

**STUDENT'S ACHIEVEMENT TAUGHT BY TEACHER WITH AND
WITHOUT EDUCATION BACKGROUND**

**A
THESIS
BY
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Letter of Approval
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By
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Entitled

“Student’s Achievement Taught by Teacher with and without Education Background” has been approved in partial fulfillment of the requirements for the Degree of Master of Education.

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LETTER OF CERTIFICATE

This is to certify that Mr. Netra Prasad Paudel, a student of academic year 2064/65 with campus Roll no.36, T.U. Registration No.9-1-50-352-99, Thesis No. 689 and Exam Roll No. 281175/2066 has completed his thesis under my supervision during the period prescribed by the rules and regulation of Tribhuvan university, Nepal. The thesis entitled **“Student’s Achievement Taught by Teacher with and without Education Background”** has been prepared based on the results of his investigation conducted during the period of 2015 under the Department of Mathematics Education, University Campus, Kirtipur, Kathmandu. I recommend and forward that his thesis be submitted for the evaluation to award the Degree of Master of Education.

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ABSTRACT

The present research entitle, “Student’s Achievement Taught by Teacher with and without Education Background” has done to find teaching performance of with and without education background teachers in learning mathematics at secondary level based on the objectives; to compare the achievement of student taught by teachers with and without education background at secondary level, to find the status of teaching learning activities applied by the teachers from education and non education background

The survey research was adopted to fulfill the purpose of the study. The study was quantitative as well as qualitative in nature. The quantitative information was taken by administrating an achievement test among eight hundred students of grade IX students taught by teacher with and without education background. In the test mean, standard deviation was calculated for each group and t-test was applied to compare the mathematical achievement of students taught by teachers with and without education background. Similarly, to collect the qualitative information class observation form were applied among 10 education background teachers and 10 non education background teachers of mathematics at secondary level. In conclusion both quantitative and qualitative analysis advised that education background teachers are slightly forward than non education background teachers. The quantitative analysis advised that the student taught by education background teachers can achieve higher achievement than student taught by non education background teachers. Similarly, the performance of education background teachers in revision of lesson, organizing the subject matter in sequential form, giving appropriate illustration to subject matter, using methods & materials is found well than non education background teacher’s form above the qualitative information collected by observation form.

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ABBREVIATION

CERID	-	Research Center for Educational Innovation and Development
CDC	-	Curriculum Development Center
CRED	-	Center for Research, Education and Development
DOE	-	Development of Education
FGD	-	Focus Group Discussion
FOE	-	Faculty of Education
GN	-	Government of Nepal
ICS	-	Institute of Community Service
IOE	-	Institution of Education
MOE	-	Ministry of Education
NCED	-	National Center for Educational Development
NESP	-	National Educational System Plan
RC	-	Resource Center
RETTOP	-	Radio Education Teacher Training Programme
SESP	-	Secondary Education Support Programme
SLC	-	School Leaving Certificate
SSRP	-	School Sector Reform Programme
TEP	-	Teacher Education Project
TPD	-	Teacher Professional Development
VDC	-	Village Development Committee

Chapter I

INTRODUCTION

Background of the Study

“Teaching is a means for establishing a harmonious relationship between teacher, pupil and subject. It gives useful information and causes the child to learn. It is a stimulation and direction of learning. It helps the child to make effective adjustments. The pupil’s activities are guided by it. It is a means for transforming emotions of teacher and students” (Bhatia and Bhatia,1987).

Teaching of mathematics is not just transmitting a mathematical knowledge to student, but helping student to construct a deep understanding of mathematical ideas and process by engaging them in doing mathematics. Skemp (1982) said that to understanding something means to assimilate it into an appropriate schema. The notion that understanding in mathematics is making connection between ideas, facts or procedure.

The main purpose of teaching mathematics is to develop the understanding, reasoning and analyzing power which is necessary to various aspect of human civilization. In order to make mathematics teaching meaningful and effective in the classroom, the students should be interested and attracted to learn mathematics and they should also find its usefulness and application to their real life situations. To fulfill the purpose of teaching mathematics, the teacher must decide which subject matter will be helpful to achieve the aim of the study; teacher must be of dynamic in nature.

Teacher Training

The word training represents a process to make a person sufficient and skillful. It is a technique to change skill, knowledge, attitude and behavior of a person. Similarly, training is an essential for teacher to make plan, to construct and use of teaching materials with applying appropriate technique and teaching strategies. It helps the teachers to be able to transmit knowledge, skill, and attitude to the learners in a more effective way. Also it helps teachers to identify the student's interest and learning problems.

As teacher are backbone for the development of educational standard, teacher training are indispensable elements for the quality education. In other words, improvement in the quality of education depends to a large extent, on the quality and professional competence of teachers which depends on the status and effectiveness of teacher training program.

Teacher training is essential for all teachers and is an integral part of effective teaching learning process. It is prerequisite for bringing quality in education. It provides opportunities to teachers to acquire theoretical as well as practical knowledge of the professional functions and responsibility of teaching. In order to improve the competencies of teachers as sincere love and deep faith on teaching profession, for sufficient educational background and professional competencies and professional assistance for teaching improvement teacher training is essential for a teacher.

Teacher Training Program in Nepal

Organized teacher training programme started in Nepal with the establishment of Basic Teacher Training Center in 1947 to train teachers for Basic Schools (about 55 Schools). However, the training program was stopped in 1953. As per the recommendation made by the Nepal National Education Planning Commission (1954), the college of education was formally established on 9 September 1956 as the first degree granting college in Nepal. The college of Education provided one year and four year B.Ed. Courses to produce Education background teachers for secondary schools and simultaneously, the Mobile Normal Schools (Primary Teacher Training Centers) conducted the 10 month primary school Teacher training program to train the primary teacher of Nepal. The purpose of this training program was to develop trained and competent teachers and contribute to the improvement of educational quality.

At the beginning of 1990, the annual target of the college of Education was to provide training for about 50 teachers for secondary school and 600 teachers for primary schools. The Normal School, later known as Primary Teacher Training Centers, trained about 9000 teachers between the year of 1956 and 1971. The college of Education graduates were mainly absorbed in expanding professional activities in the education sector including teacher training programs. The most significant contribution of teacher education scheme, besides providing Education background Teachers to rural and remote areas, was that it brought about educational awareness throughout the country.

In 1971, a high level workshop was organized to develop a teacher education plan to meet the growing demands for trained teachers and other

education personnel. The plan purposed both in –service and pre-service Teacher training programs of long and short term to be conducted under the Umbrella of Institution of Education on the basis of the proposed teacher Education were undertaken during 70s and 80s. Women Teacher Training Programme was launched to promote female education by increasing the Enrollment of the girls in the primary schools of remote and especially backward areas of the country. A special primary teacher training center was established in 1973 in Jumla in the western part of the country .Considering the low academic qualifications of the teacher in remote areas.

A four year teacher training program was conducted for sixth grade completers. Then his program had the courses with the components from both content and pedagogical courses leading to S .L .C. with teacher training

A level 10 months primary teacher training programme was organized for pre-service as well as in–service teacher with SLC qualification. since the A level programme was the first year of I. Ed. paved the way for many primary school teachers to upgrade their academic qualification and attain the status of the lower secondary teachers Campus based B level (10months and noncredit)primary teachers training pogramme

For the pre-service as well as in–service teachers with academic qualification below SLC was also conducted in several education campus during the seventies decades.

Thought radio broadcasts in combination with self learning reading materials, a training program for the in service teachers was organized in 1980. Since a large number of teachers can be trained without having to leave their teaching in the schools, especially in the rural and remote areas, the RETTP can be considered to be

both innovative in its approach and effective in practice. The expansion of primary teacher education programs brought about a sharp increase in enrollment in the education campuses. The Institute of Education was obliged to over stretch its training capacity at the cost of quality of the training programs. Moreover, the academic nature of the training programs, which of course helped the teachers to get posted to higher position, failed to leave any significant impact on the quality of teaching in primary schools. Most of the first year completers continued their second year to get the I. Ed. Certificate in order to become lower secondary teachers. Apparently, it became clear that all the first year of I. Ed. were geared to meet the requirements of lower secondary teacher training program rather than the requirement of primary teacher training program.

