skill and encoding respectively but didn't commit any errors in reading level.
- The role of gender is less important to committing the errors it means there is no significant difference between boys and girls to solve word problem in mathematics.
- Lack of pre knowledge, active less in class, careless, can't choose appropriate operation, socio economics status of students, large class size, study habit of students are causes of error occurrences.
- To minimize the error, teacher should focus on why and how students make mistake, try to improve classroom management, to participant in mathematical game and quiz, helps to make home environment for study.

This study was limited on rural area of Tanahun District of Nepal.

## TABLE OF CONTENT

## ACRONYMS

| | | |
|---|---|---|
| CDT | : | Component Display Theory |
| RCLE | : | Resource Centre Level Exam |
| HSS | : | Higher Secondary School |
| MOE | : | Ministry of Education |
| NBPTS | : | National Board for Professional Teaching Standards |
| WWW | : | Word Wide Wave |
| BC | : | Before Constructivism |

# Chapter I

# INTRODUCTION

## Background of the Study

Mathematics is useful and necessary for day to day activities of human beings. It is more applicable due to the invention of science and technology. It has been long time to discover the important in our world. In addition, these discoveries lead us to technological and industrial area, where the different usage of technological devices occur. In this area, application of mathematics helps to develop and invent such technological devices. Through this application, our life becomes easier. Nowadays, mathematics is the key of all sciences. The World Wide Web (WWW) and other media disseminate of quantitative information. The level of mathematical thinking and problem solving needed in the working area has increased dramatically. In such a Word, those who understand and can do mathematics will have opportunities that others do not. Mathematical competence opens doors to productive . Lack of mathematics competences closes these doors. Students have different abilities, needs and interest. In the present context everyone needs to be able to use mathematics in the working area, and in further study in their personal life. All students deserve an opportunity to understand the power and beauty of mathematics basics that enables them to compute fluently and to solve problems creatively and resourcefully.

It is accepted that mathematics is a tool for management and in industries. In these field use of electronic machine or calculators, is appropriate user of these devices, needs to know the basic concepts of mathematics how word problems transfer into mathematical terms. The recent achievements in all fields are marvelous due to the competitions. They simply reflect our fast moving society and other application of the electronic chips. New mathematics and mathematical model have contributed to make advanced society by giving promise as a basic for the interpretation of phenomena in many disciplines. Therefore, mathematics needs to teach in the school to strengthen the child for developing pupils elementary concepts. Mathematics is a tool, so pupils should enable to use it properly.

The aim of teaching mathematics is to make a capable personnel in the contemporary society with respect to special groups, nation and the world. Primary level is the basic stage acquiring prerequisites for further study.

In mathematics, most of the questions are asked in the form of word so errors are occurred in solving the word problems. This indicates low level of achievement. Goodwill's Skill Builder Practical Maths, (2002) stated as: word problems about both on maths tests and in everyday life. A word problem tells a story. It may also present a situation in terms of numbers or unknown or both. (An unknown also called a variable is a letter or the alphabet that is used to represent an unknown number).

While solving word problems the solver should follow the proper way to meet, the correct result .For this Newman (1983) explained as: A problem wishing to obtain a correct solution to word problem must ultimately proceed according to the following hierarchy:

1) Read the problem.
2) Comprehend what is read.
3) Carry out a mental transformation from the word of the question to the selection of an appropriate mathematical strategy.
4) Apply the process skills demanded by the selected strategy; and
5) Encode the answer in an acceptable written form.

In an effective mathematics program, students learn the reasons to communicate mathematically and become confident in their own mathematical abilities to solve problems in situations that may not be familiar to them. Students need to be equipped as confident, competent, engaged and persistent problem solvers. The key to mathematical competence is learning with understanding so that students are able to give reason for solving problems, and applying their learning to new situations. Students need to be computationally fluency to carry out mathematical procedures flexibly accurately, efficiently, and appropriately. Students need to be able to understand and use mathematics in everyday life. This understanding must be continually strengthened and expanded throughout their educational experiences.

In the past (Before Constructivism) teachers often had negative feeling about the mistake that children would make, regarding them as “unfortunate” events that needed to be eliminated and possibly avoided at all times. However, the strategy of more drill and practice has been replaced by regarding errors as valuable sources of students thinking. As a teacher, it is difficult to escape from children’s mistakes. So it is worthwhile finding out why children make mistakes in the first place. so error analysis is the first step toward doing something relevant which will remove the cause of the mistake.

Error Pattern Analysis provides you an effective and efficient method for diagnosis specific problems students are having with competition. By determining that your student is consistently using an inaccurate procedure for solving computation problems, teacher can provide specific instruction and monitoring to assist the student to use an effective procedure for solving specific types of computations. Additionally, teacher may discover through error pattern analysis that a student does not have an accurate working knowledge of a major mathematical concept. In other words, specific types of error patterns can use that a student not only uses an ineffective procedure to compute a problem, but that the student also does not accurately understand an important mathematical concept. More of error pattern analysis is much more than a diagnostic tool for determining a student's procedural effectiveness; often, it provides you a window for determining that a student lacks basic conceptual understanding. Students who have difficulties in learning mathematics, typically lack important conceptual knowledge. This situation is due to various student learning characteristics as well as instructional factors including: a student's slow rate of processing information relative to instructional pace, lack of sufficient opportunities to respond (practice), lack of specific feedback regarding Misunderstanding or non-understanding, anxiety about mathematics, and visual as well as auditory processing difficulties.

This study provides the effective way of improving curriculum, textbook, instructional strategy and gender gap or difference on mathematics achievement of the girls for their equity, like our daily life problems were asked to find the solution of such problem is the most important. So it is important to diagnose where the errors

were occurred while solving word problem .Hence the topic arises as “Error analysis of Grade V students in solving word problem of mathematics”

Hence the researcher attends to conduct the study in order to compare the occurrence of errors by girls and boys in mathematics performance and by minimizing these errors in achievement and enrolment of the students can be improved.

**Statement of the Problem**

This study is mainly concerned with analysis of mathematics performance; enroll in public primary schools students in rural area of Nepal. At which level of problem solving do the students commit errors in mathematics. The study sought to answer of the following research question:

1. What are the errors of grade V students on solving word problem of mathematics?
2. Is there any difference between the girls and boys in terms of errors in problem solving?
3. How to minimize the errors in solving word problems in Grade V?

**Significant of the Study**

Mathematics is a compulsory subject from primary level to secondary level, so it is compulsory part of school curriculum. In secondary level, it is taught as a compulsory subject and optional subject as well, but in primary level mathematics is compulsory subject. Many research shows that, many students takes mathematics as a difficult subject and Grade V student can’t understand mathematical concept and they cannot solve problem easily. There are many factors taken mathematics attitude towards mathematics, environment, parents’ involvement, motivation, social and economic factors etc. Thus, the researcher focused in this study to analyze the performance of students in mathematics. The main significance of this study were as follows:

- The improvement in the development in the day to day class room teaching.

