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# HOW TEACHERS AFFECT ACHIEVEMENT OF STUDENTS –A SURVEY?

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## Abstract

*In the present investigation an attempt has been made to reveal the contribution of teacher variables in the attainment of concepts in trigonometry among students. The sample of study consisted of 500 students (250 boys and 250 girls) of tenth class drawn from government and private schools of Amritsar district. The results of the study revealed that both qualification of teacher and commitment of teacher were positively related to student outcomes in trigonometry. Multivariate regression analysis was used to study the contribution of variables of teaching learning environment as related to the teacher in the prediction of criterion variable.*

## INTRODUCTION

Mathematics is the language of the 21st century. Thinking, reading, writing, picturing and talking about mathematics are basic skills that help us understand and explain our world. The study of mathematics can satisfy a wide range of interests and abilities. It develops the imagination. It trains in clear and logical thought. It is a challenge, with varieties of difficult ideas and unsolved problems, because it deals with the questions arising from complicated structures. Yet it also has a continuing drive to simplification, to finding the right concepts and methods to make difficult things easy, to explaining why a situation must be as it is. In so doing, it develops a range of language and insights, which may then be applied to make a crucial contribution to our understanding and appreciation of the world, and our ability to find and make our way in it. The technological development is highly rooted in the study of mathematics. Courant and Robbins opine that mathematics as an expression of human mind reflects the active will, the contemplative reason, and the desire for aesthetic perfection. Its basic elements are logic and intuition, analysis and construction, generality and individuality. Kerlinger (1985) describes mathematics as a language of science. Aminu (1990) argued that mathematics is not only the language of sciences but essential nutrient for thought, logical reasoning and progress.

There are various branches of mathematics like arithmetic, algebra, statistics, geometry, trigonometry etc. Conceptual understanding of trigonometry, an important branch of mathematical studies which is introduced in ninth class in our country is the gateway to advanced mathematics and science in higher education. Individuals differ from one another in their ability to understand complex ideas, to adapt effectively to the environment, to learn from experience, to engage in various forms of reasoning, to overcome obstacles by taking thought. Although these individual differences can be substantial they are never entirely consistent and variables related to teacher like qualification of teacher, experience of teacher, teacher attitude, student's perception of teaching process, kind of evaluation process i.e. format of question paper, duration and frequency of conducting examination, planning process i.e. traditions, rules, regulation and policies of school and school disciplines, principal-student relationship, Teacher-teacher relationship, Principal-teacher relationship, Student-student relationship, a wealth of interaction

that occurs among students, teachers & peers, where learning takes place play a major role in affecting the performance of the child.

**OBJECTIVE OF THE STUDY**

(i) To study and compare attainment of concepts in trigonometry with respect to teacher variables viz. Qualification of teacher and Commitment of teacher.

(ii) To study relationship between these variables and shows the contribution of these variables to the prediction of criterion variable.

**HYPOTHESES**

(i) Children taught by Post graduate B.Ed. teachers perform significantly better in the attainment of concepts in trigonometry from children taught by graduate B.Ed. teachers.

(ii) Attainment of concepts in trigonometry is independent of level of commitment of teacher.

(iii) Qualification of teacher shares a significant correlation with achievement scores on TCT and in multivariate regression analysis it will emerge as a significant predictor of criterion variable.

(vii) There exists no significant relationship between commitment of teacher and achievement scores on TCT and in multivariate regression analysis this variable will not contribute significantly to criterion variable.

**METHOD**

**Sample**

The sample consisted of 500 students (including boys and girls) of tenth class selected from the different schools of Amritsar district, out of which 250 were boys (125 government and 125 private) and 250 were girls (125 government and 125 private). The sample was collected by using stratified random sampling technique.

**Tools**

In the present study Trigonometric Concept Test constructed and standardized by the investigator and Teacher Role Commitment Scale (Rathod and Varma , 2003) has been used.

**Statistical Technique**

In order to study the attainment of concept in trigonometry by the pupils in relation to qualification of teacher, qualification was varied in two ways, i.e. graduate or post graduate. The information regarding qualification of teacher teaching trigonometry to students of tenth class

was sought from the information schedule given on the title page of the consumable booklet of Teacher Role Commitment Scale and t-test was employed to study difference in attainment of concepts in trigonometry between children taught by graduate and post graduate teachers.

Commitment of Teacher was varied in three ways as being most committed, committed and least committed. The scores of all the 20 teachers involved in the present study on Teacher Role Commitment Scale were obtained and then mean and standard deviation for the scores were worked out. The teachers who scored above M+ S.D. were identified as most committed and those who scored below M- S.D. were identified as least committed. The teachers with scores lying between M+ S.D. and M- S.D. were identified as committed. Analysis of variance was employed to study differences in attainment of concepts in trigonometry in relation to commitment of teacher.

Correlation tells that as and when one variable changes, in which direction and up to what extent, it is followed by a change in the other variable. It can be represented quantitatively by coefficient of correlation and is used to make predictions. The correlation coefficient in the present study was used to determine the relationship between pupil achievement on TCT and multivariate regression analysis was used to study the contribution of these variables in the prediction of criterion variable.

**Hypothesis I: Children taught by Post graduate B.Ed. teachers perform significantly better in the attainment of concepts in trigonometry from children taught by graduate B.Ed. teachers.**

This hypothesis deals with the comparison of scores obtained by students of $10^{th}$ class in Trigonometric Concept Test with respect to qualification of teacher. The objective was to find whether students who are taught trigonometry by Post graduate, B.Ed. teachers and those who are taught by graduate, B.Ed. teachers differ in their attainment of trigonometric concepts or not. The results are presented in Table I.