At the time when IOE was concentrating its efforts on consolidating its different teacher training programs, the seventh amendment to the Education Act (1980) abolished training as a pre-requisite for getting tenure in teaching. This adversely affected the overall teacher education program in IOE. The enrollment dropped by about 50 percent in 1981 mainly as a result of the drastic cut made in the number of in-service teachers in the campuses. At the same time, most of the innovative programs initiated by the IOE were also discontinued. The IOE, as it did in its initial years of operation, therefore, returned to the pre-service of teacher education leading to the degrees of I. Ed., B. Ed and M. Ed.

The report of the Royal commission on Higher Education that came out in 1983 specifically mentioned that degree oriented programs will be organized in the Faculty of Education whereas shorter duration in-service training programs are to be conducted by related agencies of MOE. At the same time, the IOE was transformed

into the Faculty of Education (FOE) and all education campuses were administratively and financially placed under Tribhuvan University's central office. Thought the FOE can give academic direction to the education campuses. The budgetary allotment also limited the role the FOE so that it can hardly undertake any innovative teacher education programs in the country. At the same time, introduction of multiple campus system at the Tribhuvan University also helped in deteriorating the quality of teacher education programs in the FOE.

In present many organization have presented different types of teaching technique, teaching strategies, skills to get better improvement in teaching performance of teacher. To make the relevance and support of this study I was motivated to find the different between teaching performance of teacher with and without education background in teaching process.

Statement of the Problem

The problem of this study was on “A Comparative Study of Student Achievement Taught by Teacher with and without Education Background.”

This study focused to answer the following research questions:

-) What is the difference between the achievement of students taught by teacher with and without education background?
-) What is the status of teaching learning activities applied by the teachers from education and non education background?

Objectives of the Study

The following are the main objectives of the research:

-) To compare the achievement of students taught by teacher with and without education backgrounds at secondary level.

-) To find the status of teaching learning activities applied by the teachers from education and non education background.

Significance of the Study

A study is important for that related field in which it has been done. The main purpose of the study is to find the status of teaching learning activities applied by the teacher with and without education background in class room teaching. So this research will be important for educational field especially for training providing agencies.

This research has been done among eight hundred students taught by twenty teachers (among them ten were trained from education faculty with B. Ed & M. Ed & ten were untrained from B. A., B. Sc. & M. Sc.) of Rupandehi district to compare students achievement taught by Teacher with and without education backgrounds. In addition to find the status of teaching learning activities on the basis of teaching methods, materials, classroom management etc., the researcher searched differences between teaching strategies and activities adapted by these teacher with and without education backgrounds. So this research is important to take information about teaching effectiveness on the basis of teachers for teacher himself, school family, District Education Office, Regional Education Directorate and gradients of the students.

Research Hypothesis

The study attempted to seek the result of following research hypothesis.

-) There is significant difference between the achievement of student taught by the teacher with and without education background.

Delimitation of the Study

This study has the following delimitations:

-) Due to the limited resource materials and time it was not possible to include all the public school of the Rupandehi district in the study. Therefore the researched analyzed mathematical achievement scores of eight hundred students taught by teacher with and without education backgrounds of 20 public secondary schools.
-) Researchers applied only classroom observation form to find the status of teaching learning activities applied by the teacher from with and without education backgrounds.
-) This study included only classroom teaching performance of the teachers.
-) In this research only 20 secondary mathematics teacher (among them 10 from education background and 10 from non education background) were taken to fill up the observation form of limited resource and time available.

Definition of the Related Terms

Teacher

The person who teaches mathematics at secondary level and is appointed as a teacher.

Education background Teacher

The teacher who comes after passing B.Ed.

Non-education background Teacher

The teacher who comes after passing B.Com. , B.A. or B.Sc.

Investigation

A formal examination of the facts about a situation, problem etc. to find the truth about it or how it happened. In this context, it is related to teaching mathematics in secondary level.

Teacher Training

It is a kind of education for teacher that can help the teacher to become skillful in their job & duty.

Achievement Score

In this study achievement means the scores obtained by the students on the test prepared by the researcher.

Chapter II

REVIEW OF RELATED LITERATURE

A review of related literature takes the research task to be undertaken a better perspective with this assumption some work related to this topic is presented here:

Taylor (1911), has developed 'Scientific Management Theory' in 1911. This theory concluded that the amount of output can be increased by improving the efficiency of the workers To improve the efficiency of the workers it is necessary to change his working style\technique\methods, given the chance to select work for him, give training to the workers, determine the salary for workers as scientific way and provide more salary to who work more .this theory can be used in teaching field too. According to this theory teacher training is necessary to improve teacher professional development, education background teacher should be select in teaching profession proper facilities should be provide to the teacher and if we give the chance to the education background teacher in teaching profession teaching will be effective and successful to achieve the goal.

Khatiwada (1974) , in his study entitled" A study to compare the Students Activities Radio and their Achievement on third grade students of Mathematics concluded in Teacher with and without education background in the town of Birgunj" conducted that teaching was more pupil centered in class conducted by trained Teachers than by untrained ones.

A research "Comparative study of Trained and Untrained teachers" conducted by CERID (1996) with the purpose of finding differences between trained and untrained teachers on profession and teaching activities. Academic qualification of

trained and untrained teacher, their behavior, attitude, intention in classroom teaching and different aspects of their teaching activities had been studied to fulfill the objectives. The research conducted on different schools of 12 districts; Kaski, Tanhu, Gorkha; Morang, Sunsari, Jhapa, Chitwan, Makawanpur, Parsa, Kathmandu, Lalitpur and Bhaktpur. Classroom observation, FGD, interviews were the main instruments of this study. The research concluded that teaching activities adapted by trained teachers are more positive than the teaching activities adapted by untrained teachers.

Subedi (2001), conducted a research entitled. “Training needs Assessment of Secondary School Mathematics Teacher” concludes that the training needs for the in-service mathematics teacher of secondary school to develop the following:

-) Instructional Materials,
-) Techniques of Teaching
-) Conceptualization of Subject Matter to Teach Mathematics.

ICS (2002), conducted a research entitled “Follow up Study of Teacher Training Programme” submitted to MOE by ICS education campus with the objectives to prepare manpower for follow up activities of teacher training programme and to evaluation the classroom situation and major hindrance to the transfer of acquired training skills as well as to help improve classroom teaching though the application of the follow up strategy. Document analysis, classroom observation, and interview with teachers, Head teachers, with different of officials of NCED were the means of collecting data. Five hundred thirty eight teachers, one hundred twenty six head teachers, one hundred twenty six schools working in eight different districts as well as parents of the children studying in grade III, and IV & V were selected as sample of this study. Parents (pre-feedback observation, post-

feedback observation) observation FGD, interviews were the instrument of this study.

The conclusions of the report are as follows:

- J Usefulness of the training was noticed to be high in mathematics followed by social Studies and English.
- J Little co-operation from the school ones crowded classroom, heavy workload, worked of instructional support of poor physical facilities discouraged the teachers to use the skill they acquired in the teaching.
- J Homework was not checked at all English teachers remained a head of all the other teachers in this act.

Subedi (2002), did study “ A Study of the Effectiveness of Mathematics Teacher Attitude Towards the Visually Impaired/ blind Student Achievement Integrated School” concluded that specially trained teacher holds significantly better attitude towards the blind students than that of untrained teacher.

Chhetri (2004), on his research entitled “ Training Programme in Mathematics” concluded that the teacher training programme in mathematics at primary level is effective. However, there was difference in teaching under the following topics: teacher preparedness, use of teaching materials, teaching process, children learning practice, homework assigned.