- This study provided necessary information about educational status of Nepalese rural areas students .
- This study provided information for the government and other agencies about how to make educational plan, polices and their corresponding strategies to promote the academic qualities on This Nepalese rural areas students.
- To know the errors commited by the students and to choose the best way of minimizing it .
- The result of the study would help school administrator, curriculum planner, Guidance councilor, facilitators, students, parents, and future researcher.

**Objective of the Study**

The following are the objective of this study

- To find out the errors of grade V students on solving mathematical word problem.
- To compare errors made by girls and boys in different level of errors in solving mathematicalword problem.
- To find the way of minimizing the errors of grade V students on solving mathematical word problem.

**Delimitation of the Study**

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

- This study was delimited to the error in five stages: reading, comprehension, transformation, process and encoding in solving the word problem.
- This study was concerned where the errors occurred but not why and how.
- This study is delimited on rural area of Tanahun district of Nepal.
- This study is based on samples selected from public schools' students of grade V only.
- All the items of the questionnaire are selected from the previous set of question which is made by RCLE.
- To know the errors committed by the students and to choose the best way of minimizing the error.

**Operational Definition**

**Word problem:** If a problem tells a story and present a situation in term of numbers of unknown both first and last sentence of the problem ask to answer of the question then it is called word problem.

**Error:** The first mistake done by the students during the solution of the problem.

**Reading error:** The error related to the reading of the given word problem.

**Comprehension error:** The error related to the act of understanding the meaning of word problem.

**Translation error:** The error related to translate the word problem in to mathematical word.

**Process error:** The error related to given sequence of work and the nature of events in solving word problem.

**Encoding error:** The error related to formal written form of the solution of word problem.

## Chapter II

## REVIEW OF RELATED LITERATURE

A review of related literature is the source of the further study of research task. It helps to researcher to the research program and gives the better ideas of surveying in the research hypothesis. Then it guides to reach hypothetically near to the conclusion. Thus a review of related literature is important and essential for guideline of research planning. There were several studies in the topic error analysis of mathematics, some of the literature related to this study are as follows:

**Newman** (1977, 1983) maintained that when a person attempted to answer a standard, written mathematics word problem then that person had to be able to pass over a number of successive hurdles: Level 1. Reading (or Decoding), 2. Comprehension ,3 .Transformation, 4. Process Skills, and 5. Encoding . Along the way, it was always possible to make a careless error and there were some who gave incorrect answers because they were not motivated to answer their level of ability. Newman's research generated a large amount of evidence highlighting that for more children experienced difficulty with the semantic structures, the vocabulary, and the symbolism of mathematics than with the standard algorithms. In many Newman studies carried out in schools the proportion of errors first occurring at the Comprehension and Transformation' stages has been large. Thus, studies regularly reported that approximately 70 percent of errors made by Year 7 students on typical mathematics questions were at the Comprehension or Transformation levels. These researchers also found that Reading (Decoding) errors accounted for less than 5 percent of initial errors and the same was true for Process Skills errors, mostly associated with standard numerical operations. Also, Newman's research consistently pointed to the inappropriateness of many remedial mathematics programs in schools in which the revision of standard algorithms was over emphasized, while hardly any attention was given to difficulties associated with Comprehension and Transformation.

**Mayer** (1982) explained problem-solving processes as using different forms of knowledge leading to the goal of solving the problem. According to him, these types of knowledge applied in problem solving consisted of:

- linguistic and factual knowledge – about how to encode statements,
- schema knowledge – about relations among problem types,
- algorithmic knowledge – about how to present distinct procedures, and
- Strategic knowledge – about how to approach problems.

**Mellin-Olsen** (1987) suggested that although the Newman hierarchy was helpful for the teacher, it could conflict with an educator's aspiration "that the learner ought to experience her own capability by developing her own methods and ways." We would maintain that there is no conflict as the Newman hierarchy is not a learning hierarchy in the strict, Gagne (1967) sense of that expression. Newman's framework for the analysis of errors was not put forward as a rigid information processing model of problem solving. The framework was meant to complement rather than to challenge descriptions of problem-solving processes such as those offered by Polya (1973). With the Newman approach the researcher is attempting to stand back and observe an individual's problem-solving efforts from a coordinated perspective; Polya (1973) on the other hand, was most interested in elaborating the richness of what Newman termed comprehension and Transformat.

**Hall** (1989) believes that there is a need to motivate pupils to arouse and sustain their interest in learning mathematics. “Motivation raises question on why people behave in the way they do it.” An individual could therefore, from psychologists’ point of view, be seen as politically, socially and academically motivated depending on the motive behind his or her activities.

**Aremu** (1998) explained that; when pupils express lack of interest in the subject, it affects the way they react or listen to the teacher. And when many of the pupils believe that they cannot pass, the teacher is affected. This is because of this negative response from the pupils, he/she as well is already being confronted by many other factors (e.g., low income, low status in society, large teacher-pupils ratio) and so on. These may cause him or her to resorts to the easiest way of disseminating knowledge that is ‘chalk and talk’ without the use of instructional materials. He may not also bother to vary his teaching styles to suit individuals; therefore, the cycle goes on. One unfortunate outcome of this is that, the negative attitude towards the subject is passed down from one generation of pupils to another and therefore the cycle keeps enlarging. What then could be done to break such a cycle of failure? This has been the

question by many mathematics educators and researchers. A lot of new and modified old methodologies have been proposed to improve performance in the subject. Instructional materials have also been designed and developed to aid mathematics teaching and learning. All these are to help break this cycle of poor performance by motivating pupils to learn mathematics. This issue of motivating learners is seen as an important aspect of effective learning. In fact psychologists believe that motivation is a necessary ingredient for learning. They believe that satisfactory school learning is unlikely to take place in the absence of sufficient motivation to learn (Fontana 1981). The issue as relating to mathematics education would then be, is it possible to motivate pupils to learn mathematics? And how could it be done? One needs to therefore look at the effect of motivation on learning.

**Askew** (2003) suggested that the place and importance of mathematical word problems in the school curriculum have attracted diverse opinions. "Teachers seem not to like word problems. Many have asked me why these are used to 'trick' children in assessments" It is well recognized that students appear to struggle with both the literacy and mathematical demands of typical mathematical word problems.

He explained that if the essence of mathematics is the setting up of working with mathematical models, and if we treat word problems in such a way, then they may have a role to play in helping children better understand the process of mathematizing. And with the increasing mathematizing of the world (from national test scores to pension prospects), informed and critical citizens need to be aware that mathematizing is not something that arises from the world, but something that is done to the world. In a small way, working on word problems might help begin to develop this awareness.

**Clements** (2004) believes that at the upper primary level most errors on mathematics tests and examinations are caused by Reading, Comprehension or Transformation errors, or by Carelessness. Often, pupils are able to carry out one or more of the four operations (+, -, x, ÷) needed to answer a question, but they do not know which operations is to use.

