Chapter – I

INTRODUCTION

Background of the Study

Mathematics is one of the important aspects of study for human life. Nevertheless mostly it is considered as a difficult subject for both teacher and students of school education to higher education. With limited knowledge and competence in method, procedures and activities to teach teachers feel difficulty in mathematics teaching even though mathematics is a well established and exciting discipline through ancient human civilization to present and has become developed and useful discipline now.

In Nepal mathematics teaching in formal education had been started from the establishment of Durbar High School in 1911 A.D. Moreover, mathematics had been taught as a compulsory subject in Basic School. Since the National Education System Plan 2028 B.S. had given a significant place to mathematics in school education. Basic education is fundamental stage of formal education and design as eight years course. Now the main focus of this course is to develop the mathematical skills to solve daily life problems.

Assessment of students learning is one of the components of a total teaching and learning process. Continuous assessment system can foster learning attitude as well as better performance. Nepali experience of some form of continuous assessment data back to the seventies when a system called internal assessment was introduced during NESP which linked assessment in class to the formal quarterly tests and the end of year test. It appears that this system was not of great value in that it was treated by the majority of

teachers as an irksome and fairly meaningless administrative chorus. The next occasion the continuous assessment was initiated in 1992.

The report of High Level National Education Commission (1992) recommended continuous assessment system for grade one to three. This was intended to continue the study of the children by means of non-testing devices. While it had claimed that the serious educational wastage at the primary level was due to defective examination system i.e annual examination. Similarly both the Ninth Plan (1997-2002) and the Tenth Plan (2002-2007) stated to introduce continuous assessment at the primary level (Dhakal 2006). The substantial effort of important of continuous assessment system policy is seen in primary education curricular (2062-2065), National curriculum Prarup (2063). Three year Interim plan and school sector improvement program (2067-2072) . These policy and program documents highlight the value of the continuous assessment system can be helpful for enhancing the learning performance of the classroom but in practice it has been followed only the paper pencil test in students evaluation. So it is necessary to justify the need of alternative assessment system for competitive learning of mathematical skills and practices through research as other developed countries have practiced. Now Government of Nepal has made mandatory to Basic level. But in practice how it is done and what effect it has given to student's achievement is not known. This study will be an attempt to analyze the effectiveness of continuous assessment system in Basic school Level.

Introduction of Assessment

The literal meaning of the 'Assessment' is form the Latin word "assidere" which means "to sit beside". Sitting beside children suggest a close relationship and sharing of experiences. Now a day, the meaning of assessment is not limited as its literal meaning. Assessment is contract to that includes the full range of information teacher gather about their students, instruction and classroom climate. It also includes the full range of method teachers use to gather that information.

Assessment is the process of finding out the extent to which is desired changes have taken place in the pupils. It, therefore, requires collection of evidence regarding growth or progress, so as to use that information for decision making. In this way, information gathering, judgment making and decision taking are the three phases of the process of assessment.

Types of Assessment

Diagnostic assessment: Diagnostic is the process of assessing what student is know and are able to demonstrate prior to instruction. The variety of assessment helps determine starting points and helps to teacher program appropriate for individual students. It is appropriately for individual students. It is rarely used in determining the student's grade.

Formative assessment is the process of assessing what students what and able to do so they progress through the learning and practice opportunities. This type of assessment provides ongoing meaningful feedback to help students improve as the practice/ learning builds.

Summative assessment is the process of assessing what students know and are able to do at certain points in the learning process. These assessments such as end of unit test and performance are used to determine the students' grade.

Continuous Assessment and Its Use

Continuous assessment is a way of assessing pupils using a set of learning outcome indicators. It refers to the daily process by which teachers gather information about learner's progress in achieving the curriculum learning targets. It is continuous because it occurs regularly at different times as a part of instruction. The underlying principle is that at all times the teacher need to know, for each of his/her students in the class, how well they have understood the ideas being taught. Teachers can then use the information for formative purpose as an integral part of their teaching and for summative purpose as well.

Teachers evaluate students learning along with their teaching. Teachers use the assessment information for improving their teaching. Therefore, the CAS is merely a tool to help teacher organize information about their students. It is then up to the teachers to use their information to vary their teaching and also to cater the needs of their individual students. It is not a system in which the teachers are busy with giving tests to these students frequently.

The philosophy of CAS is therefore a tool to assist teachers in implementing student centered active learning environment in the classroom. For this the teachers have to internalize the fact that no two students are alike, have the same capacity, or can learn with the same process and at the same place. Teachers can use CAS as an assessment tool

for several purposes. They can use it to gain an insight in to each student's level. To diagnose what and how each student is learning, to group students, to determine his/her own plan and instruct accordingly, to record the classroom performance of the students and to determine a effectiveness of his/her teaching-learning activities. The basic principles of CAS can be summarized as:

- Teaching methodology is students centered not class based.
- All the learning outcomes of the curriculum are used as the basic or the teaching and assessment of the students.
- The class teacher assesses the students along with teaching on a continuous basis. There is no separate periodical examination.
- The students' progress records are kept in their portfolios.

Continuous assessment is "an assessment approach which should depict the full range of sources and methods teacher use to gather, interpret and synthesize information about learners, information i.e, used to help teachers understand their learners plan monitor instruction and establish a viable culture". (airasion,1999; p.27)

Characteristics of CAS

CAS is non-formal in nature. In the system, student's evaluation is done in various time and situation and appropriate medium and tools are used. Students writing reading and other activities are observed in the system. Similarly students' evaluation is done through written exam, oral question answers, interviews and studying profiles. CAS is such kind of evaluation system in which evaluation is taken inseparable part of teaching activities. In this system student evaluation is done frequently along with each

teaching activities and necessary instead of scheduled written exam. CAS especially emphasizes on formative evaluation system. This system is related with hoe to teach subject matter that the students could not learn rather than taking decision for upgrading or not. In the system teacher should improve or change the teaching methods or techniques based on students' achievement. CAS assists weak students to enhance their achievement level.

Statement of the Problem

Time bounded paper pencil test has been taken as a means of evaluation for the achievement of the students in most of the developing countries. Our school evaluation has utilized this assessment system. The scores resulting from the paper pencil test may not give the sufficient information regarding various aspects of the student's progress. Those sorts of tests are mainly useful for the summative evaluation of the students but not much effective for making them learn mathematics. This type of testing has limitation. It cannot assess expression capacity of the student's, their participation in class whole learning, level of understanding, power of interpretation of the subject matter, problem solving through co-operative and collaborative learning like skills of the student's continuous assessment can assess learning target of the curriculum level and progress of various aspect of the students capacity.

This study had answered the following questions related to continuous assessment system.

- What are the challenges for implementing continuous assessment system in mathematics class?

- How the continuous assessment system does influence on students creativity and create positive attitude towards learning mathematics?

Objective of the Study

The objectives of the study were as follows:

1. To compare effectiveness of continuous assessment system and non-continuous assessment system in mathematics learning.
2. To analyze the effect of continuous assessment system in to attitude of grade VII students towards learning mathematics.

Significance of the Study

Generally mathematics teaching in Nepal is lecture base approach method and the practiced evaluation system is paper pencil test from basic level to university level. Steps have been taken from many years to improve teaching learning activities and assessment system in school education. Ministry of education has been making various efforts to develop and make the quality in basic education. However access is improved little, but the equality aspects of basic education is not found satisfactory. Still al schools going age children are not enrolled a large number of school children fail and repeat the class and drop-out rate is very high. (Chalise,2006). Existing traditional evaluation system based on written examination is also responsible for the quality of basic education (class 1-8). Large number of drop-out is seen before complicating basic level education in Nepal. Realizing this fact, Ministry of Education has introduced continuous assessment system since Tenth Plans (2002-2007). Continuous Assessment System is to encourage students

centered and effective teaching method, assisting and enriching as well as encouraging weak students, to increase student's regularity, to decrease drop-out and the failure rate.

This study has established an empirical evidence of the effectiveness of continuous system in importing students' achievement score. Simultaneously the process of implementing will be given one of the best practices of continuous assessment system in classroom. Teachers, educators, policy maker can be a level of confidence in using in this type of assessment in their respective job and profession getting information from the application of continuous assessment system in the study.

Statement of Hypothesis

Research Hypothesis

There is no significance difference between the mathematics achievements score by using CAS and Non- CAS in mathematics.

Alternative Hypothesis

There is significance difference between the mathematics achievement score by using CAS and Non- CAS in mathematics.

Statistical Hypothesis

Ho : $\mu_1 = \mu_2$

H_1: $\mu_1 \neq \mu_2$

Where μ_1 and μ_2 are the mean achievement of CAS and Non-CAS students respectively.

Delimitation of the Study

The study was delimited in school with students and teachers.

The researcher was delimited the study:

- This study was delimited to Kaski District.
- This study was delimited with only 200 students in grade VII of public school
- The standard achievement test was carried out in grade VII students.
- Extraneous variable were left frilly and supposed to be equal impact on both groups.