Neupane (2004), his research entitled “Classroom Behavior of trained and untrained teachers” conducted on six schools of Shivagunj VDC on Jhapa district, This research was done with the purpose to compare teaching classroom behavior and extra actives of trained and untrained teacher. To fulfill the objectives of the study classroom behavior and extra activities of Nepal and Social Studies teachers were

studied. This comparative study concluded that trained teachers are more active and positive in teaching than untrained Teachers.

Himal (2005), his research entitled “ A Study of the Effectiveness of Teacher Training Programme in Mathematics at Primary Level” conducted in pyuthan district, concluded that there is slightly a difference between the effectiveness of trained and untrained teacher. The conclusions of the study are as follows:

-) Primary level trained mathematics teachers had positive attitude than untrained mathematics teachers.
-) The students taught by trained and untrained teacher had slightly difference attitude towards mathematics.
-) The student taught by the trained teacher had higher achievement than the students taught by untrained teacher.

Khanal (2006), his research entitled “ Trained Teachers and Teachers Training” conducted to fulfill the objectives of finding teachers attitude towards trained teachers and teacher training and concluded that teachers have positive attitude towards teacher training and teacher training is a part of teacher for professional development.

Pulami (2007), his research entitled “Teaching Effectiveness of Trained and Untrained Teacher, A Comparative Study” conducted on Jhapa district with the purpose to compare teaching effectiveness of trained and untrained teachers. Class observation, questionnaire and interview tools were applied for data collection. The research concluded that there is only slightly a difference in teaching effectiveness between trained and untrained teacher. Only nominal affection of training is found in teaching performance of trained teachers.

Bhattarai (2009), his research entitled “ Comparative Study of Trained and Untrained Teachers in Classroom Behavior and Management” conducted on Tarhara Resource Center of Sunsari district with the objectives to study classroom behavior of trained and untrained Teacher, to compare similarities and difference between Teacher with and without education backgrounds in classroom management and to suggest the effort to make effective way for classroom management. Classroom observation, interview, questionnaire, FGD among head teachers, 30 Teacher with and without education backgrounds, 25 student of 5 selected schools which were selected by random sampling, were applied to collect data. This research concluded that trained teachers performed better than untrained teacher in different aspects such as initiation, evaluation, providing feedback, teaching methods, behaviors with student there is no differences between trained and untrained teacher’s behavior.

Ghimire (2010), did research on the entitled “ Comparative Study on Use of Teaching Methods & Instructional Materials of Trained and Untrained Teacher.” He conducted the research on Nepaldata Research Center of Bhojpur district with the objectives to find similarities & differences in using teaching method & materials between trained and untrained teacher, to find students achievement taught by trained and untrained teacher. Observation, questionnaire, achievement test and FGD were applied to collect data. This research concluded that trained teacher has used proper teaching methods & instructional materials than untrained teacher. Thus in classroom students taught by trained teacher is more active than the students taught by untrained teachers.

CERIED (1998), *Secondary Education: A Need for Diversification* concluded teachers qualification, training, professional role and responsibilities and comment are more important for good quality education.

National Education Commission (NEC, 1992) has heavily emphasized in teacher training and has mentioned:

some teachers are born, while others may be trained to become able. To become a successful teacher it is not just sufficient that he is well-versed in his subject or that he has a wide experience. What is equally necessary is that he should study the science and out of pedagogy and master the requisite teaching techniques. Teacher training should, therefore, be made compulsory (NEC, 1992:36).

Chapter III

METHODS AND PROCEDURES

This chapter contains the separate sub-headings as population, sample, source of data, instruments, data collection procedure and data analysis procedures. The main purpose of this study was to compare the mathematics achievement of the students taught by the teacher with and without education background. In this study achievement in mathematics was dependent variable and teacher's background was independent variable.

Design of the Study

The survey method was used to fulfill the objectives of the study. Both the quantitative and qualitative methods were used. The quantitative information was taken by administering an achievement test among eight hundred students of grade IX taught by the teacher with and without education backgrounds. And observation form had done three different times for selected 10 education background teachers and 10 non education background teachers of mathematics at secondary level. That's why it is a survey type study among the mathematics students and teachers.

Population of the Study

All the grade IX students and secondary mathematics teachers of Rupandehi district were the population for this study.

Sample of the Study

The researcher selected 20 public secondary schools by stratified random sampling method. Ten education background teacher and 10 non education background teachers were selected from those 20 selected public schools. The researcher selected forty students from each selected school taught by the teacher with

and without education background. In this way the researcher selected eight hundred students for achievement test.

Instrument for Data Collection

The main data collection instruments for this study were an achievement test paper and observation form. For achievement test paper, some questions were developed by researcher himself, some were taken from teacher's guide and specification grid of grade nine which are published from CDC, Sanothimi, Bhaktapur.

i. Achievement test paper

This achievement test was the basis tool for collecting the data to compare achievement of students taught by teacher with and without education backgrounds. The test was consisted thirty multiple choice questions.

The test consisted of eight items of knowledge level (20%), eleven items of computation level (27.5%), nine items of skill level (22.5%) and twelve items of application level (30%) of cognitive domain. The test was standardized by pilot study.

The content validity of the test was approved from the mathematics education expert and school teachers. For the reliability of the test researcher conducted pilot study. The 30 students of Ramapur Higher Secondary School, Ramapur Rupandehi were used for pilot study of the achievement test. Before administrating the test paper, the researcher instructed the students how to respond on the test paper. It was provided one minute per item. The purpose of pilot study was to acquaint with the field situation of test administrating and train them. Following the pilot study difficulty and discrimination values for every item were calculated and those item, which demonstrated desirable level were included in the test. To finalized the item of the test, item analysis chart was developed shown in Appendix C, difficulty level and

the discriminations of each item was calculated from 27% of higher score i.e. 8 students of higher and 27% of lower score i.e. 8 students of lower score. Also, to find the reliability of the achievement test, the researcher used split-half method and found Reliability coefficient 0.93 that was shown in Appendix D.

The test was refined by cancelling some of the items. Table of item analysis determine the level of difficulty (P) and power of discrimination of each item in the instrument. The items those having D-level above 0.25 and p-value (25-75) % were accepted. The items those having D-value less than or equal to 0.25 were cancelled.

Items no; 2, 7, 13, 19, 22, 27, 29, 34, 37, and 40 were cancelled shown in Appendix C. Thus the refined instrument of achievement test included only 30 standardized items in the achievement test as shown in Appendix A.

ii. Class observation form

A short description of teaching strategies and process adapted by teacher with and without education backgrounds was made by observing their classroom teaching activities. For this purpose the researcher selected 10 mathematics teacher from education background and 10 from non education background of secondary level. Then each selected teacher's classes were observed differently. Researcher developed a detail classroom observation form in which the observer is expected to observe the teaching learning activities that are expected to take place in a regular classroom period.

Data Collection Procedure

I myself visited each of the sample schools of Rupandehi district and administrated the achievement test to collect data. Well instruction in a conductive environment of the classroom was provided before administrating the achievement

test. This was all for the students and they are responsible for questions to finish correctly and thoughtfully.

After setting down all that pre-adjustment and management in co-ordination with the school family and especially the subject teacher and the head teacher, the researcher himself administered the standardized achievement test to the sample students of the sample schools to observe the achievement level. The achievement test was conducted for 45 minutes. The score obtained by the students of both sampled school was used in analysis and interpretation.

A short description of teaching strategies and process adapted by teacher with and without education backgrounds was made by observing their classroom teaching activities. For this purpose the researcher selected mathematics 10 trained and 10 Non-education background teachers of secondary level. Researcher developed a detail classroom observation form.

Data Analysis Procedure

The mean, standard deviation and variance were calculated for each group with their secured marks in the achievement test taken by the researcher. Then the statistical tool t-test was applied at 0.5 level of significance to compare the achievement of students taught by the teachers with and without education background. The collected data was analyzed and interpret with the help of statistical devices. The qualitative information were collected to support and relevant to the study by observation form. Descriptive analysis was done to analysis the qualitative information.