Not surprisingly, there are those who disagree and who argue for the centrality of language in the teaching and learning of mathematics. Others would also argue that

a deeper level of mathematics is needed beyond procedural proficiency, and that a conceptual knowledge of mathematics is the goal. Some would maintain that language provides a vehicle for rich classroom discussions and assists teachers and students to appreciate the power of mathematics in making sense of their world.

**Summary of findings of Newman studies**

In her initial study, Newman (1977a) found that Reading, Comprehension, and Transformation errors made by 124 low-achieving Grade VI pupils accounted for 13%, 22% and 12% respectively of all errors made. Thus, almost half the errors made occurred before the application of process skills. Studies carried out with primary and junior secondary school children by Clements (1980), Watson (1980), and Clarkson (1983) obtained similar results, with about 50% of errors first occurring at the Reading, Comprehension or Transformation stages. Clements's sample included 726 children in Grades 5 to 7 in Melbourne, Watson's study was confined to a preparatory grade in primary school, and Clarkson's sample consisted of 95 Grade 6 students in two community schools in Papua New Guinea.

The consistency of the results emphasised the robustness of the Newman approach, and drew attention to the importance of language factors in mathematics learning. If about 50% of errors made on written mathematical tasks occurred before the application of process skills, then, clearly, remedial mathematics programs needed to pay particular attention to whether the children were able to comprehend the mathematics word problems they were being asked to solve.

**Faulkner** (1992) has used Newman techniques in research investigating the errors made by nurses undergoing a calculation audit . She found that the majority of errors the nurses made were of the comprehension or transformation type. This result, based on adult data, is interesting in that it extends and confirms the findings of recent research (see, for example, Clarkson, 1991; Marinas & Clements, 1990) that a deeper understanding of the sources of the comprehension and transformation categories of errors is vital.

**Ellerton and Clements** (1996) carried out Newman interviews with 116 Year 8 students, in 12 classes in 5 schools in New South Wales and Victoria. Despite the fact that all the teachers of the students agreed that their students should not have had

difficulty comprehending the written tasks-half of which were in multiple-choice form, and the other half in short-answer form-Ellerton and Clements found that that 80% of errors first occurred at the Reading, Comprehension and Transformation stages. Only 6% of errors first occurred at the Process Skills stage.

The **Ellerton and Clements** (1996) study was different from previous Newman studies in that the researchers interviewed students for all questions, including those for which correct responses had been given. In fact, the Newman interviews revealed that for about one-fourth of the correct responses which the students gave they not have a complete grasp of the concepts and skills which the questions were testing. In such cases Newman error categories were attached to these "correct" responses

One last aspect of the **Ellerton and Clements** (1996) study is of interest. They reported that different questions produced quite different error patterns. Thus, for example, for the following question, 40% of the errors were of the Process Skills variety, and only 15% were in the Reading or Comprehension or Transformation categories.

**Marahatta** (2002) Contucted a master thesis entitled “A study on computational errors on fraction by grade VI students in Chitwan district” and he conclude that the mean errors occurring the addition of fraction 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.

**Bhatta** (2003) Conducted a master thesis entitled “An error analysis in quadratic equation at grade X.” This study was mainly focused with identification and comparison of errors committed by grade X students in quadratic equations. He concluded that there is no effect of location committing equal number of errors in understanding knowledge of solving and application of quadratic equation. And the role of gender is less important to commit the errors in understanding knowledge of solving and application of quadratic equation

**Pant** (2005) Conducted a master thesis entitled "computational errors of grade IV students on operation of fraction in Chitwan district." He concluded that errors were higher in the subtraction of fraction than in the addition of fraction. And students commit more errors in comprehension process of addition than in subtraction of fraction.

**Adhikari** (2007) Conducted a research entitled "An error analysis in mensuration of grade IX students in Kathmandu district" and he concludes that there is no significant difference between the errors committed by students in the area of problem solving and knowledge. Similarly, the researcher has found a no significant difference between the errors committed by the students in the area of problem solving, skill and application.

**Sharma** (2009) Conducted a master thesis entitled "An error analysis in solving algebraic problem of grade five students." He concluded that 75% of error occurred at the comprehension, 12%, 5%, 8% of errors occurred on process skill, encoding and careless of studies respectively. And 40%, 34%, 26% error occurred on knowledge level, skill and application level, and problem solving level respectively

The review of the studies that had been focused on the achievement in mathematics performance in different age level, different grade and different country. Most of they were focused to compare the errors committed in mathematics and found that the students in stage of mathematics learning and in other country the studies that had been focused on solving the word problems in different age group. In the light of the errors occurrence mentioned in the above studies, the expectation of the study is that similar type of occurrence of errors committed by the students in solving word problems in Mathematics at grade V.

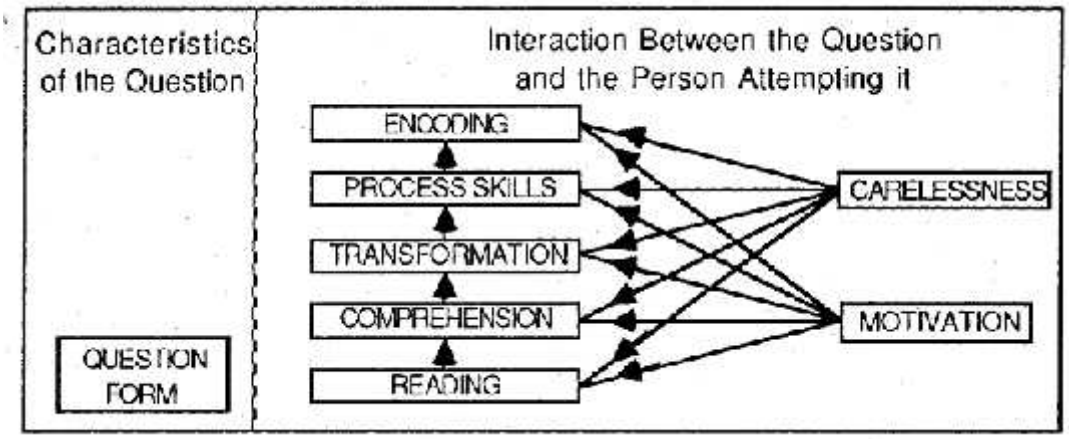
**Conceptual Framework of the Study**

A conceptual framework is a representation, either graphically or in narrative form, of the main concepts or variables, and their presumed relationship with each other. A conceptual frame work covers the main features (aspects, dimensions, factors, variables) of a research and their presumed relationship.