The result of this study was based on measure created from home work/class work (class participation), project work, and behavior changes (learning attitude and general rule and regulation of school). Creativity work in learning mathematics attendance and weekly test was the techniques used as continuous evaluation in the study to evaluate student's achievement.

Definition of the Related Terms

Continuous Assessment System (CAS): Continuous assessment is a diagnostics classroom base process to measure learning performance. It uses many ways to determine what a learner knows, understand, thinks and can do. It is meant to be a part of daily teaching and learning in order to improve teaching and learning.

Home work: The written task, solving exercise, project work, individual or group work given to the students.

Project work: Project work is an assignment given to the students to prepare in the group an individual level. This type of assignment is not possible to complete only one the basis of the study of textbook, need additional reading, thinking, working in groups and in practical studies.

Behavior change: Behavior change means the observed change in students' behavior in attitude towards math and math learning.

CAS Students: Student's of those schools where continuous assessment system is implemented.

Non- CAS Students: Student's of those schools where continuous assessment system is not implemented.

Public School: Public schools are those which receive regular government logistic and financial support.

Basic School: Basic schools are those where the classes run from grade one to eight only.

Achievement: Achievement of this study is defined in terms of the scores, obtained by students on mathematics test constructed by the researcher.

Effectiveness: The effectiveness is defined as in terms of the magnitude of the score obtained by CAS and Non-CAS group in the mathematics achievement test.

The capability of producing desired result in term's of students' performance, attitude and achievement level of students.

Chapter- II

REVIEW OF RELATED LITERATURES

Review of Related Literatures

The review of related literature deals with the theories or research studies, which have been conducted earlier. It helps to conduct the new research in a systematic manner by proving the pervious status of the knowledge in the problem area and the general outline of the research study and avoid the unnecessary duplication. Realizing the importance of literature review some theoretical concept previous studies different national documents as well as reports related to education mainly focusing on the impact of continuous assessment system on students achievement in mathematics were reviewed.

The National Education Commission Reports, (1992) stressed the need to introduce a comprehensive and regular evaluation scheme for proper judgment of students learning and for quality improvement in education. But it did not materialize. Six years later High Level National Education Commission Report (1998) blamed the existing examination system for creating the serious educational wastage at the primary level was due to defective examination system. The commission stated "The main reason for students dropout and class repetition has been the annual examination system. "

Accordingly both the Ninth Plan (2054-2059 B.S) and the Tenth Plan (2059-2064) stated to introduce continuous assessment system at the primary level. The Ninth Plan stated to gradually implement the continuous assessment system for students. The plan targeted to experimentally implement the liberal promotion policy to upgrade from grade one to three, the Tenth Plan has programmed to introduce continuous assessment

system up to grade five on the basis of piloted experiment and experience. It is clear from these contexts that MOES is planning eventually to introduce CAS nationwide in primary education. As a preliminary stage to this a piloting program was introduced in the districts Ilam, Chitwan, syangja, Surkhet and Kanchapur beginning in the school year 2057-2058 B.S. The piloting of CAS was first introduced with grade one in 2057/2058 and in subsequent year with grades two and three.

CAS (Teacher's Guide) (2056/2000) indicated that the CAS is going to implement by aiming of improvement the quality of primary education, reducing the class repetition rate and to reduce dropout rate. I hope we will be able to do these if we all are committed to implement if effectively continuous assessment goes along with the combination of class work/home work, use of materials, class room management, teacher training program, co-curricular activities etc. class work and home work is the most important factor of students achievement.

Baraily, (2006) studied the effectiveness of class work in mathematics achievement at primary level was under taker for the purpose of providing guidance to the teacher to make their teaching activities effective and meaningful by assigning class work with feedback during the class room introduction. It is concluded that the students taught through class-work with feedback developed significantly and achieved better performance, then the students through class work without feedback. Instruments also effect the students' achievement. Continuous assessment goes along with the combination of class work, homework, use of materials, classroom management, teacher training program, co-curricular activities etc. class work and homework is the most important factor of students achievement.

Khanal, (2008) studied the manipulative approach is particularly useful in helping students to receive insight in to mathematical figures and properties. He concluded that the mean achievement score of the students taught by using ‘tiles’ was higher than the mean achievement scores of students taught by without using ‘tiles’ in the teaching algebra in grade six. Classroom management also influences in students’ achievements.

Pandey, (2006) did a research on "Impact of alternative assessment in mathematics achievement." The result indicated that there is a positive correlation between the accumulated score and competency score of experimental group and the t-test result indicated that the alternative assessment has the positive assessment can be used effectively in Nepalese class room and is useful in reducing the number of failure students.

In continuous assessment system, the evaluation of students learning does not depend only on exam scores. A scheme of evaluation as suggested by Ministry of Education in Nepal, examination system was divided in two parts continuous evaluation and formal exam. Continuous evaluation covers 40% of the full marks and includes home work/class work (class participation), project work, behavior changes, creativity work and attendance. Formal exam covers 60% of the full marks and it include only tri-monthly and annual test (CSEIB, 2068).

The students must secure the sum of total marks in continuous evaluation from the above mentioned items of assessment and not be less than 32% of the full mark in the formal examination of a particular subject. The evaluation scheme should base on overall assessment of students performance.

Bell, (1999) did research on "Traditional Assessment versus Alternative Assessment". The purpose of this study was to determine whether a teacher could use one type of assessment to evaluate student's ability fairly. The question is whether or not alternative assessment strategies are necessary to meet student's individual needs. The research conducted with 28 fifth graders student compared their traditional and alternative reading and mathematics scores. Surveys were also distributed to 20 teachers and 100 students. The result indicate that the two types of testing cannot be compared a majority of the time indication a need for both types of assessment. The survey finding suggests that teachers and students are individual who all need various types of assessment.

Ariasion, P. W. (1999) (In the book, "Classroom Assessment") has discussed the entire problem that appears in the classroom generally, as to how they can be solved effectively why the assessment should be done and regular basis and so on. The book assists the teacher as to how to conduct the classroom effectively, how to carry C.A. Before, during and after the instruction which techniques are useful for assessing different skills or domains how assessment information can be used for different purpose and so many other practical things are explain in the book in detail.

Master plan of BPEP II (MOE,1997) recommended implementing continuous evaluation of the students supported by liberal promotion policy. With the recommendation of BPEP II Master Plan, “Program Implementation Plan” for 1999-2004 recognized, “continuous assessment of students learning achievement is a key element of quality improvement stratigy”. PIP emphasized continuous assessment strategies to form part of an integrated set of teaching techniques. CAS has been development and piloted

under BPEP II in the school of five district selection with the aim in planning and using learning intervention for each of the child on continuous basis.

Neupane, (1999) did research on "A study of the effectiveness of homework on mathematics of lower secondary students" with the objectives to explore and compare the achievement of two groups of students when one is given homework without feedback. Pre-test, Post-test equivalent group design was adopted. Two schools of Dhanding district were sampled. Teacher taught both groups on experimental and control. The topics were equation and inequality. Both groups got homework. Experimental group got correlated homework with some feedback but control group students did not get such treatment. After six weeks, a post-test was given. The t-test was applied to conclude that the homework assigned with feedback caused better achievement that the homework assigned without feedback.

The primary education curriculum, 2063 stressed the need of continuous assessment system for students' evaluation. The main aim of continuous assessment is to upgrade students who are involved in teaching activities in a school year by observing change in their behaviors. For the students who remain absent in a class and whose learning achievement are low can be upgrade as per the decision of the teacher, parents and head teacher for providing more learning opportunities. Pass mark is not determined in grades 1-3 because continuous assessment is done in these grades.

According to Dubisky China starts the formative evaluation system at first. China follows the integrated evaluation system from primary to university level. The state should adopt a national examination system of education there. Local Department of

Education takes the students' evaluation but Ministry of Education makes examination card. China follows the continuous evaluation and keeps the record in daily activities of the students'. After secondary education, students take the national level exam and this exam determines who is selected for the university level education. (Dubisky,2000).

Effective assessment strategies should promote students competence and improve the quality of teaching. However, not all forms of assessment are equal in accomplishing educational goals. Traditional approaches to assessment typically rely on standardized or teacher-generated tests that focus on recall or recognition of knowledge on subjective and objective, multiple-choice, matching or true-false questions. As an alternative method of assessment, authentic assessment deemphasizes rote learning and passive test taking in favor of real-world situation that push students in the direction of more meaningful, task-relevant construction, integration and application of knowledge. Consequently, authentic assessment is both direct and performance based, requiring students to demonstrate proficiency by actually doing something in context that replicate the priorities and challenges faced in daily life. (Osaji, 2009).

The report on the Uganda Primary Teacher Education Curriculum Review (2007) observed that apart from school practice, the only methods of assessment are examinations at the end of the year one and year two, "the examinations are determining what is taught and how it is taught", "students are only interested in learning what is on the examination", "the question only examine content, the practical were not emphasized or examined", students don't want to do practical work as is not examined". The report further noted a need to institutionalize continuous assessment in primary teacher education. Teacher required knowledge, strategies and skill to empower then to interpret

use and integrate continuous assessment in the teaching and learning process. Thematic curriculum is one of the recent reforms in the Uganda education. Continuous assessment during the implementation of the thematic curriculum should be well organized, simple and on-going, based on what the child has learnt, truthful, objective and meaningful. The Individual Progress Report (IPR) and the Class Progress Report (CPR) are used in Uganda (CAPTE) Uganda, (2010).