Chapter IV

ANALYSIS AND INTERPRETATION OF DATA

This study was aimed to compare teaching performance of teacher with and without education backgrounds. Both the quantitative and qualitative analysis has been done to fulfill the objective of the study. This chapter deals with the analyses and interpretation of classroom teacher's performance of education and non education background teachers. Also it deals with the statistical analysis and interpretation of data obtained from the mathematics achievement of secondary level students taught by teacher with and without education backgrounds. Data were tabulated and analyzed by using mean, variance and t-test at 0 .05 level of significance.

The analysis of the study was carried out under the following major subheading which corresponds to the objective of the study.

- Comparison of achievement scores of students taught by teacher with and without education backgrounds.
- A short description of teaching performance of teacher with and without education backgrounds.

Comparisons of achievement scores of students taught by teacher with and without education background

The first objective of the study was to compare the mathematics achievement of the students taught by teacher with and without education background. In order to achieve this objective an achievement test was administered to eight hundred students taken by random sampling method. Among them four hundred were taught by education background teachers and four hundred were taught by non-education

background teachers. To determine significant differences between the achievement scores of students taught by teacher with and without education backgrounds the mean, standard deviation were calculated for these two groups and t-test at 0.05 level of significance was calculated to compare mathematical achievement of students. The achievement test scores of students taught by teacher with and without education background are presented in Appendix E and the summary of statistical calculation for both groups is presented in below table:

Table no: 1

Comparison of student Achievement scores Between Group A (Students taught by education background teachers) and B (Students taught by non-education background teachers)

Groups	N	Mean	S.D	Var (²)	t-value (calculated)	t-value (tabulated)
A	400	16.25	6.40	40.99	2.65	1.96
B	400	12.28	5.48	30.05		

Where,

N= number of students, S.D= Standard Deviation, Var = Variance

Table no. 1 shows the number of students taught by teacher with and without education background was equal. The scores of group A ranged from 28 to 8 with mean scores 16.25 have standard deviation 6.40. Also the scores of group B ranged from 26 to 5 with mean scores 12.28 have standard deviation 5.48. Similarly mean difference scores obtained by the students taught by teacher with and without education background is 3.97. It can be seen from table no. 1 that calculated value of t i.e. 2.65 is greater than the critical value i.e. tabulated value of t = 1.96 at 5% level of significance. Therefore the hypothesis “there is no significant difference between

mathematics achievement of students taught by teacher with and without education backgrounds” is false. Thus it is concluded that the students taught by education background teacher achieved better achievement than students taught by non-education background teacher.

A Short Description of Teaching Performance of Teacher with and without education backgrounds

In present study researcher intended to investigate teaching performance of teacher with and without education background. Above quantitative research analysis advised me that students taught by education background teacher can achieve better achievement score in mathematics than the student taught by non-education background teacher. To make the relevance and support of this study I was interested to find the different between teaching performance of teacher with and without education background in teaching process. So a short descriptive analysis was done on the basis of class observation.

The researcher developed an observation from including indexes related to those basic performances that a good teacher should have by taking the help of different literature review and suggestions from supervisors & other education experts. Then researcher selected 20 teachers (10 from education and 10 from non education background) and observed their class activities three times for each teacher separately. The teaching strategies and process adapted by teacher with and without education backgrounds is analyzed below.

Condition of Teacher Preparation

Most of the educationist, philosopher believes that predatory planning is necessary for any work. Predatory planning gives the guideline for a person about what to do, how to do, when to do etc. In teaching field it is also necessary in teaching field. It is said that a good teacher should have predatory planning before entering into the classroom. By considering this view the researcher mentioned the point teacher preparation in his indexes for descriptive analysis.

Table no. 2

Teacher Preparation Record of Teacher with and without education backgrounds (In Percentages)

Activities	Educational background teacher			Non-education background teacher		
	Yes	No	Remarks	Yes	No	Remarks
1. Teacher has instructional plan	50	50		30	70	
2. Consults other references books		100	Uses only textbook & curriculum		100	Uses only textbook & curriculum
3. Arranged class properly	100		Duty of class teacher	100		Duty of class teacher

Above table shows that the conditions of teacher preparation of education and non education background teacher was found while observing their class. The teacher preparation according to instructional plan about similar condition was seen between education and non education background teacher. Both teachers with and without education backgrounds had yearly plan and five education background teachers had unit plan too. In the case of lesson plan five selected education background teachers

and three non education backgrounds teacher entered into classroom with lesson plan but other had no lesson plan they had rough plan only.

Similarly it was seen that the teacher with and without education backgrounds both are dependent upon textbook. They use textbook more. And some of them consult some mathematics practices books for exam preparation of students. Likewise the condition of arranged the class was seen as same as both teacher with and without education background's class. The duty of class arrangement was already divided for class teacher and the class at first period then other period's teacher do not give attention towards it. That type of system was found in selected school.

In conclusion it is true to say that there is no special difference between teacher with and without education background's performance in the condition of teacher preparation.

Condition of Initiating the Lesson

Initiation of any work should be attractive and meaningful. If we initiate any work attractively the whole part of the work will be finished attractively. Similarly, the teacher should initiate the lesson in such a manner, which develop interest in the students and make them inclined to learn. It makes classroom activities most fascinating as well as most fruitful and effective

Table no. 3

**Initiation of Lesson Record of Teacher with and without education backgrounds
(In Percentages)**

Activities	Education background teacher			Non-education background teacher		
	Yes	No	Remarks	Yes	No	Remarks
1. Announces the objectives of the lesson first	100			100		
2. Revision of Previous lesson	60	40	Different techniques (question-answer discussion, lecture, giving feedback for homework) were adapted at the same time		100	Uses question-answer
3. Start of the lesson interestingly		100	Started directly		100	Started directly

Above table shows the teacher with and without education background's condition about initiation of the lesson that was found at observation time. It is true to say that announcement of the objectives about the lesson at beginning is necessary and it helps a teacher to make the students ready to learn by mentally and physically. (Child friendly pg. 25 NCED). The researcher seen that all selected teachers started their lesson by announcing the content about which they were going to discuss and the activities that they were going to do in that whole period at first by orally. This means 100 percentages among selected teachers announced the objectives of the lesson at beginning were found. So this point of index is favorable towards both teacher with and without education backgrounds.

Similarly, it was seen that education background teachers were more serious towards revision of previous lesson than non-education background teachers. In

whole class of observation education background teachers were focused the previous lesson frequently. They tried to connect the day lesson with previous lesson. In the classes of education background teachers they revised the lesson by question-answer for recalling the formula while it had to use. Otherwise they gave the homework in previous day and by using cross checking technique they correct the homework with feedback in text day. At the same time they used different methods; question-answer, discussion, lectures etc. for revision and summarizes the previous lesson which was found suitable according to their lesson and also they were applying appropriately. But in another side non-education background teachers had not giving that much consideration towards it. In every class that revised the lesson by question-answer the formula when it was necessary to use. And other non education background teachers tried to revise the previous lesson but for this purpose they asked some questions to the students related to previous lesson at beginning. They researcher had seen that non-education background teachers distributed student's homework copy without providing the feedback in three classes observation of non-education background teachers. So if we compared the revision of the previous lesson it is true to say education background Teachers were forward than non education background teachers.

Above table no. 3 shows there is no difference between teacher with and without education backgrounds in start of the lesson interesting; the researcher seen that both type teachers started the lesson directly

From analysis of above information it is easy to say that education background teachers are quite forward than non education background teachers in the case about initiation of the lesson.

Condition about Presentation of the Subject Matter

Presentation of subject matter is one of the strong aspects in teaching field. It is believing that in teaching teacher's presentation plays a vital role to encourage, motivate, actively participant of the students towards the lesson. So the psychological presentation with appropriate illustrations organizes the lesson in sequential manner and has complete command over the subject matter are necessary for a good teacher.