To conduct the research on Error Analysis in solving word problems in Mathematics at Grade V. The researcher has read several other thesis, research articles and Journals. By reading and analyzing those studies, researcher decided to adopt Newman's procedure for analyzing errors on written mathematical tasks as this conceptual framework. According to Newman (1977, 1983), must ultimately proceed according to the following hierarchy to find out the errors and solutions;

1) Read the problems,
2) Comprehend what is read,
3) Carry out a mental transformation from the words of the questions to the selection of an appropriate mathematical strategy;
4) Apply the process skill demanded by the selected strategy; and
5) Encode the answer in an acceptable form.

To understand this concept clearly Clements (1980) illustrated the Newman technique with the following diagram:

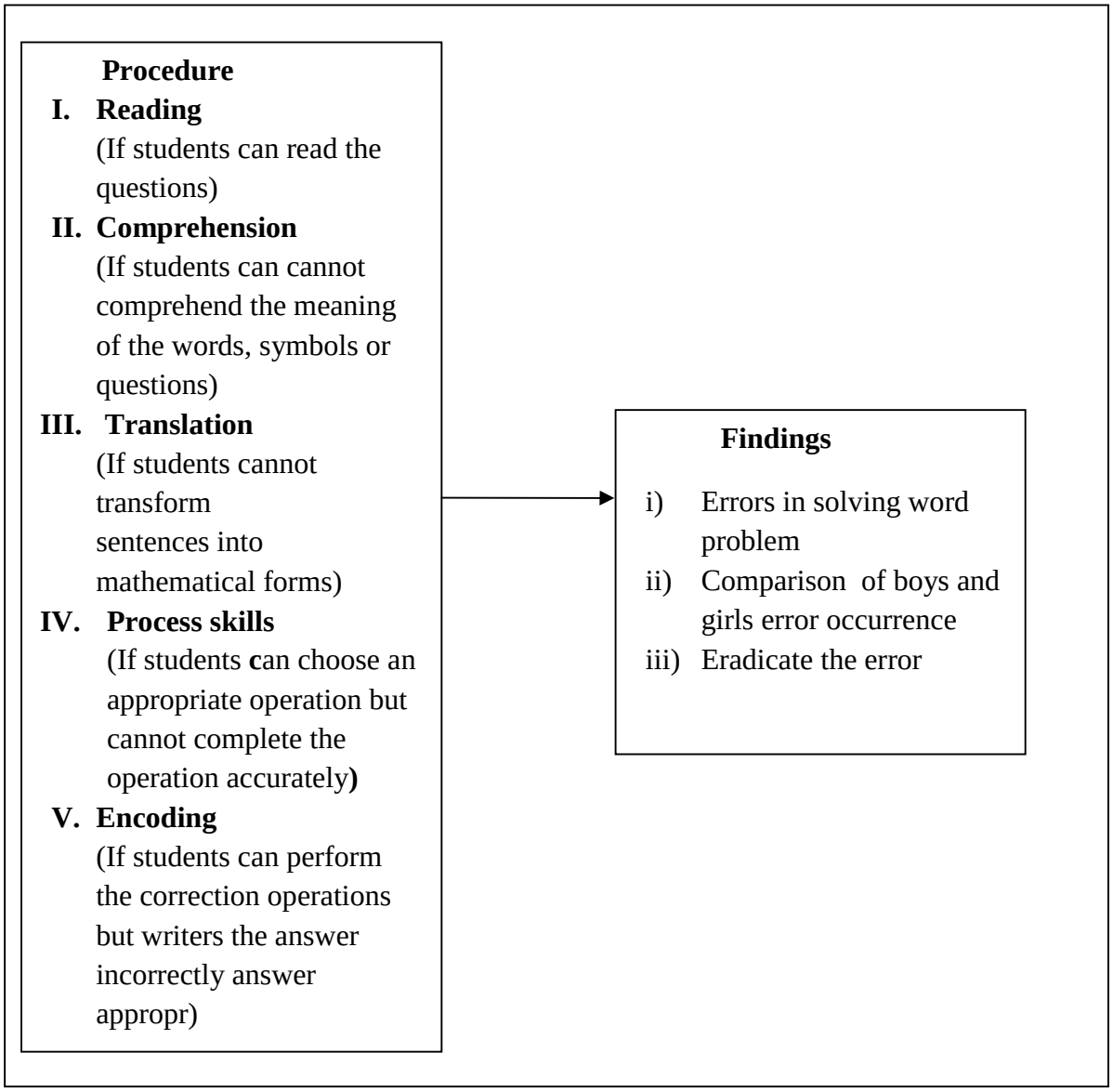



*Source: The Newman hierarchy of error causes (from Clements, 1980).*

In the above diagram, Clements describes the procedures in three forms. According to Clements (1980, p.4), errors due to the form of the question are essentially different from those in the other categories because the sources of difficulty residue fundamentally in the question itself rather than in the interaction between the problem solver and the question. This distinction is represented in figure 1 by the category labeled "Question form" being placed beside the five stages hierarchy. Two other categories, "Carelessness" and "Motivation" have also been shown as separate from the hierarchy although, as indicated, these types of errors can

occur at any stage of the problem solving process. A careless error, for example, could be a reading error, a comprehended error and so on. Similarly, someone had read, comprehended and worded out a appropriate strategy for solving a problems might decline to proceed further in the hierarchy because of a lack of motivation.

Relating with the Newman's hierarchy of errors causes for written mathematical tasks, Researcher have also prepared the following conceptual framework for this study




Like Newman's procedure, The Researcher have included reading, comprehension, translation, process skill and encoding phases in the hierarchical level. The processes of different phases are as below.

I. Reading level: The student cannot read the question (Simple recognition of words and symbols)

II. Comprehension level: The student cannot understand the meaning of the question (Linguistic understanding of problems)

III. Transformation level: The student cannot select the appropriate mathematical operations or procedures (Transformation from linguistic understanding to mathematical interpretation)

IV. Process skills level: The student cannot perform the mathematical calculation or the procedure accurately (Execution of mathematical processing)

V. Encoding level: The student cannot represent the answer appropriately (Representation of results from mathematical processing)

From the above procedure researcher found the errors in solving word problems by grade V students. After that, the researcher compared the errors performed by girls and boys. Then, the researcher discussed with subject teacher to minimize the errors which were performed by students.

This procedure can be conducted by a kind of interview. It was identified at which level students' errors occur in problem solving. According to above process to find out the errors in solving word problems, the researcher have included the interview format as follows:

For example, the Following conversation describes this method. In the transcript below, "I" stands for interviewer and "S" stands for student.

(Problem)

The cost of 12 Pen is one hundred twenty eight rupees. How much does a Pen's cost? (Process of Interview)

I: "Can you read the question?" (Reading level)

S: (Student reads the whole question.)

I: “What does the question ask you to do?” (Comprehension level)
S: “It’s asking me to find a piece of pen, and how much?”
I: “Then, what operation do you work out to find the answer?” (Transformation level)
S: “Using subtraction.” (Error occurred at this level.)
I: “Can you show me your calculation or write it on this paper?” (Process skills)
S: “There are 12 pieces of pen and the cost of 12 pen is 128 so a piece of pen is 128 / 12 = 18.