Theoretical Framework of the Study

Continuous assessment is a method of evaluating the progress and achievement of students in educational institutions. It aims to get trust possible picture each of student ability at the same time helping each student to develop his or her abilities to the fullest. It is a method whereby the final grading of students takes account in a systematic way of whose performance during a given period of schooling. It indicates that the individual pupils would be seen and assessed in totality. It also implies that the three 'H' s- Head, Heart and Hand – relating to cognitive, effective and psychomotor domain respectively, should be taken care of in the continuous assessment strategy (Osaji, 2009).

Folayajo (1979) states that continuous assessment is a system of assessment which is carried out at predetermined intervals, usually coinciding with some identifiable units of instruction or level of education system, for the purpose of monitoring the progress or otherwise of students and the general performance of the education system. In this definition includes the monitoring of students' learning with a view to improving their performance and helping them in the areas of deficiencies as a way of ensuring success at related to formative evaluation where by formative tests are developed and

administered to the pupils after a unit of lessons, and remediation given in areas of identified difficulties before the next unit is taken up. Bajah (1984) viewed continuous assessment as a continuous updating of judgment about performance in relation to specific criteria which will allow a cumulative judgment to be made about performance upon these same criteria at any time.

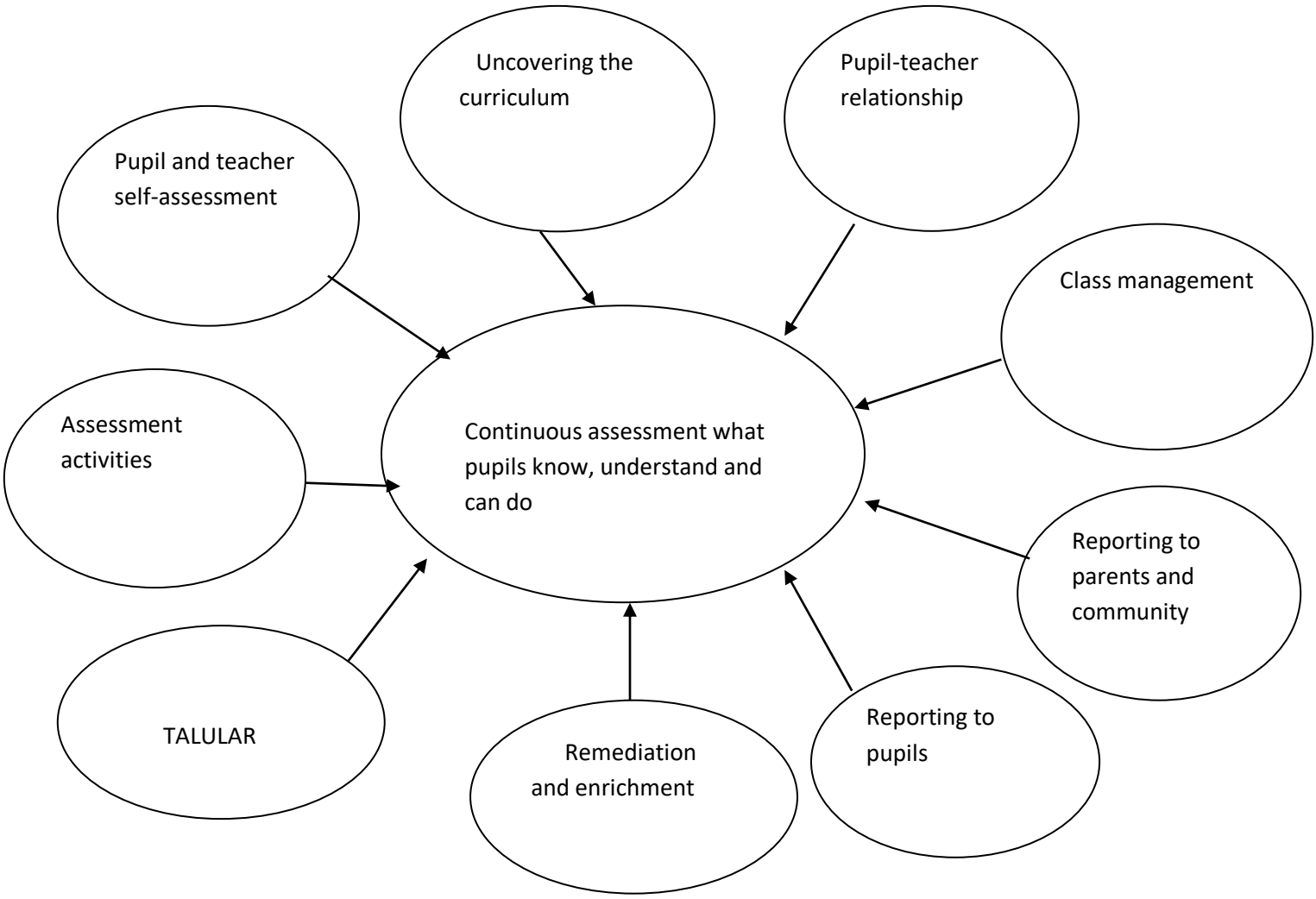
Ezewa and Okoye (1981) gave the continuous assessment within the educational context as a systematic and objective process of determining the extent of a students' performance and all the expected changes in his behaviors from the day he enters into a course of study in a continuous and progressive manner to the end of such a course of study and a judicious accumulation of all pieces of information derived from this purpose, with a view to using them to guide and shape the student in his learning from time to time and to serve as bases for important decision about the child. It is used for determining the students' level of achievement.

In this study, the researcher focuses on holistic approach in continuous assessment. Continuous assessment is more than judging the students performance, a learning process between teacher, pupils and parents. It is also a holistic process that not only brings together multiple stakeholders, but also integrates assessment and teaching as interconnected activities that are integral to the child's learning. Specifically, continuous assessment refers to making observations and collecting information periodically to find out what a student knows, understand and can do. This is determined through ongoing and fair assessment of all pupils in a class. The activities in continuous assessment are many and varied to speak to pupils' different learning styles and level of mastery of

concepts. Good continuous assessment therefore, will provide all children with opportunities to perform at their best and to learn at their own pace.

Continuous assessment is a package of concepts and tools that contributes to the overall evaluation of the child. The Malawi's holistic approach in continuous evaluation included nine factors. The following diagram (Malawi/IEQ, 2003) shows, the whole package of continuous assessment of holistic approach.

Figure:1 . Theoretical Framework



Sources: (Malawi/IEQ,2003)

The above diagram involves nine factors in continuous evaluation. Uncovering the curriculum means that teachers are not simply covering the curriculum to complete the term or year. Teachers are learning how pupils are performing because they are assessing periodically and teaching according to the pupils' needs. They are uncovering the curriculum to see the needs of pupils to be able to help them learn at their own pace. Pupils and teachers should develop a habit of self-assessment to improve their performance. Teachers were reflected on their teaching and learning and pupils were reflected on what they know, understand and can do. Continuous assessment helps to improve the relationship between pupils and teacher because they are in an on-going conversation with one another. The teaching and learning process, therefore, becomes more transparent so that the relationship can improve. Teaching And Learning Using Locally Available Resources (TALULAR) encourages teachers to be creative and resourceful in teaching and learning. So, teachers learn how to use local resources to implement teaching and assessment activities in the classroom. Teachers conduct assessment activities periodically to understand how pupils are performing. Many continuous assessment activities were conducted on a one-to-one basis with the teacher and pupil. The requires simple classroom management strategies that would keep the other pupils engaged in learning activities that help them perform at their best while a pupil is being assessed.

Another factor of continuous assessment is using effective remediation and enrichment techniques. When teachers understand how their students are performing they were know how to direct their teaching. Teachers were learning how to teach to the multiple levels of knowledge, skill and application that are presented in their classroom

so that all pupils are learning. Continuous assessment is very empowering for students because they can understand how they are performing in their subjects. After students' are assessed they were received immediate feedback from the teacher so that they know what areas they need to work on for the next time they are assessed. Teachers are able to effectively communicate with parents because they are knowledge of how students are performing through the records they have for each student.