**TABLE I: Comparison between children taught by Graduate, B.Ed. teachers and Post Graduate, B.Ed. teachers on scores of Trigonometric Concept Test**

| Qualification of Teacher | N | Mean | S.D. | t-ratio | |
|---|---|---|---|---|---|
| **Graduate, B.Ed** | 169 | 20.60 | 7.99 | 3.864 | Significant at .01 level |
| **Post Graduate,** | 331 | 23.56 | 8.14 | | |

| B.Ed. |
|---|

**Discussion based on Table I**

While looking at the Table I, it is clear that mean scores of students who were taught by Post graduate, B.Ed. teachers is higher i.e. 23.56 than those who were taught by graduate, B.Ed. teachers i.e. 20.60. The t-ratio was found to be significant at .01 level, thus, indicating that our hypothesis that Children taught by Post graduate B.Ed. teachers perform significantly better in the attainment of concepts in trigonometry from children taught by graduate B.Ed. teachers was accepted.

It is well known fact that teachers are critical influences on student learning and a highly qualified teacher having mastery over his/her subject matter is the most important element in lifting student achievement and thus accounts for lion's share of variance in student test scores. The result obtained in the present study has further verified this fact. The research studies by Koppich (2004), Berry et al. (2004), Lasley et al. (2006), Richardson (2008), Sprague (2008), Finkbonner (2009) and Akinsolu (2010) also support the present result, who found a significant relationship between teacher qualification and student achievement.

**Hypothesis II: Attainment of concepts in trigonometry is independent of level of commitment of teacher**

Commitment of teacher was studied at three levels namely least committed, committed and most committed. Mean score of students on TCT corresponding to different levels of commitment of teachers are 22.3590, 21.9428 and 24.1600 respectively. The interaction of commitment of teacher and attainment of concepts in trigonometry has been studied by applying ANOVA and results are presented vide Table II.

**TABLE II : Results of ANOVA applied to study the interaction of commitment of teacher and attainment of concepts in trigonometry**

| Source of variance | Sum of squares | df | Mean square | F | Level of Significance |
|---|---|---|---|---|---|
| **Between groups** | 436.302 | 2 | 218.151 | 3.266 | Significant at .05 level |
| **Within groups** | 33194.776 | 497 | 66.790 | | |
| **Total** | 33631.078 | 499 | | | |

**Discussion based on Table II**

A look at the above table II shows that magnitude of calculated F-value is 3.266 while the table value at .05 level of significance for degree of freedom (2, 497) is 3.01. The calculated value is more than table value, which indicates that magnitude of F-value is significant at .05 level of significance. This clearly indicates that commitment of teacher exerts a significant impact on attainment of concepts in trigonometry by pupils which is also evident from mean scores of students on TCT. The mean score of $C_3$ i.e. group taught by most committed teachers is maximum i.e. 24.1600 which is followed by the other two groups $C_1$ and $C_2$ whose mean is 22.3590 and 21.9428 respectively.

Studies by Washburn (2004), Lusco (2005), Honeycutt (2008), Cabalero (2011) and Bankole (2011) also revealed that teacher is a prime determinant of student achievement.

It is a matter of common observation that teachers who are hard working, dedicated and committed towards their jobs are likely to induce in students positive attitude towards school and school work and hence enhance their achievement. Teacher's professional and communication skills, compassion and commitment to his students converts them into wisdom seeker and hence makes them a useful member of society. Moreover, mathematics related experiences of a child are definitely influenced by the teacher since it is only in the hands of good skillful teacher to make mathematics which is considered as a mundane and unimaginative subject more interesting for students by adopting innovative teaching and learning methods which support student involvement.

Therefore, the hypothesis that attainment of concepts in trigonometry is independent of level of commitment of teacher was rejected.

**Hypothesis III: Qualification of teacher shares a significant correlation with achievement scores on TCT and in multivariate regression analysis it will emerge as a significant predictor of criterion variable.**

**Hypothesis IV: There exists no significant relationship between commitment of teacher and achievement scores on TCT and in multivariate regression analysis this variable will not contribute significantly to criterion variable.**

**TABLE III**

| Variable | Regression weight | Correlation with the | Multiple R | Beta | $R^2$ | % age criterion |
|---|---|---|---|---|---|---|

| | $b_{ik}$ | criterion $r_{ik}$ | | | | variance |
|---|---|---|---|---|---|---|
| $X_1$(Qualification of Teacher) | 2.811 | .171 | | .162 | | 2.77 |
| $X_2$(Commitment of Teacher) | .294 | .083 | .172 | .023 | .030 | 0.19 |

Total Variance=3%

$b_0$= 17.273, N= 500

Regression Equation is

$Y = 17.273 + 2.811\ X_{11} + .294\ X_{12}$

**Discussion based on Table III:**

In Table III, two variables of teachers namely $X_1$ (Qualification of Teacher) and $X_2$ (Commitment of Teacher) were entered as independent predictor. Variable $X_1$ share 'r' of the order .171 which is significant at .01 level with the criterion variable. $X_2$ shares an insignificant 'r' of the order of .083 with the criterion and consequently unable to predict any significant criterion variance. The maximum variance predicted by this model is 3%. $X_1$ predicts 2.77 percent of criterion variance which is 92.33 percent of total variance predicted by this model. Among the two teacher variables $X_1$ is significantly correlated with achievement scores on TCT. This leads to the acceptance of hypothesis III i.e. Qualification of Teacher both academic and professional and attainment of concepts in trigonometry are significantly related with each other. This findings is also supported by research studies conducted by Ubokudom (1995), Kellman (1996), Kalyani and Krishna (2002), Richardson (2008) and Sprague (2008). All of them have found that teacher qualification was positively related to student outcome.

**CONCLUSIONS**

On the basis of above findings it can be concluded that in the present sample achievement in trigonometry is dependent on both qualification as well as commitment of teacher.

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