The interview was continued like this. In this example, the error occurred at the transformation level because of the student’s comprehended what the question is after, but was not able to succeed in developing an appropriate operation. Moreover, in this way, the researcher identified student’s difficulties by Newman Procedure.

# Chapter III
# METHODS AND PROCEDURES

This chapter presents the procedure of the study which was carried to achieve the expected answer of research questions. It explains design of the study, samples, methods of sampling, tools, data collection procedures and data analysis.

## Research Design

The research design of the study was quantitative followed by qualitative methods and procedures. This study was based on descriptive survey design. It was described because it aims to describe the events or situation addressing the present activities of the students. The researcher used the Newman's theory of error analysis as theoretical background and on the basis of them, result was analyzed.

## Population of the Study

All students studying in Grade V of Government Schools running classes from Grade V situated in rural location of Tanahun District were considered as the population of this study.

## Samples 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 four different public schools from rural area of Tanahun district by purposive sampling methods, and 10 students from each schools including equal number of boys and girls.(poor,normal and best student are selected by using Mathematics teacher ) were selected as the sample of this study.

**Instrument**

**Test Items**

To get the reliable data the researcher had developed the diagnostic test on knowledge, skill, application and problem - solving word problem of question set had made to meet the objectives. For the content validity, standardization, the researcher selected the word problem from the previous annual examinations question set (2069 BS) of Grade V of Tanahun District.

**Interview with Students**

The researcher interviewed for these selected students who committed errors while solving word problem. Each question had been asked in five stages. Student who made maximum errors were selected and the following errors can be occurred on written mathematical tasks:

1) Please read the question carefully. If you don't know a word, leave it out.
2) Tell me what the question is asking you to do.
3) Tell me how you are going to find the answer.
4) Show me what you should do to get the answer.
5) Now, write down your answer to the question.

**Focus group discussion with Teacher**

After finding the errors and comparision committed by boys and girls, the researcher had discussed the respective class teacher of this school at the topic of how to minimize the errors in solving word problem in mathematics with open ended interview. The open ended interview was developed by following bases with focus on minimizing error occurred in different stages.

- Students study habits and seriousness
- Teachers' role and relation with students
- Students' home environment
- Homework class work and test
- Motivation and carelessness

**Data Collection Procedure**

The diagnostic test was administered fof sampled students of Grade V of selected school. Therefore collection of reliable data were very essential part of research. For this study, the researcher had visited the selected public school to collect the data. First of all researchers had met the head teacher and mathematics teacher of the respective school and asked permission for the research work. The class teacher was requested to provide their co-operation to collect the data for the study.

The researcher went to the class with class teacher and made clear to the students for the purpose of this study and the test. The researcher tried to make confident that the result of the test would not affect in their final examination and their position. Further, they were informed to give answer freely and fearlessly. The researcher gave the necessary instruction to the students how to give answer the question with examples. Then the test was administered to the students select for the sample. The researcher selected those types of students who committed errors in solving word problem.

At the time of data collection, the researcher took special case to ensure that each student was asked to follow the instruction of the test. If any items were unclear, that the teacher would explain individually.

**Data Analysis Procedure**

In this study, researcher used the test item and interviewed with students to find out the levels of errors and discussed with teacher to find out the way of minimizing the error occurrence in solving word problems. Then the collected data was classified to headings: reading, comprehension, translation, process and encoding error. After classifying the error, the researcher found out the frequencies of each errors and found the percentage to illustrate where the highly error occurred.

Student were divided into 4 groups and different marks were provided, 0 for the low,1 for the middle, 2 for the good and 3 marks for the excellent students and who got below 25% are low students, 25% to 50% medium, 50% to 75% good and above 75% are excellent students.

## 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 mathematics of Grade V students in rural area of Tanahun District. This study has focused on the error analysis in solving word problem at grade V. The objective of this study were to find the error of grade V students in solving word problem of mathematics and to compare these error made by boys and girls in different levels of error in solving word problem. Also it intends to find the way of minimizing the error of solving word problem of mathematics. The selected school are Kalika Primary School Chok -4, Jana Jagriti Secondary School, Chok -2, Chandika Primary School Basantapur -8, Purkot Sccondary School, Basantapur-5 in Tanahun District.

There were 66 students in grade V of these four schools. Among them 34 were girls and 32 boys. First of all the researcher was administered text paper of sample students in these school. The researcher selected 10 questions from the previous set of questions, which were made by Resource Centre Level Examination Tanahun. After takes test , these answer sheet the researcher selected 5 girls and 5 boys for in-depth interview by Newman procedure. The researcher asked 5 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 categories by five types such as: reading error, comprehension error, translation error, process skill error and encoding errors.

### Classification of Error According to Newman Technique of Error Analysis

Polya suggested that student have to solve the word problem. So several error might be committed in that step. According to Newman, while solving word problem, error might be committed in five steps. These are reading error, comprehension error, transformation error, process skill error and encoding error. Error found in question while implementing test were categories according to Newman's technique of error analysis. Errors were collected from interview too. The error was kept in reading error where the students unable to read the question properly. This error was found by

giving them question to read. The error was kept under the comprehension error when they were unable to receive what the question asked. The error was kept under transformation error, when the students were unable to change word problem into mathematics expression. The error was kept under process error when they 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 committed by the students are categories in the following table

**Table no: 1**

**Classification of Error Students**

| | Reading error | Comprehension error | Transformations error | Process skill error | Encoding error | Total |
|---|---|---|---|---|---|---|
| No. of error | 0 | 39 | 44 | 28 | 9 | 120 |
| percent | 0 | 32.5 | 36.67 | 23.33 | 7.5 | 100 |

The above table shows that, there were 66 student in grade V. Out of 40 students, researcher selected 20 boys and 20 girls students. In the reading error, there is not any error committed by student its shows that all students are able to read question properly. There were 39 comprehension errors, out of 120 errors. It is about to 32.5% also there were 28 process skill errors out of 120 errors. It is about 23.33% and there were only 9 Encoding errors out of 120 errors it is about 7.5%. This shows that transformation errors committed more then other errors.

a) **Reading Error**: An error was classified as reading error if the students do not recognize key words or symbols given on the question. For this the investigator used the question “can you read the question?” All students managed to read the question easily. It means in this research, researcher cannot get any error in reading skill.

b) **Comprehension Error**: An error was classified as comprehension error if the students can read the problem fairly but can not understand the meaning of

key words or symbol of the problem. if the occurance of error were in comprehension. For this the researcher used the question "what does the question ask you to do?" To find this type of error the researcher asked this type of question for students, what is the area of a square where the length is 30 cm?

The comprehension error was found in this type of question.Most of the responses of the students were correct. There were 39 errors out of 120 errors. It is about to 32.5%. This was a second highest error. Some of the comprehension errors committed by the students are illustrate below:

Student A had solved the above question as:

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

R: what does the question ask to do?