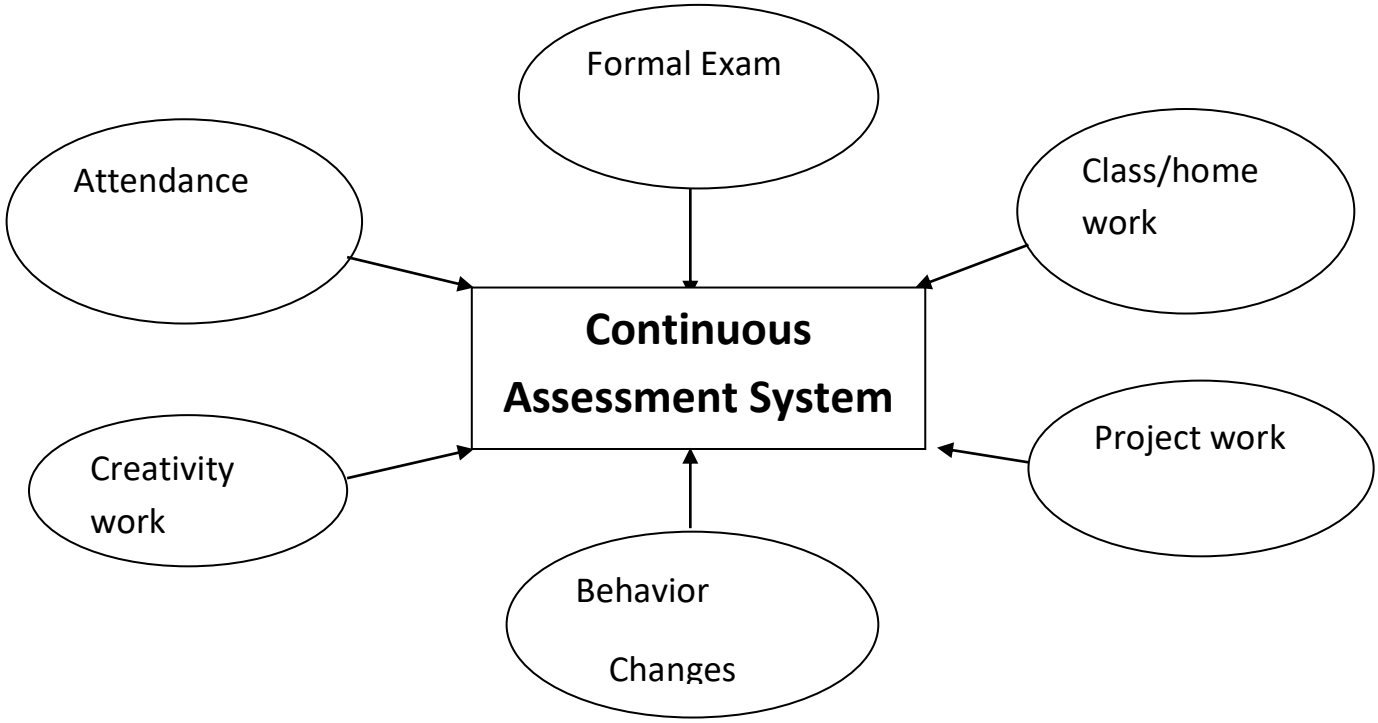
These concepts and specific activities work together holistically to create a mechanism of consulting with students, parents and teachers. They are able to discuss about the students learning because teachers know what the student has learned through periodic assessment. This enables the teacher to more effectively direct his/her teaching so that the student can understand concepts that may not have been fully mastered. Not only is the teacher able to facilitate the students' learning through the better teaching, but the student can also become more self-directed is learning because the student knows in which area she/he needs to improve. As teachers and students' begin to discuss more about students learning, parents will also become more involved in their students and especially between students and parents.

Conceptual Framework of the Study

A conceptual framework is the representation, either graphically or narrative form, of the main concept or variable and the relationship of the independent variable with dependent variable. This study involve the main six techniques of assessing students performance formal exam class/home work, project work, behavior changes, creativity work and attendance. In the Nepalese context, Continuous Student Evaluation

Implementation Book-2068 (MOE Nepal) defined the above six factor influence the continuous assessment. The relationships of these factors with continuous assessments are shown in the following figure:

Figure:2. Conceptual Framework



Sources: (MOE,2068)

MOE, (2068) Continuous Student Evaluation Implementation Book 2068, Nepal. All teachers are familiar with written technique as it is the most commonly used technique for evaluating students' progress. This is used for unit test, class test, term test and half-yearly and annual examination as the assessment components. In this type exam are considered as relevant measure to be used in continuous assessment in Nepalese context. Class work and assignment, home work involving written work can be used to

assess students writing ability and practice of mathematical problem. Project work means this type of activities related to the individual and group work. Assessment of student learning can be done on group collaboration and co-operation work as well as individual performance. Students also present their own project work in the whole class. So, presentation skill also developed through project activities. Behavior change through the continuous evaluation is the outcomes expected in students. This change seen in behavior can be measured internal as well as external observation of students' activities in school and learning attitudes. Regularity in the class is an important measure in continuous assessment. Creativity work is also teaching and is used as one measure of continuous assessment system. Attendance is one of the most important parts of student's assessment. If the student does not attained the classes they can not involve in all activities consequently back in mathematical knowledge.

Chapter-III

METHODS AND PROCEDURES

This chapter explains methodology adopted in this research under six major headings such as design, population, sampling, tools, data collection and analysis procedures.

Design of the Study

The design of the study was survey descriptive. In this design data was collected in numerical values and explained in quantitative nature.

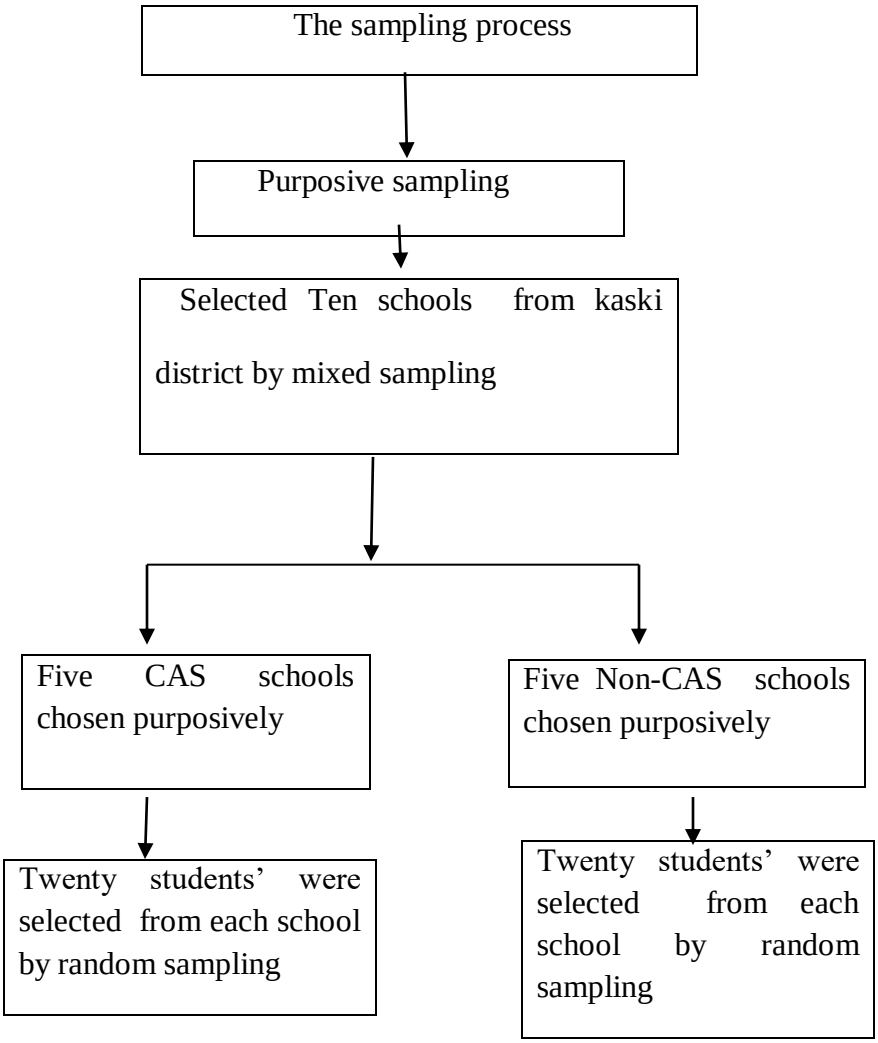
This study designed as survey type which involves the administration of achievement test for two different groups of grade VII students of academic year 2071 B.S. The main purpose of this study was determined the effective of continues assessment system on students in mathematics learning at grade VII. For the sake of effectiveness of CAS to be observed between two groups i.e. CAS and Non-CAS in such a way that on consist of student of grade VII evaluated under CAS and others consist students of grade VII evaluated in Non-CAS approach. Both groups were taken from public school of Kaski district.

Population of the Study

Population or the universe of the research indicates to the entire mass that has to be observed. Therefore the population of the study consisted of grade VII students of public school of Kaski district in academic year 2071.

Sampling Procedure

To fulfill of objectives of this study the researcher was selected 10 public schools from Kaski District by mixed sampling method. Among them five schools were CAS and five schools were non-CAS. 200 students' of these schools were selected for the purpose of this study. Twenty students were selected from each school conducting CAS and Non-CAS by random sampling procedure. Total sample size of this study was 200.



Tools of Data Collection

Since the purpose of this study is to examine the effectiveness of continuous assessment system as an evaluation procedure against the traditional non continuous assessment evaluation procedure. The researcher classified the schools of CAS and non-CAS and picked up purposively.