Table no. 4

Presentation of the Subject Matter Record of Teacher with and without education backgrounds (In Percentages)

Activities	Education background teacher			Non-education background teacher		
	Yes	No	Remarks	Yes	No	Remarks
1. Subject matter relevant the curriculum	100			100		
2. Command over subject matter	100			100		
3. Organizes the lesson in sequential form	100		Organized same type problem together	60	40	Sometimes organized same type problem together and sometimes not
4. Coverage the subject matter	100		Necessary to use practice only textbook's problems are not sufficient for students	100		Necessary to use practice only textbook's problems are not sufficient for students
5. Appropriate illustration	100		Illustration was given for new concept appropriately		100	Focused on problem or exercise more than new concept

Above table no. 4 shows clearly that teacher with and without education backgrounds had taken the subject matter that relevant to the curriculum and they had good command over the subject matter. At that view both teacher with and without education backgrounds are similar.

It was found that education background teachers are able to organize the lesson in sequential form. In textbook's exercise or in other practices book sometimes related type problems have not given sequentially. At that condition teacher should organize the subject sequentially. Same condition was found in education background teacher's organize the subject sequentially. Same condition was found in education background teacher's class. But non education background teachers were not serious towards it. Sometimes they organized the subject teachers are seem to be good than non education background teachers.

Both teacher with and without education backgrounds gave more emphasis to textbook's exercise only. They had not being used other references books for practice because the textbook only is not a sufficient material for the mathematics students of secondary level. So the research was not agreed with them about the coverage of subject matter.

Similarly, it was found education background teachers were giving appropriate illustration for new concept. But on another side it was observed that non education background teachers did not give the concept. They listed some formulae and started the exercises directly.

At last it is easy to say from above analysis education background teachers are quite good in presentation of subject matter than non education background teachers. Especially education background teachers are seemed to be good in organizing the

subject matter in sequential form and to use appropriate illustration for the content than non education background teachers.

Condition of Using Teaching Materials

Most of the selected teachers (education and non education) were agree about the importance of teaching materials in teaching. Those selected mathematics teachers had the opinion about the use of materials in mathematic that mathematics is an abstract subject and for each new concept of mathematics teaching, manipulative concrete materials are necessary. The researcher found their disapproval was that due to the overload of teaching and by few ideas & knowledge of preparing local materials they could not prepare & collect much more materials and school administration also have not being provided all types of teaching materials. At the same point aggressively one head teacher said by blaming towards the teachers, “Teacher did not give the time to prepare local materials even they have ideas; they only ready to blame towards school administration for not providing enough teaching materials.”

Condition of using teaching materials by teacher with and without education backgrounds that was seen from observation presented in the below table:

Table no. 5

Use of Teaching Materials Record of Teacher with and without education backgrounds (In Percentages)

Activities	Education background teacher			Non-education background teacher		
	Yes	No	Remarks	Yes	No	Remarks
1. Use of appropriate teaching materials	50	50		30	70	
2. Ready-made materials	30	70		40	60	
3. Locally prepared materials	50	50		20	80	
4. Having proper size		100			100	
5. Continuity in using teaching materials	40	60		30	70	

Above table no. 5 shows clearly that education background teacher used appropriate and locally prepared materials than non-education background teachers. Similarly, non-education teachers used more ready-made materials than education background teachers. But both teacher with and without education backgrounds did not give continuity in using materials.

Condition of Using teaching Methods

Condition of using teaching methods that found in class observation of 10 education background teachers in 30 classes and 10 non-education background teachers in 30 classes presented in below table:

Table No .6

Condition of Using Teaching Methods of Teacher with and without education backgrounds (In Percentages)

Activities	Education background teacher			Non-education background teacher		
	Yes	No	Remarks	Yes	No	Remarks
1. Applying different teaching methods	50	50		20	80	
a. Using teacher-center methods	100			100		
b. Applying different teaching methods	40	60		20	80	
c. Methods using relevant to the subject matter	60	40		30	70	
d. Condition of presentation of the methods	50	50		40	60	

From the above table it is easy to say that education background teachers use more different methods in their teaching than non-education background teacher. For formula derivation education background teachers used demonstration with lecture method that was found quite good presentation. In spite of using teacher-center methods by both teachers with and without education backgrounds education background teachers are little forward to use student-center methods than non education background teachers. But some special refreshment training about new teaching methods and ideas to use them is necessary for them.

In conclusion both quantitative and qualitative analysis advised that education background teachers are slightly forward than non education background teachers. The quantitative analysis advised that the students taught by education background

teachers can achieved higher achievement than students taught by non education background teachers. Similarly, the performance of education background teachers in revision of lesson, organizing the subject matter in sequential form, giving appropriate illustration for subject matter, using methods & materials is found well than non-education background teachers from above the qualitative information collected by observation form.

Chapter V

SUMMARY, FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

Summary of the Study

The present study entitled “A comparative study of students achievement taught by teacher with and without education backgrounds” was conducted to fulfill the following objectives:

-) To compare the achievement of students taught by teacher with and without education backgrounds at secondary level.
-) To find the status of teaching learning activities applied by the teachers from education and non education backgrounds.

To fulfill the first objective of the study the researcher selected forty students of each selected schools taught by teacher with and without education backgrounds by simple random sampling methods. In this way the researcher selected eight hundred students for achievement test. By using the achievement test mean, variance and standard deviation of the scores were found. Then the significance of the difference in mean and standard deviation was determined with the use of t-test to compare mean and standard deviation of these two groups of students taught by teacher with and without education backgrounds.

To collect qualitative information to support this study a short description about teaching strategies and process adapted by teacher with and without education backgrounds is made by using observation form technique. For this purpose observation form was made. Ten education background mathematics teachers and ten non education background mathematics teachers of secondary schools of the Rupandehi district were also taken as sample for observation form.

In short, in this study t-test is applied at 5% level of significance to compare mean achievement scores of students taught by teacher with and without education backgrounds. Descriptive analysis is done with the help of result of observation form.

Findings

From the existing statistical and descriptive analysis of the data leads towards the following results as the major findings of the study:

- There are significance differences in students achievements taught by teacher with and without education backgrounds. Students of grade nine taught by education background teacher achieved better achievement than the students taught by non-education background teachers.
- Both teacher with and without education backgrounds announce the objectives of the lesson at beginning.
- Education background teachers revise their previous lesson by using different techniques; question answer, discussion, lecture and also they give feedback for homework correction. But non education background teachers revise the previous lesson by using question-answer and lecture more.
- Education background teachers are quite good in presentation of subject matter than non-education background teachers. Especially education background teachers are seemed to be good in organizing the subject matter in sequential form and to use appropriate illustration for the content than non education background teachers.

- Non education background teachers used blackboard, chalk, duster more and they used few account of other materials too. On the other hands it was seen that education background teachers tried to use more materials (especially locally prepared) then non education background teachers. Also they use different materials in their lesson.
- Education background teacher use more different methods in their teaching than non-education background teachers. In spite of using teacher-center methods by both teachers with and without education backgrounds education background teachers are little forward to use student-center methods than non education background teachers. But some special refreshment training about new teaching methods and ideas to use them is necessary for them.

Conclusions

From the analysis of findings of the student and related literatures, I concluded that the students taught by education background teacher can get higher achievement than the students taught by non education background teachers. Education background teacher can perform better than non education background teacher in classroom teaching activities. They can change the positive attitude to student towards mathematics learning. There is no special difference between teacher with and without education backgrounds performance in the status of teacher preparation. Also education background teacher's performance is quite good in using teaching materials, methods, presentation of the subject matter than non education background teachers.