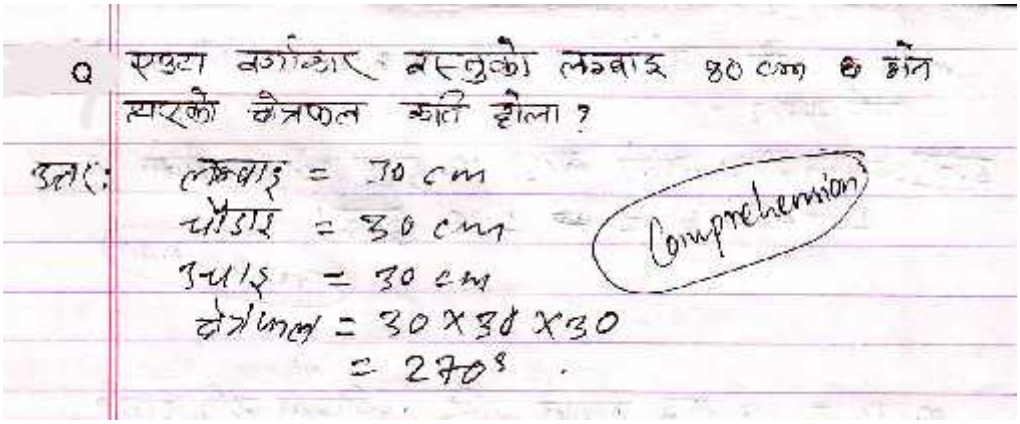
S: it is asking me to find area of square which has 30 cm of length.

R: well, do you know about square thing, and how to find the area of such things?

S: Square thing means that things which have all sides are equal and A = l×b×h.

I: Now write down your answer of these 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 comprehension error

because the student were able to read all the words in the question but hadn't grasp the overall meaning of the question.

And on the another question the solving process of Student B as fallows:

After reading the question correctly by the students the interviewer, adopted the following dialogue . (R: Reasearcher, S: student)

R: what does the question ask to do?

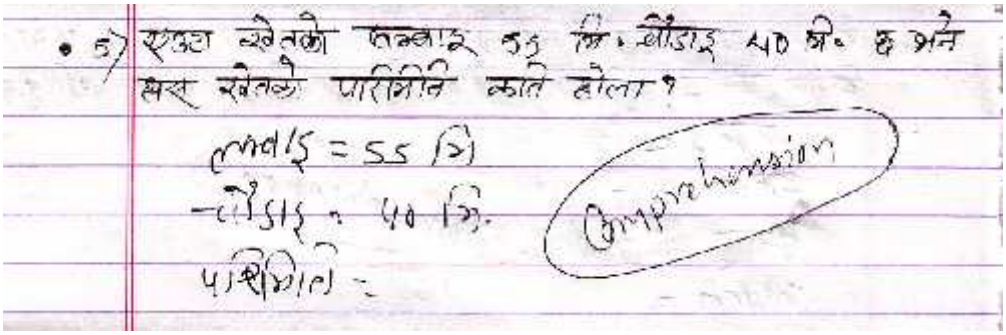
S: it is asking me to find perimeter of field.

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

S: umm, umm.

R: ok, now write down your answer to the question.

S:




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 had been able to read all the question but hadn't grasp the overall meaning of the question. He had not any idea to find the perimeter.

c) **Transformation Error**: An error was classified on transformation error if the students cannot translate the word problem in to mathematical word or cannot select appropriate mathematical operation . The researcher used the question "what operation do you work out to find the answer?"To find this type of error the researcher asked this type of question for students, How much interest of Rs. 100 in 6 years if the interest of one year is Rs. 12?

The transformation error was found in this type of question. Most of the responses of the students were correct. There were 44 errors out of 120 errors. It is

about to 36.67%. This number of error is highest error of other error. Some of the errors committed by the students are illustrate below:

Student C had solved above question as:

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

R: what does the question ask to do?

S: It is asking me to find the interest of Rs 100's of 6 years at the rate of 12.

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

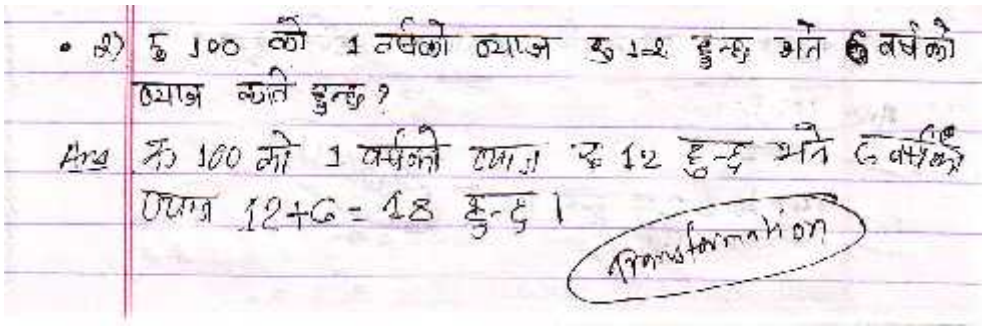
S: using addition.

R: In which numbers do you add each other?

S: 12 and 6.

R: Now write down your answer to the question

S:




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 but didn't succeed in developing an appropriate strategy.

Similarly the solution process of one another question by Students D is presented as follows:

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

R: what does the question ask to do?

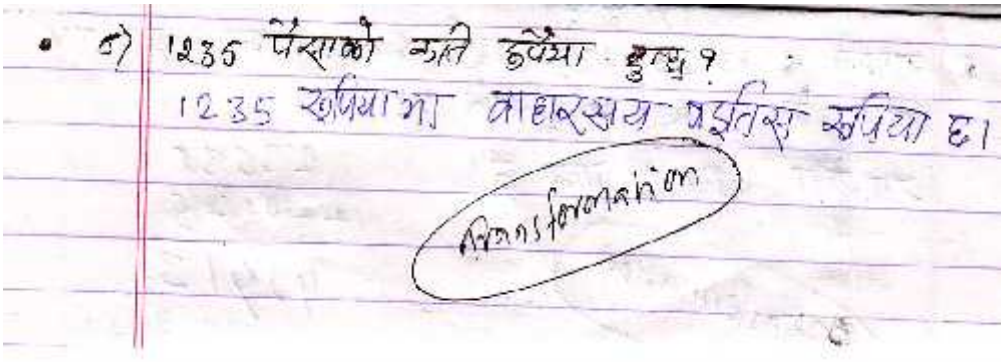
S: It is asking me to find rupees in 1235 paisa.

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

S: umm, operation? Umm,

R: ok, now write down your answer to the question

S:




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 had understand what the question was asking about but didn't succeed in developing an appropriate strategy.