Achievement test and interview were the main tools for the data collection of this study. The researcher prepared mathematical achievement test paper on the basis of learning out comes as mentioned in grade VII curriculums. The test consisted of seven items of knowledge level, eight items of computational level, eight items skills level and eight items of application level of cognitive domain. The test standardized by pilot study.

Item Analysis, Reliability and Validity of Tools

For the reliability of the test, researcher conducted pilot study. The 45 students of Nabin Higher Secondary School Ghairapatan of Pokhara used for pilot study of the achievement test. Before administrating the test paper the researcher instructed the student how to respond on the test paper. It provided 2 minute per item. Following the pilot study difficultly and discrimination values for every item were calculated and those items which demonstrated desirable level were Appendix-B, difficulty level and the discrimination index of each item was calculated from 27% of highest score student of highest and 27% of lower score students of lower score. Also, to find the reliability of the achievement test, the researcher used split-half method and found it indicated that test was reliable shown in Appendix-C.

Difficulty level (P): It is the percentage of students able to pass each item. It takes the values ranking from 0 to 100. The 'P' value of each item calculated by the formula: $P = \frac{R}{T} \times 100\%$ Where,

P = Item Difficulty Level,

R = Number of Students who give correct answer,

T = Total number of the students appeared in the test.

The criteria for analysis of item difficulty level are as follows:

Table No. 1

Criteria	Item evaluating	No. of items	Remarks
Above 80%	Easy	4	Need improvement
20%-80%	Good	30	Accepted
Below 20%	Difficult	1	Need improvement or reject

Discrimination Index (D): It ranges from -1 to +1 is denoted by 'D' and is given by the formula:

$$D = \frac{R_u - R_L}{T/2}$$

Where,

D = Index of discrimination,

R_U= Number of upper 27% students who give correct answer,

R_L = Number of lower 27% students who give correct answer.

The criteria for the analysis of Item Discrimination Index are as follows:

Table No.2

Criteria	Item evaluating	No.of items	Remarks
0.40 and above	Very Good	20	Accepted
0.30 – 0.39	Good	1	Accepted
0.20 -0.29	General	9	Accepted
0.00 -0.19	Negligible	4	Modified
Negative	Poor	1	Need Improvement

Furthermore, the reliability of the test calculated in Split-half reliability by Pearson's Correlation formula.

$$r_{xy} = \frac{N\Sigma XY - \Sigma X \Sigma Y}{\sqrt{N\Sigma X^2 - (\Sigma X)^2}\sqrt{N\Sigma Y^2 - (\Sigma Y)^2}}$$

It was found to be 0.97 which is given in Appendix-C. So, the test item is reliable (Best and Kahn, 2010).

The test was refined by cancelling and modifying some of the items. Table of item analysis determined the level of difficulty (P) and power discrimination of each item in the instrument. The items those having D-level above 0.20 and P-value (25-75%) were accepted. The items those having D-value less than 0.20 were cancelled.

Items no. 2, 7, 11, 13, 20, 28, 29 and 35 were cancelled and item no. 10 was modified shown in Appendix-D. Thus the refined instrument of achievement test included only 27 standardized items in the achievement test as shown in Appendix-D.

Data collection Procedure

The researcher prepared a suitable test item on the basis of related text book of grade VII of public school. Then the researcher visited each of sample school and administers the achievement test to collect data. Well instruction in a conductive environment of the classroom was being provided before administrating test. This was all for the students and they are responsible for questions to finish correctly and thoughtfully.

After setting down all the pre-adjustment and management in coordination with the school family and especially the subject teacher and the headmaster, the researcher himself administrated the standardized achievement test to the sampled students of the selected schools to observe the achievement level. The score obtained by the student of both types of sample school was used in analysis and interpretation.

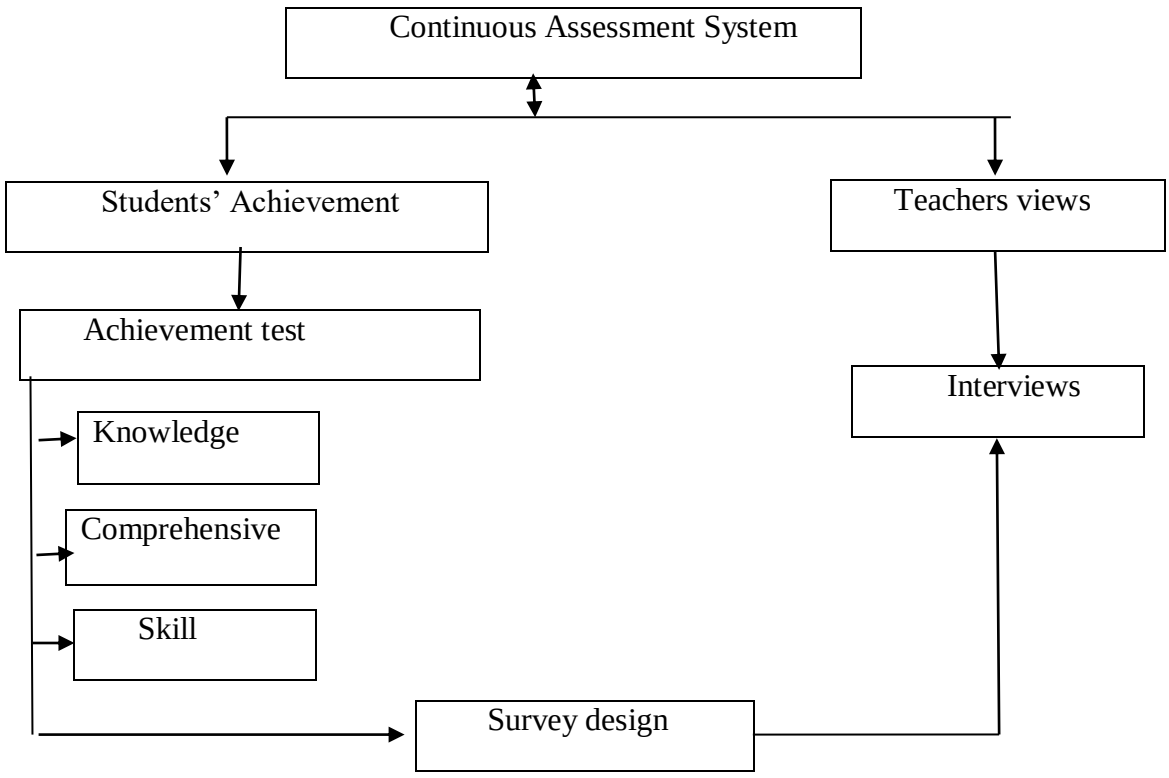
Data Analysis Procedure

The researcher visited the selected school which were implemented by CAS (Appendix-F) and implemented by Non-CAS (Appendix-F) of district and then conduct the achievement test of those groups. The achievement score of two groups analyzed by using mean, standard deviation and t-test of the comparison between CAS and Non-CAS students.

The mean standard deviation and t-test were used in analysis of achievement score of student. All the hypothesis were tested at 0.05 level of significance i. e., 95 % level of confidence t-test was used to compare the mean achievement tests score of the students.

The researcher have prepared procedural framework of the study as follows:

Figure:3. Procedural Framework



Chapter-IV

ANALYSIS AND INTERPRETATION OF DATA

In this chapter, the analysis and interpretation are followed in a systematic manner. Data analysis considered to be important step and heart of the research in research work. Analysis of data is process of inspecting, cleaning, transforming and modeling data with the goal of highlighting useful information, suggesting conclusion and supporting decision making (Best and Kahn, 2010). The data are collected to fulfill the objectives of the study. In the process of analyzing the collected data and their interpretation, several descriptive statistical device and inferential device (test of significance t-test) have been used in this study. To make the presentation comprehensible and lucid the subdivisions with suitable adequate numbers are constructed to make the interpretation. The data are organized and tabulated as below:

Comparison Between Mathematics Achievement of CAS and Non-CAS Students.

The first objective of this study was to compare effectiveness of continuous assessment and non continuous assessment system in mathematics learning. In order to accomplish this objective, achievement test was arranged by the researcher. The achievement test was administered to the sample students.

The mean standard deviation and corresponding t-value of the score obtained by students of CAS and Non-CAS groups are presented in Table 3.

Table 3

Comparison of the Mean Score of CAS and Non-CAS Students.

Group	No.of Students	Mean	S.D	t-value	Conclusion
CAS-Students	100	13.00	4.30	2.10	Significant
Non-CAS Students	100	11.80	3.90		

Region of rejection: $t \leq -1.96$ or $t \geq 1.96$ at 0.05 levels.

The above table shows that the mean scores of CAS students and Non-CAS students are 13.00 and 11.80 respectively. It gives the mean score of CAS student is higher than that of Non-CAS students by 1.20. The standard deviations of CAS and Non-CAS students are 4.30 and 3.90 respectively. Obtained t-value is 2.10 which is higher than tabulated t-value, 1.96. Thus the alternative hypothesis that CAS student achievement better than the Non-CAS student is accepted. Thus it can be concluded that the school which has implement continuous assessment system for the evaluation has better than that of school which did not implement it.