Recommendations

From the findings of the study the following recommendations have been made:

- Teacher training should make compulsory for teaching profession.
- Head teacher and teacher should have the opportunity to receive teacher training programme.
- The training programme should be practicable. It should provide the practical activities for the teachers which can use in classroom situation.
- It may be found that skills and knowledge obtained from training programme is not everything. So the teacher has used this knowledge as much as possible.
- Regular classroom observation from school supervisor or from school's head teacher should be done. Teacher can get fruitful feedback from observation for betterment. And sometimes it will be more useful to give emphasis to use skill and knowledge obtained from trained program for those teachers who are not using those skills and knowledge fully.
- All the education colleges are providing pre-service training to the teachers in different subject. So in other word, it is giving birth of thousand of education background teachers every year. Thus all stakeholders should not be careless to provide good training for them, they should be careful towards it.
- Teaching profession should be made respectable in society.
- MOE should provide teacher training programme for both the private and public school's teachers.
- Private training sectors should be mobilized in order to start the government training packages in residential basis.

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Appensdex – A
Achievement Test

कक्षा: नौ

मिति:

विषय: अनिवार्य गणित

समय:

विद्यार्थीको नाम:

रोल नं. :

विद्यालयको नाम:

पूर्णाङ्क: ३०

दिइएको प्रत्येक प्रश्नको चारवटा उत्तरमध्ये एउटाको मात्र ठीक छ। प्रश्नलाई ध्यानपूर्वक राम्ररी पढेर ठीक उत्तरको अक्षर (a, b, c, d) मा ठीक चिन्ह () लगाऊ ।

३० | १ = ३०

१. यदि $A \mid B$ भए $A \cap B$ कति हुन्छ α

- a. A b. B c. \leftarrow d. U

२. यदि $A = \{p,q,r,s\}$ $B = \{r,s,t,u\}$ $eP(A \cap B)$ कति हुन्छ α

- a. $\{r,s\}$, b. $\{p,q,r,s,t,u\}$ c. $\{t,u\}$ d. $\{p,q\}$

३. यदि $V = \{a,e,I,o,u\}$ भए $n(V)$ कति हुन्छ α

- a. 2 b. 3 c. 4 d. 5

४. तलका मध्ये कुन ठीक छ α

- a. $A - B = \{x : x \in A, x \notin B\}$ b. $A - B = \{x : x \in A, x \in B\}$
b. $A - B = \{x : x \in A, x \in B\}$ d. $A - B = \{x \in A, x \in B\}$

५. यदि यदि $n(U)=300$, $n(P)$ and $n(Q) = 180$ भए $n(P \cap Q)$ कति हुन्छ α

- a. 100 b. 130 c. 160 d. 190

६. रु. 96 मा 8 वटा बलम किन्न सकिन्छ, भने रु. 180 मा कति वटा कलम किन्न सकिन्छ α

- a. 10 b. 15 c. 20 d. 25

७. एउटा बटुवालाई 56km हिंड्न जम्मा 4 दिन लाग्छ, भने उसलाई 154km हिंड्न कति दिन लाग्छ ?

- a.11 b.10 d.12 d. 8

८. सात जना मानिसले कुनै एक काम पूरा गर्न 24 दिन लगाउछ, भने सोही काम 18 दिनमा सकाउन कति जना मानिस चासहन्छ ?

- a. 8 b. 12 c. 16 d. 20

९. ७ जना मानिसले कुनै एक काम पूरा गर्न २४ दिन लगाउछ, भने सोही काम १८ दिनमा सकाउन कति जना मानिस चाहिन्छ,

- a. 15 b. 20 c. 25 d. 30

१०. २० लिटरको दुधमा ६०% शुद्ध दुध र बाकी पानी छ, भने पानीको मात्रा कति रहेछ ?

- a. 8l b. 18 l c. 28 l d. 38 l

११. सृजनाले 150km को यात्रामा 10% मात्र यात्रा पूरा गरिछन्, भने कति km यात्रा

गरिछन् ?

- a. 20km b. 16km c. 14km d. 15km

१२. 1kg को 250g कति प्रतिशत हो ?

- a. 15 b. 20 c. 25 d. 30

१३. 140 को कति प्रतिशत 500 को 7% साग बराबर हुन्छ ?

- a. 15 b. 20 c. 25 d. 30

१४. एउटा वर्गाकार चौरको क्षेत्रफल $361 m^2$ भए उक्त चौरको लम्बाई कति होला ?

- a. 16m b. 17m c. 18m d. 19m

१५. 6m लामो र 4m चौडा कोठामा 1.5m चौडा कार्पेट बिछ्याउन कति लामो कार्पेट चाहियला?

- a. 14m b. 15m c. 16m d. 17m

१६. 5m लम्बाइ र 3m चौडाइ भएको कोठाको उचाइ 3m छ भने चार भात, भूई र सिलिङ्गको क्षेत्रफल कति होला?

- a. $58 m^2$ b. $68 m^2$ c. $78 m^2$ d. $88 m^2$

१७. कुनै वृत्तको रेडियस r छ भने वृत्तको क्षेत्रफल कति हुन्छ ?

- a. fr^2 b. $2fr$ c. fd^2 d. $\frac{fr^2}{2}$

१८. $144m^2$ क्षेत्रफल भएको वर्गाकार खेतको परिमिति कति हुन्छ ?

- a. 12m b. 144m c. 48m d. 36m

१९. a,b,c तीनवटा भुजा भएको त्रिभुजको अर्धपरिमिति s छ भने यसको क्षेत्रफल कति हुन्छ?

- a. $\sqrt{(s Za)(s Zc)}$ b. $\sqrt{s(s Za)(s Zb)}$
c. $\sqrt{s(s Za)(s Zb)(s Zc)}$ d. $\sqrt{(s Za)(s Zb)(s Zc)}$

२०. लम्बाइ l भएको घनको आयतन कति होला ?

- a. $6l^2$ b. l^3 c. $4l^2$ d. $l|b$

२१. $(x+2)(x-3)$ को सही विस्तार कुन हो ?

- a. x^2+6x+5 b. x^2-6x+5 c. x^2+5x+6 d. x^2-5x+6

२२. $32^2 \div 28^2$ को मान कति हुन्छ ?

- a. 220 b. 240 c. 260 d. 280

२३. एउटा आयतको क्षेत्रफल $(12^2 \Gamma 9x)$ वर्ग एकाइ र यसको एउटा भुजा घन भए अर्को भुजाको लम्बाई कति होला?

- a. $(3x+4)$ b. $(4x+3)$ c. $(4x^2+3)$ d. $(3x^2+4x)$

२४. $4t^2 - 1/9$ को खण्डीकरण कुन हो ?

- a. $(2t+ 1/3)(2t -1/3)$ b. $(2t + 1/3)(2t 1/3)$

c. $(2t \Gamma 1/3)^2$

d. $(2t Z1/3)^2$

२५. यदि एउटा वर्गाकार खेतको लम्बाइ $(a+b)m$ छ भने यसको क्षेत्रफल कति होला ?

A. $a^2 \Gamma 2ab \Gamma b^2$ b. $a Z 2ab \Gamma b^2$ c. $a^2 Z 2ab Z b^2$ d. $a^2 \Gamma 2ab Z b^2$

२६. समानान्तर रेखालाई छेदकले काट्दा निम्नमध्ये कुन ठीक छैन ?

a. संगत कोणहरू बराबर हुन्छन् b. क्रमागत भित्री कोणहरू बराबर हुन्छन् ।

c. क्रमागत भित्री कोणको योग 180^0 हुन्छ । d. एकान्तर कोणहरू बराबर हुन्छन् ।

२७. तल दिइएका त्रिभुजका विशेषतामध्ये कुन ठिक छैन ?

a. त्रिभुजका भित्री कोणहरूको जोड दुई समकोण हुन्छ ।

b. समद्विबाहु त्रिभुजका सबै कोणहरू बराबर हुन्छन् ।

c. समबाहु त्रिभुजका सबै कोणहरू बराबर हुन्छन् ।

d. त्रिभुजका कुनै दुई भुजाहरूको योगफल तेस्रो भुजा भन्दा कम हुन्छ ।

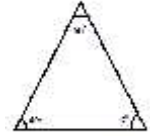
२८. दिएको चित्रमा, x को मान कति हुन्छ ?