**Process skill error**: An error was classified on process skill error if the students can choose appropriate operation but cannot complete the operation correctly. It is mostly related to BODMAS rule but not only this. In the forth category if the occurrence of error were in process skill. For this the researcher used the question "can you show me your calculation or write it on this paper?", To find this type of error the researcher asked this type of question for students, what is the number if 15 is multiply by 3 and adding with 7. The students response was as follows:

After reading the question correctly by the students the interviewer, the following dialogue took place. (R: Researcher, S: student)

R: can you show me your calculation or write it on this paper?

S: 15✕3+7

=15✕10

=150

The process skill error was found in this type of question process committed by the student. Most of the responses of the students were correct. There were 28 errors out of 120 errors. It is about to 23.33%. Some of the errors committed by the students are illustrate below:

Student E had solved the question as:

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

R: what does the question ask to do?

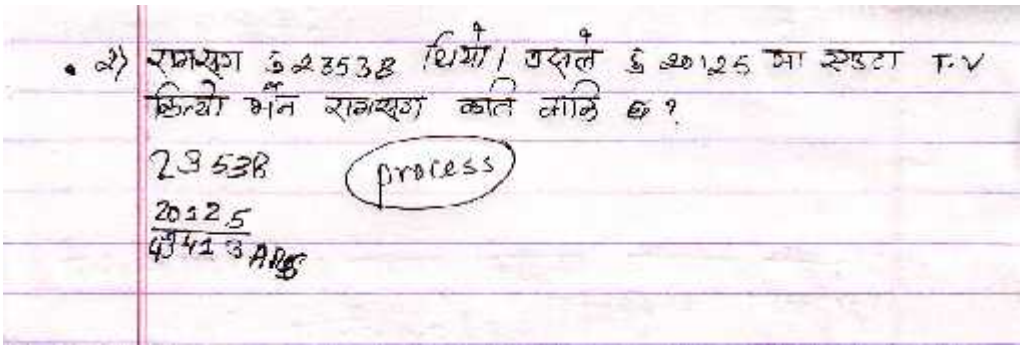
S: It is asking me to find left money after brought a TV.

R: well, what operation do you apply work to find the answer?

S: using subtraction.

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 process Skill error because the student had been able to read all the question and had understand what the question was asking also select an appropriate strategy but didn't know the procedure to carry out the operation correctly.

Similarly the solution process of one another question by Student F is presented below:

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

R: what does the question ask to do?

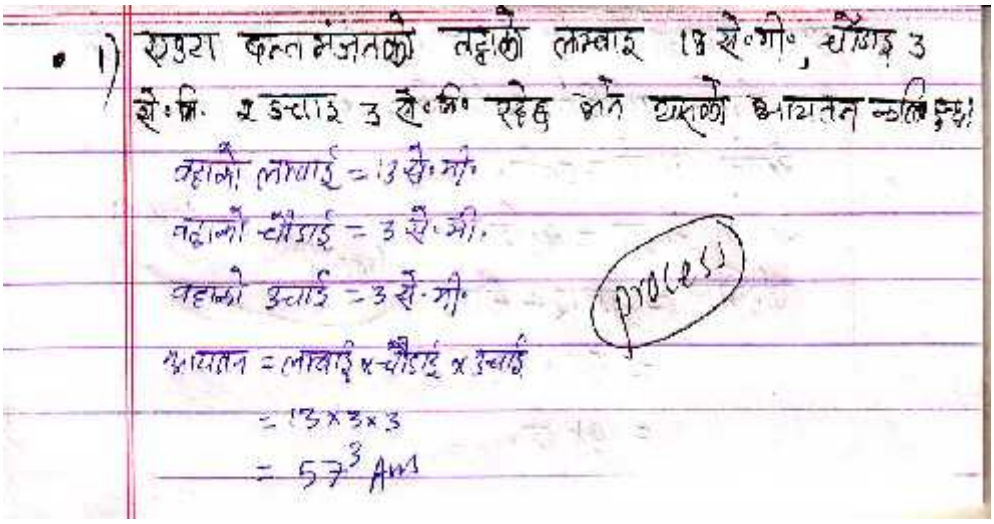
S: It is asking me to find volume of the box.

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

S: to multiply length, breadth and height.

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 process Skill error because the student had been able toidentify the correct operation but didn't know the procedure to carry out the operation correctly.

d) **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 the researcher used the sentence "please write your answer in acceptable written form"? To find this type of error the researcher asked this type of question for students, A toothpaste box has length 13 cm, breath 3 cm and height 3cm, find the volume of that box?

In this way the researcher found the encoding errors. Most of the responses of the students were correct. There were only 9 errors out of 120 errors. It is about to 7.5%. Some of the errors committed by the students are illustrate below:

Student G had solved above question as:

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

R: what does the question ask to do?

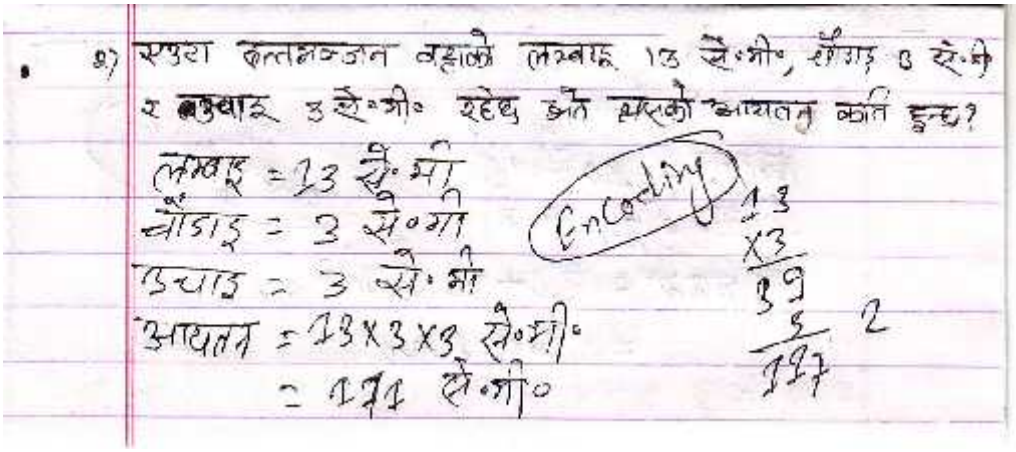
S: It is asking me to find the volume of box.

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

S: yes, V=l X b X h

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 interviewer, the following dialogue took place. (R: Researcher, S: student)

R: what does the question ask to do?