The above measure (the significance difference in achievement) shows that continuous assessment system is one of the comparatively better evaluation systems for improving students' learning performance.

Teachers' Views on the Implementation of CAS

The second objective of this study was to analyze the effect of continuous assessment system. In order to accomplish this objective the researcher took interview of teachers.

After analyzing the quantitative data, the achievement of CAS students was found better than Non-CAS student. Regarding this, the researcher was also interested to find out the factors that caused the better achievement and problems faced on implementing CAS. The researcher took interview with the headmaster and mathematics teacher on the basis of effectiveness and problem faced in implementing CAS (Appendix-E). They expressed the similar answers.

The first question "what differences in students' achievement did you find before and after CAS implemented" was asked.

They said that traditional assessment system only focused on pass or fail of the students but CAS is based on improving the students' learning, behavior and achievement, it is based on communicative approach.

Continuous assessment system helps in developing students' logical and creative thinking abilities. Students' work in group or individually, explores or investigates the mathematical problem and they construct, compare and justify the mathematical

concepts. Only the period of implementing continuous assessment, all the above method activities were performed well. Manipulative materials helped them and challenged to find alternative solution. It helped them to communicate their thinking in mathematics knowledge while using continuous evaluation. The students' deeply enjoyed and found more interested to learn mathematics concepts by using different method daily and weekly observation, extra activities, project work, working with group, presentation and interacting with students and teacher. Also developed the behavior of students such as; carrying out assignments, helping others, honesty, participation in class activities and creativity.

The second question was "what difference did you find between traditional assessment system and CAS*?"*

They replied that before CAS, students were passive but now a day they are seen active. They have got good marks in mathematics. Attraction towards mathematics has been increased.

The continuous assessment system helps the teacher get a better understanding of the learning needs of the children. The teacher uses continuous assessment to find out if the learners are learning what has been taught. Continuous assessment observes the daily activities of the students.

The third question "why CAS students have better achievement than Non-CAS students?" was asked.

They said that in the CAS system, the students are evaluated on the basis of class work, home work, project work, creative function, question-answer and attendance. So they must have to be active. Consequently they get good marks.

At last "What challenges does mathematics teacher and school administer faced while implementing CAS?" was asked.

They replied that they have many challenges. Financial problem to porches instrument, problem on daily evaluation because of overloading of teachers, problem for making the tools of evaluation, preparing project work, teaching time became shorter and teacher were busy to fill the form.

It was the risk and challenges for the teachers as well as school management to implement CAS. For the teachers the challenge is to make oneself prepared on planning the course contents, preparing project task, different forms, organizing different co-curricular activities etc. school management committee has to manage the teacher trained and required instruments to conduct the continuous assessment system.

Above interview shows that CAS is very effective than Non-Continuous assessment system. But it is important to encourage students in active participation and enough time should be given at home to do homework and to regular in class. Also it is important to provide training to the teachers. Class period should be extended, teachers should be given leisure period. The headmaster should be encouraging teachers to use CAS. Sufficient financial support from government should be given for CAS implementation to school.

Chapter-V

SAUMMARY, FINDINGS, CONCLUSION, AND RECOMMENDATION

This study was designed as survey type. The purpose of this study was to test the effectiveness of continuous assessment system on students' achievement in mathematics learning. The score obtained in the test was the data for the study. The researcher analyzed the data and obtained the findings. This chapter deals with the result of study, the effectiveness of continuous assessment system in mathematics achievement and also presents the summary, major findings, conclusions and recommendation.

Summary

The effectiveness of continuous assessment system in mathematics achievement at grade VII stated research topic was intended to answer the question whether the use of continuous assessment system were better than traditional assessment system at grade VII students in improving achievement in mathematics learning.

The researcher constructed an achievement test for the grade VII students in the subject of Mathematics on the basis of mathematics curriculum and administrated in ten schools from 200 students of Kaski at grade VII are randomly taken. The research tool of this study was the achievement test. The test was administrated to collect achievement scores of the two types of schools CAS and Non-CAS. The final achievement test contained 27 items on four levels (knowledge, computational, skill and application) of the cognitive domain. The test was administrated to both groups. Along the other statistical

measure t-test was applied in order to compare the mean score between CAS and Non-CAS groups. The data was analyzed and interpreted statistically and also the interview with headmaster and mathematics teacher was taken to find the conclusion.

Findings

To compare the achievement of CAS and Non-CAS students at Kaski district, researcher selected 200 students altogether as a sample and then conducted a test paper. By analyzing the scores of CAS and Non-CAS students breaking into several heading was discussed in chapter four.

The researcher had got the following findings;

- There was significant difference between mathematics achievement of CAS students and Non-CAS students.
- The result of the test indicated that difference of achievement is in favor of CAS group. So the better performance of CAS group over Non-CAS group obtained from the test indicated the positive effect of using continuous assessment system in mathematics class.
- According to interview with headmaster and mathematics teacher, it was found that CAS achievement is more effective assessment system than traditional assessment system for students' in mathematics but there are many problems to implement CAS.

For the findings on qualitative analysis, the basis of remarkable features on students' class from activities while using continuous assessment, the researcher drew following information.

- Students' deeply enjoyed and found more interested to learn mathematical concepts by using different method, daily and weekly observation, extra activities, project work, working with group, presentation and interacting with students and teacher.
- Students' were found more interesting in the learning new knowledge of mathematics concepts through computer visualization, working on group based project work etc. students took part the exam every week and all were interested to get feedback and prepared every time for the next exam.
- Finally, continuous assessment system played role in the overall performance of students' activities as well as achievement in mathematics. So, it is needed to apply in our country.

Continuous assessment system is not only the evaluation it is also teaching and learning process. Continuous assessment system believes that teaching learning process also associated with the assessment system. If the teacher are not playing effective role in teaching process, then they couldn't show the effect in assessment system. Limited students' number, active teacher, evolutionary plan of school, easily available teaching materials, physical and educational environment etc. are the factors ply to bring effective role of continuous assessment system to make effective learning.

Conclusion

The data collected and analyzed is used to find the answer of research question and objective of the study. Different data analyzed to get the answers the objective of the students showed effect of continuous assessment in student achievement. There is significant difference between the achievements of the students from Continuous Assessment System and Non-Continuous Assessment System. The study got the result that the CAS students could come with better results than that of Non-CAS students.

It is concluded that the continuous assessment system is effective to the Non-continuous assessment system in mathematics. Continuous Assessment System can contribute, if properly applied; in improving students' achievement scores. Furthermore, continuous assessment is better for achievement improvement, decreasing students' irregularity and dropout scale.

In the context of Nepal, continuous assessment system is not practiced seriously in government schools. On the basis of result, it can be concluded that when continuous assessment is practiced in school level continuously, the mathematical knowledge as well as pass percent of students will be increased and failure student can be decreased.

Recommendations

The recommendation is given for the educational implication and further study. The researcher intends that the recommendations given for educational implication will be used in future and the recommendation for future study will be helpful to the other researchers to carry research.

On the basis of finding of this study, the following recommendations are suggested:

- This study shows that the result of CAS is seen effective. So the recommended that implementation of CAS is better.
- Continuous Assessment System should be made compulsory in school level students' evaluation with necessary hands on training.
- Sufficient financial support should be given to schools for implementation of CAS.
- The teacher training institute should focus on the element of continuous assessment system and train them how to apply in the field.
- Students' should be encouraged involving in active participation in the project work and classroom activities.
- Government should make the policy for implementing the continuous assessment give the training for the teacher and regular supervision and support for the implementation in school.
- The headmaster should encourage teachers to use continuous assessment system.

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APPENDIX-A

Students from sampled schools

S.NO	CAS Students			S.NO	Non-CAS Students		
	Students' name	Sex	Marks		Students' name	Sex	Marks
1	Himal Gurung	M	22	1	Bikram Tiwari	M	21
2	Anil Khadka	M	18	2	Saroj Tiwari	M	19
3	Sansil Thapa	F	17	3	Sonu Gurung	F	14
4	Rashmi Adhikari	F	13	4	Bimala Tiwari	F	22
5	Shova K.C	F	13	5	Himal Gurung	M	8
6	Sunita Bhandari	F	22	6	Kamal Khatri	M	19
7	Roshan Khadka	M	18	7	Arjun Pariyar	M	15
8	Anil Tamang	M	12	8	Karuna Nepali	F	9
9	Anita K.C	F	18	9	Biplop Thapa	M	16
10	Yagaya Sherstha	M	18	10	Bikal Rana	M	11
11	Prakash Adhikari	M	9	11	Milan Adhikari	M	5
12	Roshani kshetri	F	16	12	Sushil Bastola	M	15
13	Maya Gurung	F	10	13	Nima Gurung	F	12
14	Ekaraj Bhandari	M	16	14	Ashok Tiwari	M	11
15	Srijana K.C	F	12	15	Janak Lamichhane	M	9
16	Govinda Adhikari	M	11	16	Sarita Bhurtel	F	10
17	Gita Parajuli	F	7	17	Sandesh Bastola	M	9
18	Sarita Poudel	F	12	18	Sima Bastola	F	14
19	Pinki Gurung	F	13	19	Bhola Bhurtel	M	11
20	Angila Magar	F	15	20	Sagar Tiwari	M	14
21	Ramesh Tiwari	M	16	21	Raju Tiwari	M	14
22	Arapana B. K	F	21	22	Binod Dhakal	M	19
23	Mamata Pariyar	F	16	23	Laxuman Adhikari	M	11
24	Babita Tamang	F	10	24	Subas Tiwari	M	7
25	Ukesh Rana	M	19	25	Lavina gurung	F	12
26	Anisha Gurung	F	21	26	Sabita Rana	F	21
27	Susmita Tamang	F	13	27	Prem Khadka	M	10
28	Pramisha Adhikari	F	16	28	Bikram K.C	M	11
29	Anusha Purja	F	13	29	Bhagwan Subedi	M	8
30	Bibek Manandhar	M	9	30	Rachana Bhandari	F	5
31	Rupesh Magar	M	7	31	Sangita Tiwari	F	18
32	Rajendra Pariyar	M	14	32	Sundhara K.C	M	19
33	Sanjib Paija	M	16	33	Purna Subedi	M	15