A. 40^0

b. 60^0

c. 80^0

d. 100^0



२९. निम्न मध्ये कुन अनुरूप त्रिभुज हो ?

a. क्षेत्रफल बराबर भएका

b. संगत भुजाहरू बराबर भएका

c. संगत कोणहरू बराबर भएका

d. माथिका सबै

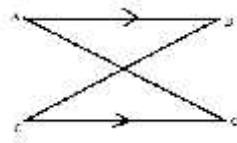
३०. दिएको चित्रमा कुन तथ्यवाट त्रिभुजहरू ऋनुरूप हुन्छन् ?

a. स.क.भु.

b. भु.भु. भु.

c. को.को.को.

d. को.भु.को.



Classroom Observation Form

Name of the teacher:

Qualification:

Name of the School:

Teaching Experience:

Class: Subject:

Lesson:

Date:

Time:

	Statements	Yes	No	Remarks
1	Teacher Preparation			
	a) The teacher has Instructional plan			
	b) Teacher consults other references book			
	c) Arranged class properly			
2.	Initiation of the lesson			
	a. He announces the objectives of the day's lesson			
	b. Revision of previous lesson			
	c. The start of the lesson is interesting			
	d. Teacher motivates the class before introducing the new lesson			
3	a. Subject is relevant to the curriculum and textbook			
	b. The teacher has command over the subject matter			
	c. He organizes the lesson in sequential form			
	d. The coverage of the subject matter is satisfactory			
	e. The presentation is psychological			
	f. Illustrations are appropriate			
4	Use of teaching Materials			
	a. Uses appropriate teaching materials			
	b. He uses ready-made teaching materials			
	c. He uses locally prepared teaching materials			
	d. Size and clarity of teaching materials are Proper			

	e. Continuity in using materials			
5.	Student's Activities			
	a. They listen attentively			
	b. They ask questions relatively			
	c. They participate in discussion			
	d. Teacher provides specific help to weak students.			
	e. Teacher gives equal chance to learn every students			
	f. Teacher encourages the students to express their views in the classroom			
6.	Use of teaching methods			
	a. Teacher applies different teaching methods			
	b. Apply teacher-center methods			
	c. Apply student-center methods			
	d. Methods are appropriate for the subject matter			
	e. Good in using presentation of methods			
7	Evaluation			
	a. The lesson is evaluated			
	b. Teacher gives assignment regularly			
	c. He gives appropriate assignment			
	d. Question should be asked only at the end of a lesson			
	e. It is not necessary to check the homework and class work regularly			
	f. He gives feedback continuously			
	g. He summarizes the lesson			

Appendix- C
Item Analysis Chart

Q.No	U _R	L _R	U _R +L _R =R	P-value	D-Value	Decision
1	7	4	11	68.75%	0.38	A
2	8	7	15	93.75%	0.13	R
3	8	3	11	68.75%	0.63	A
4	6	1	7	43.75%	0.63	A
5	4	1	5	31.25%	0.38	A
6	7	4	11	68.75%	0.38	A
7	8	8	16	100%	0	R
8	7	2	9	56.25%	0.63	A
9	7	3	10	62.5%	0.5	A
10	7	4	11	68.75%	0.38	A
11	8	3	11	68.75%	0.63	A
12	6	3	9	56.25%	0.38	A
13	8	7	15	93.75%	0.13	R
14	8	3	11	68.75%	0.63	A
15	7	4	11	68.75%	0.38	A
16	6	1	7	43.75%	0.63	A
17	7	4	11	67.75%	0.38	A
18	8	3	11	38.75%	0.63	A
19	8	8	16	100%	0	R
20	7	2	9	56.25%	0.63	A
21	5	1	6	37.5%	0.5	A
22	7	7	14	87.5%	0.25	R
23	8	3	11	68.75%	0.63	A
24	6	3	9	56.25%	0.38	A
25	7	3	10	62.5%	0.5	A
26	5	2	7	43.75%	0.38	A
27	0	2	2	12.5%	0.25	R
28	7	4	11	68.75%	0.38	A

29	8	7	15	93.75%	0.13	R
30	7	3	10	62.5%	0.5	A
31	5	2	7	43.75%	0.38	A
32	8	3	11	68.75%	0.63	A
33	7	2	9	56.26%	0.63	A
34	8	7	15	93.75%	0.13	R
35	6	1	7	43.75%	0.63	A
36	8	3	11	68.75%	0.63	A
37	8	8	16	100%	0	R
38	7	2	9	56.25%	0.63	A
39	7	4	11	68.75%	0.38	A
40	8	6	14	87.5%	0.25	R

Analysis of Item Difficulty Level and Discriminating Index

a) Difficult Level (P-value)

It is the percentage of students able to pass item. It takes the values ranging from 0 to 100. The 'P' value of each item was calculated by the formula.

$$\frac{U_R \Gamma L_R}{U_N \Gamma L_N} | 100\%$$

Where,

P = Item difficulty level

U_R = Number of upper 27% students who answered correctly

L_R = Number of lower 27% students who answered correctly

U_N = Total number of upper 27% students

L_N = Total number of lower 27% students

The analysis of item difficulty level is as follows;

Criteria	Item evaluating	No. of items	Remarks
Above 70%	Easy	9	Need improvement
70%-30%	Good	30	
Below 30%	Difficult	1	Need improvement or reject

b) Discriminating Index (D-value)

Discriminating Index is a number which differentiates the strong and poor students. It takes the value ranging from -1 to +1. The 'D' value of each item was calculated by the formula.

$$D = \frac{U_R - U_N}{U_N} \times \frac{ZL_R - \Gamma L_N}{2}$$

Where,

D, is discriminating index and U_R , L_R , U_N and L_N denote as stated above on 'P' value.

The analysis of item discriminating index is as follows;

Criteria	Item evaluating	No. of items	Remarks
0.40 and Above	Very good	18	Accepted
0.30-0.39	Good	12	Accepted
0.20-0.29	Marginal	2	Revision
Below	Poor	8	Need improvement or reject

On the basis of 'P' value and 'D' value obtained on the item analysis, ten items were rejected.

Appendix – D
Reliability Assessment Table

S.N.	Odd (X)	Even (Y)	$X=(X-\bar{x})$	x^2	$Y=(Y-\bar{Y})$	Y^2	XY
1	22	17	10.07	101.4049	5.67	32.1489	57.0969
2	18	20	6.07	36.8449	8.67	75.1689	52.6269
3	17	20	5.07	25.7049	8.67	75.1689	43.9569
4	16	19	4.07	16.5649	7.67	58.8289	31.2169
5	19	15	7.07	49.9849	3.67	13.4689	25.9469
6	15	18	3.07	9.4249	6.67	44.4889	20.4769
7	18	12	6.07	36.8449	0.67	0.4489	4.0669
8	14	15	2.07	4.2849	3.67	13.4689	7.5969
9	20	17	8.07	65.1249	5.67	32.1489	45.7569
10	13	13	1.07	1.1449	1.67	2.7889	1.7869
11	13	12	1.07	1.1449	0.67	0.4489	0.7169
12	14	10	2.07	4.2849	-1.33	1.7689	-2.7531
13	12	12	0.07	0.0049	0.67	0.4489	0.0469
14	13	11	1.07	1.1449	-0.33	0.1089	-0.3531
15	13	10	1.07	1.1449	-1.33	1.7689	-.4231
16	11	12	-0.93	0.8649	0.67	0.4489	-0.6231
17	12	10	0.07	0.0049	-1.33	1.7689	-0.0931
18	11	11	-0.93	0.8649	-0.33	0.1089	0.3069
19	10	10	-1.93	3.7249	-1.33	1.7689	2.5669
20	9	11	-2.93	8.5849	-0.33	0.1089	0.9669
21	9	10	-2.93	8.5849	-1.33	1.7689	3.8969
22	8	10	-3.93	15.449	-1.33	1.7689	5.2269
23	9	8	-2.93	8.5849	-3.33	11.0889	9.7569
24	8	7	-3.93	15.449	-4.33	18.7489	17.0169
25	7	7	-4.93	24.3049	-4.33	18.7489	21.3469
26	7	6	-4.93	24.3049	-5.33	28.4089	26.2769
27	6	6	-5.93	35.1649	-5.33	28.4089	31.6069
28	5	5	-6.93	48.0249	-6.33	40.0689	43.8669