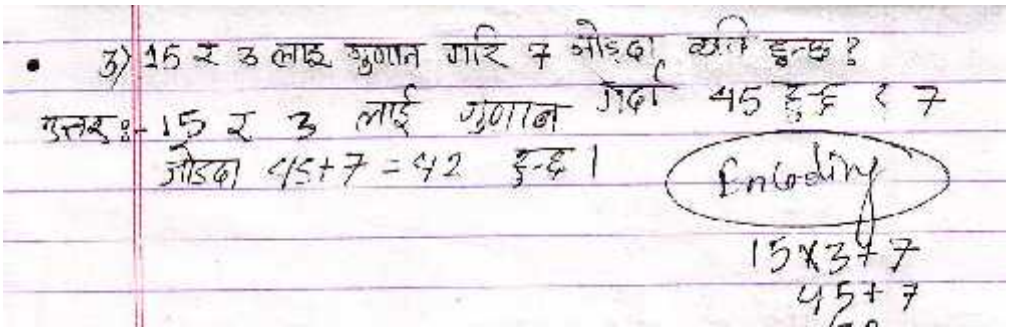
S: It is asking me to find the number multiplying 15 and 3 then adding 7.

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

S: first multiplying 15 and 3 then adding 7.

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.answer correctly

**Distribution of Error Occurrence by Girls and Boys by Newman Procedure**

The second objective of this study was to compare errors made by girls and boys in different level of error in solving word 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 boys and girls, the researcher selected 20 boys and 20 girls. Among them 5 boys and 5 girls were selected from each sample school. The researcher took interview with these students to find the no of error and level of error and the percentage of errors, which are presented in table below**:**

**Table no: 2**

**Error Occurrence by Girls and Boys**

| | **Types of Error** | | | | | |
|---|---|---|---|---|---|---|
| | Reading | comprehension | Transformation | Process | Encoding | Total |
| Girls | 0 | 18 (46.15%) | 21 (47.73%) | 19(67.86%) | 4(44.45%) | 62(51.67%) |
| Boys | 0 | 21(53.85%) | 23(52.27%) | 9(32.14%) | 5(55.55%) | 58(48.33%) |
| Total | 0 | 39 | 44 | 28 | 9 | 120 |

The above table shows that, girls students were committed 62 errors out of 120 errors. It was about 51.67%. And boy students were committed 58 errors out of 120

errors. It was 48.33%. It shows that in whole there is no more difference between error committed by girls and boys in solving word problem .

In the reading error, there is not any error committed by boys and girls, it shows that all students are able to read question properly. The second error was comprehensive error, girls students were committed 18 errors out of 39 errors. It was 46.15% and boys students were committed 21 errors out of 39 errors. It was 63.85%. It shows that in comprehension error boys committed more errors than girls. The third error was transformation error, girls students were committed 21 errors out of 44 errors. It was 47.73% and boys were committed 23 errors out of 44 errors. It was 52.27%. This also shows the boys committed more transformation error than the girls. The forth error was process skill error, in this case girls committed 19 errors out of 28 errors. It was 67.86% and boys committed 9 errors out of 28 errors. It shows that there is more difference between the error committed by boys and girls process skill when solving word problem. In this error girls committed more than the boys. The last error was encoding error, in this error girls committed 4 errors out of 9 errors. It was 44.45% and boys committed 5 errors out of 9 errors. It was 55.55%. This shows that boys committed more error than the girls in every level.

In conclusion, there is no significant difference between the error committed by boys and girls in different levels. But without process skill error boys committed more errors than the girls. Girls committed more error just only on process skil than the boys.

**The Ways of Minimizing Error in Different Stage**

The third objective of this study was to find the way of minimizing errors in solving word problem of grade V student. 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 way of minimizing the error first we need to find the cause of error. Then the researcher found the conclusions which are bellow in different topic. Errors/mistakes are seemed in simple in solving the world 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 word problem in mathematics.

**Way to Minimize Reading Errors**

In this research, researcher would not find the reading error . If this kind of errors seemed, make the habit of studying to 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 the 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 minimiz these causes. 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 Error**

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 39 errors out of 120 errors. It was about 32.5%. 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 helps 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 44 errors out of 120 errors. It was 36.67%. 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 students' pre knowledge and 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, unclearifying 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 28 errors out of 120 errors. It was 23.33%. At the time of discussion with respective teacher, if we can follow the following way, we can minimize process skill errors.

- To practice the students more and more simplified form of word problem.
- 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 practise 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 9 errors out of 120 errors. It was about 7.5%. 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
- To focus 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, ONCLUSION AND RECOMMENDATIONS

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

### Summary of the Study

Error Analysis of Grade V Students in solving word problem of mathematics. All the students of grade V studying in Tanahun District were the population of this study. All the students of grade V studying in selected four schools situated at rural area of Tanahun District were sample of this study. There were 66 students in these four schools. Among them 34 were girls and 32 were boys. The researcher took an exam at whole class. After checking answer sheet the researcher selected 5 girls and 5 boys in each school which were committed maximum errors for in depth interview. The objective of the study to find out the error of grade V students on solving word problem in of mathematics, compare error made by girls and boys in different level of error in solving word problem of mathematics and find the way of minimizing the error of grade V students on solving word problem of mathematics. This study was based on descriptive survey design .It was descriptive because it aims to describe the events or situation addressing the parent activities of the students. To find the error, the researcher using Newman interview schedule.

### Findings

From the analysis and interpretation of data following finding:

i) The total numbers of error are 120. Out of 120 errors no any error from reading, 39 from comprehension, 44 from transformation, 28 from process skill and 9 from encoding.

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

iii) Students have difficulties to give meaning of mathematical terms like as: meanings of area, perimeter, volume etc. So comprehension errors were occurred highly.

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

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

vi) Boys and girls committed different types of error in solving word problems.

vii) There is no more difference between boys and girls to errors occurrence but, comprehension error, transformation error, encoding error were committed boys more than girls and process skill error were committed girls more than boys.

viii) Comprehension errors 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.

ix) Transformation errors were appeared by the lack of concept and meaning of mathematical terms, less emphasis on explanation and less participant in class. So to minimize this error teacher should try to reduce these causes.

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

xi) 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 transformation after that comprehension; process skill and encoding are respectively. Students didn't commit any error in reading level. The role

of gender is less important for committing the errors in whole, but comprehension error, transformation and encoding errors were committed higher by boys than girls and process skill errors were committed higher by girls than boys. Students were taken as difficult to solve word problem. Students were unable to give meaning of mathematical term properly and unable to choose appropriate operation to solving word 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 are made.

i) Before starting the chapter, the teacher has to give the fundamental knowledge about the topic.
ii) Teacher should teach by use material with game and quiz.
iii) 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.
iv) Teacher should use diagnostic test and most identify the area of difficult and must use remedial teaching to avoid the errors.
v) Classroom management and teaching material should be managed to minimize the error.
vi) The teacher should try to find out the reason about committing the errors
vii) The teacher should discuss with other teacher how to minimize the errors.
viii) School Administration should gather students, teachers and guardians for open interaction so that problem could be identified easily.
ix) 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**:**

i) The study area of this research should be extended like other development region and other part of country.

ii) This type of study can be extended to private school as well .

iii) This type of study can be extended to lower secondary and secondary level including different topics.

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

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

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

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