34	Kiran Rokka	M	10	34	Deepak Poudel	M	19
35	Sital Chhantyal	F	10	35	Sandip Dhakal	M	10
36	Rakshya Adhikari	F	12	36	Dipa Bhattarai	F	7
37	Aarati B.K	F	13	37	Maya Gurung	F	13
38	Usha Pariyar	F	14	38	Dhurba K.C	M	9
39	Subash B.K	M	12	39	Puspa Bhandari	M	11
40	Madan B.K	M	9	40	Shila Khadka	F	8
41	Pralad Dhugana	M	7	41	Sibu Koirala	F	7
42	Santosh Sharma	M	8	42	Shiva Chapagain	M	9
43	Ishowr Dhakal	M	7	43	Ramchandra Bista	M	15
44	Sajan K.C	M	12	44	Shusila dhakal	F	10
45	Bikash Dhakal	M	10	45	Raju Kshetri	M	11
46	Manita Subedi	F	7	46	Asmita Dhakal	F	9
47	Bishnu K.C	F	13	47	Anju Pun	F	12
48	Santosh B.K	M	12	48	Muna Poudel	F	10
49	Dhana Pokhrel	F	10	49	Nikhil K.C	M	9
50	Sita Dhakal	F	13	50	Saroj Dhakal	M	13
51	Sarasowti Adhikari	F	11	51	Manoj Poudel	M	10
52	Min Bd.B.K	M	11	52	Nirjana Pun	F	11
53	Kalpana Magar	F	12	53	Sarmila Pun	F	10
54	Nisha Pun	F	15	54	Sajina B.K	F	13
55	Uma Cheetri	F	10	55	Ranjit Pariyar	M	6
56	Maya Gautam	F	9	56	Sadina Nepali	F	7
57	Hari Budathoki	M	7	57	Buddhi Khadka	M	7
58	Dorna Thakuri	M	13	58	Shiva Khatri	M	14
59	Hikmat Joshi	M	11	59	Kiran Poudel	M	15
60	Bhupendra Joshi	M	16	60	Punam K.C	F	16
61	Chandra Rana	M	11	61	Nalina Adhikari	F	12
62	Laxmi Poudel	F	11	62	Dil Bdr Pun	M	12
63	Harimaya Gautam	F	6	63	Anju pun	F	6
64	Bhim Jamarkattel	M	9	64	Sanjeep Koirala	M	8
65	Nayen Khatri	M	5	65	Ashok Khadka	M	5
66	Naryan Poudel	M	7	66	Juna Bhandari	F	8
67	Shirsthi Thakuri	F	11	67	Kunti Pun	F	5
68	Jivan Tiwari	M	12	68	Manila Sapkota	F	11
69	Bhuwan Poudel	M	11	69	Pabitra Khanal	F	12
70	Maya K.C	F	14	70	Sagun Pokhrel	M	14
71	Srijana Joshi	F	10	71	Bina Khadka	F	11
72	Mani Gurung	M	9	72	Sangiam Poudel	F	5
73	Damodar Bhandari	M	8	73	Shyam Pun	M	6

74	Bimala Poudel	F	14	74	Gayatri Nepali	F	14
75	Ramita Pun	F	11	75	Khem Bdr. Pun	M	9
76	Balika B.K	F	17	76	Radika Nepali	F	13
77	Shreeram Tiwari	M	10	77	Manila Khadka	F	11
78	Sumi Bhattarai	F	11	78	Asmita Adhikari	F	10
79	Priyanka Gurung	M	6	79	Samjhana Nepali	F	6
80	Anmol Sunar	M	9	80	Pramila Pun	F	13
81	Pradip Kunwar	M	5	81	Kalpana Khadka	F	5
82	Asha Kshetri	F	7	82	Rajina Pun	F	7
83	Anita Lama	F	6	83	Bhim B.K	M	5
84	Sarita Bhandari	F	9	84	Srijana Pun	F	10
85	Janak Adhikari	M	7	85	Sapana Khadka	F	9
86	Usha B.K	F	9	86	Sita Adhikari	F	9
87	Thomas Tiwari	M	15	87	Sudan B.K	M	11
88	Sachin Bd. Koirala	M	9	88	Saroj B.K	M	6
89	Kumar Pariyar	M	11	89	Dilsara Khadka	F	12
90	Kamala B.K	F	16	90	Manoj Dhakal	M	11
91	Hira K.C	M	12	91	Himali Khadka	F	6
92	Puja Magar	F	21	92	Harimaya Pun	F	11
93	Jamuna Dhakal	F	17	93	Ramita Nepali	F	18
94	Rupak Adhikari	M	19	94	Keshav Bhandari	M	15
95	Baman Chalise	M	14	95	Sashikala Pun	F	14
96	Dewa B.K	M	14	96	Bikal Pariyar	M	11
97	Santosh B.K	M	22	97	Binita Chhetri	F	20
98	Basanta Wagle	M	16	98	Gokul Nepali	M	15
99	Shanta Pariyar	F	17	99	Sabita Roka	F	16
100	Sangita B.K	F	12	100	Laxmi Khadka	F	10

APPENDIX-B

Item Analysis of the test

Students / Items	Upper 27%							Lower 27%							P%	D	Remarks
	1	2	3	4	5	6	7	8	9	10	11	12	13	14			
1	1	1	1	1	0	1	1	1	0	1	1	1	0	0	71.4	0.42	
2	1	1	1	1	1	1	1	1	1	1	0	1	1	0	78.6	0.14	cancelled
3	0	1	1	1	1	1	1	0	1	0	0	1	1	1	71.4	0.29	
4	1	1	1	1	1	1	1	0	1	0	0	1	1	1	50.0	1	
5	1	1	1	1	1	1	1	0	0	0	0	1	0	1	64.3	0.71	
6	1	1	1	1	1	1	1	0	0	1	0	0	1	0	64.3	0.71	
7	1	0	1	1	0	1	0	0	1	1	1	1	0	1	64.3	0.14	cancelled
8	1	0	1	1	0	1	1	0	1	0	0	0	0	0	42.9	0.57	
9	1	1	1	1	0	0	0	0	0	0	1	0	0	0	35.7	0.43	
10	1	1	1	1	1	1	1	1	1	1	1	0	0	1	78.6	0.43	Modified
11	0	0	0	0	0	0	1	1	0	0	0	0	0	0	14.3	0	cancelled
12	1	1	0	0	1	1	1	0	0	0	1	0	0	0	42.9	0.57	
13	1	0	1	0	1	1	0	0	0	0	0	1	1	1	50.0	0.14	cancelled
14	1	1	1	1	1	1	1	1	1	0	0	1	0	0	71.4	0.57	
15	1	1	0	1	1	0	1	0	0	1	1	1	0	0	57.1	0.29	
16	1	1	1	1	1	1	1	0	0	1	0	1	0	1	71.4	0.57	
17	0	1	0	1	1	1	0	0	0	1	0	0	1	0	42.9	0.29	
18	1	1	1	1	1	0	0	0	0	1	0	1	1	0	57.1	0.29	
19	1	1	1	1	1	0	1	0	0	1	1	0	1	1	71.4	0.29	
20	1	1	1	1	1	1	1	0	1	1	1	0	1	1	85.7	0.29	cancelled
21	1	1	1	0	1	0	1	0	1	0	0	0	0	1	57.1	0.57	
22	1	1	1	0	1	0	1	0	1	0	1	0	1	0	64.3	0.43	
23	1	1	1	1	1	1	1	1	0	0	1	0	1	0	71.4	0.57	
24	1	1	1	1	1	0	1	0	0	0	0	1	0	0	50.0	0.71	
25	1	1	1	o	1	0	1	1	0	0	1	0	0	1	71.4	0.29	
26	1	1	1	1	1	1	1	0	0	0	1	0	0	1	64.3	0.71	
27	1	1	1	1	0	1	0	0	1	0	0	0	1	0	50.0	0.43	
28	1	1	1	1	1	1	1	0	1	0	0	1	1	1	78.6	0.43	cancelled
29	1	1	0	1	0	0	0	0	0	0	0	0	0	1	28.6	0.29	cancelled
30	1	1	1	1	1	1	0	0	1	0	1	0	1	1	71.4	0.29	
31	1	1	1	1	1	0	1	1	0	1	0	0	0	0	57.1	0.57	
32	1	0	1	1	1	0	1	0	0	0	0	1	0	1	50.0	0.43	
33	1	1	0	1	0	1	1	0	0	1	0	0	0	0	42.9	0.57	
34	0	1	0	1	1	1	1	1	0	0	0	1	0	0	50.0	0.43	
35	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100	0	cancelled
	31	30	28	28	27	27	27	10	13	14	14	15	15	15			