29	5	4	-6.93	48.0249	-7.33	53.7289	50.7969
30	4	2	-7.93	62.8849	-9.33	87.0489	73.9869

$$\text{Correlation coefficient } (r_{xy}) = \frac{xy}{\sqrt{x^2 \cdot y^2}} = 0.88$$

$$\text{Total Reliability coefficient } R = \frac{2r}{1 \Gamma r_{xy}} = 0.93$$

APPENDIX-E

The raw scores obtained by 400 students (with teacher education background)

1. Ramapur Higher Secondary School
28,26,20,18,12,12,11,10,9,8,28,25,23,22,17,16,14,9,26,25
23,11,10,11,19,8,8,10,12,22,20,18,9,10,14,11,16,22,12,11
2. Shree Janakalyan Ma. Vi.
18,12,12,11,10,9,17,28,25,23,22,8,16,14,9,26,25,28,20,26
11,10,11,19,8,10,12,22,20,18,9,10,10,11,16,8,22,12,11,23
3. Pashupati Higher secondary School
18,12,12,11,10,9,17,28,25,23,22,8,16,14,9,26,25,28,20,26
8,10,12,22,20,18,9,10,10,11,16,8,22,12,11,23,18,12,12,11
4. Shree Paschim Parroha Ma. Vi.
11,10,11,19,8,10,12,22,20,18,11,10,11,19,8,10,12,22,20,8
8,10,12,22,20,18,9,10,10,11,16,8,22,12,11,23,18,12,12,11
5. Shree Kalika Ma. Vi.
12,12,11,10,9,8,28,25,23,22,17,16,14,9,26,25,23,8, 17,12
23,11,10,11,19,8,8,10,12,22,20,18,9,10,14,11,16,22,12,11
6. Shree Ujarshing Ma. Vi.
19,8,28,25,23,22,17,16,14,9,26,25,11,16,15,8,19,24,28,18
25,11,10,11,19,8,8,10,12,21,20,18,9,10,14,11,16,23,12,12
7. Kirti Higher Secondary School
25,26,20,18,12,13,11,10,9,8,28,25,23,22,17,16,14,9,26,25
23,11,10,11,19,8,8,10,12,28,20,18,9,10,12,11,16,22,12,18
8. Sharada Ma. Vi.
26,20,18,12,28,12,11,10,9,8,28,25,23,22,17,16,14,9,26,25
23,11,10,11,19,8,18,10,12,22,20,18,9,10,8,11,16,22,12,11
9. Nabaratna Higher Secondary School
24,12,11,10,9,8,28,25,23,22,17,16,14,9,26,25,23,8, 17,12
23,11,10,11,19,8,8,10,12,22,20,18,9,10,14,11,16,22,12,21
10. Saraswoti Higher Secondary School
28,26,20,18,12,12,11,10,9,8,28,25,23,22,17,16,14,9,26,25
23,11,10,11,19,8,8,10,12,22,20,18,9,10,14,11,16,22,12,11

The raw scores obtained by 400 students (without teacher education background)

11. Janachetana Ma. Vi .

24,21,14,9,8,5,7,6,13,12,11,10,10,13,13,5,6,8,14,7,9
13,11,11,9,8,19,18,17,15,9,10,7,14,26,24,20,17,15,6

12. Shree Sinamaina Higher Secondary School

20,21,10,9,8,5,7,6,13,12,13,10,11,13,10,5,6,9,14,7,9
13,11,12,9,8,19,18,17,15,9,10,7,14,26,24,24,17,16,7

13. Shree Rastriya Ma. Vi.

22,21,10,9,8,5,7,6,13,12,14,10,12,11,10,5,6,9,14,7,10
12,12,12,9,8,19,18,18,15,9,10,7,14,26,24,24,17,16,8

14. Shree Janata Ma. Vi

18, 8, 10, 5, 8, 12, 7, 6, 15,12, 10, 16,12,11,10,5,6,9,14,7, 9
12, 10,12,9, 22,19, 8 ,18, 13,9, 14,7,14,26,24,24,17, 10, 21

15. Butwal Ma. Vi

22, 15, 24,9, 12,5, 17 ,6, 18 ,12,14,10,12,11, 8,5,6, 7,14, 9
8,10, 12,12,9,8,19,18, 21, 10,9,10,7,14,26, 13,24, 7,16, 10

16. Naya Gau Higher Secondary School .

24, 6,14,9, 7 ,5,7,6,13,12, 13 ,10, 18,13,13, 6 , 5,8,14, 14
11, 9,11,11,9,8,19, 10,17,15,9,10,7, 8,26,24,20,17,15, 21

17. Santi Higher Secondary School.

7,21, 13 ,9,8, 19,7,6,13, 15,13,10,11,13, 9,5,6,9,14,7, 10
10,11,12,9,8, 5,18,17, 12,9,10,7,14,26,24,24,17,16, 20

18. Shideshori Higher Secondary School.

8,12,15,11,16,15,20,8,13,12,18,25,5,7,11,13,19,22, 10, 7,
12,9,16,8,25,18, 10,7,9,13,18, 12, 13 ,10, 18,13,13, 6 , 5,8

19. Shree Krishna Higher Secondary School.

6,8,11,19,25,10,13,26,18,7,8,25,10,13,6,9,16,17,5,26,
23,10,9,15,14,7,6,19,21, 12,9,8,19,18,18,15,9,10,6,9

20. Pushaputi Ma. Vi

5,21,10,9, 15, 22,7,6, 10 ,12,14,10,12,11,10,5,6,9,14,7
13, 12,12,12,9,8,19,18,18, 8,9,10,7,14,26,24,24,17,16,8

Appendix – F

Students Formula used in Data Collection and Analysis Procedure

S.N.	Subject	Nation	Formula
1	Mean	(\bar{x})	$\frac{x}{N}$
2	Variance	(S^2)	$\frac{(X Z \bar{x})^2}{N}$
3	Standard Deviation	(\dagger)	$\sqrt{\frac{(X Z \bar{X})^2}{N}}$
4	Difficulty level of item	$(p\%)$	$\frac{U_R \Gamma L_R}{U_N \Gamma L_N} 100\%$ <p>Where,</p> <p>U_R = Number of upper 27% students who answered correctly.</p> <p>L_R = Number of lower 27% students who answered correctly.</p> <p>U_N = Total number of upper 27% students.</p> <p>L_N = Total number of lower 27% students.</p>
5	Discrimination index Of item	(D)	$\frac{U_R Z L_R}{U_N \Gamma L_N}$ <p style="text-align: center;">2</p> <p>Where,</p> <p>U_R = Number of upper 27% students who answered correctly.</p> <p>L_R = Number of lower 27% students who answered correctly.</p> <p>U_N = Total number of upper 27% students.</p> <p>L_N = Total number of lower 27% students.</p>
6	Spearman Brown spilt half reliability of the test	(r_{tt})	$\frac{2r_{xy}}{1 \Gamma r_{xy}}$
7	t-statistics	(t)	

		$\frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\left(\frac{1}{n_1} + \frac{1}{n_2}\right) \frac{(n_1-1)S_1^2 + (n_2-1)S_2^2}{n_1+n_2-2}}}$ <p>Where,</p> <p>\bar{X}_1 and \bar{X}_2 are mean score of experimental and control group respectively.</p> <p>S_1^2 and S_2^2 are variance of experimental and control group respectively.</p> <p>N_1 and n_2 are number of students lies on experimental and control group.</p>
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