APPENDIX-C

Split-Half Reliability of the Test

Students	Odd (X)	Even (Y)	XY	X^2	Y^2
1	15	16	240	225	256
2	15	15	225	225	225
3	13	15	195	169	225
4	14	14	196	196	196
5	12	15	180	144	225
6	11	16	176	121	256
7	12	15	180	144	225
8	9	6	54	81	36
9	8	7	56	64	49
10	7	8	76	49	64
11	8	6	48	64	36
12	8	6	48	64	36
13	5	8	40	25	64
14	6	4	24	36	16
N=14	$\sum X=143$	$\sum Y=151$	$\sum XY=1738$	$\sum X^2=1614$	$\sum Y^2=1909$

Reliability of Split-Half test

$$r_{xy} = \frac{N\Sigma XY - \Sigma X \Sigma Y}{\sqrt{N\Sigma X^2 - (\Sigma X)^2}\sqrt{N\Sigma Y^2 - (\Sigma Y)^2}} = 0.94$$

Therefore, reliability of whole test $(r_{tt}) = \frac{2r_{xy}}{1+r_{xy}}$

$$= \frac{2 \times 0.94}{1+0.94}$$

$$= 0.97$$

Also,

$$t = \frac{\overline{X_1} - \overline{X_2}}{Sp\sqrt{\frac{1}{N_1}+\frac{1}{N_2}}}, \quad df = N_1+N_2-2$$

Where,

$\overline{X_1}$ = mean achievement of the students obtained through first process.

$\overline{X_2}$ = mean achievement of the students obtained through second process.

N_1= Number of student involved in first

N_2= Number of students involved in second

S_1^2 = variance of the first

S_2^2 = variance of the second

And

$$S_p^2 = \frac{(N_1-1)\,S_1^2\,(N_2-1)S_2^2}{N_1+N_2-2}$$

APPENDIX-D

Achievement Test of Students

School name:

Student name: Date:

Subject: Mathematics

Class: Time:1 hour

Address:

Read the questions carefully and put the tick mark (√) with the letter (a, b, c, d) which you think correct.

1. If two times of 5 is added to 3, the value is:

   (a)7 (b) 10 (c) 13 (d) 17

2. If p= { a, b, c, d} and Q= { b, c, d, e}, what is the value of P∩ Q ?

   (a){ c, d, e} (b) {b, c, d} (c) {a, b, d} (d) {d, e, a}

3. Conjugate of √2-√3 is

   (a)2-√3 (b) √3-√2 (c) √2+√3 (c) 3-√2

4. If 3y=6 what is the value of y+4 ?

   (a)4 (b)5 (c) 6 (d) 7

5. Which is the following number is square number?

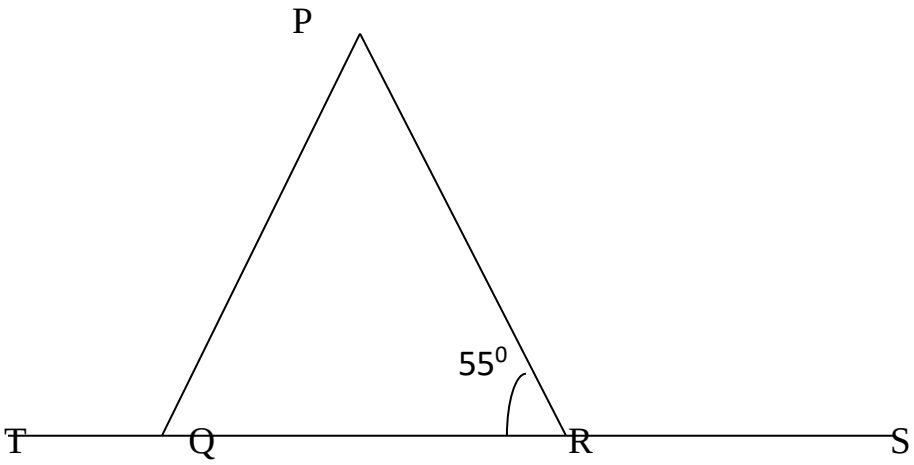
   (a)70 (b) 80 (c) 90 (d) 100

6. Which one is correct $a^m \times a^n$ equals to

(a) A^{m+n} (b) a^{mn} (c) $(a^m)^n$ (d) a^{m+n}

7. In the given adjoining figure, PQ=PR and <PRQ= 55^0 what is the value of a?

(a) 110^0 (b) 55^0 (c) 70^0 (d) 125^0



8. The sum of three interior angles of a triangle is…..

(a) 145^0 (b) 180^0 (c) 190^0 (d) 360^0

9. Find the value of: $2\sqrt{3}+\sqrt{27}$

(a) $3\sqrt{3}$ (b) $5\sqrt{3}$ (c) $6\sqrt{3}$ (d) $2\sqrt{3}$

10. What is the value of 0.2×0.3 ?

(a)0.6 (b) 0.06 (c) 0.006 (d) 6.0

11. What is the length of piece of ribbon for each girl when 6 meters long ribbon divided equally among ten girls?

(a)50cm (b) 50m (c) 60cm (d) 60m

12. What is the percent of $^{3}/_{4}$?

(a)50% (b) 65% (c) 75% (d) 85%

13. What is 20% of Rs.15?

(a)Rs.2 (b) Rs.3 (c) Rs.5 (d) Rs.6

14. What is the perimeter of a square if its length is 10 c.m.?

(a)20c.m (b) 22c.m (c) 30c.m (d) 40cm

15. 2.5 liters is equal to

(a)2000m.l (b) 2500m.l (c) 3000m.l (d)3500m.l

16. Find the median from the following data.

25, 30, 35, 40, 45

(a)25 (b) 30 (b)35 (d) 40

17. What is the area of rectangle whose length 6c.m and breadth 4c.m?

(a)24c.m^2 (b)25c.m^2 (c) 26c.m^2 (d) 27c.m^2

18. Which symbol is used to denote the memberships of any sets?

(a)€ (b)Σ (c)ε (d)ϵ

19. Find the H.C.F of x^2-1 and x+1?

(a)(x-1) (b) (x+1) (c) (x+1)(x-1) (d) x^2+x+1

20. Hari pays 72Rs. For one dozen copies what will be the cost for one copy?

(a)Rs.4 (b) Rs.5 (c)Rs.6 (d)Rs.7

21. What is the profit of a watch which was bought at Rs. 165 and sold at Rs.187?

(a)Rs.21 (b)Rs.22 (c)Rs.23 (d)Rs.24

22. If 2^x=1, find the value of x.

(a)0 (b) 1 (c) 2 (d) $1/2$

23. What is the slope of the equation y=2x+6?

(a)6 (b) 3 (c)2 (d) $2/3$

24. What is the value of $\sqrt[3]{27}$?

(a)9 (b) 6 (c)3 (d)7

25. How many prime numbers are there between 1 and 10?

(a)2 (b)3 (c)4 (d)5

26. Find the ratio of 200m and 400m.

(a)1:2 (b) 3:4 (c)4:3 (d)2:1

27. Which of the following is four degree expression?

(a)$2x^2+3$ (b) $4x+y$ (c) $3x^2y+8$ (d) $5x^2+2y$

APPENDIX-E

Interview schedule

The researcher conducted the interview with the head master and mathematics teacher of grade VII. Individual open questions have been derived on the basis of following.

I. What differences in students' achievement did you find before and after CAS implemented?

II. What differences did you find between traditional evaluation system and CAS?

III. Why CAS students have better achievement in mathematics than non-CAS students?

IV. What problems do mathematics teacher and school administrator face while implementing CAS?

APPENDIX-F

School wise description of the sample students

S.No	Name of CAS school	No. of students	S.No	Name of Non-CAS School	No. of Students
1	Rastriya H.S. School	20	1	Ratna Shova H.S. School	20
2	Bindabasini H.S. School	20	2	Amar Sidda Model H. S. S	20
3	Janpirya H. S. School	20	3	Laxmi Adarsa H. S. School	20
4	Pardi H.S. School	20	4	Aannda Joti H. S. School	20
5	Mahaendra H.S. school	20	5	Bishow Joti H . S. School	20